

Key Factors Influencing Quality Performance in Construction Projects: A Study in Aceh Besar Regency

Anita Rauzana^{1*}, Dian Fajriani¹, Ibnu Abbas¹, Khairunnisa Putritami Saiful¹, Wira Dharma²

¹ (Department of Civil Engineering, Faculty of Engineering, Universitas Syiah Kuala, Banda Aceh 23111, Indonesia)

² (Faculty of Mathematics and Natural Sciences, Universitas Syiah Kuala, Banda Aceh, 23111, Indonesia)

*Email: anrauzana@usk.ac.id

Abstract:

Quality performance can be defined as the level of achievement in terms of product quality and management quality that can be attained by a company within a certain period of time. Construction service companies must maintain good performance in order to produce optimal work outcomes. Likewise, the quality of construction projects must be ensured to produce high-quality products or services that meet the expectations of project owners or service users. This study aims to identify the factors influencing quality performance and determine the most influential factors affecting quality performance in construction projects in Aceh Besar. The scope of this study is limited to respondents from contractor companies involved in the implementation of construction projects in Aceh Besar. The data used in this study consist of primary and secondary data. Primary data were obtained through questionnaires regarding quality performance factors, while secondary data were collected from relevant literature and data on the number of contractor companies. The study utilized data collected from questionnaires distributed to 35 contractor companies in Aceh Besar. Respondents' perceptions were measured using a Likert scale. Data were analyzed using statistical methods, including validity tests, reliability tests, and descriptive analysis. Based on the results of the questionnaire survey and data analysis, eight factors were identified as having a significant influence on quality performance in construction projects for contractors: lack of work experience, shortage of labor, occurrence of labor strikes, low material quality, materials delivered not meeting specifications, difficulties in material supply, poor equipment quality, and inadequate project financial planning. The findings of this study are expected to provide additional information and insights regarding the factors influencing quality performance in construction projects within construction companies in Aceh Besar.

Keywords — Quality performance, Construction projects, Quality management, Contractor performance, Quality factors

I. INTRODUCTION

The increase in the number of construction service companies in Indonesia has not been fully accompanied by improvements in their qualifications and performance. This condition can be observed in the quality of work, timeliness of project completion, and efficiency in the utilization of resources such as labor, capital, and technology, which still fall short of expectations. This issue is

also highlighted in Law of the Republic of Indonesia No. 18 of 1999 on Construction Services, which states that the quality of construction service implementation must be continuously improved in order to produce high-quality and competitive construction outcomes [1]. In practice, construction work involving advanced technology has not yet been fully mastered by many construction service companies, particularly those with small-scale qualifications. This condition may lead to lower quality outputs and limited capacity of local

contractors to compete in larger-scale construction projects [2], [3], [4].

In the construction industry, quality is one of the primary indicators of project success, alongside cost and time. This concept is commonly known as the triple constraint in project management, which includes time, cost, and quality. These three aspects are interrelated and collectively determine the success of a construction project. If one of these aspects is not achieved, the overall project performance will be adversely affected [5], [6], [7], [8], [9]. Therefore, effective quality management is essential to ensure that construction outputs meet established standards and align with the needs and expectations of project stakeholders.

Various studies have shown that the quality performance of construction projects is influenced by multiple factors related to human resources, materials, equipment, construction methods, and project management. Factors such as workforce competence, material quality, managerial capability, and coordination among project stakeholders have a significant impact on construction project quality performance [10], [11]. In addition, the quality of project planning and control also plays a crucial role in ensuring that project implementation meets the established quality standards. Other studies have also indicated that lack of work experience, limited availability of skilled labor, and poor material quality are among the main causes of declining quality performance in construction projects. Furthermore, issues related to material procurement, delays in material delivery, and non-compliance of materials with specifications can also negatively affect the quality of construction outputs [12]. Therefore, identifying the factors that influence construction project quality performance is essential for improving the overall quality of project execution.

The factors affecting quality performance in construction project implementation are important to understand, as they can serve as a basis for improving project performance. These factors may include lack of work experience, low material quality, inadequate project financial planning, and various other factors related to project management [13]. Based on this background, the objective of

this study is to identify the factors that influence the quality performance of construction projects in Aceh Besar and to determine the most dominant factors affecting such performance.

II. METHODS

2.1 Data Collection

Data collection in this study was conducted by distributing questionnaires to respondents who served as the research sample. The collected data consisted of primary data and secondary data. The location of this study was contractor companies operating in Aceh Besar Regency. The subjects of the study were contractors working in these companies. The object of this research was to identify the factors influencing quality performance in construction projects in Aceh Besar.

2.2 Primary Data

Primary data in this study refer to data obtained directly from the original sources through interviews and questionnaire responses from respondents. The primary data were collected by distributing questionnaires directly to 35 contractor companies in Aceh Besar. The responses were based on the subjective opinions and experiences of the respondents regarding the factors influencing quality performance in construction projects.

2.3 Secondary Data

Secondary data in this study consisted of information obtained from external sources. These data included a list of contractor companies registered as members of the Indonesian National Construction Contractors Association. The secondary data also included information about the number of contractor companies that had undertaken construction projects in Aceh Besar, which formed the basis for determining the number of respondents involved in the study.

2.4 Target Respondents

The target respondents in this study were company leaders or project managers from contractor companies located in Aceh Besar. The respondents were limited to contractors registered as members of the Indonesian National Construction Contractors Association with small-scale qualifications who had undertaken construction projects in Aceh Besar. From the total population of 84 contractor companies, the sample size was determined using the Slovin formula with a margin of error of 10%. Based on this calculation, the number of samples obtained was approximately 46 companies. However, only 35 respondents returned the completed questionnaires and were therefore included in the data analysis. The Slovin formula is commonly used to determine sample size in survey-based research when the population size is known [14], [15].

2.5 Questionnaire Design

The questionnaire was designed in the form of a list of questions and tables according to the objectives of the study and was distributed to 35 contractor companies in Aceh Besar. The respondents consisted of company directors, project managers, field supervisors, project administrators, or other personnel involved in construction project implementation. The questionnaires were distributed by directly visiting the respondents. During the questionnaire completion process, the researcher provided explanations and guidance to ensure that respondents clearly understood the questions and that the responses remained within the scope of the research. Some questionnaires were completed immediately, while others were left with the contractors to be collected later. The questionnaire contained 30 questions, which were analyzed using a scoring technique based on the Likert scale. The Likert scale is widely used in social science research to measure attitudes, perceptions, and opinions [16], [17].

2.6 Questionnaire Distribution

In this study, questionnaires were distributed directly to the respondents by visiting the contractor companies. Some questionnaires were completed immediately, while others were left with the respondents and collected afterward. The responses were used to identify the most influential factors affecting the quality performance of construction projects in Aceh Besar.

2.7 Data Processing Method

The collected data were analyzed to obtain the research results. The analysis consisted of validity testing, reliability testing, and descriptive statistical analysis. The data processing was performed using Microsoft Excel, and the results were presented in tabular form.

a. Validity Test

The validity test was conducted to determine whether the questionnaire items were valid for measuring the intended variables. The collected data were grouped according to the questionnaire items, and the validity value was calculated using the correlation formula. Validity testing aims to determine whether the questionnaire items are appropriate for measuring the research variables. If the test results indicate that an item is not valid, the item is removed from the instrument. Conversely, valid items are retained and used in the research. The minimum acceptable correlation coefficient is ≥ 0.30 , meaning that items with a correlation value below 0.30 are considered invalid [18].

b. Reliability Test

After the validity test, the valid questionnaire items were subjected to a reliability test. Reliability testing is used to determine whether the questionnaire instrument is consistent and reliable when used repeatedly. An instrument is considered reliable if it consistently produces stable results under repeated measurements. In this study, the

reliability coefficient must be ≥ 0.60 to indicate that the questionnaire items are reliable and suitable for use in the research [18].

2.8 Descriptive Analysis

Descriptive analysis was used to describe the collected data by identifying the most frequently occurring responses (mode). This analysis helps determine which responses were most commonly selected by the respondents. The descriptive analysis was conducted in two stages. The first stage analyzed the questionnaire items in Section A, which described the characteristics of the respondents. The second stage analyzed the items in Section B, which concerned the factors influencing the quality performance of construction projects in Aceh Besar. Based on the results of the descriptive analysis, the percentage distribution of responses was calculated to determine the factors that influence the quality performance of construction projects and to identify the most dominant factors affecting quality performance in construction projects in Aceh Besar.

III. RESULTS AND DISCUSSION

3.1 Respondent Characteristics and Company Profile

The characteristics of the respondents obtained from the questionnaire distributed to contractors in Aceh Besar Regency were classified based on general company information, including company age, the number of projects completed in the last five years, and the average annual company revenue. A detailed summary of the respondent contractors' characteristics is presented in Table 1.

TABLE I
 RESPONDENT CHARACTERISTICS

No	Variable	Category	Number of Respondents	Percentage
1	Company Age	1 – 5 years	10	28.57%
		5 – 10 years	15	42.86%
		10 – 15 years	7	20.00%
		> 15 years	3	8.57%
Total			35	100%
2	Number of Projects Completed in the Last Five Years	1 – 10 projects	5	14.29%
		10 – 20 projects	19	54.29%
		20 – 30 projects	9	25.71%
		> 30 projects	2	5.71%
Total			35	100%
3	Average Company Revenue per Year	≤ IDR 500 million	10	28.57%
		IDR 500 million – IDR 1 billion	14	40.00%
		IDR 1 billion – IDR 5 billion	11	31.43%
		> IDR 5 billion	0	0.00%
Total			35	100%

Table 1 presents the characteristics of the respondents based on company age, number of projects completed in the last five years, and the average annual company revenue.

Based on the company age, most respondents were companies that had been operating for 5–10 years, accounting for 42.86% of the total respondents. This indicates that the majority of contractor companies involved in this study were relatively established and had sufficient experience in the construction sector. Meanwhile, 28.57% of the companies had been operating for 1–5 years, showing the presence of relatively new companies in the industry. Companies with an operational age of 10–15 years accounted for 20.00%, while companies operating for more than 15 years represented only 8.57% of the respondents.

In terms of the number of projects completed in the last five years, the majority of companies had completed 10–20 projects, representing 54.29% of the respondents. This suggests that most companies had moderate project experience during the observed period. Furthermore, 25.71% of the companies had completed 20–30 projects, indicating a relatively higher level of project involvement. Meanwhile, 14.29% of companies had completed 1–10 projects, and only 5.71% had completed more than 30 projects.

Regarding the average annual company revenue, the largest proportion of respondents fell within the range of IDR 500 million to IDR 1 billion, accounting for 40.00% of the total respondents. This was followed by companies with annual revenues between IDR 1 billion and IDR 5 billion, representing 31.43% of respondents. Additionally, 28.57% of the companies reported annual revenues of less than or equal to IDR 500 million. None of the respondent companies reported annual revenues exceeding IDR 5 billion. Overall, these results indicate that most contractor companies participating in this study are small to medium-sized enterprises with moderate operational experience and project involvement in the construction sector.

3.2 Validity Test

The validity test is used to determine whether the questionnaire is valid or not. The validity testing was conducted by calculating the correlation between each indicator score of each factor and the total score of the respective factor. The validity test was performed for each factor using the Pearson Product-Moment correlation analysis by comparing the value of r_{xy} with the value of r_{table}

If the value of r_{xy} is greater than the value of r_{table} , the factor is considered valid. The r_{table} value obtained from the Product Moment table is 0.334. The results of the validity test calculations for the questionnaire are presented in Table 2.

TABLE 2
 VALIDITY TEST RESULTS

Factor	r-Value
A1	0.383
A2	0.351
A3	0.412
A4	0.433
A5	0.420
A6	0.727
A7	0.367
A8	0.455
A9	0.407
A10	0.631
A11	0.727
A12	0.368
A13	0.367
A14	0.572
A15	0.419
A16	0.716
A17	0.716
A18	0.527
A19	0.532
A20	0.412
A21	0.727
A22	0.433
A23	0.575
A24	0.730
A25	0.361
A26	0.433

A27	0.355
A28	0.398
A29	0.621
A30	0.430

Based on the results presented in Table 2, it can be seen that all questionnaire factors have correlation values (r) greater than the rtable value of 0.334. This indicates that all indicators used in the questionnaire are valid and capable of measuring the variables intended in this study. The obtained rrr values range from 0.351 to 0.730, which shows that each factor has a sufficient level of correlation with the total score of its respective variable. Therefore, it can be concluded that all 30 questionnaire items are valid and suitable for further analysis, such as reliability testing and subsequent statistical analysis in this research.

3.3 Reliability Test

Reliability analysis is used to determine the consistency of the questionnaire in measuring the research variables. This analysis predicts the correlation between the constructed scale and all existing scales using the Cronbach’s Alpha coefficient. A questionnaire is considered reliable if the Cronbach’s Alpha coefficient is ≥ 0.6 , indicating that the instrument can consistently measure the same object or variable. The results of the reliability test are presented in Table 3.

TABLE 3
 RELIABILITY TEST RESULTS

No	Number of Factors	Cronbach’s Alpha	Description
1	30	0.896	Reliable

Based on the results of the reliability analysis for all factors, the reliability coefficient obtained is 0.896. This indicates that the questionnaire instrument is highly reliable because it exceeds the minimum Cronbach’s Alpha coefficient requirement of 0.6. Therefore, the questionnaire is considered suitable and reliable to be used for further data analysis in this study.

3.4 Descriptive Statistical Analysis

Descriptive statistical analysis was conducted to identify the factors that most significantly influence the quality performance of construction projects. The analysis employed the mode value to determine the most frequently occurring responses, representing the options most commonly selected by the respondents. The results of the mode value analysis are presented in Table 4.

TABLE 4
 MODE VALUES OF QUALITY PERFORMANCE FACTORS

Factor	Number of Respondents	Mode	Category
A1	35	5	Very Influential
A2	35	4	Influential
A3	35	4	Influential
A4	35	4	Influential
A5	35	5	Very Influential
A6	35	3	Moderately Influential
A7	35	4	Influential
A8	35	4	Influential
A9	35	4	Influential
A10	35	5	Very Influential
A11	35	3	Moderately Influential
A12	35	3	Moderately Influential
A13	35	4	Influential
A14	35	4	Influential
A15	35	5	Very Influential
A16	35	5	Very Influential
A17	35	5	Very Influential
A18	35	4	Influential
A19	35	3	Moderately Influential
A20	35	4	Influential
A21	35	3	Moderately Influential
A22	35	5	Very Influential
A23	35	3	Moderately Influential
A24	35	4	Influential
A25	35	2	Low Influence
A26	35	4	Influential
A27	35	4	Influential
A28	35	4	Influential
A29	35	4	Influential

Factor	Number of Respondents	Mode	Category
A30	35	5	Very Influential

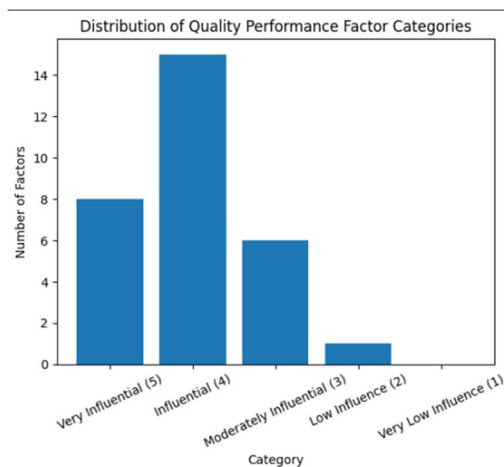


Fig. 1 Distribution of Quality Performance Factor Categories

Based on the results presented in Table 4 and Fig. 1, eight factors were identified as having a very significant influence on the quality performance of contractors in Aceh Besar Regency. These factors include lack of work experience, inadequate project financial planning, labor strikes, poor equipment quality, low-quality materials, insufficient workforce, non-compliant material specifications, and difficulties in material procurement.

The three most dominant factors influencing the quality performance of construction projects are explained as follows:

1) Lack of Work Experience

This factor is identified as the most influential factor affecting the quality performance of construction projects. Based on the analysis results, 15 out of 35 respondents selected scale 5 (very influential), as indicated by the mode value. Inadequate experience, particularly among newly recruited workers, often results in poor workmanship and slower work progress, which may require rework to achieve the expected quality standards. Therefore, companies are encouraged to organize seminars or specialized training programs for workers to enhance their skills and experience.

Such training activities are essential in improving workers’ knowledge and practical abilities in performing their tasks.

2) Insufficient Number of Workers

This factor is ranked as the second most influential factor affecting project quality performance. The analysis shows that 12 out of 35 respondents rated this factor as very influential (scale 5) based on the mode value. Labor is a critical component in construction projects, as it plays a key role in ensuring project success. A shortage of workers can slow down project progress, leading to time pressure that may cause a decline in work quality, as the focus shifts toward meeting deadlines rather than maintaining quality standards.

3) Occurrence of Labor Strikes

This factor is identified as the third most influential factor affecting the quality performance of construction projects. Based on the analysis, 13 out of 35 respondents selected scale 5 (very influential), as indicated by the mode value. Labor strikes can significantly disrupt project implementation, as construction activities may come to a complete halt. Additionally, materials that have already been delivered to the project site may deteriorate or become unsuitable for use when work resumes. Therefore, contractors must maintain good relationships with workers to prevent conflicts and ensure smooth project execution, ultimately supporting the achievement of the desired quality performance.

IV. CONCLUSIONS

The results of the data analysis indicate that there are 8 factors categorized as very influential, 15 factors as influential, 6 factors as moderately influential, 1 factor as having low influence, and no factors categorized as having very low influence. Furthermore, based on the questionnaire survey and data analysis, eight quality performance factors were identified as having a very significant influence on construction projects for contractors. These factors include lack of work experience, insufficient number of workers, occurrence of labor

strikes, low quality of materials, materials not meeting specifications, difficulties in material procurement, poor equipment quality, and inadequate project financial planning.

REFERENCES

- [1] Republic of Indonesia, *Law of the Republic of Indonesia Number 18 of 1999 concerning construction services*. 1999.
- [2] S. K. Yaman, P. Hassan, N. M. Yusop, N. E. Hashim, H. Mohammad, and H. Abu Bakar, "Factors affecting quality in construction project life cycle (CPLC)," *Int. J. Integr. Eng.*, vol. 14, no. 1, pp. 322–335, 2022.
- [3] A. Rauzana, D. A. Usni, F. T. Sipil, U. S. Kuala, and B. Aceh, "Kajian Faktor-Faktor Penyebab Rendahnya Kinerja Mutu pada Proyek Konstruksi di Provinsi Aceh," vol. 26, no. 2, pp. 267–274, 2020.
- [4] A. Rauzana and W. Dharma, "Causes of delays in construction projects in the Province of Aceh, Indonesia," *PLoS One*, vol. 17, no. 1, p. e0263337, 2022, doi: 10.1371/journal.pone.0263337.
- [5] PMI, *A guide to the project management body of knowledge (PMBOK guide)*, 6th ed. USA: Newton Square, USA: Project Management Institute., 2017. [Online]. Available: <https://www.pmi.org/pmbok-guide-standards>
- [6] PMI, *A guide to the project management body of knowledge (PMBOK® Guide)*, 7th ed. 2021.
- [7] O. S. Williams, R. Adul Hamid, and M. S. Misnan, "Accident Causal Factors on the Building Construction Sites: A Review," *Int. J. Built Environ. Sustain.*, vol. 5, no. 1, pp. 78–92, 2018, doi: 10.11113/ijbes.v5.n1.248.
- [8] A. Rauzana, "Implementation of Quality Management System in Construction," *Am. J. Eng. Res.*, vol. 6, no. 12, pp. 173–179, 2017.
- [9] Sudarto, "The Effect of Project Manager Quality on Decent Rewards." University of Indonesia, 2001.
- [10] K. N. Jha and K. C. Iyer, "Critical factors affecting quality performance in construction projects," *Total Qual. Manag. Bus. Excell.*, vol. 17, no. 9, pp. 1155–1170, 2007, doi: <https://doi.org/10.1080/14783360600750444>.
- [11] A. Rauzana, A. Bakar, and M. . Yusof, "The Influence of Uncertainty Variables on Cost Estimation Lesson Learned From Construction Industry in Indonesia," *Aust. J. Basic Appl. Sci.*, vol. 9, no. 7, pp. 380–385, 2015.
- [12] Y. J. Park and C. Y. Yi, "Resource-based quality performance estimation method for construction operations," *Appl. Sci.*, vol. 11, no. 9, p. 4122, 2021, doi: <https://doi.org/10.3390/app11094122>.
- [13] V. Pavate, S. Thorushe, S. Dharmadhikari, G. Dalavi, S. Sawant, and V. Powar, "A Review - Factors Affecting on Time , Cost and," no. February, 2024.
- [14] Sugiyono, *Statistik Nonparametris untuk Penelitian*. Bandung: Alfabeta, 2015.
- [15] Sugiyono, *Combined Research Methods (Mixed Methods)*. Bandung: Alfabeta, 2013.
- [16] W. M. Vagias, *Likert-type scale response anchors*. Clemson International Institute for Tourism & Research Development,. Department of Parks, Recreation and Tourism Management, Clemson University., 2006.
- [17] V. Peansupap and R. Ly, "Evaluating the Impact Level of Design Errors in Structural and Other Building Components in Building Construction Projects in Cambodia," *Procedia Eng.*, vol. 123, pp. 370–378, 2015, doi: 10.1016/j.proeng.2015.10.049.
- [18] J. F. Hair, G. T. M. Hult, C. M. Ringle, and M. Sarstedt, *A Primer on Partial Least Squares Structural Equation Modeling (PLS-SEM)*. SAGE Publications, 2021.