ANALYSIS OF THE INFLUENCE OF PROJECT MANAGER COMPETENCIES ON THE SUCCESS OF THE WAE KAMPAS IRRIGATION NETWORK IMPROVEMENT PROJECT IN COMPANG DALO VILLAGE, RUTENG DISTRICT, MANGGARAI REGENCY, EAST NUSA TENGGARA

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Abstract

The success of construction projects is significantly influenced by project management capabilities, leadership skills, and the strategic and business understanding of the project manager. This study aims to analyze the effects of Technical Project Management, Leadership Skill, and Strategic and Business Management on project success in the Irrigation Network Improvement Project of Wae Kampas in Compang Dalo Village, Ruteng District, East Nusa Tenggara, Indonesia. A quantitative approach was employed using multiple linear regression analysis. Data were collected through questionnaires distributed to 60 respondents involved in the project. The analysis revealed that all three independent variables have a significant partial and simultaneous influence on project success. The coefficient of determination (R^2) of 0.878 indicates that 87.8% of the variation in project success is explained by these variables. These findings underscore the importance of applying technical project management, effective leadership, and a comprehensive understanding of business and organizational strategy to ensure infrastructure project succes.

Keywords: *project manager competence, project success, irrigation, strategic management, PMI Talent Triangle.*

INTRODUCTION

The construction industry is a strategic sector experiencing rapid growth globally, including in Indonesia. This growth is characterized by an increase in the volume of construction projects and increasingly complex quality requirements in every aspect of project implementation. This phenomenon has a direct impact on the demands placed on construction service providers to continuously improve work quality, competitiveness, and efficiency in project implementation.

Facing the ever-evolving dynamics of development, the success of construction projects is determined not only by technical aspects but also by effective management. Construction projects are characterized by limited time, budget, and specific quality standards. These three elements are known as the triple constraint, which serves as the primary benchmark for determining project success (PMBOK Guide, 2017). Therefore, effective project management requires highly competent human resources, particularly in strategic positions such as project managers.

The project manager, as the leader of the implementation team, is responsible for ensuring that the project is completed within the established quality, time, and cost targets. To achieve this, the project manager must possess comprehensive managerial skills, including those covering the management of time, cost, risk, scope of work, procurement, human resources, and project integration. Among these competencies, human resource management skills are crucial, given that construction projects generally involve a large workforce. This competency encompasses the ability to coordinate, organize, and lead team members, which directly impacts overall project productivity and performance.

Project manager competencies are a crucial determinant of project success.

According to PMI (2017), project manager competencies encompass three key domains within the PMI Talent Triangle: technical project management, leadership, and strategic and business management. A project manager must be able to design realistic work schedules, allocate resources appropriately, and lead a team to achieve established goals efficiently and effectively.

The appointment of project managers in various agencies or construction companies is often not based on adequate competency standards. Appointments are often made suddenly or based on non-technical considerations, such as personal affinities or bureaucratic interests, rather than on the professional and capabilities of the individual concerned (Brahmantari, 2021). This has implications for weak managerial performance in project management, which in turn impacts the failure to achieve project targets.

Many previous studies have shown that a lack of project manager competence can lead to delays, cost overruns, and even a decline in the quality of construction results. In an apartment development project in Jakarta, failures in time management and internal coordination were found to cause project delays of up to 17.5% of the contractual time (Firdausi et al., 2022). This confirms that the presence of an incompetent project manager can be detrimental both technically and financially.

Brahmantari's (2021) research categorizes project manager competencies into six groups: leadership, professionalism, project and issue management, scope management, human resource management, and attitudinal aspects such as responsibility and the ability to prioritize decisions. The combination of these aspects forms the foundation for developing a reliable project manager.

Research by Prianto et al. (2020) also reinforces the importance of project manager competency in determining project success. They found that job competency, particularly in terms of skills and attitudes, significantly influences project completion on time, within budget, and with quality. However, many of these studies focus on large-scale national projects, such as high-rise buildings or toll roads, and few examine infrastructure projects at the regional or rural level.

Local-scale infrastructure projects, such as the construction of irrigation networks in rural areas, have distinct characteristics. These projects generally involve community participation, utilize local resources, and face limitations in terms of accessibility and funding. Therefore, project managers are needed who are not only technically competent but also understand the local social, cultural, and geographical context.

The Wae Kampas Irrigation Network Improvement Project in Compang Dalo Village, Ruteng District, is one such rural infrastructure project. This project has a total irrigation channel length of approximately 1,735 kilometers. This project is funded through the Special Allocation Fund (DAK) and the General Allocation Fund (DAU) for the 2023 fiscal year. The project, valued at over IDR 3.1 billion, was contracted in July 2023 and is scheduled for completion within 150 working days. Although the project is generally on schedule, its implementation faces significant challenges, such as hilly terrain, extreme weather conditions, and a limited skilled workforce.

These challenges demand high managerial competence from a project manager. The project manager's performance in planning, organizing, directing, and evaluating all construction activities is crucial. Furthermore, project success is measured not only by physical completion but also by the extent to which the project benefits the community in a sustainable manner.

Based on field observations, it was found that some project managers in the area lack the educational background and experience relevant to their duties and responsibilities. This has led to inefficiencies in resource allocation, conflicts in implementation, and low-quality work results at several project sites.

These issues impact not only the technical aspects of project implementation but also the credibility of the local government as the project implementer.

Results that do not meet specifications, work delays, and budget overruns lead to public disappointment and can hamper efforts to improve the quality of life through the development of basic infrastructure such as irrigation.

Given these issues, it is crucial to scientifically examine the extent to which project manager competency influences the success of construction projects, particularly irrigation network improvement projects in rural areas. This research is relevant because it can bridge the gap between project management theory and the reality of its implementation on the ground.

This research is also expected to provide theoretical and practical contributions. Theoretically, this study broadens understanding of the relationship between project manager competency and project success in the local context. Practically, the findings of this study can be used as a basis for formulating policies on recruitment, training, and capacity development for project managers in both government and private institutions.

This research highlights the importance of improving project manager competency as a strategic effort to ensure the success of regional construction projects. This study specifically highlights the Wae Kampas Irrigation Network Improvement Project as a representative case study illustrating the dynamics of project management in a region with limited resources but high development needs.

Based on this description, the researcher is interested in conducting a further study entitled: "Analysis of the Influence of Project Manager Competency on the Success of the Wae Kampas Irrigation Network Improvement Project in Compang Dalo Village, Ruteng District, East Nusa Tenggara."

LITERATURE REVIEW

Project Manager Competencies

Project manager competencies are a critical factor in determining project success or failure (Yulianto, 2019). Based on the National Competency Standards (SKKNI), regulated by Minister of Manpower and Transmigration Regulation No. 8 of 2012 and Minister of Manpower and Transmigration Decree No. 371 of 2013, competencies encompass three main aspects: knowledge, skills, and attitude. These competencies encompass mastery of knowledge, technical skills, and professionalism in carrying out tasks (Jumas, Ariani & Asrini, 2021). Qualified project managers possess not only technical skills but also leadership and strategic understanding, which can be strengthened through professional certifications such as PMI (Hafnidar, 2016).

Technical Project Management Skills

Technical skills are a key pillar of the PMI Talent Triangle framework, encompassing mastery of project management principles, methods, and tools (PMI, 2017). This encompasses ten knowledge areas: integration, scope, time, cost, quality, human resources, communication, risk, procurement, and stakeholders. Mastery of technical skills enables project managers to effectively manage schedules, budgets, risks, and quality (Edum-Fotwe & McCaffer, 2000; Wiewiora et al., 2019). Studies show that technical skills play a role in data-driven decision-making and change control, thus supporting project success (Jumas et al., 2021).

Leadership Skills

Leadership skills include communication, conflict management, negotiation, and team motivation. A project manager must be able to lead adaptively, especially in the face of project uncertainty and the interests of diverse stakeholders (Müller & Turner, 2010). According to PMI (2017), effective leadership encompasses negotiation, conflict management, team building, interpersonal communication, and decision-making. Research shows that leadership style, particularly transformational leadership, is positively **correlated with** motivation, productivity, and project success (Turner & Müller, 2005; Wiewiora et al., 2019).

Strategic and Business Management Skills

In addition to technical and leadership skills, project managers also need to understand

organizational strategy and business dynamics. Strategic and business management skills require an understanding of the project's role in supporting the organization's vision, mission, and competitive advantage (PMI, 2017; Turner & Müller, 2003). In construction, this includes investment analysis, strategic risk management, and the project's impact on social, economic, and environmental aspects (Kloppenborg et al., 2019). Project managers with strategic competencies are more adaptable in dealing with change, allocating resources, and ensuring the project delivers sustainable value to the organization (Shenhar et al., 2001).

Project Success

Project success is essentially defined as the achievement of objectives according to initial targets, which include cost, time, quality, safety, and stakeholder satisfaction. Success benchmarks generally refer to the triple constraint (cost, time, quality) as the main indicator (Ward et al., 1991; Kagioglou et al., 2001), but in the context of modern projects also include additional aspects such as customer satisfaction, team satisfaction, sustainability, and occupational health and safety (Toor & Ogunlana, 2010; Kumaraswamy & Thorpe, 1996).

From a micro perspective, success is determined by technical performance and achievement of implementation targets, while from a macro perspective, it encompasses the project's contribution to the organization's strategic objectives (Lim & Mohamed, 2018; Zachawerus, 2018). Furthermore, success is subjective because it is influenced by the interests of different stakeholders, including clients, contractors, and end users (Adelback & Johansson, 2013). Thus, project success is determined not only by technical achievement but also by stakeholder satisfaction and its contribution to the organization's strategic value.

The complete relationship between the variables in this study can be seen in the following figure.

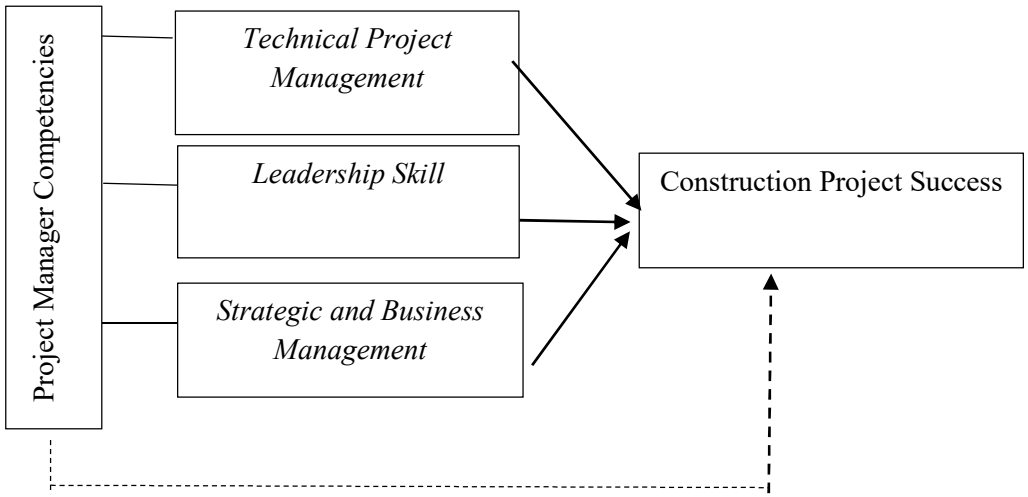

Figure 1 Research Paradigm

RESEARCH METHODS

This study used a quantitative approach with verification methods to analyze the influence of project manager competencies, consisting of Technical Project Management Skills (X1), Leadership Skills (X2), and Strategic and Business Management Skills (X3), on the success of the Wae Kampas irrigation network improvement project in Compang Dalo Village. The study population consisted of all 32 workers involved in the project. The entire population was sampled using a saturated sampling technique due to its relatively small size.

Primary data was obtained through a five-point Likert-scale questionnaire, ranging from 1 (strongly disagree) to 5 (strongly agree), structured based on the operational indicators of each variable. Secondary data were obtained from project documents and related literature. Prior to use, the research instrument was tested for validity using the Product Moment correlation technique and for reliability using Cronbach's Alpha.

Data analysis was performed using multiple linear regression to examine the effect of the independent variables on the dependent variable. The t-test was used to determine the partial effect of each variable, the F-test to test the simultaneous effect, and the coefficient of determination (R^2) to measure the contribution of the independent variables to project success.

RESEARCH RESULTS

Respondent Characteristics

Respondents' identities, including age, education level, employment status, and length of service, were determined using data from 32 individuals involved in the Wae Kampas irrigation network improvement project.

Table 1 Respondent Characteristics

Respondent Profile	Criteria	**Frequency**	**Precentage**
Age	20 – 25 Years	1	3%
Highest Education	26 – 35 Years	18	56%
	36-45 Years	11	34%
	>45 Years	2	6%
Employment Status	Elementary School or Equivalent	1	3%
Respondent Profile	Junior High School or Equivalent	3	9%
	High School or Equivalent	4	13%
	Bachelor's Degree (S1/S2/S3)	24	75%
Age	Job Director	1	3%
Highest Education	Supervising Consultant	9	28%
Employment Status	Planning Consultant	10	31%
	Contractor	8	25%
	Employee	2	6%
	PPK	1	3%
	PHO	1	3%
Respondent Profile	Less than 1 Year	3	9%
	1 - 3 Years	10	31%
	3 - 5 Years	5	16%
	Over 5 Years	14	44%

Source: Researcher Data Processing, 2025

Based on respondent characteristics, the majority were aged 26–35 (56%), followed by those aged 36–45 (34%). Only 3% were among the youngest respondents (20–25), and 6% were aged 45 and over. This indicates that the majority of respondents were of productive age. In terms of educational attainment, the majority of respondents had a college degree (Bachelor's/Master's/Doctoral) at 75%. Only 13% were high school graduates, 9% were junior high school graduates, and 6% were elementary school graduates. This indicates that project implementation is supported by a workforce with relatively good educational backgrounds.

In terms of employment status, the largest number of respondents were planning consultants (31%) and supervisory consultants (28%), followed by contractors (25%), workers (6%), and 3% each from project directors, PPK (Committee for Development Planning), and PHO (Project Planning Supervisory Agency). In terms of work experience, the majority of respondents had worked for more than 5 years (44%), followed by 1–3 years (31%), 3–5 years (16%), and less than 1 year (9%). Thus, the majority of respondents had considerable experience in the construction sector, enabling them to provide relevant and representative answers to the research instrument.

Validity and Reliability Test

Table 2 Validity and Reliability Test

Variable	**Statement**	**r Count**	**r Table**	**Information**
Technical Project Management (X_1)	X1.1	0.778	0,3494	Valid
	X1.2	0.580	0,3494	Valid
	X1.3	0.646	0,3494	Valid
	X1.4	0.397	0,3494	Valid
	X1.5	0.708	0,3494	Valid

	X1.6	0.699	0,3494	Valid
	X1.7	0.803	0,3494	Valid
	X1.8	0.674	0,3494	Valid
	X1.9	0.820	0,3494	Valid
	X1.10	0.753	0,3494	Valid
Leadership Skill (X_2)	X2.1	0.706	0,3494	Valid
	X2.2	0.685	0,3494	Valid
	X2.3	0.738	0,3494	Valid
	X2.4	0.828	0,3494	Valid
	X2.5	0.563	0,3494	Valid
	X2.6	0.836	0,3494	Valid
	X2.7	0.762	0,3494	Valid
	X2.8	0.582	0,3494	Valid
	X2.9	0.708	0,3494	Valid
	X2.10	0.569	0,3494	Valid
Strategic and Business Management (X_3)	X3.1	0.763	0,3494	Valid
	X3.2	0.605	0,3494	Valid
	X3.3	0.707	0,3494	Valid
	X3.4	0.692	0,3494	Valid
	X3.5	0.431	0,3494	Valid
	X3.6	0.666	0,3494	Valid
	X3.7	0.794	0,3494	Valid
	X3.8	0.637	0,3494	Valid
Project Success (Y)	Y1	0.525	0,3494	Valid
	Y2	0.682	0,3494	Valid
	Y3	0.791	0,3494	Valid
	Y4	0.469	0,3494	Valid
	Y5	0.682	0,3494	Valid
	Y6	0.795	0,3494	Valid

In Table 3 there are validity index values for each question item for the variables Technical Project Management, Leadership Skill, Strategic and Business Management, and Project Success which are measured through correlation values (r-table) which are above the critical value (0.3494) so each question for these variables is declared valid.

Table 3 Reliability Test Results

Variable	*Cronbach Alpha*	*Cut of value*	Information
Technical Project Management (X_1)	0,872	0,70	Reliabel
Leadership Skill (X_2)	0,881	0,70	Reliabel
Strategic and Business Management (X_3)	0,825	0,70	Reliabel
Project Success (Y	0,735	0,70	Reliabel

Source: Data Processing with SPSS 23, 2025

Meanwhile, the reliability value of the statement items in the questionnaire for the 5 variables above shows a Cronbach's alpha value of > 0.7. These results indicate that the question items on the variables Technical Project Management, Leadership Skill, Strategic and Business Management and Project Success in the research instrument are said to be appropriate, stable and can be relied upon as variables in a study.

Classical Assumption Test

Normality Test

Normality can be tested statistically using the Kolmogorov-Smirnov test. If the p-value is > 0.05, the data are normally distributed. The results of the Kolmogorov-Smirnov test are as follows:

Table 4 Normality Test Results

One-Sample Kolmogorov-Smirnov Test		
		Unstandardized Residual
N		32
Normal Parameters[a,b]	Mean	.0000000
	Std. Deviation	1.30172390
Most Extreme Differences	Absolute	.096
	Positive	.096
	Negative	-.057
Test Statistic		.096
Asymp. Sig. (2-tailed)		**.200[c,d]**

Source: Data Processing with SPSS 25, 2024

Based on the Kolmogorov-Smirnov test, a significance value of 0.200 is greater than 0.05, indicating that the data obtained are normally distributed, thus meeting one of the assumptions for hypothesis testing.

Multicollinearity Test

Multicollinearity issues can be detected by examining the VIF value. If the VIF value is less than 10, the model can be concluded to be free of multicollinearity. The VIF values in this study are as follows:

Table 5 Multicollinearity Test Results

Variabel	*Tolerance*	VIF
Technical Project Management	0.216	4.639
Leadership Skill	0.149	6.730
Strategic and Business Management	0.307	3.262

Source: Data Processing with SPSS 23, 2025

Table 5 shows that the Technical Project Management variable has a VIF of 4.639, Leadership Skills has a VIF of 6.730, and Strategic and Business Management has a VIF of 3.262. All three independent variables have VIF values below the established limit of 10. These results indicate that the model does not contain multicollinearity among the independent variables.

Heteroscedasticity Test

One way to detect heteroscedasticity is to examine the scatterplot graph between the predicted values of the dependent variable, ZPRED, and its residual values (SRESID). The basis for determining whether heteroscedasticity exists is as follows:

a) If there is a specific pattern, such as the points forming a regular pattern (wavy, widening, then narrowing), this indicates heteroscedasticity.

b) If there is no clear pattern, and the points are spread above and below the 0 (zero) mark on the Y-axis, this indicates the model is free from heteroscedasticity.

The following figure is used to detect the presence or absence of heteroscedasticity symptoms:

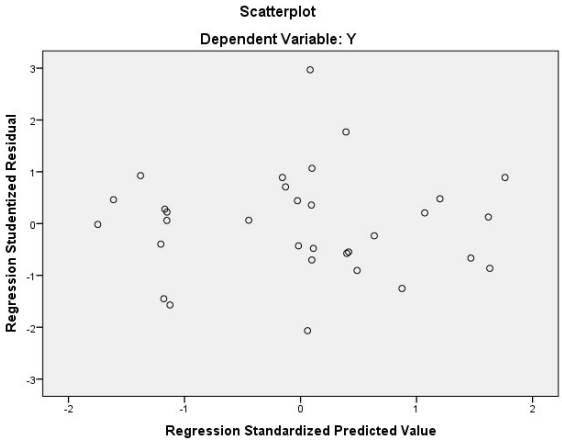

Figure 2 Heteroscedasticity test with scatterplot (Source: Data Processing with SPSS, 2025)

Figure 1 shows that there is no heteroscedasticity in the model, as there is no clear pattern, and the points are spread above and below 0 on the Y-axis. This indicates that the variance of the residuals from one observation to the next is constant. Therefore, the assumption of no heteroscedasticity or homoscedasticity for the regression equation is met.

Multiple Linear Regression Model

The Multiple Linear Regression Model was used to determine the equation model for the variables Technical Project Management, Strategic and Business Management, and Leadership Skills on Project Success. The results of the multiple linear regression calculation are as follows:

Table 6 Regression Coefficient Results

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	4.553	1.564		2.911	.402
	X1	.326	.082	.568	3.993	.000
	X2	.344	.097	.605	3.532	.000
	X3	.200	.091	.263	2.203	.044

a. Dependent Variable: Y

Based on the results of the multiple linear regression analysis, the equation Y = 4.553 + 0.326X1 + 0.344X2 + 0.200X3 + e was obtained,

where Y = project success, X1 = Technical Project Management Skill, X2 = Leadership Skill, and X3 = Strategic and Business Management. The regression coefficients for all three variables were positive, indicating that improving the technical competence, leadership, and strategic and business skills of project managers contributed to increased project success. The leadership variable (β = 0.344) had the most dominant influence, followed by technical competence (β = 0.326) and strategic-business skills (β = 0.200).

Hypothesis

Tests for the significance of regression coefficients are useful when determining the relationship between two variables, with one variable held constant or controlled.

Table 7 Partial Test Results

Model	Regression Coefficient	t count	t Table	Sig.	Information
$X_1 \rightarrow Y$	0,326	3,993	2,048	0,000	H_0 is rejected
$X_2 \rightarrow Y$	0,344	3,532	2,048	0,001	H_0 is rejected
$X_3 \rightarrow Y$	0, 200	2,203	2,048	0,036	H_0 is rejected

The partial test results presented in Table 7 indicate that all independent variables significantly influenced project success. The Technical Project Management variable (X1) obtained a calculated t-value of 3.993, which is higher than the t-table (2.048) with a significance value of 0.000 (<0.05). Therefore, the null hypothesis (H_0) is rejected and the alternative hypothesis (H_a) is accepted. This proves that the better the project manager's technical competence in managing technical aspects, the higher the project success rate, as indicated by the positive regression coefficient of 0.326.

Furthermore, the Leadership Skills variable (X2) also significantly influenced project success with a calculated t-value of 3.532 > 2.048 and a significance value of 0.001 (<0.05). The regression coefficient of 0.344 confirms that effective leadership skills in directing, motivating, and building team coordination are crucial factors in achieving project success.

Meanwhile, the Strategic and Business Management variable (X3) produced a t-value of 2.203 > 2.048 with a significance of 0.036 (<0.05), which means it has a significant effect on project success. A positive regression coefficient of 0.200 indicates that the better the project manager's ability to integrate business strategy with project implementation, the more assured the project's success. Thus, these results confirm that the three competencies of project managers, namely technical, leadership, and strategic management, have been partially proven to contribute significantly to achieving the success of construction projects.

Table 8 Simultaneous Hypothesis Test (F Test)

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	378.351	3	126.117	67.225	.000[b]
	Residual	52.529	28	1.876		
	Total	430.880	31			

a. Dependent Variable: Y
b. Predictors: (Constant), X3, X1, X2

Source: Data processing using SPSS 25, 2025

Based on Table 8, the calculated F value of 67.225 is greater than the F table value of 2.95. Furthermore, sig. (0.00) is lower than the α level of significance (5%), so H0 is rejected. Therefore, the regression model is meaningful, indicating that simultaneously, there is a significant influence between Technical Project Management, Leadership Skills, and Strategic and Business Management on the success of the Wae Kampas irrigation network improvement project.

Coefficient of Determination

The coefficient of determination measures the model's ability to explain the variation of the dependent variable by the independent variables. According to Darma (2021), the coefficient of determination (R2) is useful for assessing the extent of an indicated relationship, measuring whether changes in the

independent variable will be accompanied by changes in the dependent variable in equal amounts. The coefficient of determination is obtained from the following calculation:

Table 9: Analysis of the Coefficient of Determination

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.907[a]	.822	.817	3.11664

a. Predictors: (Constant), Lingkungan Kerja, Kompetensi Sumber Daya Manusia

b. Dependent Variable: Produktivitas Kerja

Source: Data Processing with SPSS 25, 2025

$$Kd = r^2 \times 100\% = 0{,}907^2 \times 100\% = 82{,}2\%$$

The coefficient of determination (R Square) of 0.878 indicates that 87.8% of the variation in changes in the Project Success variable can be explained by the three independent variables: Technical Project Management, Leadership Skills, and Strategic and Business Management. The remaining 12.2% is explained by factors outside the research model. This confirms that the regression model used has a very good level of accuracy in explaining the influence of the three independent variables on project success.

The Influence of Technical Project Management on Project Success in the Wae Kampas Irrigation Network Improvement Project

According to Goetsch & Davis (2020), Technical Project Management is a dynamic condition related to goods, services, people, products, and the environment that meets or exceeds expectations. Meanwhile, according to Kotler & Armstrong (2019), Technical Project Management is the ability of a product to perform its function, including durability, reliability, ease of operation and repair, and value attributes.

The analysis results show that the Technical Project Management variable (X1) significantly influences Project Success (Y) with a t-value of 3.993 and a significance level of 0.000, which is less than α = 0.05. A positive regression coefficient of 0.326 indicates that the higher the implementation of technical project management, the higher the project success rate. This demonstrates that technical aspects such as scheduling, budget management, quality control, and risk management play a significant role in ensuring project objectives are achieved on time, within budget, and with the specified quality.

This finding is supported by the Project Management Institute (PMI) (2021) theory in A Guide to the Project Management Body of Knowledge (PMBOK® Guide), which states that Project Integration Management and Scope, Time, Cost, and Quality Management are core technical areas that determine project success. These technical capabilities are key components of the project manager competency framework and must be consistently applied to ensure project efficiency.

Research by Rahman et al. (2021) in the journal Engineering, Construction, and Architectural Management also supports these findings, finding that strong technical project management significantly improves the performance of construction projects in the public sector. Another study by Nugraha and Aryani (2020) showed that technical elements such as the Work Breakdown Structure (WBS), time schedule, and quality control are key determinants of the success of infrastructure projects in Indonesia.

The Influence of Leadership Skills on Project Success in the Wae Kampas Irrigation Network Improvement Project

Regression analysis shows that the Leadership Skills variable (X2) significantly influences Project Success (Y) with a t-value of 3.532 and a significance level of 0.000. A positive regression coefficient of 0.344 indicates that the better a project manager's

leadership skills, the higher the project success. This demonstrates that the ability to lead a team, make decisions, and build effective communication and motivation are crucial factors in ensuring the smooth and efficient implementation of a project.

According to the Transformational Leadership theory by James MacGregor Burns and developed by Bernard Bass, leaders who are able to inspire, influence, and motivate individuals will drive team members to achieve high performance and exceed project targets. PMI (2021) also emphasizes that soft skills such as leadership, communication, and negotiation are now essential elements in the profile of a successful project manager.

These results align with research by Farid et al. (2022) in the International Journal of Project Management, which found that a transformational leadership style significantly influences the achievement of medium-scale infrastructure projects in Southeast Asia. Meanwhile, a study by Wibowo and Nurcahyo (2020) concluded that a project manager's leadership skills directly increase the effectiveness of team coordination and accelerate project completion in the construction sector.

The Influence of Strategic and Business Management on Project Success in the Wae Kampas Irrigation Network Improvement Project

Regression test results showed that the Strategic and Business Management variable (X3) also significantly influenced Project Success (Y) with a calculated t-value of 2.203 and a significance level of 0.044 (<0.05). The positive regression coefficient of 0.200 indicates that the better the project manager's ability to understand the strategic and business aspects of the project, the higher the project success rate. This includes an understanding of the business environment, stakeholders, the organization's strategic objectives, and the project's economic value.

According to PMI (2021), the Strategic and Business Management dimension is part of the Talent Triangle, which emphasizes the importance of business insight and organizational strategy in executing projects sustainably and aligned with the company's vision. This capability enables project managers to focus not only on technical aspects but also on long-term value creation for the project.

Research by Hassan et al. (2023) in the Journal of Construction Engineering and Management showed that the integration of strategic management in construction projects significantly contributes to the efficiency of resource use and the achievement of project ROI. Furthermore, a study by Wahyuni and Prasetyo (2019) in Indonesia concluded that project managers' business skills are a determining factor in the success of government projects, particularly in the context of public procurement and stakeholder management.

The Influence of Technical Project Management, Leadership Skills, and Strategic and Business Management on Project Success in the Wae Kampas Irrigation Network Improvement Project

The results of the study indicate that the variables Technical Project Management (X1), Leadership Skills (X2), and Strategic and Business Management (X3) simultaneously have a significant influence on Project Success (Y). This is evidenced by the F-test results in Table 4.1, which show that the calculated F-value of 67.225 is significantly greater than the F-table value of 2.95, and the significance value of 0.000 is less than the significance level of $\alpha = 0.05$. Thus, H_0 is rejected and H_a is accepted, which means that the regression model that includes the three independent variables together has a significant effect on project success.

Furthermore, the correlation test results in Table 4.13 show a correlation coefficient (R) of 0.937, very close to 1. This indicates a very strong and positive relationship between the three independent variables and the dependent variable. This means that the higher the implementation of technical project management, effective leadership, and strategic and business management by the project manager, the greater the project success rate. Conversely, a decline in the quality of these three variables can negatively impact project success.

Furthermore, the coefficient of determination (R^2) was 0.878, indicating that 87.8% of the variation in project success can be explained by the three independent variables studied. Meanwhile, the remaining 12.2% is explained by factors outside the model, such as

external factors (economic conditions, government regulations) or other internal factors (worker motivation, work methods, or construction technology).

These research results emphasize the importance of a holistic and integrated project management approach in infrastructure projects, particularly strategic government projects like the Wae Kampas Irrigation Network Improvement Project, which demands success in terms of time, cost, quality, and stakeholder satisfaction. The three management dimensions measured in this study were shown to play a significant role in determining the overall success of the project.

CONCLUSION

After analyzing the data and discussing the influence of Technical Project Management, Leadership Skills, Strategic, and Business Management on the success of the Wae Kampas irrigation network improvement project, the following conclusions can be drawn:

1. Technical Project Management has a significant influence on Project Success. The regression coefficient is positive, indicating that the higher the implementation of technical project management, such as scheduling, quality control, and risk management, the higher the project success.
2. Leadership Skills have a significant influence on Project Success in the Wae Kampas irrigation network improvement project. The regression coefficient is positive, indicating that good leadership, such as the ability to direct, motivate, and build effective communication within the project team, can significantly improve construction project success.
3. Strategic and Business Management have a significant influence on Project Success in the Wae Kampas irrigation network improvement project in Compang Dalo Village, Ruteng District, East Nusa Tenggara. The regression coefficient is positive, indicating that mastery of strategic aspects and understanding of the project's business context positively contribute to the successful achievement of project targets.
4. Technical Project Management, Leadership Skill, and Strategic and Business Management simultaneously have a significant influence on Project Success by Consumers in the Wae Kampas irrigation network improvement project in Compang Dalo Village, Ruteng District, East Nusa Tenggara. The correlation coefficient (R) value of 0.937 indicates a very strong relationship, and the R^2 value of 87.8% of the variation in Project Success can be explained by these three variables while the remaining 12.2% is influenced by other factors not studied.

RECOMMENDATIONS

Based on the conclusions outlined, the author proposes the following recommendations:

1. Improving Technical Competence

Project managers and implementation teams are advised to continuously improve their technical competencies through structured training, project management certification, and the application of the latest technology in project implementation to ensure the project's technical effectiveness and efficiency.

2. Strengthening Leadership Skills

Construction organizations need to instill the importance of leadership at every level of project implementation, particularly in establishing communication, team coordination, and making swift and accurate strategic decisions, so that projects run smoothly and adapt to field dynamics.

3. Developing Strategic and Business Capacity

It is recommended that project managers understand not only the technical aspects but also the business context and organizational strategy of the project, including understanding stakeholders, ROI, project sustainability, and government policies to ensure the project delivers long-term value.

4. Further Research

Further research could consider other variables such as work motivation,

organizational culture, the use of digital technology in project management, and external risk management, to gain a more comprehensive understanding of the factors influencing project success.

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