

Business process improvement for internal quality assurance using information systems: A case study of a vocational higher education institution

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ABSTRACT

Digital transformation in higher education institutions (HEIs) requires not only the adoption of technology but also a clear roadmap for successful implementation and effective change management. As independently funded institutions, private HEIs must also consider their strategic and operational business needs. This study aims to identify and analyze business process improvements in the governance of the Internal Quality Assurance System (Sistem Penjaminan Mutu Internal/SPMI) through a single case study of a private vocational HEI in Indonesia. The research consisted of a literature review, identification of primary and supporting business processes, focus group discussions (FGDs), and value chain analysis. Business process improvement was conducted through five stages: organizing for improvement, understanding the process, streamlining, measuring and controlling, and continuous improvement. Business Process Model and Notation (BPMN) was used to model and visualize the redesigned business processes. The findings produced a comprehensive blueprint of the internal quality assurance process and the SPMI business process cycle for vocational HEIs. The redesigned process addresses a critical gap in the previous system by strengthening the linkage between evaluation and control outcomes and institutional policy formulation. The improved SPMI cycle is more structured and efficient through refinements to the audit process, the application of Eisenhower Matrix analysis, and the management of indicator duplication. In addition, the study developed a real-time e-SPMI dashboard and a base-indicator detection feature to minimize indicator duplication. This study contributes theoretically by integrating the SPMI literature with a business process improvement perspective and extending value chain analysis within internal quality assurance. Practically, it provides a BPMN-based process model and value chain framework that can be directly implemented at Politeknik Caltex Riau (PCR) and adapted by other private vocational HEIs with similar organizational contexts.

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INTRODUCTION

Quality assurance is a continuous process through which higher education institutions (HEIs) identify areas for improvement and maintain the quality of their educational provision (Arifudin, 2019). In Indonesia, these efforts are institutionalized through the Internal Quality Assurance System (Sistem Penjaminan Mutu Internal, SPMI), which provides a systematic framework for making quality improvement more targeted, measurable, and sustainable (Rizal et al., 2020). Effective implementation of SPMI also requires institutions to manage organizational knowledge throughout the quality assurance cycle, which comprises determination, implementation, evaluation, control, and improvement (Penetapan, Pelaksanaan, Evaluasi, Pengendalian, dan Peningkatan, PPEPP) (Sipahelut & Ubjaan, 2023). Rather than functioning solely as an

administrative mechanism for demonstrating compliance, SPMI is therefore expected to support continuous institutional learning and improvement.

The changing regulatory environment has further strengthened the need for HEIs to review how these quality assurance processes are organized. Ministerial Regulation Number 39 of 2025 provides the current regulatory framework for systemic, sustainable, and integrated quality assurance in Indonesian higher education. The regulation is intended to transform the National Higher Education Standards and accreditation system, encourage institutional quality improvement, and harmonize quality assurance arrangements. The revised standards provide a more flexible and streamlined framework for higher education provision, creating a need for institutions to reassess existing SPMI processes and ensure that they remain aligned with the new regulatory environment. This is particularly important because effective and efficient business processes can substantially influence institutional operations and quality management (Ramadhana & Chandra, 2019).

This challenge is especially relevant for private HEIs, which must maintain educational quality while operating with relatively independent financing and responding to changing institutional and stakeholder needs. Private HEIs therefore need to identify the activities and institutional values that contribute most directly to their competitive advantage (Dorri et al., 2012). In Indonesia, SPMI implementation continues to face challenges related to limited resources, insufficient commitment to quality, and inadequate technological support (Ramadhan et al., 2025). Addressing these challenges requires more than compliance with quality standards; institutions also need to understand how their quality-related activities create value and how these activities can be organized more efficiently. Value chain analysis offers one way of identifying these activities by relating institutional processes to an HEI's vision, mission, goals, and strategic targets (Syidada & Wahyuningtyas, 2019). Although originally developed for business organizations, Porter's value chain can be reconfigured to reflect the characteristics and value-creation processes of higher education institutions (Dorri et al., 2012).

The value created through quality assurance is also shaped by institutional context. For example, Safitri (2025) showed how spiritual values can be incorporated into SPMI implementation within Islamic HEIs, illustrating that quality management practices need to reflect the characteristics and culture of the institution in which they operate. More broadly, effective quality management requires alignment among institutional objectives, strategic targets, stakeholder participation, implementation timelines, and evaluation mechanisms. Integrating these elements within SPMI can support a total quality management orientation centered on stakeholder satisfaction and sustainable institutional development (Yusvan et al., 2025). For private vocational HEIs in particular, such alignment is important because quality assurance must respond not only to regulatory requirements but also to the practical and professional orientation of vocational education.

Digital information systems provide another important layer in this process. The implementation of Information Systems (IS) for quality assurance needs to remain aligned with institutional goals and strategies rather than simply digitizing existing administrative procedures. Business process management can provide an important link between organizational requirements and Information Technology (IT), allowing institutions to examine how existing processes operate before determining how technology can support their improvement (Azhari et al., 2021). Within this approach, value chain analysis can identify the activities that generate institutional value, while Business Process Model and Notation (BPMN) can represent those activities as explicit and analyzable workflows. BPMN provides graphical elements for representing process flows, relationships, swimlanes, and supporting artifacts, making complex organizational processes easier to examine and redesign (Nanda et al., 2020). In the higher education context, the reconfigured value chain proposed by Pathak and Pathak (2010) provides a useful basis for adapting Porter's framework to the distinctive processes through which HEIs create and deliver value.

Politeknik Caltex Riau (PCR), a private vocational HEI in Indonesia, provides an informative case for examining these issues. PCR holds "Excellent" accreditation and had completed 14 SPMI cycles by 2026, indicating substantial institutional experience with internal quality assurance. The institution also uses an information system, including e-SPMI, to support the management of its quality assurance cycle. Despite this level of maturity, regulatory changes and the continuing digitalization of quality management create a need to reassess whether existing business

processes remain efficient, integrated, and aligned with institutional priorities. PCR therefore provides a relevant setting for examining business process improvement in a relatively mature SPMI environment. As a single case, however, the study is intended to provide context-specific insights that may be relevant to private vocational HEIs with comparable organizational and quality assurance characteristics rather than to represent all Indonesian HEIs.

Existing studies on SPMI in Indonesia have largely focused on implementation strategies, institutional practices, and the extent to which quality standards are fulfilled. Considerably less attention has been given to the underlying business processes through which the SPMI cycle operates, particularly how these processes can be systematically analyzed, redesigned, and supported by information systems. More specifically, limited research has integrated business process improvement, value chain analysis, and BPMN to examine the complete SPMI workflow in a private vocational higher education context. This leaves an important gap between understanding what quality standards institutions need to achieve and understanding how the organizational processes used to achieve, evaluate, control, and continuously improve those standards can be redesigned.

To address this gap, the present study applies the higher education value chain model adapted from Pathak and Pathak (2010) and combines value chain analysis with business process improvement and BPMN to examine the SPMI processes of a private vocational HEI. The study aims to identify the primary and supporting activities involved in quality assurance, diagnose weaknesses in the existing SPMI business processes, and develop an improved, context-specific business process design supported by e-SPMI. The novelty of the study lies in treating SPMI not only as a quality standards framework but also as an interconnected set of organizational processes that can be systematically analyzed and redesigned. Theoretically, the study extends the SPMI literature by integrating quality assurance with business process improvement, BPMN, and value chain analysis. Practically, it produces a BPMN-based SPMI business process model and an improved quality assurance process design that can serve as a governance reference for PCR and potentially inform similar private vocational HEIs seeking to strengthen the efficiency, integration, and continuity of their internal quality assurance systems.

METHOD

This study adopted a single-case study design to examine and improve the business processes underlying the Internal Quality Assurance System at Politeknik Caltex Riau (PCR), a private vocational higher education institution in Indonesia. The research was conducted through three interconnected stages. The first stage involved a literature review to establish the conceptual basis and identify relevant developments in business process management and BPI. The second stage focused on collecting empirical data on the existing SPMI processes through direct observation, interviews, focus group discussions (FGDs), questionnaires, and a review of internal SPMI documents within PCR's Planning, Development, and Quality Assurance Department. The third stage applied the BPI framework through five sequential phases: (1) organizing for improvement, (2) understanding the process, (3) streamlining, (4) measurement and controls, and (5) continued improvement.

The organizing-for-improvement phase defined the scope of the existing SPMI processes and identified the processes requiring improvement. Value chain analysis was used to distinguish primary and supporting activities and to determine which business processes should be examined further. Empirical input at this stage was obtained through FGDs involving personnel responsible for planning, development, and quality assurance, together with institutional leaders, including the director, vice director, and heads of sections or units, departments, and study programs. Participants were purposively selected based on three criteria: holding a management-level position, having more than five years of institutional experience, and having experience using the e-SPMI system. A total of 20 participants met these criteria and participated in the study. The FGDs were guided by semi-structured questions designed to explore primary and supporting business processes, barriers encountered during the SPMI cycle, and opportunities for process improvement. Questionnaires were also administered to obtain complementary descriptive information on existing quality assurance practices.

Ethical considerations were incorporated throughout the data collection process. Participation was voluntary, the purpose and procedures of the study were explained before data collection, and informed consent was obtained from the participants. The confidentiality of participants' identities and responses was also maintained. Data from the FGDs and questionnaires were analyzed descriptively using a qualitative approach. Responses were organized into four problem categories: business processes, information systems, indicators, and human resources. The identified issues were then synthesized using a fishbone diagram as a cause-and-effect analysis technique to trace the root causes of problems within the existing quality assurance processes. These root causes subsequently informed the formulation of process-improvement alternatives during the streamlining phase.

The understanding-the-process phase involved mapping the activities identified through value chain analysis and representing the existing SPMI workflows as as-is business processes. Business Process Model and Notation (BPMN) was used to provide a structured representation of process activities, actors, interactions, and workflow sequences. To strengthen the credibility of the process mapping, source triangulation was conducted by comparing information obtained from the FGDs with internal SPMI documents and direct observations of business process implementation. The preliminary process maps and interpretations were subsequently reconfirmed with FGD participants to ensure that they accurately reflected actual institutional practices before being incorporated into the BPMN models.

The streamlining phase focused on redesigning the identified business processes to improve their efficiency, clarity, and effectiveness. The analysis was guided by Harrington (1991) BPI framework, which proposes 12 streamlining tools: bureaucracy elimination, duplication elimination, value-added assessment, simplification, process cycle-time reduction, error proofing, upgrading, simple language, standardization, supplier partnerships, significant picture improvement, and automation and/or mechanization. These tools were considered in relation to the problems identified through the value chain analysis, FGDs, fishbone analysis, process mapping, and existing e-SPMI practices. The resulting improvements were then incorporated into the proposed to-be processes, allowing the existing workflows to be compared with their redesigned forms.

The measurements-and-controls phase evaluated the proposed improvements by implementing the redesigned processes in a simulated environment using process-modeling tools. The simulation was used to examine whether the proposed workflows could address the problems identified in the as-is processes and support more efficient and integrated quality assurance activities. The results of this assessment informed the continued-improvement phase, in which the proposed processes were reviewed and refined to formulate the final recommendations. The final output of the methodological process was an improved BPMN-based business process design for PCR's internal quality assurance system, including recommendations for strengthening the integration of the redesigned processes with e-SPMI and supporting continuous improvement across the SPMI cycle.

RESULTS AND DISCUSSION

Organizing Improvement

The problem point based on FGD results was in the business process: the transition between working meetings and coordination meetings. There is a tendency to miss links between the resulting evaluation and control results and the decisions made. Apart from that, the quality of the control and improvement process also needs improvement to ensure that each step in quality assurance runs more effectively and is well integrated.

Based on the participants' recommendations, several solutions can be implemented to address problems in PCR's quality assurance processes. First, careful preparation is required, including clear standard operating procedures, meeting minutes outlining the agenda, and a meeting location free from distractions. A team must be formed to identify what indicators need to be checked. Second, coordination between units is essential for following up on evaluation results, with leadership's commitment to implementing agreed-upon follow-up actions. Third, work programs and budget allocations should be aligned with the results of the quality assurance evaluation and the

recommended follow-up actions. In addition, developing a system to track the implementation of control improvements is highly recommended, such as adding a dashboard to the existing SPMI. Finally, the improvement phase must involve discussions between management and quality assurance to map follow-up recommendations into academic and non-academic implementation, strengthening integration between management and the SPMI.

Based on focus group discussions, several strategies can be implemented to improve the quality culture at PCR: first, increase outreach to all groups by installing posters on quality standards in various locations and ensuring consistent implementation without double standards from implementers. Second, socialization needs to be ongoing because building a quality culture cannot be achieved in one or two meetings; rather, it must be part of daily communication, including involving external parties who use PCR facilities. Third, the approach must be carried out in stages, integrating the practices into the system until the desired target is achieved. For example, uploading documents such as semester learning plans and study contracts should be integrated with the SPMI so that it does not become a waste of time and makes data searching easier later. If there are complaints, it is better to look for solutions rather than eliminate existing processes so that a quality culture can continue to be maintained and developed.

A problem analysis was conducted using the fishbone method to identify the root causes of problems in the quality assurance business process at PCR. The analysis identified material issues related to SPMI documents that needed to be updated due to changes in regulations, such as Ministerial Regulation Number 39 of 2025. With this new regulation, further adjustments to the quality culture in HEIs are needed. The next problem is aligning the indicators with the HEI's Key Performance Indicators from its strategic plan. This leads to the use of multiple sources or reference indicators to measure standard achievement, which creates new problems. The large number of indicators causes an educational institution to become less focused on determining the direction of its goals, and increasingly, the required indicators are not achieved.

Based on the fishbone analysis, there are problems in collecting documentary evidence in internal audits. Then, for quantitative indicators, although the indicators are similar, the calculation formulas vary across sources. This makes it difficult for the ad hoc team to determine which references to use, leading to duplicate indicators. According to the root of the technological problem, PCR currently uses an information system to document all SPMI implementation. The main issue with this system is that it has not been integrated with other systems, making it challenging to collect data manually during the internal quality audit process. Even though it has a system, it cannot provide a dashboard that shows data trends and insights from the large amount of data collected.

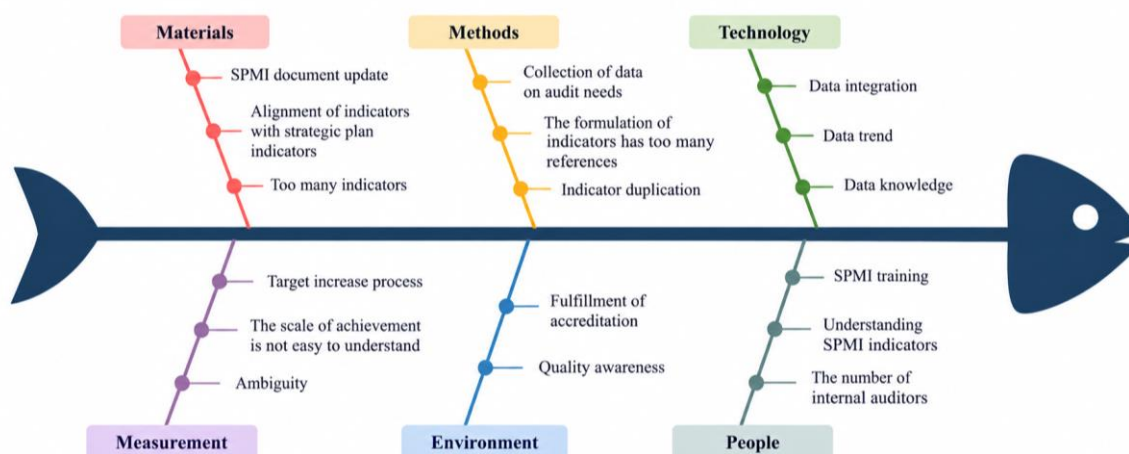


Figure 1. Fishbone Diagram

Another problem faced is that the achievement scale for indicators is difficult to understand and creates ambiguity, especially for qualitative indicators. The results also introduce an element of

subjectivity. The information system still does not provide unique codes for indicators, making it difficult to determine whether each year's targets have been met. From an environmental perspective, another challenge concerns the varying accreditation requirements across study programs and accrediting institutions. From a people perspective, the main issue concerns SPMI training, not only for auditors but also for auditees, who need to understand the SPMI workflow and target indicators. The limited number of internal auditors and the organization's growth need to be reviewed for their effectiveness.

Value Chain Analysis

To achieve its vision, mission, and goals, PCR implements three sub-systems, namely: internal quality assurance system for both academic and non-academic; external quality assurance system or accreditation by the National Accreditation Board for HEIs and Independent Accreditation Institutions; periodic reporting on the fulfillment of national standards. In the organizational structure, the planning, development, and quality assurance department (BP3M) is divided into three main sections: the BPMI, the External Quality Assurance Section (BPME), and the Planning and Development Section (BPP). The director leads the chain of command for each section's duties and functions. In its implementation, PCR quality assurance consistently implements SPMI thoroughly to guarantee PCR quality. Two main and supporting activities can be used to achieve this value. Based on the identification carried out (Figure 2), there are five primary activities in Porter's value chain model: inbound logistics, operations, outbound logistics, marketing & sales, and service (Porter, 1985).



Figure 2. Quality Assurance Value Chain Diagram in Higher Education

The FGD results revealed several key themes related to the implementation of SPMI at PCR, such as the effectiveness of the SPMI cycle, the accessibility of documents and quality support systems, critical points in the SPMI business process, recommendations for process improvement, and strategies for strengthening the quality culture. The majority of respondents assessed the cycle as implemented correctly or very correctly, with quality assurance socialization deemed appropriate and easily understood by almost all respondents. The SPMI system was generally deemed easy to access for the SPMI document. There were differences of opinion regarding the number of quality indicators that needed to be simplified without reducing their coverage.

The most critical theme that emerged was the identification of problem areas in the SPMI business process. There is a missing link between the working and the coordination meeting. These meetings represent the evaluation and control activity for each program or target. The respondents suggested developing clearer SOPs and meeting minutes; strengthening inter-unit coordination with leadership committed to following up on evaluation results; aligning work programs and budgets with quality evaluation results; and developing a dashboard within the SPMI to track control follow-up. Next, strengthening quality culture. The respondents emphasized the importance of extensive, ongoing socialization and the integration of quality practices into the SPMI system. It does not

become an additional administrative burden but rather a part of daily communication and governance within the institution.

Inbound logistics is a collaborative effort among students, lecturers, and educational staff. To monitor quality across all collaborative activities, it is necessary to have a section responsible for SPMI in HEI. The BPMI collaborates with internal auditors to conduct internal quality audits to assess the conformity of standard implementation and make recommendations for improvement.

In operational activities, the entire community undergoes the SPMI process by meeting the targets for the indicators and the set standards. Outbound logistics activities focus on meeting and exceeding accreditation targets. PCR also needs to ensure the satisfaction of alumni, students, staff, and alumni users. In terms of PCR output, the benchmark for quality is the time it takes graduates to get their first job and external recognition of PCR's quality, such as benchmarking and visits to other PCR campuses.

In marketing and sales activities, these are carried out through brand and marketing development, strengthening social media, creating a quality culture mascot, and developing a quality culture slogan. It is important to raise awareness among the entire PCR academic community about the importance of maintaining quality service and SPMI, which is a joint responsibility. In service activities, the BPMI presents awards to personnel/departments that are most active and cooperative in carrying out the SPMI process. The BPMI also serves as an internal quality management clinic for issues related to understanding new indicators and changing targets, including monitoring related to non-compliance with standards. It also serves as a repository for the aspirations of the entire academic community. If the community identifies deviations, they can be channeled through the information system.

There are two parts to service support activities: primary and secondary service support. Adequate technological support is needed, especially for data integration and system updates. Certified auditors must obtain reliable and valid audit results when conducting internal quality audits. A lot of administrative work in quality assurance needs to be completed and documented thoroughly, as well as procurement related to increasing activities. Meanwhile, secondary activities relate to human resources and firm infrastructure to support the SPMI process.

Understanding Process

Determination

According to the current internal quality assurance manual, establishing internal quality standards and indicators is carried out through a systematic, structured business flow. The process begins with the head of BPMI providing a template or format for standards and compiling an initial standard formulation that includes the parties authorized to prepare and determine them. Next, the head of BPMI proposes forming an ad hoc team, which is then officially appointed by the director through a directorial decree to prepare standards for PCR.

The ad hoc team first prepares and reviews relevant references, including laws and regulations, the institution's core values, and PCR's vision, mission, and objectives. After that, the head of BPMI provides socialization and training to the ad hoc team regarding standard formulation techniques, including the use of the ABCD (audience, behavior, competence, degree) formula. The results of the standard formulation are then edited and verified by the head of BPMI to ensure accuracy of wording and substance. The head of the relevant section reviews the standard document and obtains approval from the vice director, in accordance with their authority. The final stage of this process is the ratification and implementation of the internal quality Standards by the director through a director's decree as the basis for official implementation within the institution.

Implementation

The business process for implementing internal quality standards is carried out through coordinated, hierarchical stages involving quality management elements, unit leaders, and implementers at the management level. The process begins with the head of BPMI socializing the standards to the management level and conveying the standard targets for each unit. Next, the head

of Sections continues to socialize the standards with lecturers and staff in the study program and the section, including explaining the targets and strategies for achieving the set standards.

Once the implementation phase is underway, the head of sections periodically monitors progress toward standard targets. It compiles a report on monitoring results as part of internal quality control. The monitoring report then serves as the basis for further evaluation by the vice director, who also conducts regular monitoring to ensure compliance with standards and consistency of the quality assurance system across all units.

Evaluation

The business process of self-evaluation, formation of an internal audit team, and implementation of an internal quality audit is carried out through planned, systematic, and documented stages. During the planning and preparation stage, the BPMI establishes the internal quality audit implementation schedule and assigns auditors through a letter of assignment or director's decree. Next, the chief auditor establishes the auditors' task allocation, ensuring the principles of independence, credibility, and responsibility are met. Auditors also review the indicators and assessment matrix for the audit instruments under their responsibility. To ensure a common understanding of audit implementation, auditors also coordinate to align perceptions before the audit process begins.

During the audit implementation phase, there are two areas of focus: indicators carried over from the previous cycle and indicators from the current cycle. For indicators from the previous cycle, the auditee first completes a report on the implementation of planned corrective actions. The auditor team then verifies evidence of the implementation of these actions, particularly for indicators with an observation or non-conformity status. If previous findings are not followed up on, they are re-recorded as new findings in a more severe category. Auditors also assess the effectiveness of the corrective actions implemented. Meanwhile, for indicators in the current cycle, the auditor team conducts an audit by reviewing the self-evaluation results input by the auditee through the internal quality information system. If clarification or additional evidence is needed, the auditor can discuss or confirm achievements with the auditee until an agreement is reached on the results.

Based on the final results of the indicator achievement, the auditor then compiles a description of the findings. If the indicator is met or exceeded, the auditor documents the findings description as evidence of achievement. In contrast, if the indicator is an observation or non-conformity, the auditor must include a description of the findings, root causes, and impacts, and the auditee must compile a corrective action plan. In addition, the auditor also provides recommendations for improvements through the e-SPMI. The final stage of this process is the preparation of the audit report, in which the head of the study program auditor compiles the report for the audited study program, and the head of the auditor compiles the final internal quality audit report for the current period. It uploads it to the system as official documentation of the implementation of SPMI.

Control

The management review meeting (MRM) for business processes, at the control stage, is implemented through a coordinating mechanism that involves quality assurance elements, unit leaders, and institutional leaders to ensure effective follow-up of audit results. The process begins with the head of BPMI discussing and coordinating the results of the internal quality audit report with the heads of the study program and section. Next, the heads of the study program and section, as the audited parties, study the report in depth and then coordinate further with the vice director in the field to discuss the evaluation results and necessary control measures.

In this stage, the head of BPMI is also involved in the coordination process as a director of quality control implementation. Based on the discussion results, the heads of the study program and section analyze the findings and prepare recommendations for corrective action, which are then reported to the relevant vice director. After the recommendations are approved, the heads of the study program and section coordinate the implementation of standard control measures in their respective units. The final stage of this process involves the vice director, according to the field, who coordinates with the BPMI to monitor the implementation of improvements, ensure that the follow-up of the evaluation results is going according to plan, and support continuous quality improvement.

Improvement

The MRM for the improvement process begins with the head of BPMI monitoring acknowledging various standard improvement efforts carried out by the vice director, together with the heads of the study program and section. Next, the head of BPMI collaborates with the relevant parties to make adjustments or improvements to the standards based on the evaluation results and quality development needs. In the next stage, the vice director studies and analyzes the standard improvement and control form as a basis for decision-making, then discusses the standard improvement plan with the heads of the study program and relevant section.

The results of this discussion serve as the basis for the vice director to make adjustments or improvements to the standards in coordination with the head of BPMI. The entire proposed improvement process is then officially documented by the head of BPMI by recording the standard improvement forms submitted by the heads of the study program and section, ensuring that every change to the standard is recorded, controlled, and traceable as part of a continuous SPMI.

Streamlining

Based on the mapping and development of the SPMI business processes, several changes and improvements have been made across the key stages. To summarize, the process changes are shown in the following Table 1.

Table 1. Streamlining Process Identifications

No.	Process	Before	After	Description
1	Determination	Business process for preparing standards and indicators	- Business process for developing standards and indicators - Business process for formulating policies - Business process for manual procedures - Business process for forms or procedures for documenting activities	Addition of 4 business processes
2	Implementation	Implementation process of the business	- Internal monitoring of business processes - Self-evaluation of business processes	Process replacement into 2 business processes
3	Evaluation	Self-evaluation of business processes, formation of an internal auditor team, and internal quality audit	- Business process for forming an internal audit team - Business process for evaluation in the form of an internal quality audit - Business process for feedback on alumni user satisfaction / graduate user satisfaction - Business process for feedback on academic satisfaction by students - Business process for feedback on services by students, lecturers, and educational staff - Business process for feedback on understanding HEI's vision	- Self-evaluation has been accommodated during the implementation phase. - Internal quality audit has been split into two business processes. - 4 additional business processes have been added.
4	Control	The Management Review Meeting	Eisenhower Matrix Determination Business Process	Expanded into four business processes
5	Improvement	The Management Review Meeting	- Standard/Indicator Duplication and Management Business Process - The Management Review Meeting on Business Process - Performance Reporting Business Process	

The establishment stage, previously limited to developing standards and indicators, has now expanded into four business processes: standard development, quality policy formulation, procedure manual design, and activity documentation. In the implementation stage, the previously general implementation process has been further refined into two main processes: internal monitoring and self-evaluation. This change signifies a refinement of the standard implementation mechanism, ensuring that it is not only executed but also monitored and assessed in a structured manner. Furthermore, the evaluation stage has undergone significant development. Previously, the evaluation

process encompassed only self-evaluation, the formation of an internal audit team, and the internal quality audit; now, it encompasses seven business processes. In addition to the formation of the audit team and the implementation of the internal quality audit, the evaluation was also expanded with various feedback mechanisms, including feedback on alum satisfaction, student academic satisfaction, service feedback from students, lecturers, and educational staff, and feedback on understanding of the vision, mission, and strategies of HEI. This strengthening demonstrates that quality evaluation is no longer solely based on internal audits, but also on stakeholder perceptions.

At the control stage, the process, which previously consisted only of the MRM for control, has now expanded to four business processes, including the application of the Eisenhower Matrix and the management of duplicate standards or indicators. This demonstrates a more strategic, priority-based approach to quality control and more efficient standards management. Finally, at the improvement stage, the process, which previously included only the MRM for improvement, has now expanded to three business processes: the MRM for improvement, internal quality performance reporting, and a structured standards improvement process. This development emphasizes that quality improvement is not merely conceptual but also based on performance data and formal, documented reports.

Determination

The first activity is preparation and determination of standards. This process begins with the head of BPMP providing a standard template as a reference for document development. Next, an initial standard formulation is conducted, detailing the authorized parties involved in the preparation and determination. The head of BPMP proposes forming an ad hoc team, which is then officially appointed by the director through a decree. The ad hoc team is tasked with reviewing various references, including national regulations, the institution's core values, and the organization's strategic document.

The team formulates the standard using the ABCD formula. The team also establishes achievement and risk levels as part of the indicator-based quality evaluation mechanism. The head of BPMP then verifies and edits the draft standard to ensure terminological consistency and wording accuracy. The final standard is entered into the e-SPMP system and subsequently verified by the relevant field manager before being digitally validated. The detailed process can be seen in [Figure 3](#).

The SPMP policy formulation process involves coordination between the head of BPMP and BP3M to review applicable laws and regulations as a normative basis. Based on the results of this review, the policy is formulated and systematically documented. The BPMP Administrator then uploads the policy document to the e-SPMP for approval. The director approves the document through the system, ensuring it has formal legitimacy and is accessible to all institutional staff as a guideline for quality implementation.

The next stage is to create an SOP. This business process focuses on the accessibility of procedure documents. Users can log in to the e-SPMP, select the "assignment" menu, and then access the procedure manual submenu. The system provides a document search feature that lets users quickly find the procedures they need. Additionally, document printing options are available to support offline use or for administrative documentation.

The form management process is designed to help users obtain the documents needed to carry out quality activities. After logging in to the system, users select the "assignment" menu and the "forms" submenu to browse available documents. The system provides a search feature and a download option, allowing the form to be used according to the work unit's operational needs.

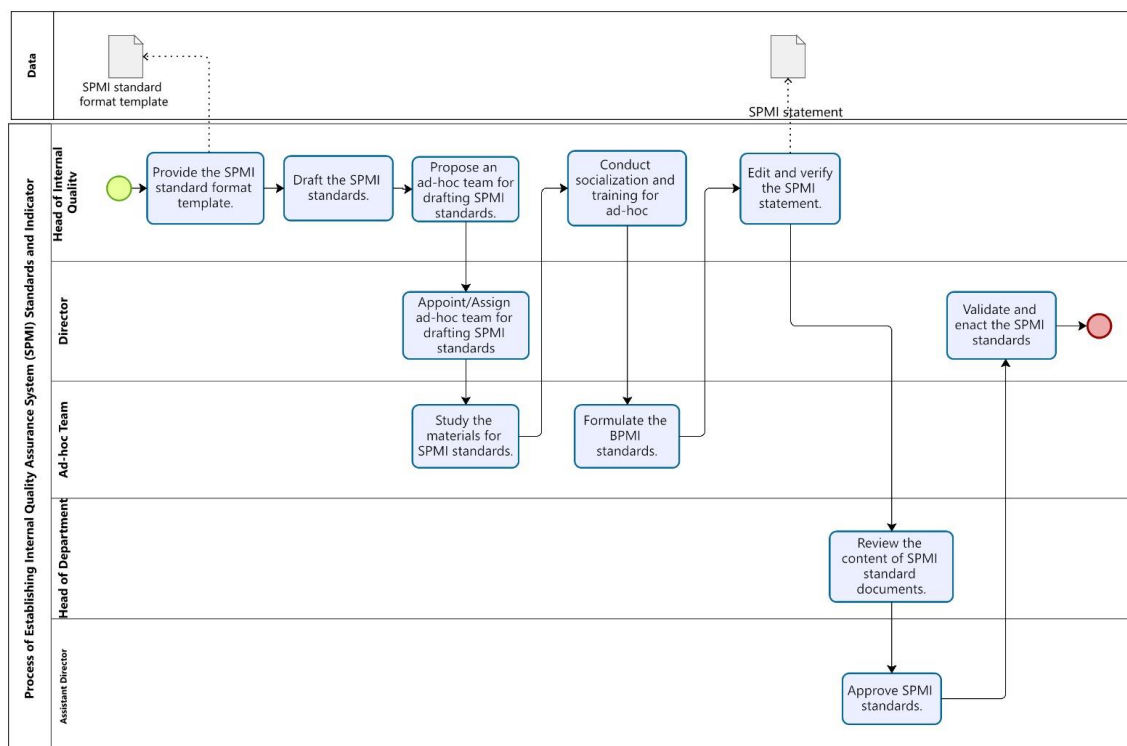


Figure 3. Preparation and Establishment of SPMI Standards and Indicators

Implementation

The implementation phase consists of two main business processes: internal monitoring and self-evaluation. These two processes are designed to ensure the implementation of standards while generating evaluative data that can be used as a basis for quality improvement decisions. The internal monitoring process begins with the implementation of an activity by the person in charge (PIC) and the implementation team. Upon completion of the activity, the PIC must prepare an implementation report and submit it within three days of the activity.

This report then serves as the basis for the ad hoc monitoring and evaluation team to conduct the assessment process. The team conducts monitoring and evaluation by uploading report documents. The evaluation results are compiled and submitted within two days of receiving the report. Based on these results, the PIC implements recommended improvements or takes follow-up actions. The improvement results are then reviewed by the monitoring and evaluation team to ensure compliance with the standards and recommendations. After the verification process is complete, the team leader reports the monitoring and evaluation results to the grants project implementation unit as a form of accountability and documentation of activity performance.

The self-evaluation process is a reflective mechanism that allows work units to assess their performance independently. This process begins with the head of BPMI opening an evaluation period in the e-SPMI system for both academic and non-academic categories. Once the period is active, the auditee can access the evaluation menu and select an available period. Next, the auditee selects a group that aligns with their field or work unit to ensure compliance with the evaluation indicators. The completion process involves determining the scale of achievement for each indicator, followed by an evaluative analysis that explains the level of achievement, the supporting factors, and the challenges encountered. This information is crucial for the quality control process and continuous improvement planning.

Evaluation

The evaluation phase comprises four main business processes: internal quality audit, academic satisfaction feedback, service feedback, and evaluation of understanding of the institution's and study program's vision, mission, objectives, and strategies. Internal quality audits are conducted

through four main stages: planning, implementation, plenary meetings, and report preparation. During the planning phase, the client formally submits an audit request to BPMI, stating the audit objectives, scope, and plan. Based on this request, BPMI develops an audit schedule with the client and assigns auditors through a director's decree. The implementation phase begins with audit preparation, including an auditor meeting to establish a common understanding, reviewing auditee documents in the e-SPMI, and developing a checklist. The auditor then opens the audit and conducts it according to the schedule, using interviews, observations, and document reviews.

The audit process takes up to two days, and all discussion history is documented in the system. Audits are conducted only on indicators completed by the auditee, while incomplete indicators are reported to the client. The auditor also reviews the effectiveness of follow-up actions taken from the previous year's findings before closing the audit by presenting achievements and recommendations for improvement. The audit results are then discussed in a plenary meeting chaired by the chief auditor to agree on the findings and recommendations. The chief auditor then prepares an audit report and submits it to the chief auditor for summary and upload to the e-SPMI. The final report is submitted to the client by the BPMI and the chief auditor and can be used as material for MRMs.

Academic satisfaction feedback is collected each semester through the institution's survey system. The questionnaire is structured around the performance evaluation indicators for lecturers and educational staff. Respondents are then selected to include all students from various classes and study programs within the academic period. The system provides survey-reminder features, including soft and hard notifications that integrate with other systems. After the survey is published, BPMI releases the survey results, sends email notifications, processes the data, and inputs the results into the system dashboard. The analysis is then compiled into a report, followed by the determination of performance rankings and the announcement of the highest achievement results.

The process for institutional service evaluation is the same. The evaluation is conducted using survey systems, with respondents consisting of active students, lecturers, and educational staff within the evaluation targets. A survey report is then compiled as the basis for evaluating the unit's service performance. The implementation mechanism follows the same annual survey procedures as the service evaluation. BPMI creates the survey by determining the type, period, target respondents, and question instruments. Respondents include students, lecturers, and active education staff within the evaluation scope. The results are compiled, analyzed, and integrated into the quality dashboard. The survey report is then compiled to inform strategic decision-making and strengthen institutional communication.

Control and Improvement

The control and improvement stage consists of three main business processes (Figure 4): the MRM, the Eisenhower-based priority matrix, and the management of standards improvements. The MRM is a strategic forum for leaders to review quality performance results and formulate directions for institutional improvement. This process begins with the preparation stage, where the BP3M schedules and compiles the meeting agenda at least one week prior to the meeting. The administrator prepares the attendance list and meeting equipment, while the BPMI prepares discussion materials, including internal quality audit results and feedback results. The BPP also prepares worksheets to assist in formulating the work focus for the following year.

During the implementation stage, all leaders attend the meeting according to the predetermined agenda. Participants record attendance; the BPMI serves as the note-taker, recording and summarizing the discussion results; and the BPP serves as the performance data processing operator. In this forum, the leadership formulates a follow-up work program, reviews non-conformity indicators and feedback, and analyzes priority levels using the urgency-importance (Eisenhower) matrix approach in the e-SPMI. The analysis results are then agreed upon as the institution's work program or focus. All meeting results are documented in the e-SPMI as part of the socialization and control process. Based on these decisions, BPMI implements control and indicator improvements, then socializes the updated indicators as the basis for the next SPMI cycle.

The control process is carried out through indicator-priority analysis using the Eisenhower matrix. This stage begins when the head of BPMI opens a control period in the e-SPMI for both

academic and non-academic categories. The auditee then selects an active period and a standard group based on their respective work unit areas. Next, the auditee completes the indicator target achievement status and determines the level of importance (important/not important) and urgency (urgent/not urgent). Each indicator is accompanied by an analytical description that explains its relevance and current condition. The head of BPMP then processes the results of this input into a priority analysis worksheet, which will serve as the primary material for the MRM. Thus, the control process is not merely administrative, but becomes a data-driven analytical mechanism for determining quality improvement priorities.

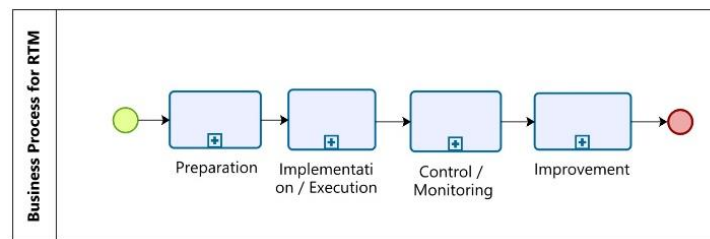


Figure 4. The Management Review Meeting Process

The process begins when the head of BPMP opens an improvement period in the e-SPMP system. After receiving the MRM's decision on improvements, the head of BPMP conducts the standard duplication stage as the basis for developing indicators for the next period. In the first stage, the system allows indicators to be duplicated as a reference to the previous standard. The second stage involves indicator management, during which the head of BPMP adjusts indicators based on recommendations from the control and improvement results. Once the adjustment process is complete, the indicators are approved through the system.

Continued Improvement

Even though all SPMP processes use e-SPMP, they still need improvement. The development of the e-SPMP dashboard system (Figure 5) is a strategic step in digitizing the quality assurance process. This system integrates all data and information related to internal quality documents. This allows business processes to become more structured, transparent, and monitored in real time. To meet accreditation standards, the dashboard provides flexibility in adapting business processes to the latest regulations. The addition of the base indicator feature addresses the previous limitations in indicator traceability and control.

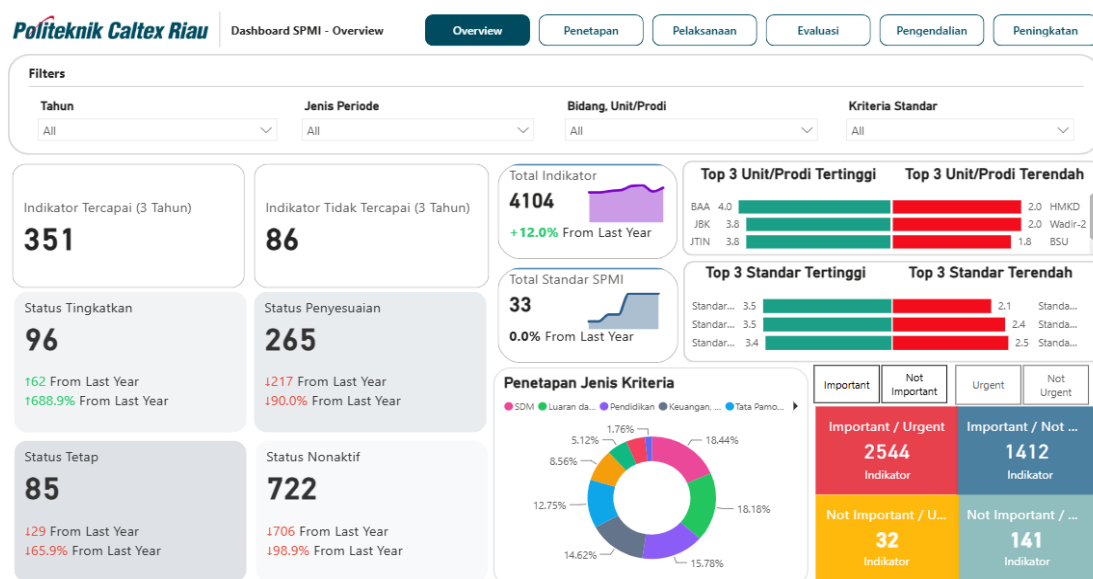


Figure 5. E-SPMP dashboard (Determination data)

Discussion

Implementing good quality management in HEIs is necessary because it directly impacts student satisfaction, service perception, and institutional competitiveness (Rahmiaty et al., 2025). Private HEIs operate in an increasingly complex environment shaped by changing enrollment patterns, financial pressures, quality expectations, and growing competition, making effective quality management essential to their institutional sustainability (Welch, 2024). It is necessary to define the value of private HEIs that want to create quality education and deliver the best service to stakeholders. Research by Langrafe et al. (2020) shows that there are different implications for internal and external stakeholders when leveraging the value of HEIs to gain a competitive advantage. Internal stakeholders, such as students and faculty, show direct relationships with HEIs. External stakeholders, such as suppliers and labor markets, exhibit more diverse and complex relationships in certain situations. This will provide different values at each HEI. Implementing comprehensive internal quality assurance can encourage improvements in HEI governance and management, thereby achieving good results in external accreditation (Ahmed, 2025). Synergy between SPMI and external accreditation is a two-way evaluative process. Accreditation often reflects administrative success rather than sustained internal quality assurance (Sabran & Julaiha, 2026).

HEIs differ from other industrial sectors because they must formulate value-creation ideas, visualize them as a value chain, and align them with a business process model to ensure the quality of the education students receive (Tian & Martin, 2014). Using a value chain data perspective in the education sector can make it easier to understand the relationships among intangible assets across sectors at various educational levels (Bornemann & Wiedenhofer, 2014). The implementation of a quality assurance system in Tanzanian universities is driven by regulations, stakeholder consultation, and learning processes (Mtitu, 2025). But its success depends on consistent policies, communication, resources, and a strong culture of quality. This system can also be adapted for HEIs in Indonesia, given its inherent values.

Many other researchers have also used this preconfigured value chain analysis method, which takes various forms and changes. For example, research conducted by Eisenreich et al. (2022) criticizes Porter's value chain model. This research analyzes the weaknesses of Porter's basic model in its failure to reflect sustainable business practices. Thus, this research presents a new model that adapts traditional management perspectives and forms interconnected circles. Organizations need to initiate process management to demonstrate the value delivered to stakeholders and to make it a strategic planning requirement (Cardoso et al., 2022).

Value chain analysis is the most frequently used method for determining the core activities of an organization's business processes. This stage also includes FGD to improve the quality of PCR's internal quality audit. The FGD consists of participants from various leadership positions. An FGD was conducted to improve PCR quality, and a questionnaire was administered to obtain a general view of current quality assurance practices at PCR. The entire SPMI process implemented in PCR needs improvement, including the control and improvement process. The SPMI process is important to ensure that existing controls can be more effective in improving performance. In addition, evaluation and integration with team member performance evaluation and annual report evaluation also require attention. Still, the primary focus should be on improving control to significantly impact the entire process.

Identify business processes that will be improved using value chain analysis. During this stage, FGDs were conducted to enhance the quality of the PCR internal quality audit. Identify business processes that will be enhanced using value chain analysis. The value chain is the most commonly used method for determining the core activities of an organization's business processes. In defining the value chain, it adapts to the case conditions. The case study, namely the private vocational college, refers to a reconfigured model (Pathak & Pathak, 2010). The main objective is to establish a culture of quality across all PCR academics. Overall, the transformation of the internal quality business process demonstrates a shift from an administrative system to a more comprehensive, integrated, data-driven quality assurance system oriented towards continuous improvement in accordance with the principles of the SPMI cycle. The MRM business process at the

improvement stage is carried out as part of a continuous improvement cycle to ensure that quality standards remain relevant, adaptable, and aligned with the institution's needs.

Value formulation is a dynamic process influenced by personal experience, organizational best practices, marketing strategy, and economic factors (Jaxongirovich, 2024). Based on the results of the value formulation for SPMI, PCR has adjusted its internal quality culture. HEI needs to develop an appropriate value chain to gain a competitive advantage. HEI produces value in the form of high-quality human resources and plays an essential role in green growth and in addressing social inequality (Trinh, 2023). Based on research examining the relationship between the expansion of HEIs and the labor market in Norway (Aamodt & Arnesen, 1995), internal quality assurance, through value chain analysis, enables HEIs to improve quality and expand into market targets. A clear target market must drive all HEIs to provide satisfaction and meet the expectations of partners, in this case, the industry or users of graduates. Value chain analysis can be effectively mapped by improving the curriculum to better suit today's industry needs (Paquibut, 2017). Research conducted by Safitri (2025), which examined the implementation strategy of SPMI in HEIs, found that integrating spiritual values into the quality management system is an effective means of building a sustainable quality culture. Certainly, these implemented spiritual values are appropriate for the HEI's cultural environment.

Digital transformation in HEIs must create a clear roadmap for successful implementation and change management. The elements influencing the digital transformation process are leadership, human capital, experience, and IT strategy (Carmo et al., 2025). Therefore, the correct value chain needs to further define the relationship between digital transformation in the education sector and the goals of HEIs. Digital transformation can be conceptualized in terms of operations, the development of teaching techniques, content, and operational systems. So there needs to be a value chain that replaces human-centric and sustainable HEIs by regulating technology 5.0 (Hashim et al., 2024). In the context of value chain innovation, it is also necessary to pay attention to the human capital structure and investment in education to deliver better value (Liu et al., 2024).

Manualizing quality assurance processes is often time-consuming and prone to administrative errors. With a dashboard, data management is automated and accurate. This reduces manual workload and allows quality assurance teams to focus on analysis and strategic decision-making. In the old business process, the standard and indicator-setting process lacked unique codes for its indicators. Consequently, various shortcomings arose, with indicator codes constantly changing each time they were duplicated. Issues that arose included indicator duplication, the inability to view historical improvements for the same indicator, and difficulty controlling indicators. The addition of the base indicator feature addresses the previous limitations in indicator traceability and control, enabling more consistent and accountable indicator management across improvement cycles.

Although the business process model proposed in this study demonstrates potential improvements for the PCR quality assurance system, several limitations should be noted. First, the study was conducted at a single vocational HEI with specific characteristics; therefore, applying this model to HEIs with different structures, scales, or types (e.g., universities) requires contextual adjustments. Second, the business process analysis was based on a single SPMI cycle, meaning it does not yet reflect the long-term consistency or effectiveness of the "to-be" model across multiple cycles. Thus, while these findings align with prior research on business process improvement in HEIs, generalizing the results to other institutions requires consideration of their respective organizational conditions.

CONCLUSION

Business Process Improvement (BPI) has been completed, and improvements have been made to business processes and the e-SPMI. In defining the value chain, it adapts to the case conditions. The case study, namely the private vocational college, refers to a reconfigured model. This research follows several stages to identify and analyze the value chain. The stages followed in this research were a literature review, identification of primary and supporting business processes, FGD implementation, and value chain analysis. Of the entire SPMI process implemented at PCR,

the control and improvement process needs improvement. This is important to ensure that existing controls are more effective at improving performance. A problem analysis was conducted using the fishbone method to identify the root causes of issues in the quality assurance business process. From a materials perspective, the SPMI documents need to be updated due to regulatory changes. The main objective is to establish a culture of quality across all PCR academics. Two main and supporting activities can be used to achieve this value. From each of these activities, a value has been successfully formulated that is appropriate to the PCR environmental conditions.

The development of the E-SPMI Dashboard is a strategic step in digitizing the quality assurance process. This system can integrate all data and information related to SPMI documents, implementation, evaluation, and follow-up into a single, easily accessible platform. This allows business processes to become more structured, transparent, and monitored in real time. Prior SPMI research in Indonesia has largely focused on implementation strategies and compliance with quality standards, with limited integration of business process management approaches such as BPMN and value chain analysis. This study addresses that gap by producing a BPMN-based SPMI business process model and grand design, contributing theoretically by enriching SPMI literature with business process improvement approaches. This study offers a directly applicable governance reference for PCR and other private vocational HEIs with similar characteristics. Future studies could also examine the applicability of this model across different institutional contexts, such as universities and other vocational institutions with varying organizational structures, and evaluate its implementation over time to assess its long-term impact on quality assurance performance.

AUTHOR CONTRIBUTIONS STATEMENT

This journal uses the Contributor Roles Taxonomy (CRediT) to recognize individual author contributions, reduce authorship disputes, and facilitate collaboration.

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C : Conceptualization

M : Methodology

So : Software

Va : Validation

Fo : Formal analysis

I : Investigation

R : Resources

D : Data Curation

O : Writing - Original Draft

E : Writing - Review & Editing

Vi : Visualization

Su : Supervision

P : Project administration

Fu : Funding acquisition

CONFLICT OF INTEREST STATEMENT

The authors declare that they have no known competing financial or non-financial interests that could have appeared to influence the work reported in this paper.

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