AR-ROSIKHUN
JURNAL MANAJEMEN PENDIDIKAN ISLAM

ARROSIKHUN: JURNAL MANAJEMEN PENDIDIKAN ISLAM
Vol. 04, No. 03 (2025), p. 388-400
Available online at https://ejournal.uin-malang.ac.id/index.php/alrosikhuun/index

IMPLEMENTATION OF THE DEMING CYCLE IN THE SCHOOL QUALITY ASSURANCE SYSTEM

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http://doi.org/10.18860/rosikhun.v4i3.36908

ARTICLE HISTORY
Received: June 2025
Revised: July 2025
Accepted: August 2025

KEYWORDS
PDCA Models, School Quality Assurance, Quality Management.

Abstract:
This study aims to analyse the implementation of the Plan-Do-Check-Act (PDCA) model within the quality assurance system at SMK Sore Tulungagung. Previous studies emphasise that PDCA is essential for institutional quality improvement, yet its application in vocational schools remains underexplored. In Indonesia, ISO-based management systems have encouraged schools to adopt structured planning and evaluation mechanisms. This research uses a qualitative case study design through in-depth interviews, observations, and documentation. Key informants include the principal, the internal quality assurance team, and the administrative staff. The findings show that the planning stage involves comprehensive program mapping aligned with ISO 9001:2015 and risk management principles. The implementation stage demonstrates clear documentation, defined responsibilities, and responsive service flows. The evaluation stage incorporates satisfaction surveys, internal audits, and management review meetings that ensure issues are systematically addressed. Follow-up actions are carried out through corrective measures and continuous improvement efforts. The study also finds that digital monitoring is still limited, affecting long-term consistency. Overall, the PDCA model strengthens the school's quality culture and operational effectiveness. This study demonstrates how an adaptive, data-driven PDCA framework can enhance internal quality assurance in vocational institutions and recommends integrating digital monitoring systems to ensure sustainability.

KATA KUNCI
Model PDCA, Jaminan Kualitas Sekolah, Manajemen Kualitas.

Abstract:
Penelitian ini bertujuan untuk menganalisis implementasi model Plan-Do-Check-Act (PDCA) dalam sistem penjaminan mutu di SMK Sore Tulungagung. Studi sebelumnya menekankan bahwa PDCA sangat penting untuk peningkatan kualitas kelembagaan, namun penerapannya di sekolah kejuruan masih kurang dieksplorasi. Di Indonesia, sistem manajemen berbasis ISO telah mendorong sekolah untuk mengadopsi mekanisme perencanaan dan evaluasi terstruktur. Penelitian ini menggunakan desain studi kasus kualitatif melalui wawancara mendalam, observasi, dan dokumentasi. Informan utama termasuk kepala sekolah, tim penjaminan kualitas internal, dan staf administrasi. Temuan menunjukkan bahwa tahap perencanaan melibatkan pemetaan program komprehensif yang selaras dengan ISO 9001:2015 dan prinsip-prinsip manajemen risiko. Tahap implementasi menunjukkan dokumentasi yang jelas, tanggung jawab yang ditentukan, dan alur layanan yang responsif. Tahap evaluasi mencakup survei kepuasan, audit internal, dan rapat tinjauan manajemen yang memastikan masalah ditangani secara sistematis. Tindakan tindak lanjut dilakukan melalui tindakan korektif dan upaya perbaikan berkelanjutan. Studi ini juga menemukan bahwa pemantauan digital masih terbatas, memengaruhi konsistensi jangka panjang. Secara keseluruhan, model PDCA memperkuat budaya kualitas dan efektivitas operasional sekolah. Studi ini menunjukkan bagaimana

kerangka kerja PDCA yang adaptif dan berbasis data dapat meningkatkan jaminan kualitas internal di institusi kejuruan dan merekomendasikan integrasi sistem pemantauan digital untuk memastikan keberlanjutan.

Please cite this article in APA style as:
Trisnantari, H. E., Jannah, S. R. (2025). Implementation Of The Deming Cycle In The School Quality Assurance System. *Ar-Rosikhun: Jurnal Manajemen Pendidikan Islam*, *4*(3), 388-400.

INTRODUCTION

The current Industry 5.0 era places unprecedented demands on the workforce, requiring human resources that are not only technically proficient but also highly adaptable to rapid digital transformation. Vocational High Schools (Sekolah Menengah Kejuruan or SMK) in Indonesia are the frontline institutions tasked with preparing these ready-to-work graduates. However, they face a critical "competency gap" that threatens their relevance. (Agustian et al., 2024; Hakim et al., 2025) that the primary challenge for vocational education today is the misalignment between school curricula and the dynamic needs of the Business and Industrial World (DUDI), leading to low graduate absorption. The Central Statistics Agency supports this misalignment (BPS, 2023), which reported that the open unemployment rate (TPT) for SMK graduates remains the highest across all education levels, at 9.60%. This persisting high unemployment rate serves as a severe social indicator that the internal quality mechanisms within vocational schools are failing to produce competitive outputs. Consequently, the revitalisation of vocational education cannot rely solely on infrastructure investment but must fundamentally address the quality management systems that govern educational delivery.

To bridge this competency gap, educational institutions must adopt a systematic Quality Management System (QMS) that ensures continuous improvement rather than sporadic administrative compliance. The most widely accepted framework for this is the Plan-Do-Check-Act (PDCA) cycle, which provides a rigorous structure for managing educational operations. (Correia et al., 2025; F. Tharaba et al., 2025) Describe the PDCA cycle as a holistic approach in which planning (Plan) is based on data, implementation (Do) is closely monitored, evaluation (Check) is comprehensive, and follow-up (Act) drives future standards. In the Indonesian context, this cycle is formalised as the Internal Quality Assurance System (SPMI), which is mandatory for all schools. However, the effectiveness of PDCA lies not in its documentation but in its execution as a "living cycle." (Hutahaean et al., 2024; Yusutria et al., 2024) Emphasise that, in the era of Society 5.0, this quality cycle must be agile, enabling schools to rapidly adapt their curricula and processes in response to real-time industry feedback. Thus, the theoretical ideal is a school where the PDCA cycle functions as the central engine of institutional adaptation and excellence.

Despite the clear regulatory framework, the practical application of SPMI in many Indonesian vocational schools is often hampered by operational rigidities and a lack of substantive integration. This study focuses on the specific context of SMK Sore Tulungagung, a vocational school operating under the unique constraints of an afternoon learning schedule. (Chatzipanagiotou & Katsarou, 2023) notes that schools with specific operational constraints often struggle more with the Check and Act phases due to limited time for coordination and management review. However, SMK Sore Tulungagung presents a compelling case study as it attempts to overcome these barriers by implementing the ISO 9001:2015 standard alongside the national SPMI.

(Abdurrahman, 2025; Yazo-Cabuya et al., 2025) Note that ISO 9001:2015 introduces "risk-based thinking," which can potentially address weaknesses in traditional school management. The scope of this research, therefore, is to examine how a constrained school environment can leverage the rigid requirements of ISO 9001:2015 to enforce the discipline required for a fully functional PDCA cycle.

Recent literature has extensively scrutinised the failures and potentials of quality assurance in vocational education. (Rambe et al., 2025) Found that the success of SPMI is less about document completeness and more about the "collective commitment" of school stakeholders to the quality culture. Similarly, (Rasto et al., 2025) identified a specific "documentation-practice gap" of approximately 22% in Indonesian vocational schools, where administrative compliance does not translate into operational teaching quality. (Yusof et al., 2024) previously revealed that schools consistently fail at the Act stage, unable to convert audit findings into policy changes. In contrast, (Ahmad et al., 2025) Argued that integrating internal (SPMI) and external (ISO/Accreditation) systems creates a synergy that can force improvement.

Furthermore, (Wang & Chen, 2025) Focused on the Plan stage, suggesting that risk analysis is the missing link for effective planning. (Azza & Yasin, 2025) Added that a sustainable quality culture is formed only when the PDCA loop is repeatedly closed over time. Finally, (Rohbiyatun et al., 2025) Highlighted that community and industry participation in the Check phase is crucial for validity.

While existing studies acknowledge the "documentation-practice gap"(Rasto et al., 2025) and the general failure of the Act phase (Yusof et al., 2024), there is a significant paucity of research addressing how schools with severe operational constraints (such as afternoon schedules/limited HR) can successfully sustain the PDCA cycle. Most literature analyses regular, full-day state schools, overlooking the unique dynamics of private or afternoon vocational schools, which form a large part of the Indonesian landscape. The novelty of this research lies in its specific investigation of the ISO 9001:2015 integration mechanism as a solution to these constraints. Unlike previous studies that view ISO and SPMI as separate or merely complementary, this study posits that the mandatory audit structure of ISO 9001:2015 serves as the necessary "forcing function" to ensure the Check and Act stages are completed in environments where they would otherwise be neglected due to resource scarcity.

The primary problem identified is the discontinuity of the quality cycle in vocational schools, particularly the failure to effectively implement data-driven follow-up actions (Act). Therefore, the objective of this research is to construct a practical, adaptable model of quality assurance that ensures the sustainability of the PDCA cycle within operationally constrained vocational schools. This study aims to move beyond descriptive analysis to prescriptive modelling. Accordingly, the central Research Question (RQ) is: "How does the integration of ISO 9001:2015 risk-based management with the SPMI framework ensure the continuity and measurability of the PDCA cycle in vocational schools facing operational limitations?" Answering this question will clarify the specific managerial protocols required to close the gap between administrative quality planning and actual graduate competency.

This study argues that operational constraints in vocational schools are best mitigated not by loosening standards, but by adopting stricter, internationally standardised audit protocols (ISO 9001:2015) that enforce the PDCA logic. The

original contribution of this research is a validated "Integrated Quality Control Model" that offers a roadmap for private and afternoon vocational schools to achieve high performance despite resource limitations. For policymakers, this provides evidence that quality resilience stems from system integration rather than from funding alone. For vocational school managers, it offers a replicable strategy to eliminate the "documentation-practice gap" identified by (Rasto et al., 2025). Ultimately, this research contributes to the broader goal of reducing the SMK unemployment rate by ensuring that the internal quality systems are robust enough to guarantee that every graduate possesses the competencies demanded by Industry 5.0.

RESEARCH METHODS

The primary unit of analysis in this study is the implementation of the Internal Quality Assurance System (SPMI) within a high-constraint educational environment, specifically at SMK Sore Tulungagung, East Java. This institution serves as a unique "bounded system" because, unlike typical vocational schools, it operates on an afternoon schedule (starting at 12:30 PM), which imposes significant constraints on time management, the intensity of student-teacher interaction, and administrative coordination. The object of study focuses on the managerial processes and artefacts involved in integrating the PDCA (Plan-Do-Check-Act) cycle with ISO 9001:2015 quality standards. Specifically, the analysis targets the "quality behaviour" of school stakeholders and the functional effectiveness of quality documents (Standard Operating Procedures and Quality Manuals) in driving continuous improvement. This location was purposively selected because it represents an anomaly in vocational education: a school that successfully maintains ISO certification despite severe operational time constraints. By focusing on this specific case, the research aims to dissect the phenomenon of quality resilience, examining how structural limitations are navigated through specific management programs and risk-based thinking strategies, a context often overlooked in general school management studies (Abdurrahman, 2025; Yazo-Cabuya et al., 2025).

To investigate this complex phenomenon, the researcher employed a qualitative approach with a Single Instrumental Case Study design. This design was chosen based on the constructivist paradigm, which posits that participants within their specific setting socially construct reality. According to (Moser & Korstjens, 2017; M. F. Tharaba & Wahyudin, 2024) and reaffirmed in recent educational studies by (Mtisi, 2022), a qualitative case study is the most appropriate strategy when the research questions seek to answer "how" and "why" a contemporary phenomenon functions within its real-life context, especially when the boundaries between the phenomenon (quality culture) and the context (afternoon school operations) are not clearly evident. The study aims to provide a holistic description rather than a statistical generalisation. By adopting this design, the researcher can explore the depth of the PDCA cycle implementation, capturing the nuances of human interaction, leadership commitment, and the "lived experience" of the Quality Assurance Team in translating rigid ISO standards into flexible, daily school practices. This approach allows for an intensive, detailed, and in-depth examination of the gap between the government-mandated ideal quality standards and actual on-the-ground practices (Rambe et al., 2025).

Data collection was conducted through rigorous triangulation, involving key informants, participant observation, and document review, to ensure the validity

and reliability of the findings. The primary information sources were selected through purposive sampling, prioritising individuals with direct authority and knowledge of the quality system. These key informants include the Principal (policy maker), the Vice Principal for Curriculum (executor), the Internal Quality Assurance Team (TPMI) (auditor), and the Head of Administration (document controller). Data was gathered using three specific instruments: (1) In-depth Interviews utilizing a semi-structured interview guide to probe the stakeholders' perspectives on PDCA implementation; (2) Non-participant Observation, where the researcher observed quality audit meetings and classroom activities to cross-verify stated commitments against actual behavior; and (3) Desk-Review (Documentation) of critical artifacts such as the Quality Manual, Audit Reports, and Management Review Minutes (Rasto et al., 2025). To organise this process effectively, a data collection matrix was established as follows:

Table 1. Data Collection Matrix

Research Focus	Data Source (Informants)	Data Collection Technique	Targeted Data
Plan (Planning)	Principal, Vice Principal of Curriculum	Interview & Desk-Review	Strategic Plan (Renstra), Risk Analysis Documents, Quality Objectives.
Do (Implementation)	Teachers, Head of Admin, Lab Heads	Observation & Documentation	Teaching Journals, SOP Implementation, Workshop Minutes.
Check (Evaluation)	Head of TPMI, Internal Auditors	Interview & Desk-Review	Internal Audit Reports, Customer Satisfaction Surveys, Audit Checklists.
Act (Follow-up)	Principal, Management Representative	Interview & Observation	Management Review Meeting (RTM) Minutes, Corrective Action Requests (PTK).

The collected data were analysed using the Interactive Analysis Model proposed by Miles, Huberman, and Saldaña, which was recently applied in vocational contexts by (Ahmad et al., 2025). This process involves three concurrent flows of activity: Data Condensation, Data Display, and Conclusion Drawing/Verification. In the Data Condensation phase, the researcher performed a "desk review" and "thematic coding" to select, focus, simplify, and abstract the raw data from field notes and interview transcripts, discarding irrelevant information to sharpen the focus on PDCA integration. Subsequently, in the Data Display phase, the compressed information was organised into structured matrices, flowcharts, and narrative texts to facilitate understanding of the causal networks between ISO standards and school improvements. Finally, the Conclusion Drawing stage involved interpreting the displayed data to identify patterns and regularities. To ensure the robustness of the findings, Data Verification was conducted continuously throughout the study using source triangulation (checking consistency across different informants) and methodological triangulation (comparing interview results with document evidence). This interpretive analysis allows the researcher to move beyond mere description to construct a theoretical model of quality assurance suitable for constrained environments (Wang & Chen, 2025).

RESULTS AND DISCUSSION

RESULT

The findings of this study demonstrate that the implementation of the PDCA-based quality assurance system at SMK Sore Tulungagung reflects a mature institutional effort to embed structured planning aligned with ISO 9001:2015 standards. The planning stage (Plan) is operationalised through systematic quality mapping, performance gap identification, and institutional risk assessment, which together form the epistemic foundation of the school's quality improvement agenda. This approach resonates with recent scholarship emphasising data-driven planning as the cornerstone of effective internal quality management in vocational schools (Lina et al., 2025). The formation of functional work units strengthens distributive leadership by allocating specific responsibilities across organisational lines, while integrating risk-based analysis into work plan meetings reflects a shift toward proactive governance practices, as recommended by ISO-aligned educational quality models (Schrettenbrunner, 2024). Workshops serve as collaborative platforms to harmonise program designs across units, ensuring policy coherence and alignment with the School Quality Assurance System (SPMI). In conclusion, the findings indicate that SMK Sore Tulungagung has institutionalised a strategic, evidence-based, and collaborative planning framework that enhances its readiness for continuous quality improvement.

Field data obtained through observations and semi-structured interviews corroborate the structured nature of the school's planning system. The Vice Principal for Curriculum remarked, "Our planning must begin with quality mapping; it allows us to justify every program based on measurable gaps rather than assumptions." The ISO coordinator emphasised the strategic integration of risk identification, stating, "Before a program is approved, each unit must identify potential process failures because ISO emphasises preventive action." A senior teacher from the Mechanical Engineering Department highlighted the role of workshops, noting, "Through the workshops, we align our programs with other units, so we do not work in isolation." Observations during the planning workshop confirmed these statements, revealing active inter-unit dialogue, evidence presentation, and document validation. The researchers also observed that planning documents were systematically coded and archived, demonstrating compliance with ISO's documentation standards. These findings align with contemporary studies suggesting that participatory planning and documentation rigor significantly enhance the effectiveness of institutional quality assurance (Edi Wardani et al., 2025; Rokhmah et al., 2025). Collectively, the descriptive data affirm that SMK Sore Tulungagung's planning phase is participatory, data-driven, and institutionally integrated.

To enhance conceptual clarity, the core findings of the planning system are organised into the following table. The table provides a structural overview of the four critical components that shape the planning stage, making it easier for audiences to interpret.

Table 2. Key Components of the PDCA-Based Planning System at SMK Sore Tulungagung

Planning Component	Description
Quality Mapping	Identification of institutional gaps based on eight national standards through structured self-assessment.

Functional Work Units	Establishment of fifteen units with documented responsibilities and formal authorization.
Work Plan Meetings	Formulation of risk-based program designs aligned with ISO 9001:2015 PDCA and documentation principles.
Workshops	Synchronization of unit work plans, policy calibration, and strengthening inter-unit coordination.

The table illustrates the systemic integration of structural delegation, risk-based thinking, and collaborative alignment. With this visualisation, the planning process becomes more transparent and analytically accessible for researchers examining school-based quality assurance practices.

Restating the findings, the planning stage of SMK Sore Tulungagung's quality assurance system reveals the integration of national standards, ISO 9001:2015 principles, and participatory organisational practices. Quality mapping functions as a diagnostic mechanism enabling the school to identify performance deficits and strategically prioritise improvement areas. The formation of functional units demonstrates the application of distributed governance, which strengthens collective ownership of quality outcomes, a concept widely recognised in recent quality assurance literature (Maria Gaspar, 2021). The use of risk-based planning during work plan meetings reflects the organisation's commitment to preventive, rather than corrective, quality management, which is at the core of ISO-aligned educational leadership frameworks (Martins et al., 2022). Workshops serve as integrative mechanisms that promote policy coherence across units, mitigating fragmentation and enhancing institutional synergy. These interpretations suggest that SMK Sore Tulungagung's planning model is characterised by evidence-informed decision-making, structural robustness, and collaborative execution. The paragraph concludes that this integrated system has strengthened the school's capacity to maintain continuity in the PDCA cycle and foster sustainable institutional quality.

Generally, the findings of this study indicate that vocational schools can strengthen their internal quality assurance mechanisms by adopting a PDCA-based planning model supported by ISO 9001:2015 principles. The model demonstrated by SMK Sore Tulungagung shows that quality mapping, functional work-unit structuring, risk-based planning, and collaborative workshops are universal components that can be replicated by other educational institutions seeking to enhance their quality assurance maturity. These findings support broader theoretical assertions that institutionalised planning practices contribute significantly to long-term quality sustainability (Rousseau & ten Have, 2022; Tucker et al., 2021). The study also affirms that ISO-based approaches are not merely certification requirements but can serve as operational frameworks that reinforce organisational discipline, documentation integrity, and preventive governance. Consequently, this model provides a replicable blueprint for vocational schools aiming to embed continuous improvement within their institutional culture. Conclusively, the generalisation drawn from this investigation suggests that robust planning serves as the backbone of an effective PDCA cycle, positioning schools to achieve adaptive, accountable, and sustainable quality development.

DISCUSSION

The first key finding is that systematic quality mapping and performance gap identification underpin the planning process, with significant functional

implications for institutional quality assurance. Because the school begins with an evidence-based diagnosis, the resultant improvement plans are more focused and relevant to actual needs, rather than guided by arbitrary or ad hoc decisions. This increases the likelihood that resources (time, personnel, funding) are used efficiently, and that interventions target genuine deficiencies. Previous research supports this: as stated by ISO 9001:2015 Quality Management System Implementation To Improve the Performance of Vocational High Schools in Sumedang Regency, West Java Province (Erwin Firdaus et al., 2022), "the systematic self-assessment provides a clear baseline, enabling schools to implement corrective measures more accurately". Therefore, the quality mapping process serves as a robust foundation for sustainable quality improvement, ensuring that plans are data-driven, relevant, and likely to address root problems rather than superficial symptoms.

Why does quality mapping produce such beneficial effects? The underlying structure is to embed a formal, institution-wide self-assessment mechanism within the school's governance architecture. By institutionalising self-evaluation against national standards (NES), the school creates a shared diagnostic language across all work units, which fosters collective awareness of strengths and weaknesses. In institutional quality assurance contexts, this shared evaluative foundation enhances transparency and empowerment. This structural embedding of quality mapping reflects what Transformasi Sistem Penjaminan Mutu Internal (SPMI) pada Sekolah Menengah Kejuruan (SMK) (Sahroni, 2023) describes as "the establishment of School Self-Evaluation (SSE) mechanisms makes quality assurance a routine and collective responsibility of the entire school community" (p. 10). Therefore, the underlying structural integration of mapping ensures that planning is not incidental but is built on shared institutional norms and obligations, strengthening ownership, accountability, and continuity.

The second significant finding concerns the formation of functional work units: the establishment of fifteen distinct units with documented responsibilities and formal authorisation. The functional implication is that delegating tasks to specialised work units enhances role clarity, improves accountability, and reduces overlap or duplication of duties. This structural clarity enables faster decision-making, smoother coordination, and more effective program execution essential characteristics for responsive and quality-driven institutions. Indeed, empirical evidence from Implementasi Penjaminan Mutu Pendidikan Vokasi untuk Memenuhi Kebutuhan Dunia Kerja: Studi Multi-Situs di SMK Negeri 1 Cerme dan SMK Negeri 1 Duduksampeyan (Syaifudin, Khamidi & Haq, 2025) indicates that "functional teams with clear roles significantly improved coordination and streamlined quality processes in SMK settings." In sum, establishing work units mitigates organisational complexity, fosters specialisation, and enhances operational efficiency, thereby improving the institution's capacity to implement quality assurance plans effectively.

The effectiveness of the functional work unit stems from distributed leadership and organisational design. By distributing authority and responsibility across units rather than centralizing decision-making, the school builds an organizational structure that is more flexible, responsive, and adaptable to varied service demands. Such distributed governance reduces bottlenecks, avoids overburdening central management, and enables contextualised decision-making by specialised units. This structure aligns with what the study Vocational Quality

Assurance Performance In Preparation For School Self-Evaluation In The COVID-19 Pandemic Era (Yusof et al., 2024) describes as “a decentralised quality assurance governance model enhances institutional responsiveness during crises.” Accordingly, the underlying structural design, divided into functional units, facilitates resilience, clarity, and adaptability, strengthening the school’s ability to sustain quality assurance over time.

This structural relationship between planning, implementation, evaluation, and corrective actions is illustrated in the PDCA flowchart, which shows how SMK Sore Tulungagung sequentially links quality mapping, program execution, performance monitoring, and corrective improvements.

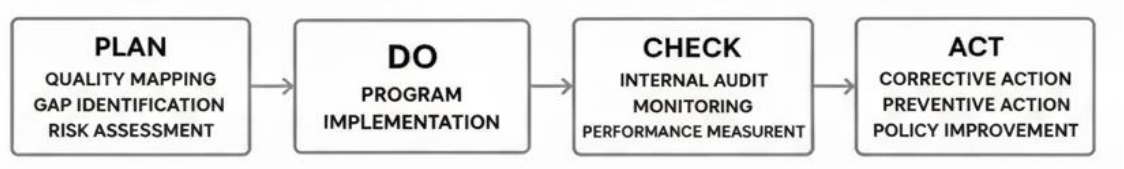

Image 1. flowchart PDCA

The third significant finding that risk-based work plan meetings and integrative workshops are used to formulate and align quality improvement programs has strategic implications. This practice transforms planning from a static, annual ritual into a dynamic, preventive governance process. By anticipating potential risks, units can preemptively address obstacles, thereby reducing the likelihood of implementation failure or inefficiencies. Moreover, workshops that align cross-unit plans foster policy coherence and inter-departmental synergy, avoiding duplication or conflicting initiatives. In related research, (Erwin Firdaus et al., 2022) note that “the integration of risk analysis into ISO-based planning enabled schools to mitigate resource constraints and ensure program sustainability” (p. 709). Thus, risk-based planning and collaborative workshops function as critical enablers of institutional resilience and sustainable quality improvement.

Underlying this effectiveness is the institutionalization of ISO 9001:2015’s risk-based thinking and process orientation within the school’s management system. The structural embedding of risk assessment and collaborative forums creates a proactive organizational culture that values preventive action, transparency, and inter-unit communication. Such structural mechanisms reduce uncertainty, promote mutual accountability, and ensure that planning is responsive to both internal and external demands. The study Sekolah Total Quality Management dalam Sebuah Manajemen Pendidikan Formal ISO 9001:2015 (Hafiza & uhamad Sa’ajiz, 2024) argues that "schools that institutionalize ISO-based workshops and risk management tend to develop sustainable quality cultures." Therefore, the underlying structure, combining ISO-aligned procedures, risk-based thinking, and collaborative forums, fosters a quality culture that is adaptive, preventive, and systemic.

From a practical standpoint, this study offers a replicable framework for vocational schools aiming to institutionalize robust internal quality assurance. Educational leaders can adopt the trilogy of systematic quality mapping, functional work-unit structuring, and risk-based collaborative planning to enhance planning efficacy and institutional adaptability. Theoretically, the findings contribute to the literature on school quality assurance by demonstrating how PDCA and ISO

9001:2015 principles can be operationalized together to create a holistic IQAS mechanism. This integration expands existing theory beyond compliance-based models toward a proactive, governance-oriented perspective. Additionally, the study underscores the importance of organizational design (distributed leadership), culture (collaborative, preventive), and procedural rigor (documentation, risk assessment). Altogether, the implications suggest that sustainable school quality assurance demands not only procedural adoption, but structural embedding and cultural transformation.

CONCLUSION

The findings of this study highlight the most essential insight that the implementation of the PDCA-based quality assurance system at SMK Sore Tulungagung offers: institutional quality improvement becomes sustainable only when planning, execution, evaluation, and corrective actions are structurally integrated and consistently practiced. This research demonstrates that quality mapping, functional unit structuring, risk-based planning, participatory workshops, and ISO 9001:2015 documentation culture collectively foster a mature quality assurance ecosystem. The primary lesson derived from this study is that continuous improvement is not merely procedural but deeply organizational a mindset that requires evidence-based decision-making, distributed leadership, and preventive governance. Methodologically, this study contributes to the scientific discourse by integrating PDCA principles with qualitative process tracing within a vocational education context, offering renewed perspectives on how internal quality assurance models can be operationalized in schools. The study also adds conceptual strength by articulating planning components in a structured, replicable framework that can guide future school-based quality management research.

Despite these strengths, the study has limitations that must be acknowledged. The research is confined to a single institutional case SMK Sore Tulungagung within a specific geographical, cultural, and organizational context, limiting the generalizability of the findings. The perspectives gathered were predominantly from adult staff members, leaving out variations across gender, age groups, and stakeholder categories such as students, parents, or industry partners. The exclusive use of qualitative methods, while providing depth, restricts the ability to measure the magnitude of PDCA effectiveness across broader populations. In line with these limitations, future research is needed that uses survey-based or mixed-methods approaches to capture wider demographic variations, gender representation, and cross-institutional comparisons. Such expanded research will enable a more comprehensive understanding and provide stronger empirical foundations for educational policy formulation, particularly for strengthening internal quality assurance systems in vocational schools across diverse regions.

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