ANALYSIS OF THE DETERMINING FACTORS FOR THE SUCCESS OF THE IMPLEMENTATION OF THE SP8 ROAD RECONSTRUCTION/ROAD IMPROVEMENT PROJECT – LUBUK PINANG, MUKOMUKO REGENCY

Sutangwin[1], Chandra Afriade Siregar [2], A.Andini Radisya Pratiwi[3], R Didin Kusdian.[4], Dody Kusmana[5], Djoko Pitoyo[6]

Master of Civil Engineering Study Program, Universitas Sangga Buana YPKP Bandung
email: Balkisb901836@gmail.com

ABSTRACT

This study aims to identify the determining factors for the success of construction projects and determine the most dominant factors supporting the successful implementation of the SP8 – Lubuk Pinang Road Reconstruction/Improvement Project in Mukomuko Regency. The research method used is factor analysis with a quantitative approach, using a total sampling of 108 project workers as respondents. The results of the descriptive analysis indicate that the project implementation was generally categorized as very good, with an average success rate of 91.3%. All variables, including technology/equipment, materials, human resources, work management, financial aspects, and weather and work environment conditions, scored high, above 91%, indicating that the project was executed professionally and efficiently. However, the material management aspect remains a concern for future improvement. Through factor analysis, four main groups of factors determining project success were identified: (1) Project Resource Quality and Readiness, (2) Work Discipline and Safety Support, (3) Contractor Adaptive Capability and Environmental Support, and (4) Professional Standardization and Competence. Of these four factors, Project Resource Quality and Readiness was the most dominant, with the highest eigenvalue of 14.962 and a contribution to the variance of 59.848%. This factor encompasses the adequacy and technical specifications of equipment, material quality, and workforce competence.

Keywords: Project success, road construction, factor analysis, external factors, internal factors

INTRODUCTION

The construction sector, like other sectors, plays a crucial role in supporting national economies in various countries around the world. Evaluation of the results of construction activities is often conducted using the concept of "value added," which refers to the difference between the value of construction sector production and the costs incurred to produce those products (Mito, 2019). The construction industry plays a crucial role in the development of a country's infrastructure and facilities and makes a significant contribution to national economic development. The rapid growth of the construction industry in many developing countries has created extensive employment opportunities for a diverse workforce. This sector is expected to continue to grow in the future (Manoharan et al., 2022).

The construction industry is crucial because rapid economic growth has increased demand for infrastructure and facilities worldwide. This industry also provides the basic conditions for the sustainability and development of human life on Earth. To address increasing population growth, pressure on land, and burgeoning economic growth, construction projects are gaining popularity and are rapidly expanding in many countries. Furthermore, these projects and initiatives are implemented to ensure that a country's economic growth can support and create broad connections within the economy. To successfully implement these projects and achieve their objectives throughout their service life, effective project management practices must be adopted from the planning stage through completion (Ibrahim & Daniel, 2019).

Roads are critical infrastructure across various sectors. This is stated in Law Number 38 of 2004 concerning Roads, which states that roads are transportation infrastructure that plays a vital role in the economic, socio-cultural, environmental, political, and defense and security sectors. Furthermore, Law Number 22 of 2009 concerning Road Traffic and Transportation states that national roads play a vital role in the distribution of goods and people. To support this crucial role, roads are expected to be kept in good condition. Road stability is crucial for facilitating vehicle movement.

The basic principle of infrastructure asset management is the task, knowledge, and science of managing infrastructure throughout its life cycle so that it can function effectively, efficiently, and sustainably (Suprayitno & Soemitro, 2018). To implement these basic asset management principles, the Director General of Highways at the Ministry of Public Works and Public Housing implemented a Road Preservation program.

In Bengkulu Province, especially Mukomuko Regency, one of the strategic projects currently being implemented is the reconstruction/improvement of the SP8 – Lubuk Pinang Road, which is an important connecting route between the center of economic activity and rural areas. Mukomuko Regency partly consists of hilly land and partly coastal and ocean areas. The Mukomuko Regency area stretches from Southeast to Southwest with a coastline of ± 98.218 Km. With management rights up to a limit of 4 miles, meaning the area of the sea area of Mukomuko Regency is ± 727.6 Km² or 72,760.106 Ha. Mukomuko Regency is one of the regencies in Bengkulu Province which is a split regency from North Bengkulu Regency, formed in 2003 based on Law Number 03 of 2003. The capital of this regency is Mukomuko City with a distance of 197.70 km from Bengkulu City or is the furthest regency in Bengkulu Province. With an area of 4,146.34 km² and consisting of 15 sub-districts.

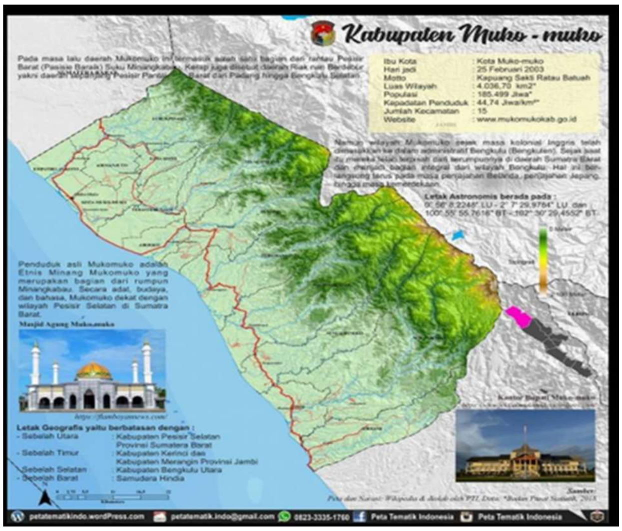

Figure 1.1 Map of Mukomuko Regency

The following are the boundaries of Mukomuko Regency:

1. To the north, it borders West Sumatra Province.
2. To the south, it borders North Bengkulu Regency.
3. To the east, it borders Jambi Province.
4. To the west, it borders the Indian Ocean.

The Mukomuko Regency Public Works and Spatial Planning Agency has a program for planning, construction, and maintenance of roads and bridges in Mukomuko Regency, Bengkulu Province. In 2023, one of the activities implemented was the Reconstruction/Improvement of the SP8 – Lubuk Pinang Road in Mukomuko Regency. This project aims to improve connectivity between sub-district roads and the regency capital, making it crucial for boosting the community's economy.

In the implementation of construction projects in Mukomuko Regency, particularly infrastructure development, the government, as the project owner, plays a crucial role in achieving project objectives. To ensure that the project meets its intended objectives, the government delegates responsibility to contractors and consultants for project implementation. The contractor's scope of work on a project is to execute work in accordance with their expertise, experience, and specialization. The consultant assists the owner with various studies and provides expert support in monitoring and controlling the physical implementation of the project.

The success of a construction project can be measured in two ways: profits and timely completion. This success depends on sound planning of project methods, equipment, and timelines. Construction work is faced with unpredictable internal and external conditions, thus posing various challenges. National road projects often encounter various obstacles, such as delays, quality standards that do not meet Road Performance Indicator (ROI) standards, mismatches between planned resources and implementation, and external factors such as unpredictable weather, which can hinder the project's success. Those implementing the Road Preservation, Reconstruction, and Improvement of the SP8 – Lubuk Pinang Road in Mukomuko Regency must be prepared for unpredictable situations and be able to effectively resolve problems to ensure implementation is carried out according to plan.

Project success is determined not only by the availability of funds, but also by many other factors, such as the suitability of the technology and equipment used, the quality and accuracy of materials, human resource competence, work management effectiveness, and external factors such as weather and geographic conditions. Problems frequently encountered in the field include delays in project completion, non-compliance with technical specifications, and poor construction quality.

Based on previous studies, factors such as inadequate planning, minimal oversight, low contractor capacity, and logistical distribution constraints contributed to the failure of optimal project implementation (Nugroho, 2021; Hardiyanto, 2023). Therefore, a comprehensive analysis is needed to identify factors influencing the success of the SP8 – Lubuk Pinang Road reconstruction project. The results of this analysis are expected to inform decision-making for stakeholders, particularly in improving the effectiveness of road construction projects in Mukomuko Regency and the surrounding area.

Given these issues, an analysis of the factors influencing the success of the SP8 – Lubuk Pinang Road Preservation, Reconstruction/Improvement contract in Mukomuko Regency is necessary. If these success factors are met during the implementation of the SP8 – Lubuk Pinang Road Preservation, Reconstruction/Improvement contract, Mukomuko Regency, will significantly impact the project's success and is expected to meet the Road Performance Indicators, thus eliminating payment deductions, ensuring construction quality meets technical specifications, and ensuring timely completion of work.

Based on the background outlined above, the researcher is interested in conducting further research entitled "Analysis of Determining Factors for the Success of the SP8 Road Reconstruction/Improvement Project - Lubuk Pinang, Mukomuko Regency."

METHOD

The research methods used in this study are descriptive and verification. A descriptive method is used to describe the condition or value of one or more variables independently, while a verification method can be defined as research conducted on a specific population or sample with the aim of testing a predetermined hypothesis. The population in this study was 108 workers on the SP8 Road Reconstruction/Improvement Project - Lubuk Pinang, Mukomuko Regency. The sample used in this study was obtained using a non-probability sampling technique with saturated sampling.

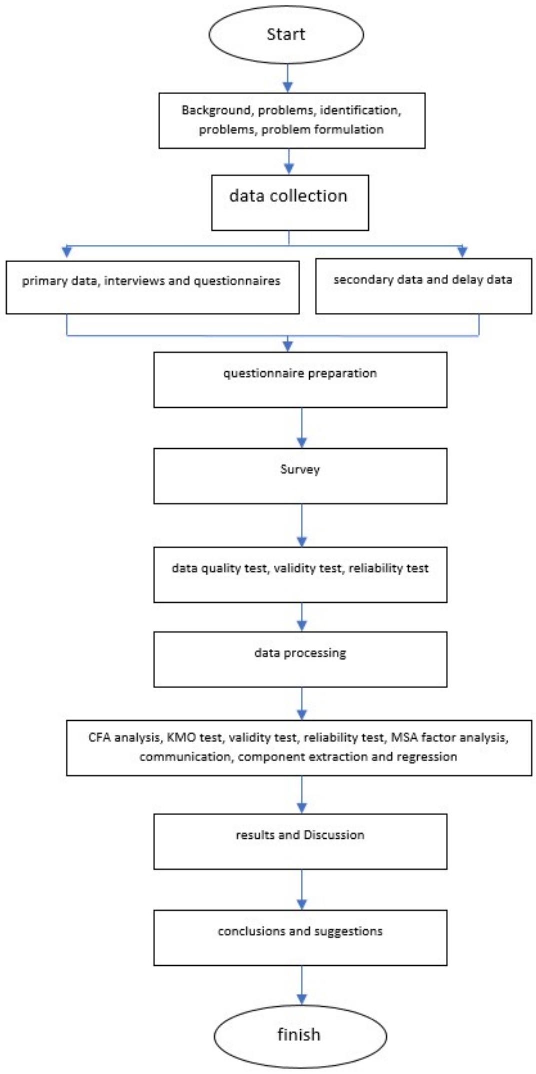

Figure 3.1 Research Flowchart

3.2.6.2 Factor Analysis

Factor analysis is used for exploratory research to identify factors influencing variables before they are clearly known. Furthermore, this analysis can test the validity of questionnaires, where indicators that do not cluster within a variable are considered invalid. Factor analysis simplifies a large number of variables into several main factors with similar characteristics, based on the correlation between the variables.

Prior to analysis, a normality test was conducted to ensure normal data distribution, followed by the KMO test (≥0.5) and Bartlett's Test of Sphericity ($p < 0.05$) to check the adequacy of the correlation between variables. The Determinant of Correlation Matrix was used to assess the interrelationships between variables (values close to 0 indicate variables are interrelated).

The main method was Principal Component Analysis (PCA), which reduces the data to factors that contain the maximum variance. The number of factors was determined based on eigenvalues (>1), the percentage of cumulative variance, and a scree plot. Factor rotation (varimax) was used to simplify interpretation, ensuring that each variable had a high factor loading on one factor and a low factor loading on another.

Significant factor loadings were determined based on sample size; in this study, with a sample size of 108, the threshold factor loading was 0.55. Once the factors were formed, they were named based on the characteristics of their member variables, and validation was performed by dividing the sample to ensure the stability and generalizability of the results.

RESULTS AND DISCUSSION

4.2 Factor Analysis Results

Factor analysis is a technique for analyzing the relationships between several interrelated variables, with the goal of simplifying the variables under study into fewer factors than the initial number (Santoso, 2006). This study used the Confirmatory Factor Analysis (CFA) method because it identifies the structure of relationships between variables by revealing the factors (dimensions) underlying those relationships.

4.3.1 Kaiser-Mayer-Olkin (KMO) Test and Bartlett's Test of Sphericity

The Kaiser-Mayer-Olkin (KMO) Test, Measure of Sampling Adequacy (MSA), and Bartlett's Test of Sphericity were conducted to determine the feasibility of factor analysis. The Measure of Sampling Adequacy (MSA) test, with a value ranging from 0 to 1, questions the appropriateness of factor analysis. A high index value (ranging from 0.5 to 1.0) indicates that factor analysis is feasible. However, a KMO value below 0.5 indicates that factor analysis is not feasible. Meanwhile, Barlett's test of sphericity is used to test the correlation between variables. A significant Barlett's test of sphericity indicates that the correlation matrix has a significant correlation with a number of variables. The following table shows the results of the KMO and Barlett tests using SPSS 25 software.

Table 4.12 Results of the Kaiser Meyer Olkin (KMO) and Bartlett's Test

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.806
Bartlett's Test of Sphericity	Approx. Chi-Square	3307.267
	df	300
	Sig.	.000

Source: Author's Processed Results, 2025

The output table above shows that the KMO-MSA value of 0.806 (greater than 0.5) indicates that the variables can be predicted and further analyzed. The Bartlett's Test of Sphericity significance value of 0.000 (less than 0.05) indicates that the research variables can be predicted and further analyzed.

4.3.1 Anti-Image Matrices

In addition to the KMO-MSA value indicating the feasibility of factor analysis, this is also supported by the results of the Anti-image Matrices. These values are found on the main diagonal, indicated by the numbers marked with the letter (a). The value must be greater than 0.5 because this number indicates how much an indicator can be explained by other indicators; the higher the value, the better. Table 4.16 shows the Anti-image Matrices values for each indicator. This table indicates that all indicators have an anti-image correlation value above 0.5, allowing for further analysis. The following Anti-image

Matrices values are formed as in table 4.13 below.

Table 4.13 Anti Image Matrices Values

Item	***Anti-image Matrices***
X1.1	.901
X1.2	.685
X1.3	.721
X1.4	.849
X1.5	.877
X2.1	.798
X2.2	.811
X2.3	.842
X3.1	.837
X3.2	.825
X3.3	.854
X3.4	.783
X3.5	.759
X3.6	.885
X4.1	.691
X4.2	.804
X4.3	.869
X5.1	.884
X5.2	.740
X6.1	.742
X7.1	.859
X7.2	.720
X7.3	.873
X7.4	.789
X7.5	.836

Source: Author's Processed Results, 2025

4.3.1 Variable Extraction

The next stage of factor analysis is extracting a set of selected variables to form one or more factors. This can be seen from the magnitude of the communality of the variables described in each item. The greater the communality of a variable, the stronger the relationship between the variable and the factors formed. Conversely, the lower the communality of a variable, the weaker the relationship between the variable and the factors formed. The communality values for the variables can be seen in Table 4.17.

Table 4.14 Communality Values

Communalities		
	Initial	Extraction
X1.1	1.000	.829
X1.2	1.000	.872
X1.3	1.000	.816
X1.4	1.000	.672
X1.5	1.000	.898
X2.1	1.000	.701
X2.2	1.000	.554
X2.3	1.000	.793
X3.1	1.000	.839
X3.2	1.000	.626

X3.3	1.000	.604
X3.4	1.000	.835
X3.5	1.000	.754
X3.6	1.000	.732
X4.1	1.000	.751
X4.2	1.000	.781
X4.3	1.000	.719
X5.1	1.000	.757
X5.2	1.000	.715
X6.1	1.000	.826
X7.1	1.000	.693
X7.2	1.000	.772
X7.3	1.000	.772
X7.4	1.000	.818
X7.5	1.000	.858
Extraction Method: Principal Component Analysis.		

Source: Author's Processed Results, 2025

The table above shows the initial and extraction values. The initial value represents the variable variance before extraction, and the extraction value reflects the percentage of a variable's variance that can be explained by the factors to be formed. A higher extraction value indicates a stronger relationship with the factors to be formed. The table above shows that each variable has a value above 0.5, and variables with values closer to 1 have a strong relationship with the factors to be formed.

4.3.1 Determining the Number of Factors (Factoring)

The number of factors needed to represent the variables to be analyzed is based on the magnitude of their eigenvalues and the percentage of total variance. Only factors with an eigenvalue ≥ 1 are retained in the factor analysis model, while others are excluded. The results of the Total Variance Explained table are shown in Table 4.18.

Table 4.15 Total Variance Table

Component	Initial Eigenvalues		
	Total	% of Variance	Cumulative %
1	14.962	59.848	59.848
2	1.566	6.263	66.111
3	1.425	5.701	71.812
4	1.037	4.147	75.959
5	.952	3.806	79.766
6	.769	3.078	82.843
7	.682	2.726	85.570
8	.567	2.269	87.839
9	.484	1.938	89.777
10	.427	1.708	91.485
11	.309	1.235	92.720
12	.300	1.200	93.920
13	.277	1.109	95.029
14	.239	.955	95.984
15	.219	.875	96.858
16	.159	.636	97.494
17	.144	.575	98.069
18	.118	.470	98.539
19	.105	.419	98.958
20	.070	.279	99.237
21	.061	.242	99.479
22	.053	.211	99.690

23	.042	.167	99.856
24	.023	.093	99.949
25	.013	.051	100.000

Extraction Method: Principal Component (*Source: Author's Processed Results, 2025)*

Table 4.18 shows that the number of factors formed is four: the first factor has an eigenvalue of 59.848, the second factor has an eigenvalue of 6.263, the third factor has an eigenvalue of 5.701, and the fourth factor has an eigenvalue of 4.147. From this table, two factors are identified, each with a variance percentage of 60%, 6.263%, 5.701%, and 4.147%. Thus, a total of 75.959% of all variables can be explained by the four factors formed.

Furthermore, the number of factors can also be seen from the resulting scree plot diagram. The scree plot illustrates the relationship between the number of factors formed in graphical form, as shown in Figure 4.8.

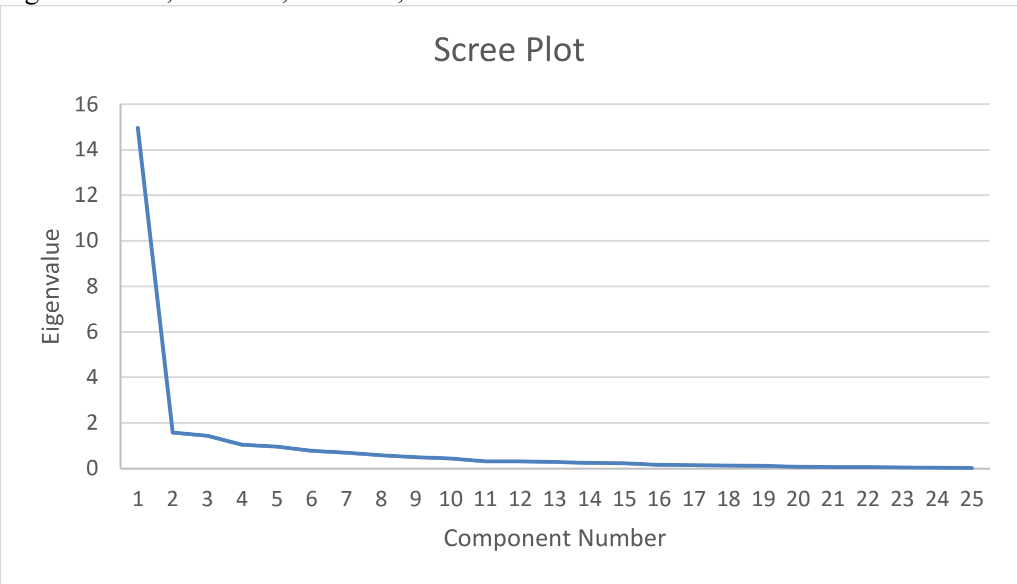

Figure 4.4 Scree Plot

Figure 4.8 shows the results of grouping based on the new eigenvalues. The higher the eigenvalue of a factor, the higher its placement. Four factors have eigenvalues above 1.0, while items along the descending line have eigenvalues below 1.0.

4.3.1 Factor Rotation

According to Sutopo and Slamet (2015), factor rotation is essential to avoid difficulties in interpreting the new factors. This study used orthogonal rotation with the varimax (variance of maximum) procedure because it produces a simple factor structure by maximizing the sum of the variances of the factors containing the squared loading values. The results of the factor rotation are shown in Table 4.19 below.

Table 4.16 Rotation Factor Values

Rotated Component Matrix[a]				
	Component			
	1	2	3	4
X1.1	.742	.452	.197	.191
X1.2	.769	.061	.525	.031
X1.3	.798	.206	.217	.299
X1.4	.324	.285	.689	.104

X1.5	.791	.167	.199	.454
X2.1	.629	.477	.280	-.009
X2.2	.455	.415	.155	.389
X2.3	.566	.565	.260	.292
X3.1	.694	.498	.300	.136
X3.2	.490	.471	.352	.198
X3.3	.446	.366	.255	.454
X3.4	.093	.803	.219	.366
X3.5	.252	.435	.586	.398
X3.6	.183	.142	.608	.556
X4.1	.191	.267	.222	.771
X4.2	.331	.243	.473	.623
X4.3	.065	.437	.575	.440
X5.1	.427	.538	.177	.504
X5.2	.456	.232	.667	.094
X6.1	.393	.160	.719	.360
X7.1	.173	.348	.683	.274
X7.2	.304	.710	.397	.132
X7.3	.255	.794	.160	.227
X7.4	.674	.196	.264	.505
X7.5	.375	.762	.346	.132
Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization.				
a. Rotation converged in 9 iterations.				

Source: Author's Processed Results, 2025

Table 4.20 shows the distribution of the extracted variables into the formed factors based on their factor loadings after the rotation process.

4.3.1 Factor Transformation Matrix

The correlation value between factors 1 to 4 can be determined by examining the Factor Transformation Matrix. The Factor Transformation Matrix is shown below in Table 4.20.

Table 4.17 Factor Transformation Matrix

Component Transformation Matrix				
Component	1	2	3	4
1	.571	.520	.488	.406
2	-.818	.372	.277	.341
3	-.022	-.756	.579	.304
4	-.067	.137	.592	-.792
Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization.				

Source: Author's Processed Results, 2025

4.3.1 Factor Naming

Based on the Rotated Component Matrix results in Table 4.21, each statement item is grouped into four factors based on its factor loading value. To facilitate interpretation, the researcher named each factor by considering the similarity of themes and the interrelationships between the indicators that make up each factor group.

Table 4.18 Grouping of Statement Items according to Factor Loading Order

Factor	***Item***	Statement	***Factor Loading***
1	X1.3	The availability of key equipment is sufficient to support project implementation.	**0.798**
	X1.5	The technology of the key equipment used in this project is up-to-date and relevant to project needs.	0.791
	X1.2	The technical specifications of the key equipment align with project requirements.	0.769
	X1.1	The key equipment used in this project functions as expected.	0.742
	X3.1	The workforce has relevant experience related to the work performed on this project.	0.694
	X7.4	Adequate lighting in the work area helps me work more carefully and efficiently.	0,674
	X2.1	The materials used are of good quality and meet the specified specifications.	0.629
	X2.3	Materials are delivered to the project site on time, according to the predetermined schedule.	0.566
	X3.2	The number of available workers is sufficient to complete the work on time.	0.490
	X2.2	The volume of available materials is sufficient for the smooth implementation of the project.	0.455
2	X3.4	The contractor adheres to the road performance standards as stipulated in the contract to meet the specified service level.	0.803
	X7.3	The availability and use of protective equipment (PPE) makes me feel safe and supports the smooth progress of the project.	0.794
	X7.5	I am able to control my emotions and maintain a professional work ethic even under the pressure of completing the project.	0.762
	X7.2	Neatly organized and stored materials facilitate work and expedite project completion.	0.710
	X5.1	The available funds were sufficient to complete the project according to plan and budget.	0.538
3	X6.1	The project was completed on time despite unexpected weather conditions.	0.719
	X1.4	The contractor had sufficient essential equipment to complete the work within the specified timeframe.	0,689

Factor	***Item***	Statement	***Factor Loading***
	X5.2	The budget allocated for this project was sufficient to cover all operational needs.	0.667
	X7.1	A comfortable and orderly work environment supported my focus and productivity throughout the project.	0.683
	X3.6	The contractor was adaptable to changes or addendums to the contract.	0.608
	X3.5	The contractor possessed the technical expertise necessary for the project.	0.586
	X4.3	The work methods used were appropriate to the project's environmental conditions.	0.575
4	X4.1	The work methods applied met established quality standards.	0.771
	X4.2	The work methods applied were appropriate to the characteristics of the materials used.	0.623
	X3.3	Most of the workforce held certifications relevant to their duties on this project.	0.485

Source: Author's Processed Results, 2025

Based on Table 4.21, the researcher attempted to name the factors by identifying each statement item and their interrelationship within a single factor.

Factor 1: Project Resource Quality and Readiness

The first factor includes the ten items with the highest loadings on the first component, including:

• X1.3 (0.798) – The availability of sufficient quantities of key equipment to support project implementation.
• X1.5 (0.791) – The technology of the key equipment used is up-to-date and relevant.
• X1.2 (0.769) – The technical specifications of the equipment meet project requirements.
• X1.1 (0.742) – The key equipment functions as expected.
• X3.1 (0.694) – The workforce has relevant experience.
• X7.4 (0.674) – Adequate lighting supports work accuracy.
• X2.1 (0.629) – Materials are of good quality and meet specifications.
• X2.3 (0.566) – Materials are delivered on time.
• X3.2 (0.490) – The number of workers is sufficient.
• X2.2 (0.455) – The volume of materials available is sufficient for the smooth running of the project.

Factor Meaning: All of these indicators describe the readiness, completeness, and quality of key resources (equipment, labor, materials), as well as supporting working conditions. Therefore, it is called "Project Resource Quality and Readiness."

Factor 2: Work Discipline and Safety Support

The second factor consists of the five items with the highest loadings on the second component:

• X3.4 (0.803) – The contractor complies with contractual performance standards.
• X7.3 (0.794) – The use of PPE supports safety and smooth work.
• X7.5 (0.762) – Emotional control under project pressure.
• X7.2 (0.710) – Materials are neatly arranged, making the job easier.
• X5.1 (0.538) – Sufficient funds are available to complete the project as planned.

Factor Significance: These items indicate adherence to standards, orderly work area organization, safety, and work discipline under pressure. Therefore, it is called "Work Discipline and Safety Support."

Factor 3: Contractor Adaptability and Environmental Support

The third factor consists of seven items:

• X6.1 (0.719) – The project is completed on time despite changing weather.

• X1.4 (0.689) – Major equipment is sufficient to meet the deadline.

• X5.2 (0.667) – The budget is sufficient to cover all operational needs.

• X7.1 (0.683) – A comfortable and orderly work environment.

• X3.6 (0.608) – Adaptability to contract changes.

• X3.5 (0.586) – The contractor's technical capabilities meet project requirements.

• X4.3 (0.575) – Work methods are appropriate to the project's environmental conditions.

Factor Significance: Describes the contractor's ability and environmental conditions to address project dynamics, including timeliness, weather adjustments, and efficient work methods. Hence, it is named "Contractor Adaptive Capability and Environmental Support."

Factor 4: Standardization and Professional Competence

The fourth factor contains the following three items:

• X4.1 (0.771) – Work methods comply with quality standards.

• X4.2 (0.623) – Work methods comply with material characteristics.

• X3.3 (0.485) – Workers possess relevant expertise certification.

Factor Significance: This item indicates the standard of implementation and the validity of the technical competence of the workers. Therefore, it is named "Standardization and Professional Competence."

4.3.1 Discussion of Research Results

4.3.1.1 Success Rate of the SP8 Road Reconstruction/Improvement Construction Project – Lubuk Pinang, Mukomuko Regency

Based on the data processing results, the project implementation success rate was 92.73%. This value indicates a high level of success because it falls within the very good category. Based on the descriptive analysis that has been carried out, the following respondents' responses to each variable are shown in Table 4.19.

Table 4.19 Respondents' responses to each variable

Variables	Score	%	Category
Technology/Equipment	2488	92,15	Sangat Baik
Materials	1476	91,11	Sangat Baik
Human Resources (HR)	2999	92,63	Sangat Baik
Work Management	1497	92,41	Sangat Baik
Finance	997	92,31	Sangat Baik
Weather	493	91,30	Sangat Baik
Work Environment	2521	93,37	Sangat Baik
Average	1781,57	91,3	Sangat Baik

Source: Author's Processed Results, 2025

Based on the data in the table, it can be concluded that all variables analyzed in the implementation of the SP8 – Lubuk Pinang Road Construction Project in Mukomuko Regency fall into the "Very Good" category. The highest score was for the Work Environment variable, with a percentage of 93.37%, followed by Human Resources (HR) at 92.63%, Work Management at 92.41%, Finance/Financial Affairs at 92.31%, Technology/Equipment at 92.15%, Weather at 91.30%, and Materials with the lowest score, at 91.11%. The overall average for all seven variables was 91.3%, also in the "Very Good" category.

The high score for the Work Environment variable indicates that a safe, orderly, and productive work environment is the most beneficial factor for workers and project implementers. Furthermore, HR and Work Management also demonstrated very optimal performance, indicating that the availability of a competent workforce and an organized work system are essential foundations for supporting the smooth running of the project. Although the Materials variable scored the lowest, its value still indicates a very good rating. This should be a particular focus for improving the efficiency of procurement, quality, and distribution of materials in the future. Overall, these results reflect that the project implementation has been very well managed, but ongoing maintenance and improvement are still required, especially in variables with relatively lower scores to maintain optimal project performance.

Determining Factors for the Success of the SP8 – Lubuk Pinang Road Reconstruction/Improvement Project, Mukomuko Regency

The success of a road construction project does not depend solely on a single aspect but rather on the integration of various factors. The factor analysis reveals that the success of the SP8 – Lubuk Pinang Road Reconstruction/Improvement project is determined by four main factors.

The Quality and Readiness of Project Resources are the primary foundation, as they relate to the efficient and effective use of resources in project implementation. If equipment is functioning optimally, quality materials are available on time, and a sufficient and experienced workforce is available, construction activities can proceed without significant obstacles. Delays and cost overruns can be avoided if these resources are readily available from the outset.

Work Discipline and Safety Support are also crucial factors because project success depends heavily on an orderly, organized work culture that maintains safety. This aspect is also closely related to the productivity and morale of the field workforce. A safe and procedural work environment can increase work time efficiency and reduce the potential risk of accidents.

The third factor, Contractor Adaptive Capability and Environmental Support, emphasizes the importance of the contractor's ability to manage project dynamics and uncertainty. In highway projects, weather changes, design changes (addendums), or other field dynamics are often unavoidable. The ability to adapt to these changes without compromising quality or delaying the project schedule is a key indicator of a professional contractor.

Finally, Standardization and Professional Competence explain that a successful project depends not only on tools and materials, but also on work methods and the expertise of human resources. The applied quality standards must be understood and consistently implemented by a certified and competent workforce, so that the final project results meet technical specifications and road user expectations.

The Most Dominant Factor Influencing the Successful Implementation of the SP8 Road Reconstruction/Improvement Project in Lubuk Pinang, Mukomuko Regency

Based on the Rotated Component Matrix calculation, the most dominant factor influencing the success of the project is Factor 1: Quality and Readiness of Project Resources. This is indicated by the highest number and factor loading values for the indicators in the first component, such as X1.3 (0.798), X1.5 (0.791), X1.2 (0.769), and X1.1 (0.742). The dominance of this factor indicates that the readiness of primary equipment, material quality, and the adequacy and experience of the workforce are the most crucial elements in ensuring the smooth running of the project.

The high influence of this factor confirms that in large-scale infrastructure projects such as road improvements, the foundation for success lies in the readiness of the resources used. Complete equipment that meets specifications, quality materials, and an experienced workforce ensure each stage of implementation runs according to plan, reducing the potential for delays or technical failures. Therefore, project management needs to pay special attention to the planning and provision of these resources from the outset to ensure optimal and timely implementation.

Furthermore, the dominance of this factor also indicates that hard resource aspects (equipment, materials, labor) remain a top priority in the context of infrastructure projects in Indonesia, particularly road projects in areas like Mukomuko Regency, which likely present unique logistical challenges. Therefore, for similar projects in the future, extra attention needs to be paid to resource planning from the early stages, from budgeting and vendor selection to field quality control.

In other words, this factor reflects the need for operational readiness and physical equipment, which are the foundation for project success. The role of management in ensuring this readiness, including equipment procurement, material warehouse management, and recruitment of competent labor, is a key factor that cannot be overlooked in any road construction project.

CONCLUSION

Based on the results of data collection, data processing, and analysis, the author can draw the following conclusions that address the research questions:

1. Based on the descriptive analysis, the success rate of the SP8 – Lubuk Pinang Road Reconstruction/Improvement project in Mukomuko Regency is in the very good category, with an average score of 91.3%. All variables related to technology/equipment, materials, human resources, work management, finance, weather, and the work environment scored above 91%, indicating that the project was carried out effectively and professionally. However, the lowest-scoring variable, such as materials, still requires attention in terms of procurement and distribution efficiency to maintain the quality of future project implementation.

2. Project success is determined by four main factors: the Quality and Readiness of Project Resources, Work Discipline and Safety Support, Contractor Adaptive Capability and Environmental Support, and Professional Standardization and Competence. These four factors complement each other and demonstrate that project success relies not only on physical resources but also on managerial and procedural aspects, and the ability to adapt to field dynamics. This reflects the importance of comprehensive planning and structured implementation in infrastructure projects.

3. Of the four factors identified through factor analysis, the Project Resource Quality and Readiness factor holds the most dominant position, with the highest eigenvalue of 14.962 and a variance contribution of 59.848%. This factor encompasses critical aspects such as the adequacy and technical specifications of key equipment, the quality and availability of materials, the experience of the workforce, and lighting and other work support. The dominance of this factor indicates that project success is highly dependent on the readiness and quality of physical resources and labor from the initial stages of implementation. Therefore, comprehensive resource planning and management efforts, from the selection of appropriate equipment and material quality control to the recruitment of competent labor, must be a top priority in every infrastructure construction project, particularly in areas with technical and geographical challenges such as Mukomuko Regency.

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