

## Analysis of the Implementation of ISO 9001:2015 on the Quality of Implementation of Irrigation Network Modernization Projects

Windy Dwi Perkasa<sup>1</sup>, Henrico Sagala<sup>2</sup>, Aryati Indah Kusumastuti<sup>3</sup>, Heri Mulyono<sup>4</sup>

Universitas Swadaya Gunung Jati, Cirebon, Indonesia

Email: windidwiperkasa.evo@gmail.com<sup>1</sup>, henricosagala98@gmail.com<sup>2</sup>

### Keywords

ISO 9001:2015; Quality management system; Irrigation network modernization project

### ABSTRACT

The importance of implementing Quality Management Systems (QMS) in facing business competition in the construction sector, especially at the construction work implementation stage—both private and government—requires strict compliance with quality standards and procedures to produce quality construction products that meet customer expectations and needs. This study analyzes the level and impact of implementing QMS ISO 9001:2015 clauses 4 to 10 on the quality of irrigation network modernization projects in the Rentang Irrigation Area. The research combines descriptive analysis with a quantitative approach, involving 98 respondents from 14 construction service providers directly involved in the project. Data were collected through structured questionnaires and analyzed using descriptive statistics and multiple linear regression. Results show that the degree of QMS ISO 9001:2015 adoption in the Rentang irrigation network modernization project was very good, with an average score of 4.06 (80.96%). Multiple linear regression analysis and hypothesis testing prove that implementation of clause 7 (support) and clause 10 (improvement) partially have significant effects on project quality. The simultaneous implementation of clauses 4 to 10 of ISO 9001:2015 has a significant impact on the quality of irrigation network modernization project implementation. The effectiveness depends on strong top management support to ensure adequate resources and continuously evaluated employee competencies, guaranteeing construction products meet customer expectations and needs.

## INTRODUCTION

The development of the construction industry in Indonesia is currently experiencing very rapid growth, in line with increasing developments in the fields of water resources (SDA), roads and bridges, settlements and housing, and other infrastructure. Faced with developments marked by fierce competition, companies must demonstrate their ability to meet market demands and win the hearts of customers (He et al., 2022). Winning the competition mainly depends on the quality of the products produced, as well as the ability to manage and improve resources (Wicaksono & Wacono, 2021).

According to the International Organization for Standardization (ISO), more than 1.5 million organizations worldwide have implemented ISO 9001 standards, with the construction sector representing a significant portion of certified organizations (Shaikh & Sohu, 2020). ISO statistics show a steady global increase in certifications, indicating the broad acceptance of quality management systems (Alawag & Razalli, 2025). Studies in the construction sector demonstrate that projects implementing ISO 9001-based quality management systems (QMS) experience approximately 15–25% improvement in project delivery performance and 20–30% reduction in defect rates compared to non-certified projects (Neyestani & Juanzon, 2017; Brooks & Brooks, 2021). These improvements are often linked to reduced rework, enhanced customer satisfaction, and lower failure costs throughout the project lifecycle (Khan & Khan, 2024). To achieve these benefits, factors

such as top management commitment, personnel training, consistent internal and external audits, and effective document control are considered critical (Shaikh & Sohu, 2020).

Quality in the field of construction is defined as the conformity between the results of the work and the technical specifications and other provisions of the service user within a predetermined period of time and cost (Almaskati, Alruqi, & Almatroudi, 2024). Accidents in the implementation of construction are generally caused by the selection of work methods, materials, equipment, work equipment, and the ability of workers who do not pay attention to quality and safe product processes and results. Studies show that poor methods, unsuitable materials or equipment failures, and insufficient worker training contribute significantly to health and safety hazards on construction sites (Newaz, Bhowmik, Rahman, & Uddin, 2025; Al-Naser, Shabeeb, & Al-Shra'ah, 2024). For example, frequent safety violations, such as misuse of personal protective equipment and inadequate procedural compliance, are strongly related to accident frequency (Sehsah, Khan, & Hossain, 2020). Moreover, systematic reviews identify that handling of materials, heavy machinery operation, and human error are among the leading factors in construction accidents (Almaskati et al., 2024; Rafindadi, Kado, & Gora, 2025).

Project quality management involves various processes required to ensure that a project meets the requirements and needs of stakeholders. In addition, project quality management helps reduce the risk of project failure, reduce repair costs, improve process efficiency, and increase customer satisfaction.

The government's efforts to increase national food productivity to achieve food security include the construction of new irrigation networks and the rehabilitation of existing irrigation networks. Dysfunction or damage to irrigation infrastructure negatively impacts the performance of the existing irrigation system, resulting in decreased irrigation effectiveness and lower crop yields (Basukala, Devkota, & Kumar, 2024). Irrigation network rehabilitation activities are efforts to improve irrigation infrastructure at the village level to restore or enhance irrigation functions and services, both by maintaining their original condition and by expanding the service area. Empirical evidence shows that rehabilitating canals leads to significant increases in cultivated area, cropping intensity, and irrigated area, which contribute directly to higher agricultural productivity (Modernizing Central Asia report, 2019; Impact Evaluation Study of Rehabilitation of Irrigation Canals in Kyrgyzstan, 2021). Also, increasing conveyance efficiency through rehabilitation (lining canals, repairing sluice gates) reduces water losses and improves water delivery reliability, thus enabling farmers to better plan crop cycles and increase production (Insights on the irrigation conveyance efficiency ..., 2025).

Recent studies have shown mixed results regarding quality management implementation in irrigation projects. Research by Kumar et al. (2020) found that only 35% of irrigation rehabilitation projects in developing countries successfully implemented comprehensive quality management systems. Singh and Patel (2019) demonstrated that projects with formal QMS implementation showed 40% fewer technical defects and 25% better water distribution efficiency. However, there has been limited research specifically analyzing the impact of *ISO 9001:2015* on irrigation network rehabilitation projects in Indonesia, particularly regarding the relationship between specific ISO clauses and project quality outcomes.

One large-scale irrigation network rehabilitation effort initiated by the Ministry of Public Works and Public Housing (PUPR) is the Rangkap Irrigation Area Irrigation Network Modernization project, located in West Java Province. This project irrigates 87,840 hectares of agricultural land covering three districts: Majalengka Regency (1,094 hectares), Cirebon Regency (20,257 hectares), and Indramayu Regency (66,175 hectares), utilizing the discharge of the Cimanuk River. The

modernization of the Irrigated Range Irrigation Network is carried out considering the system's age, which has reached decades, leading to decreased water service performance (pu.go.id, 2023).

In accordance with the Minister of Public Works and Housing Regulation Number 10 of 2021 concerning Guidelines for Construction Safety Management Systems, every service user and service provider in construction services is required to implement the Construction Safety Management System (SMKK). The implementation of SMKK is carried out by fulfilling the provisions of PMPM (Quality Assurance and Quality Control) construction work. PMPM is part of the SMKK, aiming to ensure technical safety in construction to produce high-quality construction processes and results.

The urgency of this research stems from the pressing need to evaluate the extent to which the implementation of *ISO 9001:2015* has impacted the quality of government construction projects, particularly irrigation network rehabilitation projects that are strategic for national food security. The novelty of this research lies in analyzing the implementation of *ISO 9001:2015* in the context of large-scale irrigation modernization projects in Indonesia, which has rarely been studied, and measuring its impact on construction project quality with a specific case study in the Rangang region.

This research was conducted with the aim of collecting, processing, and analyzing data related to the *ISO 9001:2015* quality management system and the quality of construction project implementation. The benefits of this study include providing empirical evidence for construction practitioners on the effectiveness of *ISO 9001:2015* in irrigation projects, contributing to academic knowledge on quality management in infrastructure projects, and offering insights for policymakers on quality standards implementation in government construction projects. The implications extend to improving project delivery methods, enhancing stakeholder satisfaction, and supporting sustainable infrastructure development practices.

## METHOD

This research employed a descriptive analysis method with a quantitative approach, conducted in the Rangang Irrigation Area, West Java Province, Indonesia. The study analyzed the implementation of *ISO 9001:2015* QMS and its impact on the quality of irrigation network modernization projects. The population consisted of all personnel from construction service provider companies directly involved in the Rangang irrigation network modernization project, totaling 98 individuals from 14 companies. Total sampling (census method) was used, including all 98 personnel to ensure comprehensive data coverage.

After preliminary studies, problem formulation, and defining the scope and objectives, methods, population, and samples were determined. The independent variable (X) was clauses 4 to 10 of the *ISO 9001:2015* Management System, while the dependent variable (Y) was the quality of project implementation.

Data collection involved primary and secondary data. Primary data was obtained using questionnaires related to the variables studied, which were distributed online via Google Forms to respondents. Secondary data was gathered through literature studies and relevant books.

Once data collection was complete, the responses were compiled, and respondent characteristics summarized for further analysis. Data validation was conducted to ensure accuracy and reliability. After confirming data validity, descriptive statistical analysis and multiple linear regression analysis were performed.

Questionnaire results measured the level of *ISO 9001:2015* QMS implementation and work quality. Respondents' scores were categorized into five groups using a Likert scale. The interpretation categories of the assessment criteria were presented in the following table:

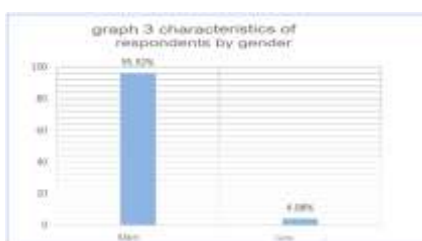
**Table 1. Assessment Score Interpretation Criteria**

Answer Alternative	Description	Likert Scale Score	Assessment Criteria Score
VE	Very Excellent	5	4.21 – 5.00
G	Good	4	3.41 – 4.20
FG	Fairly Good	3	2.61 – 3.40
NG	Not Good	2	1.81 – 2.60
VNG	Very Not Good	1	1.00 – 1.80

**RESULTS AND DISCUSSION**

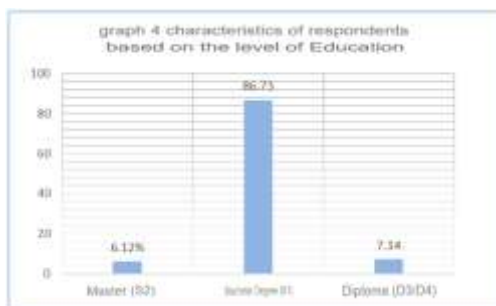
**Description of Respondent Characteristics**

The characteristics of the respondents in this study include aspects such as gender, education level, position or position, and working period. The characteristics of respondents from the results of the questionnaire distribution can be explained as follows:



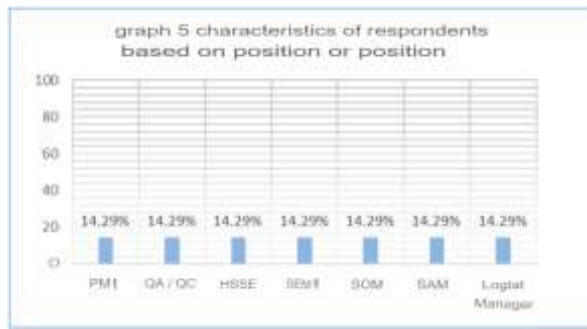
**Figure 1. Characteristics of Respondents by Gender**

Based on Figure 1 which describes the Characteristics of Respondents by Gender, it can be seen that the respondents sampled in this study were dominated by men, as many as 94 people or 95.92%. Meanwhile, female respondents amounted to 4 people or 4.08%.



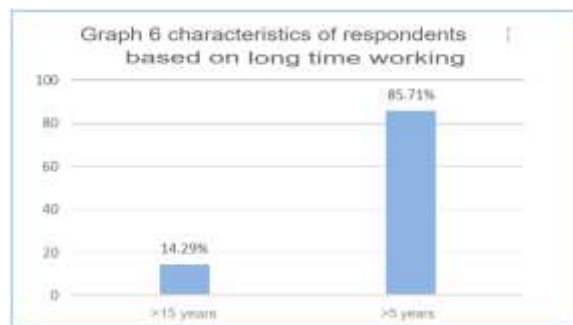
**Figure 2. Characteristics of Respondents Based on Education Level**

In Figure 2 which shows the Characteristics of Respondents Based on Education Level, information was obtained that respondents with a Diploma (D3/D4) educational background were 7 people (7.14%), Bachelor (S1) 85 people (86.73%), and Master (S2) 6 people (6.12%).



**Figure 3. Characteristics of Respondents Based on Position or Position**

Furthermore, Figure 3 which describes the Characteristics of Respondents Based on Position or Position shows that out of a total of 98 respondents who were the research sample, each position or position consisted of 14 people or 14.29%.



**Figure 4. Characteristics of Respondents Based on Length of Service**

Based on figure 4 Characteristics of Respondents Based on Service Period, it can be concluded that respondents with work experience in their current positions, with a minimum of 5 years of experience, amounted to 84 people or 85.71%. Meanwhile, respondents who have at least 15 years of work experience amounted to 14 people or 14.29%.

**Data Validity Test**

Validity measurements can be made using Pearson Correlation. Pearson correlation is carried out through correlation or correlation between the value of each indicator of the question or statement and the total value obtained in this study.

The results of the r calculation obtained are then compared with the r table, where the degree of freedom (df) is calculated as  $n - 2$  with a significance of 5%, i.e.  $df = 98 - 2 = 96$ . Thus, the r-value of the table is obtained as 0.1986 (rounded to 0.199). The results of the data validity test will be presented in the following table:

**Table 2. Validity Test Results of Independent Variable Data (Variable X)**

Item No.	Pearson Correlation (r count)	Sig. (2-tailed)	Description
X1.1	0.909**	0.000	Valid
X1.2	0.859**	0.000	Valid
X1.3	0.655**	0.000	Valid
X1.4	0.808**	0.000	Valid
X2.1	0.794**	0.000	Valid
X2.2	0.823**	0.000	Valid

Item No.	Pearson Correlation (r count)	Sig. (2-tailed)	Description
X2.3	0.650**	0.000	Valid
X3.1	0.547**	0.000	Valid
X3.2	0.975**	0.000	Valid
X3.3	0.975**	0.000	Valid
X3.4	0.975**	0.000	Valid
X4.1	0.822**	0.000	Valid
X4.2	0.662**	0.000	Valid
X4.3	0.684**	0.000	Valid
X4.4	0.630**	0.000	Valid
X4.5	0.680**	0.000	Valid
X5.1	0.894**	0.000	Valid
X5.2	0.792**	0.000	Valid
X5.3	0.910**	0.000	Valid
X5.4	0.847**	0.000	Valid
X5.5	0.470**	0.000	Valid
X5.6	0.807**	0.000	Valid
X5.7	0.888**	0.000	Valid
X5.8	0.575**	0.000	Valid
X5.9	0.667**	0.000	Valid
X5.10	0.667**	0.000	Valid
X5.11	0.667**	0.000	Valid
X6.1	0.966**	0.000	Valid
X6.2	0.966**	0.000	Valid
X6.3	0.937**	0.000	Valid
X6.4	0.936**	0.000	Valid
X7.1	0.695**	0.000	Valid
X7.2	0.744**	0.000	Valid
X7.3	0.871**	0.000	Valid
X7.4	0.892**	0.000	Valid

Based on Table 2 regarding the Results of the Data Validity Test for Independent Variables (Variable X), it was obtained that the validity correlation coefficient in the Corrected Item-Total Correlation (r calculated) column for all items in the questionnaire instrument had a value greater than the r of the Product Moment table of 0.199, with a significance value of less than 0.05. Therefore, all statement data in the ISO 9001:2015 quality management system questionnaire instrument is declared valid and can be used as a data collection tool to measure research variables.

**Table 3. Results of the Data Validity Test of Dependent Variables (Variable Y)**

Item No.	Pearson Correlation (r count)	Sig. (2-tailed)	Description
Y1	0.515**	0.000	Valid
Y2	0.465**	0.000	Valid
Y3	0.628**	0.000	Valid
Y4	0.399**	0.000	Valid
Y5	0.437**	0.000	Valid
Y6	0.484**	0.000	Valid
Y7	0.334**	0.001	Valid

Item No.	Pearson Correlation (r count)	Sig. (2-tailed)	Description
Y8	0.379**	0.000	Valid
Y9	0.396**	0.000	Valid
Y10	0.456**	0.000	Valid
Y11	0.353**	0.000	Valid
Y12	0.369**	0.000	Valid
Y13	0.394**	0.000	Valid
Y14	0.542**	0.000	Valid
Y15	0.558**	0.000	Valid
Y16	0.595**	0.000	Valid
Y17	0.397**	0.000	Valid
Y18	0.360**	0.000	Valid
Y19	0.309**	0.002	Valid
Y20	0.605**	0.000	Valid
Y21	0.507**	0.000	Valid
Y22	0.661**	0.000	Valid
Y23	0.593**	0.000	Valid
Y24	0.703**	0.000	Valid
Y25	0.452**	0.000	Valid
Y26	0.420**	0.000	Valid
Y27	0.418**	0.000	Valid
Y28	0.489**	0.000	Valid
Y29	0.648**	0.000	Valid
Y30	0.580**	0.000	Valid
Y31	0.531**	0.000	Valid
Y32	0.632**	0.000	Valid
Y33	0.660**	0.000	Valid
Y34	0.529**	0.000	Valid
Y35	0.427**	0.000	Valid
Y36	0.502**	0.000	Valid
Y37	0.422**	0.000	Valid
Y38	0.745**	0.000	Valid
Y39	0.420**	0.000	Valid
Y40	0.490**	0.000	Valid
Y41	0.563**	0.000	Valid
Y42	0.747**	0.000	Valid
Y43	0.751**	0.000	Valid
Y44	0.294**	0.003	Valid
Y45	0.355**	0.000	Valid
Y46	0.370**	0.000	Valid
Y47	0.437**	0.000	Valid
Y48	0.392**	0.000	Valid
Y49	0.813**	0.000	Valid

Furthermore, based on Table 3 regarding the Data Validity Test Results for Dependent Variables (Variable Y), it is known that the Corrected Item-Total Correlation validity correlation coefficient (r<sub>corrected</sub>) of all questionnaire instruments shows a value greater than the r of the Product Moment table of 0.199, with a significance value that does not exceed 0.05. Thus, all statement data

in the project implementation quality questionnaire instrument is said to be valid and can be used as a data collection tool to measure research variables.

**Data Reality Test Results**

A questionnaire can be considered reliable or reliable if the respondents answer the questions asked consistently from time to time. A construct or variable is declared reliable if it gives a Cronbach Alpha value greater than 0.60. The results of the reliability test on the 84 items in the questionnaire used can be seen in the following table:

**Table 4. Reliability Test Results of Research Data**

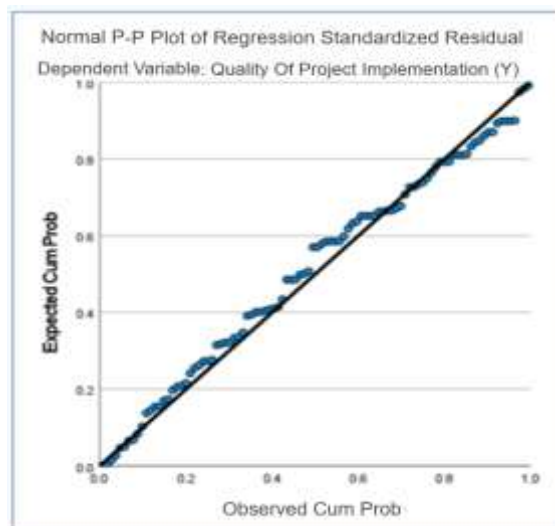
Statement Item	N of Items	Cronbach's Alpha	Description
<b>Project Implementation Quality (Y)</b>	49	0.939	Reliable
<b>Clause 4 Organizational Context (X1)</b>	4	0.648	Reliable
<b>Clause 5 Leadership (X2)</b>	3	0.648	Reliable
<b>Clause 6 Planning (X3)</b>	4	0.909	Reliable
<b>Clause 7 Support (X4)</b>	5	0.677	Reliable
<b>Clause 8 Operation (X5)</b>	11	0.933	Reliable
<b>Clause 9 Performance Evaluation (X6)</b>	4	0.951	Reliable
<b>Clause 10 Improvement (X7)</b>	4	0.501	Reliable

From the SPSS output related to the data reliability test presented in Table 4, it can be seen that the Cronbach Alpha value for each research variable is greater than 0.60. Therefore, it can be concluded that all research variable questionnaire instruments are reliable and suitable for use as a measuring tool in research.

**Classical Assumption Test Results**

The tests applied are normality tests, multicollinearity tests, and heteroscedasticity tests. The results of the test can be presented as follows:

1. Normality Test



**Figure 5. Normality Test Results of P-Plot Graph**

**Table 5. Kolmogorov-Smirnov Normality Test Results**  
**One-Sample Kolmogorov-Smirnov Test**

One-Sample Kolmogorov-Smirnov Test		Standardized Residual	
<b>N</b>		98	
<b>Normal Parameters<sup>a,b</sup></b>	Mean	.0000000	
	Std. Deviation	.96324195	
<b>Most Extreme Differences</b>	Absolute	.083	
	Positive	.061	
	Negative	-.083	
<b>Test Statistic</b>		.083	
<b>Asymp. Sig. (2-tailed)<sup>c</sup></b>		.093	
<b>Monte Carlo Sig. (2-tailed)<sup>d</sup></b>	Sig.	.096	
	99% Confidence Interval	Lower Bound	.088
		Upper Bound	.104

- a. Test distribution is Normal.
- b. Calculated from data.
- c. Lilliefors Significance Correction.
- d. Lilliefors' method based on 10000 Monte Carlo samples with starting seed 2000000.

Based on the analysis of the P-plot graph (Figure 5), the dots are scattered around the diagonal and the distribution appears to follow the diagonal direction. In addition, the results of the normality test in Table 5 show a probability value of  $0.093 > 0.05$ . From these results, it can be concluded that this model is normally distributed and is suitable for use in the next analysis.

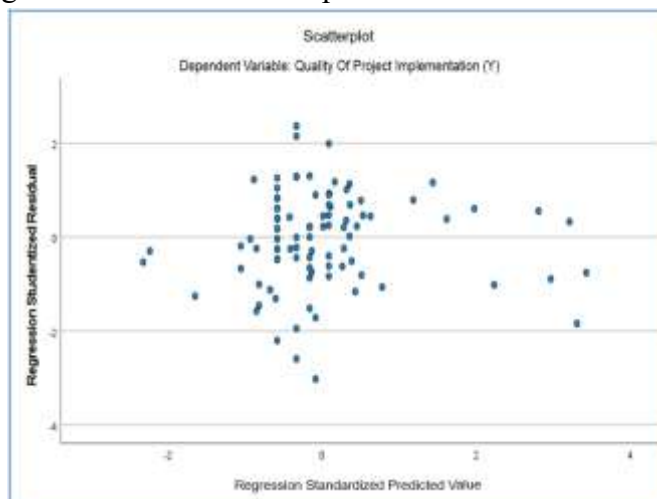
2. Multicollinearity Test

The analysis of the multicollinearity problem was carried out by considering the value of the inflation factor variance (VIF). Provided that when the VIF value is less than 10.00 and the tolerance value is greater than 0.100, there are no symptoms of multicollinearity.

Based on the results of the multicollinearity test, the value of the X1 variable can be determined that is acceptable. In addition, variance inflation factor (VIF) with a value below 10 was also obtained. It can be concluded that there are no signs of multicollinearity in the regression model equation. This shows that there is no correlation between independent variables. Therefore, this model is worth learning more.

3. Heteroscedasticity Test

The following figure shows the SPSS output for the heteroscedasticity test:



**Figure 6 Heterokedasticity test results using scatterplot graphs**

Furthermore, based on the scatterplot display that has been presented, it can be observed that the plots are randomly scattered both above and below the zero value of the Residual Studentized Regression axis. Thus, it can be said that the proposed regression model is free of the symptoms of heteroscedasticity.

**Analysis and discussion**

This study uses descriptive statistical analysis to determine the level of implementation of ISO 9001:2015 SMM. And in testing the influence of the application of clauses 4 to 10 of ISO 9001 on the quality of project implementation, multiple linear regression analysis was used.

**Descriptive Statistical Analysis**

The purpose of this analysis is to create an overview or description of the data for each variable using mean, minimum, maximum, and standard deviation values. This analysis was performed with the IBM SPSS Statistics for Windows version 27.0 program.

**a. ISO 9001:2015 Implementation Level**

In the assessment of the level of implementation of SMM clauses 4 to 10 of ISO 9001:2015, the data obtained from the distribution of the questionnaire was interpreted using the Likert scale and divided into five categories as follows:

**Table 6. Score Interpretation Criteria**

Implementation Score Range	Likert Scale Score	Description
1.00 – 1.80 <20%	1	Indicates that the level of implementation of the ISO 9001:2015 quality management system is very low or Very Poor (VP).
1.81 – 2.60 ≥20%–<40%	2	Indicates that the level of implementation of the ISO 9001:2015 quality management system is low or Poor (P).
2.61 – 3.40 ≥40%–<60%	3	Indicates that the level of implementation of the ISO 9001:2015 quality management system is moderate or Fair (F).
3.41 – 4.20 ≥60%–<80%	4	Indicates that the level of implementation of the ISO 9001:2015 quality management system is high or Good (G).
4.21 – 5.00 ≥80%	5	Indicates that the level of implementation of the ISO 9001:2015 quality management system is very high or Very Good (VG).

The results of descriptive statistical analysis can be seen in the following table:

**Table 7. Descriptive Statistical Test Results**

Variable	N	Minimum	Maximum	Sum	Mean	Hours of deviation
Project Quality (Y)	98	3	5	388	3.96	0.251
Clause 4. Organizational Context (X1)	98	3	5	408	4.17	0.311
Clause 5. Leadership (X2)	98	4	5	403	4.11	0.314
Clause 6. Planning (X3)	98	4	5	412	4.20	0.375
Clause 7. Support (X4)	98	3	5	377	3.85	0.383

Variable	N	Minimum	Maximum	Sum	Mean	Hours of deviation
Clause 8. Operation (X5)	98	3	5	395	4.03	0.234
Clause 9. Performance Evaluation (X6)	98	3	5	397	4.05	0.303
Clause 10. Improvement (X7)	98	3	5	396	4.04	0.274
Valid N (listwise)	98					



Figure 7. ISO 9001;2015 Quality Management System Implementation Assesment Suvey

Based on Table 7 and Figure 7 that have been presented, it is known that the highest implementation rate is found in Clause 6 regarding planning, with an average score of 4.20 or 84.08%. Therefore, this can be categorized in the high or good category because the average score is in the range of 3.41 – 4.20. In contrast, the lowest adoption rate is found in Clause 7 related to support, with an average score of 3.85 or 76.98%. This indicates that the implementation category can be categorized as high or good, as the average score is in the range of 3.41 to 4.20, which is less than 80%.

Based on this analysis, it can be concluded that the level of implementation of ISO 9001:2015 SMM in irrigation network modernization projects with an average score of 4.06 (80.96%), which is classified as Excellent.

b. Quality of Project Implementation

The results of the collection and processing of data related to the quality of the implementation of the range irrigation network modernization project were the quality of project implementation in the quality planning indicator obtained a score of 86.66%, quality assurance of 76.83%, and quality control of 79.32%. The average score of the project implementation quality assessment was 3.96 (79.10%), which was classified as **Good**.

**Analysis of the Regresi Linier Berganda**

Multiple linear regression tests were performed using the IBM SPSS Statistics, Version 27 software. 0. The results of the data testing through multiple linear regression analysis can be seen below:

Table 8. Multiple Linear Regression Test

Model		Non-Standard Coefficients		Standard Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	9.239	8.873		1.041	.301
	Clause4. Organizational Context (Organizational Context) (X1)	1.966	1.049	.199	1.874	.064

Model	Non-Standard Coefficients		Standard Coefficients	t	Sig.
Clause 5 Leadership (Leadership) (X2)	1.694	1.352	.113	1.253	.213
Clause 6 Planning (Planning) (X3)	1.052	.570	.128	1.847	.068
Clause 7 Support (X4)	2.851	.546	.341	5.224	<.001
Operation Clause 8 (Operation) (X5)	1.001	.555	.209	1.803	.075
Performance Evaluation Clause 9 (Performance Evaluation) (X6)	-2.205	1.048	-.217	-2.105	.038
Clause 10 Placement (Improvement) (X7)	3.078	1.018	.274	3.024	.003

**a. Bound Variable: Quality of Project Implementation (Y)**

From the results of the regression equation test above, a multiple linear regression model can be prepared as follows:

$$Y = 9.239 + 1.966X1 + 1.694X2 + 1.052X3 + 2.851X4 + 1.001X5 - 2.205X6 + 3.078X7 + e$$

From the equation of the model and the regression results, the following interpretation can be made:

- The value of the constant coefficient of 9.239 indicates that if the application of Clause 4 to clause 10 of ISO 9001:2015 remains constant, then the value of Y (quality of project implementation) will be worth 9,239 units.
- The regression coefficient of Variable X1 (Clause 4 - Organizational Context) is 1.966 and is significant with a p> value of 0.05. This coefficient is positive, indicating that if the implementation of Clause 4 (Organizational Context) increases by 1 unit, then the quality of project implementation will increase by 1,966 units, provided that no other factors change or remain constant.
- The regression coefficient of Variable X2 (Clause 5 - Leadership) is 1.694 and is also significant with a p> value of 0.05. This coefficient is positive, indicating that if the implementation of Clause 5 (Leadership) increases by 1 unit, then the quality of project implementation will increase by 1,694 units, provided that no other factors change or remain constant.
- The Variable Regression Coefficient X3 (Clause 6 - Planning) is 1.052 and significant with a p> value of 0.05. This coefficient is positive, which indicates that an increase in the implementation of Clause 6 (Planning) by 1 unit will lead to an increase in the quality of project implementation by 1,052 units, provided that no other factors change or remain constant.
- The Variable Regression Coefficient X4 (Clause 7 - Support) is 2.851 and significant with a p> value of 0.05. This coefficient is positive, which indicates that if the implementation of Clause 7 (Support) increases by 1 unit, then the quality of project implementation will increase by 2,851 units, provided that no other factors change or remain constant.
- The value of the regression coefficient of the X5 variable of Clause 8 Operation is 1.001 and significant > 0.05, which is positive, this shows that if the application of clause 8 increases by 1 unit, then the quality of project implementation will increase by 1,001 units, with the note that no other factors change or remain constant.
- Regression Coefficient of Variable X6 (Clause 9 - Performance Evaluation): The value of the regression coefficient for variable X6 is -2.205. Although these coefficients are negative, it is important to note that their significance needs to be taken into account in order to draw proper conclusions regarding their effect on the quality of project implementation.
- The value of the regression coefficient of the X7 variable of Clause 10 Improvement is 3.078 and significant < 0.05, a positive sign, this shows that if the application of clause 10 increases by 1

unit, the quality of project implementation will then increase by 3,078 units, with the note that no other factors change or remain constant.

**Determination Coefficient Analysis (R2)**

This analysis is carried out to measure the magnitude of the contribution of independent variables to the dependent variables, which allows us to determine which variables have the most significant influence. The test results show the following information:

**Table 9. Determination Coefficient Test Results (R2)**

Models	R	R Square	Adjusted R Square	Std. Error of the Estimate	R Square Change	F Change	df1	df2	Sig. F Change	Durbin-Watson
1	.930 <sup>a</sup>	.865	.855	4.689	.865	82.602	7	90	<.001	1.990

a. Predictors: (Constant), Clause 10 Improvement (X7), Clause 7 Support (X4), Clause 6 Planning (X3), Clause 9 Performance Evaluation (X6), Clause 5 Leadership (X2), Clause 4. Organizational context (Context of The Organization) (X1), Clause 8 Operation (X5)

b. Dependent Variable: Quality Of Project Implementation (Y)

Based on the output of the summary model above, *the value of R Square* is 0.865. This shows that the implementation of ISO 9001:2015 (independent) explains 86.5% of the quality variables of project implementation (dependent). And 13.5% was influenced by other variables that were not included in this model.

**Individual Parameter Test (Statistical Test t)**

The t-statistical test aims to show how much influence each independent variable individually has on the variation in the dependent variable. The applicable provisions are as follows:

- a. If the calculation > the table or the probability is less than the significant level (Sig. < 0.05), then there is a partial significant influence between the independent variable and the dependent variable.
- b. If the calculation < the table or the probability is greater than the significant level (Sig. > 0.05), then there is partially no significant influence between the independent variable and the dependent variable.

The t-test is carried out by comparing the tcount with the ttable where the results of the calculation of the ttable with a significance level of 5% are obtained in the following way:

= (a) ; (n-1) = 0,05 ; 98 -1  
 = 0.05; 97 = 1.66071 = **1.661**

Based on the results of the calculation using the SPSS program presented in table 9, the "Results of the Multiple Linear Regression Test" can be described as follows:

- a. The variable clause 4 of the organizational context (X1) has a calculated t value of 1.874 > from the t of the table of 1.661 with a significance value of 0.064 which is greater than the significance level of 5% (0.05). Thus, it can be interpreted that the X1 variable partially has a insignificant influence on the project implementation quality variable (Y).
- b. The variable of clause 5 leadership (X2) has a calculated t value of 1.253 < from t table 1.661 with a significance value of 0.213 which is greater than the significance level of 5% (0.05). Thus, it can be interpreted that the X2 variable partially does not have a significant influence on the variable of project implementation quality (Y).
- c. The variable of clause 6 of planning (X3) has a calculated t value of 1.847 > from t of table 1.661 with a significance value of 0.068 which is greater than the significance level of 5% (0.05). Thus,

- it can be interpreted that the X3 variable partially has a insignificant influence on the project implementation quality variable (Y).
- d. The variable of clause 7 support (X4) has a calculated t-value of 5.224 > from t table 1.661 with a significance value of 0.001 which is smaller than the significance level of 5% (0.05). Thus, it can be interpreted that the X4 variable partially has a significant influence on the quality variable of project implementation (Y).
  - e. The variable clause 8 operation (X5) has a calculated t value of 1.803 > from t table 1.661 with a significance value of 0.075 which is greater than the significance level of 5% (0.05). Thus, it can be interpreted that the X5 variable partially has a non-significant influence on the variable of project implementation quality (Y).
  - f. The variable of clause 9 of performance evaluation (X6) has a calculated t value of -2.105 < from t of table 1.661 with a significance value of 0.038 which is smaller than the significance level of 5% (0.05). Thus, it can be interpreted that the X6 variable partially does not have a significant influence on the variable of project implementation quality (Y).
  - g. The variable clause 10 increase (X7) has a calculated t-value of 3.024 > from the t table of 1.661 with a significance value of 0.003 which is smaller than the significance level of 5% (0.05). Thus, it can be interpreted that the X7 variable partially has a significant influence on the project implementation quality variable (Y).

**Simultaneous Significance Test (Statistical Test F)**

The statistical test F is used to show that all independent variables simultaneously have a significant impact on the dependent variables under the following conditions:

- a. Independent variables simultaneously have a significant impact on the quality of the project implementation variable if the  $f_{table} >$  calculation or probability is less than the significant level (Sig < 0.05).
- b. Independent variables simultaneously have a significant impact on dependent variables if the  $f_{count} <$   $f_{table}$  or probability is less than significant (Sig > 0.05).

Ftables searched in a statistical table with a significance level of 0.05 :

$$df1 = k-1 = 8-1 = 7$$

$$df2 = n-k = 98-8 = 90$$

then the Ftable value is 2.113.

From the results of the calculation with the SPSS program, a variance analysis (ANOVA) was obtained as a result Using SPSS software, the following variance analysis (ANOVA) was produced from the calculation results:

**Table 10. Simultaneous Significance Test Results (f-test)**

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	12710.856	7	1815.837	82.602	<.001b
	Residual	1978.461	90	21.983		
	Total	14689.316	97			

a. Dependent Variable: Quality Of Project Implementation (Y)

b. Predictors: (Constant), Clause 10 Improvement (X7), Clause 7 Support (X4), Clause 6 Planning (X3), Clause 9 Performance Evaluation (X6), Clause 5 Leadership (Leadership) (X2), Clause 4. Context of the Organization (X1), Clause 8 Operation (X5)

Based on table 11 above, it shows that the calculated F value reaches 82.602 > Ftable 2.113, with a significance level of 0.001. This indicates that each independent variable significantly affects the dependent variable at the same time. Thus, the simultaneous implementation of ISO 9001:2015 has a

significant influence on the quality of implementation of the range irrigation network modernization project.

## CONCLUSION

The study concluded that the implementation of the ISO 9001:2015 Quality Management System in the Rangang irrigation network modernization project was rated Very Good, with an average score of 4.06 (80.96%), and significantly influenced project quality. Notably, clause 7 (Support) and clause 10 (Improvement) had a significant impact, highlighting the role of top management support and continuous competency enhancement. Other clauses contributed to the overall quality but did not show individual significance. Future research should expand by incorporating moderation or mediation variables such as organizational culture, information technology, or stakeholder satisfaction, and compare multiple irrigation projects across locations for consistency. Longitudinal studies are recommended to assess long-term effects on operational performance and sustainability, while mixed-method approaches could provide deeper insights into challenges and enablers of ISO 9001:2015 implementation in government construction projects.

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