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Analysis of the Implementation of the ISO 9001:2015 Quality Management System Using GAP Analysis (Case Study at a National Gas Distribution Company)

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ABSTRACT

This study analyzes the implementation of the ISO 9001:2015 Quality Management System (QMS) at the National Gas Distribution Company using the Gap Analysis method to assess the level of implementation, non-conformity, and improvement. Using a qualitative descriptive approach through observation, interviews, and document analysis, the results show that the QMS has been implemented with a very high level of conformity (97.60%). The Planning (6) and Improvement (10) clauses reached 100%, reflecting strength in strategy and continuous improvement. However, there were minor non-conformities in the organizational context, leadership, support, operations, and performance evaluation clauses, especially related to data updates, communication, information management, vendor evaluation, and management review. Recommendations for improvement are focused on optimizing these processes to increase the effectiveness of the implementation of the ISO 9001:2015 QMS at the National Gas Distribution Company.

Keywords: *Quality Management System, ISO 9001:2015, Gap Analysis, National Gas Distribution Company, Continuous Improvement..*

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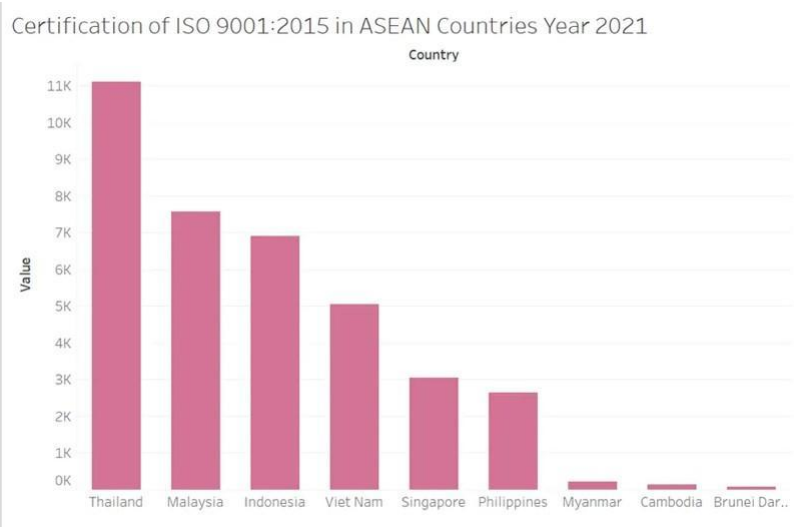
INTRODUCTION

Product or service quality is a crucial factor in determining a company's success, as consumers always expect high quality standards. Therefore, companies are required to maintain consistent quality to be competitive and meet customer needs. One internationally recognized quality management standard is ISO 9001, which serves as a guideline for organizations in implementing a quality management system consistently, transparently, and sustainably. Implementing this standard helps companies increase customer satisfaction through continuous improvement, enabling them to survive and thrive in a competitive business environment. ISO 9001:2015 aims to improve organizational performance, operational efficiency, and strengthen corporate governance through the Plan, Do, Check, Act (PDCA) principle. Furthermore, this standard supports risk management, regulatory compliance, and increased competitiveness. Various studies have shown that integrating ISO 9001:2015 with other strategies, such as Lean Thinking, can support production quality and a company's competitiveness in the market. ISO 9001 certification also provides strategic benefits, ranging from product quality assurance, regulatory compliance, process efficiency, and expanded market access. In the ASEAN region, Indonesia ranked third in the number of ISO 9001-certified companies in 2021, indicating the increasingly widespread implementation of this quality standard, including at one of Indonesia's gas energy companies.

Figure 1 Graph of the Number of ISO 9001 Certificates in ASEAN Countries



Source: Kadisasongko, 2023

This research was conducted at a gas transportation company in Indonesia that focuses on distributing natural gas through a pipeline network. As an energy provider, the company is committed to distributing gas quickly, accurately, and safely, with the support of various departments in its operations, including the Risk Management and Corporate Governance (RMCG) Department. This department plays a role in ensuring service quality meets standards and identifying various risks, both operational and non-operational. To maintain service quality and reliability, the company has implemented the ISO 9001:2015 Quality Management System and obtained official certification as proof of its commitment to international standards.

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However, interviews with the RMCG Department indicated that despite the company's ISO 9001:2015 certification, challenges remain in its implementation One of the problems that occurred was a gas pipeline leak in 2023 due to corrosion that caused thinning of the pipe wall.

Corrosion is triggered by environmental exposure and chemicals, while available pipe inspection technology is not yet able to optimally predict the rate of damage. This condition poses a risk to the consistency of infrastructure quality, making it an important reason for the company to conduct a GAP Analysis evaluation of the implementation of ISO 9001:2015 to improve the existing quality management system. To systematically understand the root cause of the problem, background identification was carried out using the 5W+1H approach, as shown in Table 1 below.

Table 1 5W+1H GAP Analysis

Element	Description
What	Gas pipe leaks due to corrosion that causes cracks and thinning of the pipe walls.
Who	The National Gas Distribution Company through the RMCG (Risk Management and Corporate Governance) Department is responsible for quality and risk management.
When	In 2023, during gas distribution operational activities.
Where	KP 124 point is a gas distribution pipeline belonging to the National Gas Distribution Company.
Why	The inline inspection system is not yet capable of accurately calculating and predicting corrosion rates; there is a potential lack of integration between preventive maintenance and risk management programs.
How	Leaks occur because the pipe walls corrode due to exposure to water or certain chemicals, which is not detected in time by existing inspection and quality control procedures.

Source: Sharing sources processed by researchers, 2025

The identification results indicate that the problems faced by this gas company are not only technical in nature, but also related to the suboptimal implementation of ISO 9001:2015. This standard emphasizes the importance of a quality management system capable of identifying risks early, ensuring infrastructure adequacy, and implementing preventative measures before operational failures occur. The pipe leak case indicated a gap between the procedures written in the ISO 9001:2015 document and implementation in the field. Therefore, a gap analysis was conducted to measure the level of conformity of the implementation of the quality management system with ISO 9001:2015 requirements and to formulate appropriate corrective measures. Further investigation into the implementation process of this quality standard is expected to provide an overview of the weaknesses and opportunities for improvement in the company's quality management system, thereby supporting improvements in operational quality and reliability.

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LITERATURE REVIEW

Operational Management

Operational management is the process of managing resources and activities to produce goods or services effectively and efficiently (Sofijan, Purnomo & Astuningsih, 2021). Its functions include planning, scheduling, and monitoring to ensure optimal production processes and support the achievement of organizational goals (Widyanti, 2019).

Total Quality Management (TQM)

Total Quality Management (TQM) emphasizes comprehensive and continuous quality improvement through the involvement of all organizational elements. ISO 9001:2015 is relevant to TQM principles because it emphasizes customer focus, continuous improvement, and data-driven decision-making. Gap analysis can be used to measure gaps in the implementation of quality standards (Crismanto & Noya, 2018).

Organizational Change Theory

Organizational Change Theory explains the process of a company adapting to change, one of which is through Kurt Lewin's model: unfreeze, change, refreeze (Nurhasanah et al., 2024). The implementation of ISO 9001:2015 reflects this process of change, from recognizing the need for improvement to establishing a culture of continuous quality.

Continuous Improvement (Kaizen)

Kaizen is a management philosophy that emphasizes consistent and continuous small improvements (Imai, 1986). This principle aligns with the Plan-Do-Check-Act (PDCA) cycle in ISO 9001:2015, which focuses on continuous improvement to improve quality and customer satisfaction (Tanjung et al., 2025).

Quality Management System Concept

A Quality Management System (QMS) is a set of standard procedures and practices designed to ensure processes and products meet specific needs and requirements (Dianto, 2021). This system encompasses planning, control, assurance, and quality improvement, oriented toward customer satisfaction. Its key characteristics include process consistency, error prevention, and the involvement of critical elements such as objectives, customers, outcomes, inputs, processes, suppliers, and feedback (Wartuny et al., 2018). To support its implementation, quality documentation is structured hierarchically, making it easier for organizations to understand and manage the system effectively. For example, the four levels of documentation in the QMS pyramid might include the following:

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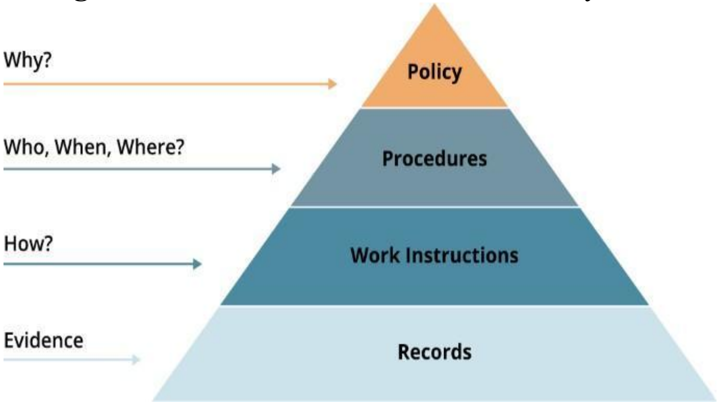
Figure 2 Levels of the SMM Document Pyramid



Source: Desiree Tarranco, 2025

In implementing ISO 9001:2015, companies require key documents as a reference for implementing their quality systems. These documents include a quality policy outlining management's commitment to quality, procedures outlining cross-departmental workflows based on the PDCA principle, and work instructions guiding the technical details of task execution to ensure consistency and compliance. Additionally, quality records serve as evidence of activity implementation, a basis for decision-making, and a means of evaluating compliance through internal audits.

GAP Analysis

GAP analysis is a tool used to identify gaps between a company's current and desired future conditions. Its purpose is to provide a realistic picture of the existing situation and formulate necessary corrective measures. In the context of ISO 9001:2015, GAP analysis helps companies assess the availability and suitability of quality documentation and serves as a basis for developing or improving documents that do not meet standards. The assessment is conducted using a checklist that compares actual conditions with ISO standard requirements.

$$\text{GAP} = \frac{Value}{Total\ Value} \ x\ 100\% \ldots\ldots\ldots\ldots\ldots (1)$$

Information:

Value : Assessment of each clause (observation results)
Total Value: The maximum value of each clause that the company expects (agreement)

According to Chrismanto & Noya (in Nasikin & Rahardjo, 2019), the gap analysis assessment aims to determine the extent of the gap in the company's current condition. This measurement will determine the suitability of the current condition with the ISO 9001:2015 standard. The percentage range is divided into 5 parts: 0-50%, 51-75%, 76-89%, 90-95%, 96-100%. The percentage will indicate the actual condition of ISO implementation in the company. The larger the gap percentage, the better, meaning a higher percentage of compliance with ISO 9001:2015 requirements, and vice versa.

ISO 9001:2015 Standard

ISO 9001:2015 is a quality management standard published by the International Organization for Standardization (ISO) and contains requirements that must be met by a company or organization. This standard emphasizes a risk-based approach, customer satisfaction orientation, and continuous improvement across all organizational processes. The core clauses in ISO 9001:2015 cover organizational context (Clause 4), leadership (Clause 5), planning (Clause 6), support (Clause 7), operations (Clause 8), performance evaluation (Clause 9), and improvement (Clause 10). All of these clauses are integrated with the primary goal of achieving customer satisfaction and ensuring the quality of products and services. For example, the clause on planning (Clause 6) plays a crucial role because it links risk identification with strategic decision-making, making it a continuous process, not just an administrative activity. Through the implementation of ISO 9001:2015, organizations are expected to improve competitiveness, customer trust, and operational efficiency, making the quality management system an integral part of long-term business performance.

METHOD

Population and Sample

The population of this study was all employees of the National Gas Distribution Company, spread across the Head Office, Gas Transmission Management (GTM), Regional Office 4 (RO4), and other supporting units. The sample was determined using a purposive sampling technique, namely employees who have knowledge and direct experience in implementing the ISO 9001:2015 Quality Management System. The main respondents were the RMCG Manager and employees from relevant divisions who were willing to be research sources.

Data Collection Method

Data collection was conducted through three main techniques. First, observation, which involves direct observation of the implementation of the Quality Management System using the ISO 9001:2015 checklist to obtain primary data. Second, interviews, which involve two-way communication with sources familiar with the implementation of ISO 9001:2015, such as employees or relevant departments, to complement and validate the observation results. Third, documentation, which involves searching archives, reports, and relevant literature as secondary data to support the analysis of the implementation of the Quality Management System at the National Gas Distribution Company.

Variable Definition and Measurement

The definitions and variables of this research refer to the ISO 9001:2015 Standard, specifically clauses 4 to 10, which are relevant to management system implementation. Variables are understood as values determined by researchers, whether related to people, objects, or activities, which are then studied to draw conclusions.

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Table 2 Definition and Operationalization of Variables

Variable	Definition	Indicator
ISO 45001:2018 Standard	The requirements of an international standard-based quality management system aim to ensure that companies are consistently able to provide products or services that meet customer requirements, applicable laws and regulations and increase customer satisfaction through the implementation of an effective system (ISO 9001:2015, International Organization for Standardization).	● The 7 main clauses of ISO 9001:2015 (Clauses 4-10) are each broken down into sub- indicators: ● Clause 4: Organizational context (understanding internal and external context, identification of stakeholders, scope of QMS, QMS and its processes) ● Clause 5: Leadership (leadership and commitment, customer focus, quality policy, roles and responsibilities) ● Clause 6: Planning (risks and opportunities, quality objectives, change planning) ● Clause 7: Support (resources, competence, awareness, communication, documented information) ● Clause 8: Operation (operational planning, operational control, product/service handling) ● Clause 9: Performance evaluation (monitoring, measurement, internal audit, management review) ● Clause 10: Improvement (nonconformities, corrective action, continual improvement).

Implementation of Quality Management System	The implementation of Quality Management System requirements by a company through policies, procedures, and operational activities to ensure product/service quality, enhance customer satisfaction, and ensure continuous improvement by the	● QMS Documents (Quality Manual, Procedures, Work Instructions) ● Observation results of the implementation of work processes per clause ● Internal audit records
	organization. (Source: adaptation of ISO 9001:2015 & Goetsch & Davis, Quality Management for Organizational Excellence).	● Interview results with relevant parties ● Quality performance records (KPIs, customer satisfaction levels, complaint records)

Source: Various sources processed by researchers, 2025

This study uses the ISO 9001:2015 Standard as the main variable with seven main clauses (4-10) as indicators, as well as quality management implementation measured through QMS documents, quality records, internal audit results, field observations, and interviews with relevant personnel. Each element is assessed based on evidence from direct observation and available secondary data.

Variable Measurement Scale

This study uses a Likert scale to measure variables related to the implementation of the ISO 9001:2015 Quality Management System, with indicators adjusted so that the analysis results can represent actual conditions in the field.

Table 3 Variable Measurement Scale

Score	Category	Information
5	Very suitable	If the organization or company carries out these activities well.
4	In accordance	If the organization or company carries out the activity but it is not perfect/there are activity requirements that have not been met.
3	Suitable enough	If an organization or company only carries out these activities occasionally.
2	Not Appropriate	If an organization or company understands that the activity is a good thing to do but does not/has not done it.
1	It is not in accordance with	If the organization or company does not carry out these activities.

Source: Bakhtiar and Purwanggono, (2009)

A Likert scale is used to assess the level of compliance with ISO 9001:2015 clauses. Through GAP Analysis, assessment results are compared against ideal standards to identify gaps that need to be addressed.

RESULTS AND DISCUSSION

Table 4 Number of Non-Conformity Findings (GAP) in Each

No.	Quality Management System Clauses ISO 9001:2015	Number of Non-Conformance Findings (GAP)
1.	Clause 4 Organizational Context	1 point
2.	Clause 5 Leadership	1 point
3.	Clause 7 Supporters	1 point
4.	Clause 8 Operations	2 point
5.	Clause 9 Performance Evaluation	2 point
Total Non-Conformity Findings Overall		7 point

Source: Data Processing Results (2025)

Based on the audit results of the implementation of ISO 9001:2015 at the National Gas Distribution Company, several inconsistencies were found in several key clauses. In clause 4 concerning organizational context, although the company had identified internal and external issues, stakeholder data was not updated. was not reflected in documents or information systems, potentially leading to miscommunication and impacting customer satisfaction and organizational performance. Furthermore, in clause 5 concerning leadership, the National Gas Distribution Company had demonstrated a commitment to the quality policy, but there were inconsistencies related to the re-signing of the document by the President Director.

The change in the board of directors in August 2021 was not followed by a renewal of signatures, which could raise doubts about the consistency of top management's commitment to the quality management system (QMS). Another finding was found in clause 7 concerning support. The company has demonstrated good performance in resource provision, but weaknesses remain in the management of hardcopy documents. The lack of a clear mechanism for recording and reporting document destruction poses a risk of non-compliance with regulations. Therefore, a systematic procedure is needed to ensure that each destruction is properly documented. Two discrepancies were identified in clause 8 concerning operations.

First, the format of the pipeline valve inspection form does not align with applicable work instructions, potentially leading to confusion during implementation. Second, the e-procurement system's Vendor Performance Evaluation (VPE) menu lacks a filter or grouping feature based on vendor code. This creates a disorganized vendor performance evaluation, obscures assessment trends, and complicates in- depth analysis per vendor, which can ultimately impact supplier management and the quality of third-party products and services. Furthermore, discrepancies were also identified in clause 9 concerning performance evaluation.

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Based on clause 9.3.1, National Gas Distribution Company has not yet conducted a management review in 2022 because the internal audit has not been completed. Consequently, the QMS performance evaluation is not optimal and opportunities for continuous improvement are hampered. Meanwhile, according to clause 9.3.3, the output of the management review, in the form of evaluation results and decisions, is not available. This lack of documentation weakens evidence of compliance with the ISO 9001:2015 tandard and eliminates the opportunity for analysis that could be used to support decision- making and continuous improvement.

Clause 4: Organizational Context

Although the company had identified internal and external issues affecting its Quality Management System (QMS), discrepancies were found regarding stakeholder data updates. Changes in customer names from previous entities to new ones were not recorded for updates in the information system, potentially leading to errors in communication and customer relationship management.

Clause 5: Leadership

The company demonstrated a strong commitment to establishing quality policies and organizational objectives. However, the change in the board of directors in August 2021 was not followed by a re-signing of the quality policy by the President Director. This potentially raises doubts about the consistency of top management's commitment to QMS implementation.

Clause 7: Supporters

The company's performance in resource provision is considered good, but there are still discrepancies in document management. A mechanism for recording and reporting the destruction of hardcopy documents is not yet in place, which poses a risk of regulatory compliance issues. A more systematic procedure is needed to ensure complete and accurate documentation of the destruction process.

Clause 8: Operations

The use of a pipeline valve inspection form format that does not align with work instructions. This situation has the potential to cause confusion in implementing procedures and reduce the effectiveness of operational controls. Therefore, it is necessary to adjust the form format to align with applicable official documents. Furthermore, the e-procurement system, specifically the Vendor Performance Evaluation (VPE) menu, lacks a filter feature or the ability to group data by vendor code. As a result, detailed vendor performance evaluations cannot be conducted, data is poorly organized, and assessment trends per vendor are difficult to discern. This hinders in-depth analysis of supplier performance and increases the risk of receiving products or services that do not meet quality standards.

Clause 9: Performance Evaluation

In Clause 9.3.1 (Periodic Management Review), it was found that the National Gas Distribution Company had not yet conducted a management review for 2022. This activity was delayed because the internal audit had not been completed, so the evaluation of the Quality Management System (QMS) performance was not carried out as scheduled. This condition reduced the effectiveness of the QMS because there was no comprehensive assessment of

quality achievement or identification of areas for improvement. As a result, opportunities for continuous improvement and adjustment of the quality policy to the organization's conditions were missed. Furthermore, in Clause 9.3.3 (Documentation of Review Results), it was found that the output of the management review, in the form of evaluation results and decisions taken, was not yet available. This absence of documentation indicates that although the review was planned, the process was not carried out or was not properly documented. This weakens the evidence of compliance with ISO 9001:2015 and eliminates the opportunity for the National Gas Distribution Company to conduct in-depth analysis that could be used as a basis for decision-making and continuous improvement.

CONCLUSION

This study shows that the implementation of ISO 9001:2015 QMS at the National Gas Distribution Company has been running very well with an average compliance rate of 97.60%, even the planning and improvement clauses achieved a perfect score. However, the GAP Analysis found several minor non-conformities, especially in the aspects of performance evaluation, organizational context, leadership, operations, and support. To close these gaps, improvements are recommended in the form of updating stakeholder data, strengthening internal communication, refining the vendor evaluation system, and increasing discipline in the implementation of management reviews. This optimization is expected to strengthen the consistency of standard implementation while increasing the effectiveness, efficiency, and quality of quality management at the National Gas Distribution Company.

SUGGESTION

Based on the research results, there are several practical suggestions for the National Gas Distribution Company, including: conducting periodic updates and validation of stakeholder data, strengthening internal communication through training and two-way feedback mechanisms, increasing the efficiency of documented information management with a more sophisticated electronic system, improving vendor evaluation features in the e-proc system, and ensuring that management review meetings are carried out consistently and comprehensively. Meanwhile, for further research, it is recommended to expand the scope with comparative studies on similar companies and analyze the impact of the implementation of ISO 9001:2015 QMS on business performance, such as customer satisfaction, operational efficiency, and increased competitiveness.

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