

Modeling The Successful Factors of The Large Contractors of Bali Province in Project Tender Throughout Indonesia

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Abstract

PT. Tunas Jaya Sanur, one of the big construction companies, always deals with the market segment's changing conditions. The better the market conditions, the greater the chance to get the project, and vice versa. The study's first objective is to identify the factors that have a dominant influence on Bali contractors' tenders' success in project tenders throughout Indonesia, especially PT. Tunas Jaya Sanur. The study shows two factors that positively affect the ratio of successful tender values: factors of quality of work and human resources (X_{b1}) and support factors for external resources and communications (X_{b2}). Furthermore, the researchers conduct modeling with multiple linear regression and obtain the equation, namely $Y = 3.583 + 0.472 X_{b1} + 0.611 X_{b2}$. The equation shows that the two independent variables positively influence the value of a successful project tender. The increase in one of the two independent variables will also increase a successful project tender value.

Keywords: factors, construction services, PT. Tunas Jaya Sanur

1. Introduction

The construction service business market in Indonesia is very potential. The investment activities carried out by the government and the private sector is increasing every year. The utilization of the potential of the construction service business in Indonesia can be carried out by competitively involving national entrepreneurs through a process that is transparent, fair, efficient, and practical (economical), accompanied by law enforcement. Also, it is necessary to increase contractors' capacity and the implementation of policies that favor national entrepreneurs. It is hoped that the national construction service business's involvement will create jobs and improve public infrastructure services so that the national construction service business can compete in the regional market share and the international market. The intense competition in the construction industry today makes contractors' success to survive in the industry is determined by the ability to overcome uncertainties in cost, quality and time, satisfaction, occupational safety and health, and environmental impacts. The study discusses the factors that influence successful project tenders' value, followed by PT Tunas Jaya Sanur, and conducts modeling on these factors. It is all related to the value of project tenders successfully won in tenders throughout Indonesia.

2. Literature Review

Tender is a process to obtain goods and services carried out by an institution, both government and private. The process starts from planning the needs until completing all activities to obtain goods/services (Presidential Decree No. 54/2010). Tenders based on project ownership are divided into 2, namely public and private project tenders. The study analyzes the factors that influence the tenders' success rate that is followed. Factor analysis is a multi-variable data analysis technique that aims to reduce data. The research seeks to find the relationship between each independent variable that can be made from one or a series of variables smaller than the initial number of variables. Factor analysis is a technique that describes the relationship between the diversity of several variables in a small number of factors. Variables that have high correlation are grouped into one group, where the correlation between variables in one group and other groups is relatively small. The purpose of factor analysis (Hair et al. 2010) is to identify any relationship between variables using a correlation test to create new factors, or new variables, to replace certain variables. Factor analysis is carried out using SPSS and Smart PLS software here.

3. Research Method

The stages in the study are started from the process of problem formulation and research objectives. Furthermore, after determining the problems to be discussed and their objectives, the literature review stage is carried out. The literature review stage is carried out from references in the form of books and previous study literature. Furthermore, the researcher determines the factors that influence the study results, followed by collecting data from all company branches. Descriptive analysis using SPSS and Smart PLSS software is carried out after the data is obtained, including testing for validity, reliability, factor analysis, and regression analysis. After receiving data from the analysis results, the research is continued by determining new factors and modeling the factors' influence on the desired indicators, the value of the successful tenders. The last stage is to draw conclusions and provide suggestions.

4. Discussions

4.1. Data Characteristics

Table 1. Project Characteristics by Branch Offices

No	Description	Number of Projects	Percentage
1	Denpasar Branch	99	59%
2	Jakarta Branch	42	25%
3	Batam Branch	4	2%
4	Mataram Branch	23	14%

Source: Data of PT. Tunas Jaya Sanur (2020)

From the data above, it can be seen that the number of projects won by PT. Tunas Jaya Sanur. The most is from 2015 to 2019 from the Denpasar branch with 99 projects, followed by Jakarta 42 projects, Mataram 23 projects, and Batam branch with four projects.

Table 2. Project Characteristics by Tender Win Year

No	Tender Year	Number of Projects	Percentage
1	2015	34	20%
2	2016	30	18%
3	2017	30	18%
4	2018	40	24%
5	2019	34	20%

Source: Data of PT. Tunas Jaya Sanur (2020)

From the data above, it can be seen that the number of PT Tunas Jaya Sanur projects from 2015-2019 is fluctuating, starting from the fewest, namely 30 projects per year, to the highest number, which is 40 projects per year.

Table 3. Project Characteristics Based on Project Value

No	Project Value	Number of Projects	Percentage
1	Less than or equal to 1 billion	22	13%
2	1.01 billion - 5 billion	55	33%
3	5.01 billion - 15 billion	47	28%
4	15.01 Billion - 25 Billion	15	9%
5	Above 25 billion	29	17%

Source: Data of PT. Tunas Jaya Sanur (2020)

The data above shows the distribution of the number of PT Tunas Jaya Sanur projects based on the value of the projects won. The highest number of projects is in category 2, which is 33%.

4.2. Results of Validity and Reliability Tests With SPSS

From the test results using SPSS V17, the validity and reliability test results are obtained as follows:

Table 4. Validity Test Results

Variable	Correlations
Quality / Quality of Work	0.635
Subcontractor Partners	0.857
Commitment in Project Completion	0.749
Fostering a relationship/network	0.686
Competitive Unit Prices	0.500
Factors have adequate infrastructure/equipment	0.729
Stakeholder intervention	0.631
Administrative Requirements	0.769
Availability of Technology	0.861
Number of Competitors	0.753
Execution time	0.744
Team / Staff Ability	0.886

Source: Results of SPSS Analysis (2021)

The table above shows]the correlation between each statement item score to the total score of the statement items shows the correlation coefficient of ≥ 0.15 . In that case, each of the statement items is said to be valid.

The Cronbach alpha value results are $0.921 > 0.60$, so all statements are reliable.

4.3. Factor Analysis using SPSS

4.3.1 KMO Test, Bartlett's Test Sphercity, dan MSA

Because the number of KMO test results is already above 0.5, the significance is far below 0.05 ($0.00 < 0.05$), the existing variables and samples can be analyzed using factor analysis.

Table 5 MSA (Measure of Sampling Adequacy) Test Results

Variable	MSA Value
Quality/Quality of Work	0.951
Subcontractor Partners	0.941
Commitment in Project Completion	0.940
Fostering a relationship/network	0.845
Competitive Unit Prices	0.944
Factors have adequate infrastructure/equipment	0.933
Stakeholder intervention	0.910
Administrative Requirements	0.925
Availability of Technology	0.931
Number of Competitors	0.939
Execution time	0.940
Team/Staff Ability	0.948

Source: Results of SPSS Analysis (2021)

The table above shows that the number of KMO test results is already above 0.5, the significance is far below 0.05 ($0.00 < 0.05$)

4.3.2. Factor Extraction

Researchers used a principal component analysis method using the SPSS program. Furthermore, the factor group rotation process is carried out.

Table 6. (a) Results before factor rotation (b) Results after factor rotation

Component Matrix		
	Component	
	1	2
Quality/Quality of Work	.844	-.287
Subcontractor Partners	.801	.333
Commitment in Project Completion	.741	.334
Fostering a relationship/network	.626	.656
Competitive Unit Prices	.799	.023
Factors have adequate infrastructure/equipment	.813	.372
Stakeholder intervention	.720	-.381
Administrative Requirements	.812	-.193
Availability of Technology	.860	-.246
Number of Competitors	.765	-.312
Execution time	.906	-.179
Team/Staff Ability	.935	-.042

Extraction Method : Principal Component Analysis

2 component extracted

Rotated Component Matrix		
	Component	
	1	2
Quality/Quality of Work	.839	.301
Subcontractor Partners	.420	.760
Commitment in Project Completion	.372	.723
Fostering a relationship/network	.82	.903
Competitive Unit Prices	.611	.515
Factors have adequate infrastructure/equipment	.405	.797
Stakeholder intervention	.800	.150
Administrative Requirements	.756	.355
Availability of Technology	.826	.343
Number of Competitors	.793	.232
Execution time	.821	.424
Team/Staff Ability	.705	.615

Extraction Method : Principal Component Analysis

Rotation Method : Varimax with Kaiser Normalization

Rotation converged with 3 iterations

Source: Results of SPSS Analysis (2021)

From the results of the table above, it can be explained that the distribution of the existing factors is as follows:

a) Factor 1 (Quality of Work and Human Resources) consists of 8 variables. The variables include the quality/quality of work with a loading value of 0.839; Competitive unit price of 0.611; Stakeholder intervention 0.8; Administrative requirements 0.756; availability of technology 0.826; Number of competitors 0.793; Implementation time 0.821; and the ability of the team/staff with a loading value of 0.705.

b) Factor 2 (External Resources and Communication Support) consists of 4 variables. These variables include subcontractor partners with a loading value of 0.76; commitment in project completion 0.723; fostering network relations 0.903; and adequate infrastructure and equipment with a loading value of 0.797.

4.4. Classical Assumption Test Using SPSS

4.4.1. Normality test

The normality test in the study used the Kolmogorov-Smirnov statistic with SPSS. The results of the normality test are shown in the table above. Based on the results of the normality test above, because of the Asymp. Sig value is $0.478 > 0.05$; it can be stated that the research data has met the normal distribution.

4.4.2. Multicollinearity test

The results of the multicollinearity test using SPSS version 17. The analysis calculation results show that the VIF value of each independent variable is less than 10, with a tolerance value greater than 0.1. It can be concluded that the regression model does not contain multicollinearity symptoms.

4.4.3. Heteroscedasticity Test

The assumption of heteroscedasticity is an assumption in a regression where the residuals' variance is not the same for one observation with another. In regression, one of the assumptions that must be met is that the residuals' variance from one observation to another has no specific pattern. A test is carried out using the Glejser method, which compares the sig-t value and 0.05 to detect the presence or absence of heteroscedasticity. If sig. t-count is smaller than 0.05, heteroscedasticity will occur, and vice versa. If the sig-t count is more significant than 0.05, there will be no heteroscedasticity. The results of the Glejser test

4.4.4. Linearity Test

A linearity test needs to be done to determine whether the proven model is linear or not. From the output table above, the significance value = 0.001 is less than 0.05. Because the significance is less than 0.05, it can be concluded that between the factor 1 and factor 2 variables, there is a significant linear relationship with the project value.

4.4.5. Determination Coefficient Test

Multiple coefficients of determination are obtained from multiple linear regression tests. After the R count is known to be 0.593, the researcher wants to know how much influence the variable X has on the Y variable using the determinant coefficient r^2 expressed as a percentage.

The results are as follows:

$$\begin{aligned} R^2 &= (0.824)^2 \times 100\% \\ &= 0.679 \times 100\% \\ &= 67.9\% \end{aligned}$$

From the results of the above calculations, it can be concluded that there is an effect of variable X on Y of 67.9%, and the rest, 22.1%, is influenced by other factors.

4.4.6. Multiple Linear Regression Analysis

Multiple linear regression is used to determine the effect of the variable resource availability and sub-contractor support and the quality of work and communication variables on the successful project tender value. The following are the results of the SPSS to determine the effect of the independent variable on the dependent variable. From the results of the above analysis, it produces a regression equation model

$$Y = 3,583 + 0.472 Xb_1 + 0.611Xb_2$$

4.5. Analysis Using Smart PLS

4.5.1. Assessing the Outer Model

There are three criteria for using data analysis techniques with Smart PLS to assess the outer model, namely Convergent Validity, Discriminant Validity, and Composite Reliability.

Convergent Validity

Table 7. Smart PLS Outer Loading Table

Variable	Indicator	Outer Loading
Factor 1 (Quality of Work and Human Resources)	Quality/Quality of Work	0.858
	Competitive Unit Prices	0.668
	Stakeholder Intervention	0.834
	Administrative Requirements	0.700
	Availability of Technology	0.802
	Number of Competitors	0.848
	Execution time	0.800
	Staff Ability	0.915
Factor 2 (External Resources and Communication Support)	Subcontractor Partners	0.828
	Commitment to Complete the Project	0.830
	Fostering Relationships and Networking	0.847
	Adequate Infrastructure / Equipment	0.851
Project Value		1.000

Source: Smart PLS Analysis Results (2021)

The table above shows that the indicators of Factor 1 and Factor 2 have an outer loading value greater than 0.5. The team/staff ability indicator is the most decisive measure of the factor 1 variable (Quality of Work and Human Resources) because it has the largest outer loading value (0.916). The Adequate Infrastructure indicator is the strongest measure of the factor 2 variable (External Resource Support and Communication) because it has the largest outer loading value (0.851).

Discriminant Validity

The results of discriminant validity testing can be seen in the following table:

Table 8. Average Variance Extracted Table

Variable	Average Variance Extracted (AVE)
Quality of Work and Human Resources	0.704
External Resources and Communication Support	0.651
Project Value	1.000

Source: Smart PLS Analysis Results (2021)

Table above explains that the three variables have AVE values above 0.50. All variables have a root AVE value higher than the correlation coefficient between one variable and another, so it can be said that the data has good discriminant validity.

Composite Reliability

The results of the composite validity test can be seen in the following table:

Table 9. Composite Reliability Table

Variable	Cronbach Alpha	Note
Factor 1 (Quality of Work and Human Resources)	0.860	Reliable
Factor 2 (External Resources and Communication Support)	0.922	Reliable
Project Value	1.000	Reliable

Source: Smart PLS Analysis Results (2021)

Table above explains the results of the composite validity test, all Reliable

4.5.2. Assessing the Inner Model

The inner model test or structural model is carried out to see the relationship between variables, the significance value, and the research model's R-square.

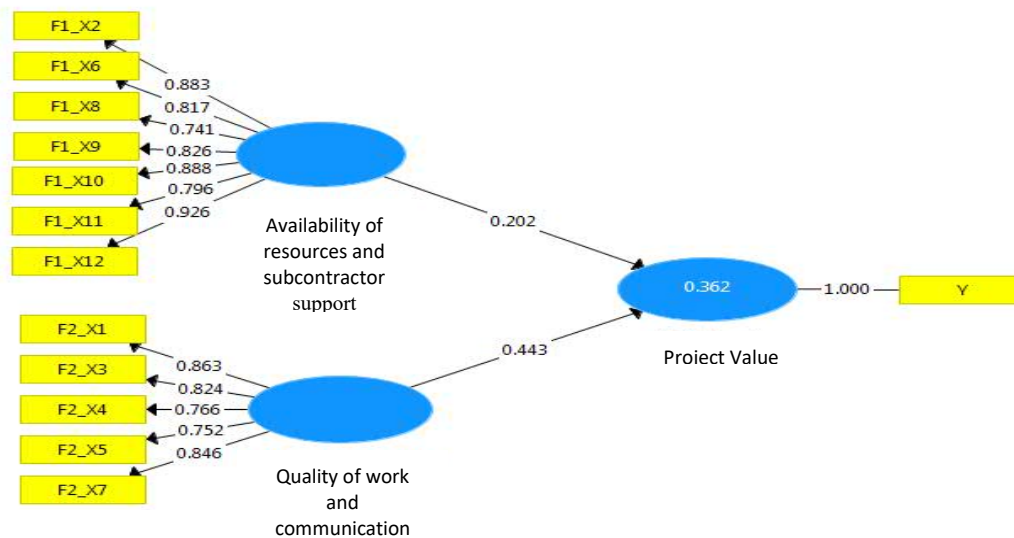


Figure 1. Output Result of PLS Mode
Source: Smart PLS Analysis Results (2021)

The picture above explains that the indicator measurement's covariance is influenced by the latent construct, reflecting the variation of the unidimensional construct depicted in an ellipse shape, with several arrows from the construct to the indicator. This model hypothesizes that changes in latent constructs affect changes in indicators. Model assessment with PLS begins by looking at the R-square for each latent dependent variable. Changes in the R-square value can be used to assess certain exogenous latent variables on endogenous latent variables that have a substantive impact.

Table 10. R Square value table

Variable	R Square
Project Value	0.497

Source: Smart PLS Analysis Results (2021)

The table above shows the R-square value of the project value variable 0.497. The higher the R-square value, the greater the exogenous variables' ability to be explained by the endogenous variables, so the better the structural equation. The project value is 0.497, which means that 49.7 percent of the project value variance can be explained by the variable quality of work and human resources and external resource support and communication. Other variables outside the research model explain the rest.

4.5.3. Hypothesis test

The results of hypothesis testing with the Partial Least Square structural equation model are shown in the following figure:

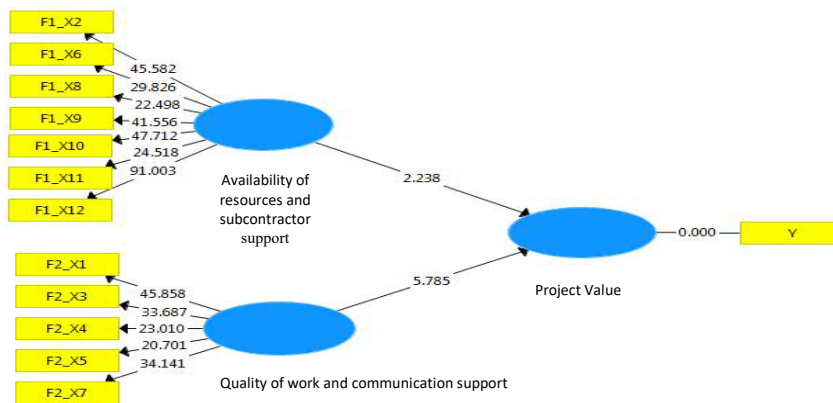


Figure 2. PLS Bootstrapping Output Results
Source: Smart PLS Analysis Results (2021)

The table below provides the estimated output for structural model testing:

Table 11. Inner Weight Output Result

	Original Sample (O)	Sample Mean (M)	Standart Deviation (STDEV)	T Statistics (O/STDEV)	P Values
Availability of resources and communication -> Project value	0.322	0.326	0.088	3.64	0.000
Quality of work and human resources -> Project Value	0.404	0.402	0.094	4.278	0.000

Source: Smart PLS Analysis Results (2021)

Figure 2 and Table 11, explains the Hypothesis, include:

Hypothesis 1 Testing: Influence of Factor 1 with Project Value

Hypothesis 1 states that Factor 1 (Quality of Work and Human Resources) has a positive and significant effect on the project's value. The parameter coefficient test result between factor 1 and the project value shows a positive relationship with a coefficient value of 0.322 with a t-statistic value of 3.64 and significant at $\alpha = 0.00$. The t-statistic value is above the critical value of 1.96; thus, the hypothesis is accepted.

Hypothesis 2 Testing: Effect of Factor 2 on Project Value

Hypothesis 2 states that Factor 2 (External Resource Support and Communication) positively and significantly affects the project's value. The parameter coefficient test result between factor 2 on the project value shows a positive relationship with a coefficient value of 0.404 with a t-statistic value of 4.278 and significant at $\alpha = 0.001$. The t-statistic value is above the critical value of 1.96; thus, the hypothesis is accepted.

5. Conclusions

Based on data analysis and discussion, it can be concluded that from the analysis using SPSS and Smart PLS, it is found that two factors have a positive influence on the successful project value of major contractors in Bali province in project tenders throughout Indonesia. The two factors are the Quality of Work and Human Resources (Xb_1) and External Resources and Communication Support (Xb_2). The two factors above in the analysis using SPSS have an Eigen Value above one and a cumulative percentage above 60%. The results of modeling hypothesis testing with Smart PLS indicate that the two factors above positively affect the project's value during the successful tender. Furthermore, from the multiple linear regression test, one equation is obtained, namely $Y = 3.583 + 0.472 Xb_1 +$

0.611Xb₂. The equation explains that the two independent variables positively affect the project value of a successful tender. It means that an increase in one of the two independent variables will also cause an increase in the value of the project from the successful tender.

It is necessary to conduct similar research on other companies with the same qualifications and to participate in project tenders throughout Indonesia, such as PT. Tunas Jaya Sanur to complement this research.

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