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The Influence of Competition, Project Characteristics, and Provider Capacity on Tender Bidding for Construction Works in Jember Regency Government

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ABSTRACT

This study aims to analyze the influence of competition, project characteristics, and provider capacity on the decision of construction service providers in bidding for tenders in Jember Regency. The approach used was quantitative with an explanatory study. The data analysis technique used was Structural Equation Modelling–Partial Least Squares (SEM-PLS) through the SmartPLS 4.0 application. Data were collected through a questionnaire from 100 respondents determined using the Lemeshow formula. The results of the study showed that the three independent variables significantly influence the tender bidding variable. Competition has a positive influence, indicating that healthy competition encourages providers' participation. Project characteristics also have a positive influence, where informative and realistic project specifications increase the providers' interests. Provider capacity indicates that internal readiness, such as experiences, resources, and financial capability, is the main determinant of participation in a tender. Implication of this finding highlights the need for preparing a transparent tender document and increasing provider capacity to support the effectiveness of the procurement process. This study contributes to the development of an evaluation model for provider participation in public sector construction procurement and as a reference for more competitive and integrated procurement policies.

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1. INTRODUCTION

Government procurement of goods/services is a strategic process in supporting national development, public services, and the efficiency of the state budget. To ensure the process runs effectively and accountably, the Indonesian Government has established some fundamental principles in goods/services procurement, including transparency, efficiency, effectiveness, openness, competitiveness, fairness, and non-discrimination. The principles of openness and competitiveness provide opportunities for all eligible goods/services providers to participate and encourage the establishment of a healthy competitive climate [1].

One of the main indicators in considering the success of the procurement process is the level of providers' participation

in submitting the tender bidding document. High level of participation not only reflects the quality of competition but also potentially increase the budget efficiency and the quality of work results [2]. The Government, through the Strategic Plan of the National Public Procurement Agency (LKPP) of 2020-2024, targets a provider's participation rate of 21% in 2024 as part of a provider's access improvement program [3].

However, low provider participation still becomes a challenge in the procurement process. Low participation level can cause unhealthy competition, increasing the potential for collusive practice and causing inefficient bidding prices. Moreover, if the number of providers does not meet the minimum requirements, the tender may be declared unsuccessful, leading to the project delay and inefficiency of resources [1], [4].

The previous literature demonstrates that there are several main determinants influencing the providers' decision in participating in a tender, including competition, risk, job requirements, and company position [5]. Moreover, the project characteristics are also the determining factor, where projects with unclear scope and complex specifications tend to be avoided by providers. Factors, such as payment scheme, client's financial capacity, and payment history, are important determinants in the risk perception of providers [6].

On the other hand, the internal capacity of providers, including the financial capability, human resources, and experience, also influences their readiness and interest in participating in a tender. Providers with limited resources are more likely to refrain from participating due to perceived non-competitiveness, while more capable providers will be more responsive to tender opportunities [1].

In the local context, Jember Regency is an interesting region to study due to its high number of construction tenders and relatively greater level of competition among providers compared to other regions in the Keresidenan Besuki. Based on the data from LPSE (2025), the average providers' participation in construction tenders in Jember Regency during 2021-2023 only reached 14%, lower than the national target of 21%. This indicates a gap that requires further analysis.

Based on the background above, this study aims to analyze the influence of competition, project characteristics, and provider capacity on the provider's decision in bidding for construction work tenders in Jember Regency.Such as minimization of typos and the use of the number of sentences in the appropriate paragraph [7].

In the introduction, state the background of your research [8], the purpose of your research [9], and/or anything else that you think is important to write as part of the introduction [10]. Follow the rules of writing good and correct Indonesian [11]. Such as minimization of typos and the use of the number of sentences in the appropriate paragraph [12].

In the introduction, state the background of your research [13], the purpose of your research, and/or anything else that you think is important to write as part of the introduction [14]. Follow the rules of writing good and correct Indonesian [6]. Such as minimization of typos and the use of the number of sentences in the appropriate paragraph [15].

In the introduction, state the background of your research, the purpose of your research, and/or anything else that you think is important to write as part of the introduction [16]. Follow the rules of writing good and correct Indonesian [17]. Such as minimization of typos and the use of the number of sentences in the appropriate paragraph [1].

The Introduction section should provide: i) a clear background, ii) a clear statement of the problem, iii) the relevant literature on the subject, iv) the proposed approach or solution, and v) the new value of research which it is innovation (within 3-6 paragraphs). It should be understandable to colleagues from a broad range of scientific disciplines. Organization and citation of the bibliography are made in Institute of Electrical and Electronics Engineers (IEEE) style in sign [18], [19] and so on. The terms in foreign languages are written italic (italic).

The text should be divided into sections, each with a separate heading and numbered consecutively [20].

2. LITERATURE REVIEW

2.1 Attribution Theory

Attribution theory is a theory explaining an individual's behavior in choosing an action to address the problems they face [8].Attribution theory is a theory explaining the cause behind an individual's or one's own behavior determined by internal and external factors. An individual's behavior is determined by the combination of personal attribution and situational attribution, where personal attribution is an attribution within the individual. Meanwhile, situational attribution is an attribution influenced by the surrounding environment, such as rules/regulations and other people's perceptions/actions [11]. This theory demonstrates that behavior is related to individual attitudes and characteristics, and can also be used to predict an individual's behavior in facing certain situations. In this study, attribution theory was used to justify the providers' behavior in submitting tender bids for construction works.

2.2 Competition

Competition refers to the level of competition and openness in the goods/services procurement process. Healthy and fair competition levels encourage the providers' confidence that the tender process is not predetermined and opportunities to win are widely open. In a tender for goods/services procurement, participants who can win the tender are those who meet the administrative requirements and have a low bidding evaluation ranking. The possibility of winning the tender bid is generally reflected in the number and competitiveness of competitors [5].

2.3 Project Characteristics

Project characteristics refer to technical and administrative attributes of a work package. A project with clear characteristics, adequate project value, and controlled risk tends to be more attractive to providers in submitting tender bids. Project characteristics are external factors uncontrolled by providers. Project characteristics include factors related to the characteristics of work and job requirements [6].

2.4 Provider Capacity

Provider capacity refers to the technical capabilities, resources, capital, and experiences owned by providers in meeting the tender requirements. Provider capacity is a factor inherently correlated to the company, indicating the capabilities and conditions of providers when participating in tender bidding. These factors are developing along with the development of the company and vary from one company to another[1].

2.5 Tender Bidding

According to Presidential Regulation of the Republic of Indonesia Number 12 of 2021 concerning Amendments to Presidential Regulation Number 16 of 2018 concerning Government Procurement of Goods/Services (2021), tender is a selection method to obtain the

providers of goods/jobs, constructions/services, and others. A construction work tender is a method of selecting providers for projects whose activities involve the construction, operation, maintenance, demolition, and reconstruction of a building.

A bid refers to a proposal made by a party to perform certain works for the benefit of other parties based on the predetermined and mutually agreed requirements [12]. To obtain a government construction project, the providers are required to participate in the provider selection process, namely tender. In a tender conducted by Local Governments, an open bidding method is used, which is a bid submitted openly, and bidding prices depend on the evaluation process, and the results are announced transparently to all tender participants. Tender bidding refers to the number of participants submitting a bid in a government tender. The number of providers' bids reflects the market confidence in the government system of goods/services procurement and the attractiveness of a project [10].

A study conducted by Lan oo et al. (2022) explained that project bidding is one of the strategic decisions for contractors. This study reviewed 24 relevant studies published between 1988 and 2021 using meta-analysis. The results showed that there are 28 important factors influencing contractors to make a bid. There are 5 major factors related to the characteristics of a tender project: project payment terms, client financial capacity in the industry, client payment history to the previous projects, and project size. Moreover, Sancoko and Pratama (2020) explained that 10 factors considered having the highest level of importance in influencing providers to submit bids are the availability of labor/equipment, the document completeness, fulfillment of requirements, accessibility to project location, project hazard/safety level, construction method, project location, tax obligations, project condition, and tender duration.

A study conducted by Dewantoro and Nuswantoro (2024) explained that company characteristics, project characteristics, project document, tender condition, and economic condition are elaborated into 31 factors, which influence providers to participate in construction work tenders in Palangka Raya City. The results of the analysis showed that factors of company characteristics, project characteristics, project document, tender condition, and economic condition positively and significantly influence the construction work tender. On the other hand, Chua and Li (2000) explained that competition, risk, job requirements, and company position are divided into internal and external factors. Overall, these factors form a framework for the further development of the support system for determining bidding decisions.

3. METHODS

This study used a quantitative approach to test hypotheses and analyze the relationship between variables with data measured in numerical form. This approach is

based on the positivist paradigm with data analysis statistically to obtain an objective conclusion [21], [22]. The type of study used was an explanatory study to explain the causal relationship between independent and dependent variables, while testing the influence between variables formulated in the hypotheses [13], [22].

The population in this study was all goods/services providers for construction work who participated in a tender through the LPSE of Jember Regency. Since the exact population size was unknown, determining the number of samples was carried out using the Lemeshow formula with a 95% confidence level and a 10% margin of error, resulting in a minimum sample size of 100 respondents [23]The sampling method used was probability sampling with a simple random sampling technique to provide equal opportunities for each member of the population selected as the sample [24]

The type of data used consisted of primary and secondary data. Primary data were obtained directly from respondents through a closed-ended questionnaire. Moreover, secondary data were in the form of laws and regulations, LKPP documents, and other references related to government goods/services procurement.

This study consisted of one dependent variable, which was Tender Bidding (Y), and three independent variables:

1. Competition (X_1) – includes market conditions, the number of competitors, and applicable regulations.
2. Project Characteristics (X_2) – includes project size, technical specification, duration, and accessibility of location.
3. Provider Capacity (X_3) – includes experiences, equipment, labor, and financial conditions.

Each variable was measured by a number of indicators compiled in a 4-point Likert scale-based questionnaire, from "Not Important" (1) to "Very Important" (4).

Table 1. Operational Definition of Variables

No	Research Variables	Definition of Variables	Indicator	Reference
1.	Competition (X_1)	Competition is the level of competition and openness of the tender process.	1. Economic/market conditions 2. Job requirements 3. The number of competitors 4. The number of existing tender bids 5. Hazard level 6. Applicable laws and regulations 7. Expected profit 8. History of profit/loss	Chua & Li (2000) ; (Ghasabeh & Chileshe, 2016) ; (Enshassi et al., 2010)
2.	Project Characteristics (X_2)	Project characteristics refer to technical and administrative attributes of a work package. External factor related to work to be bid by providers.	1. Type and size of the project 2. Accessibility to the project location 3. Project duration 4. Project value 5. Project complexity 6. Technical specification of the project 7. Project start time	(Larasati et al., 2024) ; (Sancoko & Pratama, 2020) ; (Chua & Li, 2000) ; (Ghasabeh & Chileshe, 2016)

			8. Indirect costs	
3.	Provider Capacity (X_3)	Provider capacity refers to the technical capabilities, resources, capital, and experiences owned by providers. Internal factor reflecting the capabilities and conditions of providers when submitting tender bids.	1. Experiences of similar projects 2. Current workload 3. The availability of equipment 4. Experiences and competence of labor 5. Financial capability 6. Relationship with banks 7. The availability of other projects	(Sancoko & Pratama, 2020) ; (Chua & Li, 2000) ; (Enshassi et al., 2010) ; (Ghasabeh & Chileshe, 2016)
4.	Tender Bidding (Y)	Tender bidding is a proposal by a provider to carry out certain tasks for the benefit of other parties in accordance with the predetermined requirements. This factor refers to the number of participants submitting a bid in a tender.	1. Lowest price-based bid 2. Optimal profit-based bid 3. The quality of work based on the bid value 4. Providers selection process	Sumadinata & Sibuea (2021); (Nugraha & Sutjipto, 1986); (Astana et al., 2023)

Data were analyzed using Structural Equation Modelling–Partial Least Squares (SEM-PLS) with the assistance of SmartPLS software. SEM-PLS was chosen because it was able to simultaneously test the latent relationships between variables and was suitable for a model with reflective indicators.

3.1 Outer Model Testing (Measurement Model)

1. Convergent Validity: Outer loading value ≥ 0.70 and Average Variance Extracted (AVE) ≥ 0.50.
2. Discriminant Validity Cross-loading, Fornell-Larcker Criterion, and HTMT Ratio (≤ 0.90).
3. Construct Reliability: Cronbach's Alpha and Composite Reliability ≥ 0.70.

3.2 Inner Model Testing (Structural Model

1. R-Square (R^2): A value ≥ 0.67 indicates a strong model.
2. Q-Square (Q^2): A value > 0 indicates predictive relevance.
3. Goodness of Fit (GoF): SRMR < 0.08; NFI near 1.
4. Multicollinearity Test VIF < 5.
5. F-Square Test: 0.02, 0.15, 0.35 indicate the weak, moderate, and strong influence.

Hypothesis Test: t-statistic > 1.96 and p-value < 0.05.

4. RESULTS AND DISCUSSION

The measurement model (outer model) was evaluated in three stages: convergent validity, discriminant validity, and composite reliability. This measurement model was used to test the validity and reliability of constructs or variables studied. The results of the analysis of these stages are elaborated as follows:

4.1 Convergent Validity

The convergent validity in this study was measured based on the outer loading

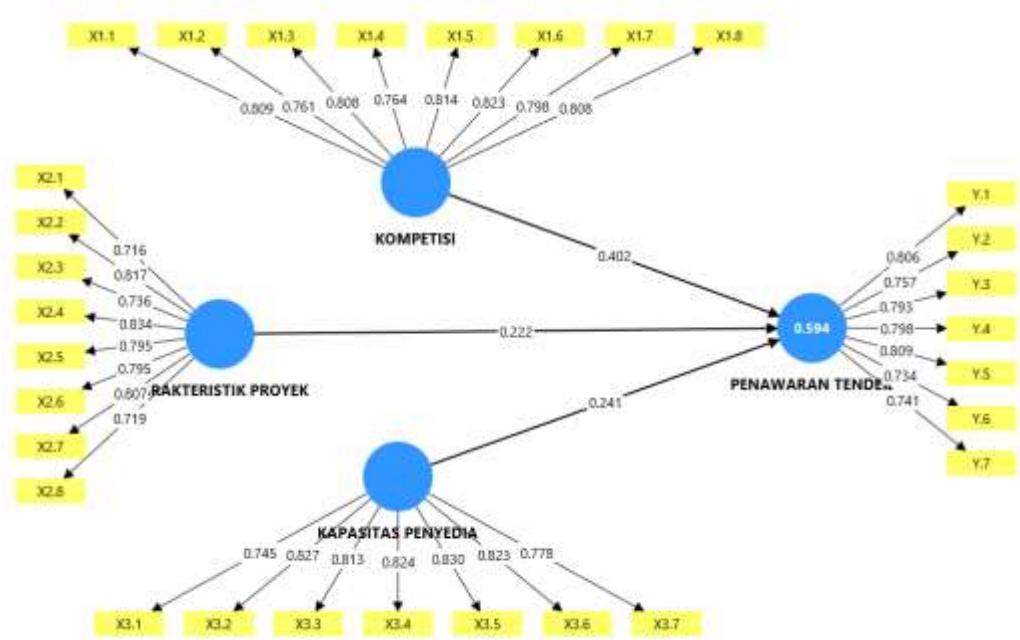
value and AVE (Average Variance Extracted) value. The criterion of outer loading value used to assess the convergent validity was outer loading value > 0.7. After data analysis was conducted using SmartPLS 4, the outer loading values obtained are presented in the following table:

Table 2. The Results of Outer Loading

Variable	Item	Outer Loading	Description	Variable	Item	Outer Loading	Description
Competition	X1.1	0.809	Valid	Providers Capacity	X3.1	0.745	Valid
	X1.2	0.761	Valid		X3.2	0.827	Valid
	X1.3	0.808	Valid		X3.3	0.813	Valid
	X1.4	0.764	Valid		X3.4	0.824	Valid
	X1.5	0.814	Valid		X3.5	0.830	Valid
	X1.6	0.823	Valid		X3.6	0.823	Valid
	X1.7	0.798	Valid		X3.7	0.778	Valid
	X1.8	0.808	Valid				
Project Characteristics	X2.1	0.716	Valid	Tender Bidding	Y.1	0.806	Valid
	X2.2	0.817	Valid		Y.2	0.757	Valid
	X2.3	0.736	Valid		Y.3	0.793	Valid
	X2.4	0.834	Valid		Y.4	0.798	Valid
	X2.5	0.795	Valid		Y.5	0.809	Valid
	X2.6	0.795	Valid		Y.6	0.734	Valid
	X2.7	0.807	Valid		Y.7	0.741	Valid
	X2.8	0.719	Valid				

Source: SMARTPLS 4 Data Processing (2025)

Data presented in Table 2 shows that each variable indicator item in the study has an outer loading result of >0.7, indicating that all variable indicator items are valid. Variables of Competition, Project Characteristics, Provider Capacity, and Tender Bidding have met the requirements of convergent validity with the outer loading values for all four variables of 0.7, so that the convergent validity test has been achieved and is considered valid. Meanwhile, the results of measurement model analysis with loading factors for variables of Competition, Project Characteristics, Providers Capacity, and Tender Bidding of > 0.7 and considered valid are presented in Figure 2 below



Besides observing the outer loading value, the convergent validity can also be observed from the AVE value, and variables are declared valid if the AVE value ≥ 0.5. The results of AVE testing can be seen in Table 4.2:

Table 3. The Results of AVE (Average Variance Extracted)

Variable	AVE	Description
Providers Capacity	0.650	Valid
Project Characteristics	0.606	Valid
Competition	0.638	Valid
Tender Bidding	0.604	Valid

Source: SMARTPLS 4 Data Processing (2025)

Based on Table 3, the analysis results of all variables are considered valid because the AVE score is higher than 0.5 and meets the specified requirements. This result indicates that each indicator variable successfully represents its latent variable.

4.2 Discriminant Validity

Method to test the discriminant validity with reflective indicator was by observing the cross-loading value > 0.70 (Ghozali, 2021a). The following are the results of the cross-loading analysis:

Table 4. The Results of Cross-Loading Analysis

	Providers Capacity	Project Characteristics	Competition	Tender Bidding
X1.1	0.506	0.450	**0.809**	0.548
X1.2	0.428	0.532	**0.761**	0.545
X1.3	0.622	0.476	**0.808**	0.611
X1.4	0.456	0.449	**0.764**	0.478
X1.5	0.567	0.609	**0.814**	0.574
X1.6	0.573	0.511	**0.823**	0.575
X1.7	0.494	0.583	**0.798**	0.599
X1.8	0.573	0.625	**0.808**	0.587
X2.1	0.532	**0.716**	0.477	0.486
X2.2	0.600	**0.817**	0.559	0.600
X2.3	0.640	**0.736**	0.442	0.534

	Providers Capacity	Project Characteristics	Competition	Tender Bidding
X2.4	0.622	**0.834**	0.527	0.537
X2.5	0.509	**0.795**	0.498	0.459
X2.6	0.459	**0.795**	0.497	0.480
X2.7	0.583	**0.807**	0.568	0.504
X2.8	0.548	**0.719**	0.565	0.511
X3.1	**0.745**	0.545	0.449	0.522
X3.2	**0.827**	0.620	0.594	0.579
X3.3	**0.813**	0.495	0.511	0.544
X3.4	**0.824**	0.650	0.588	0.564
X3.5	**0.830**	0.652	0.496	0.528
X3.6	**0.823**	0.579	0.549	0.543
X3.7	**0.778**	0.547	0.552	0.489
Y.1	0.616	0.537	0.601	**0.806**
Y.2	0.559	0.518	0.514	**0.757**
Y.3	0.455	0.438	0.496	**0.793**
Y.4	0.572	0.462	0.616	**0.798**
Y.5	0.536	0.607	0.571	**0.809**
Y.6	0.488	0.516	0.483	**0.734**
Y.7	0.390	0.526	0.564	**0.741**

Source: SMARTPLS 4 Data Processing (2025)

The results of cross-loading in Table 4.3 above show that the correlation of a construct with its indicator value is higher than the correlation value with other variable indicators, so that it can be concluded that all constructs or latent variables have met the requirements of discriminant validity and are interpreted that each indicator has been able to test its respective latent variable. Besides observing the value of cross-loading, the discriminant validity can also be seen from the Fornell-Larcker Criterion value by comparing the square root of AVE for each construct with the correlation value between constructs in the model. The following is the table of the results of the Fornell-Larcker Criterion test:

Table 5. The Results of the Fornell-Larcker Criterion Test

	Providers Capacity	Project Characteristics	Competition	Tender Bidding
Providers Capacity	**0.806**			
Project Characteristics	0.726	**0.779**		
Competition	0.664	0.665	**0.799**	
Tender Bidding	0.669	0.664	0.710	**0.777**

Source: SMARTPLS 4 Data Processing (2025)

Based on Table 5 above, Fornell-Lacker values (square root of AVE) for each variable show that each variable has a higher value than its correlations with other variables, so that the requirements for discriminant validity are met. Discriminant validity can also be seen from the Heterotrait–Monotrait Ratio (HTMT) value, where discriminant validity can be achieved if the HTMT value is < 0.90 (Henseler et al., 2015). The following are the HTMT values presented in Table 6:

Table 6. The Results of Heterotrait–Monotrait Ratio (HTMT) Analysis

	Providers Capacity	Project Characteristics	Competition	Tender Bidding
Providers Capacity	-	0.794	0.722	0.737
Project Characteristics	0.794	-	0.725	0.734
Competition	0.722	0.725	-	0.779
Tender Bidding	0.737	0.734	0.779	-

Source: SMARTPLS 4 Data Processing (2025)

The results of Heterotrait–Monotrait Ratio (HTMT) testing in Table 6 show that all HTMT values are < 0.90, so that all constructs are declared to meet the requirements of discriminant validity.

4.3 Composite Reliability

Besides the validity test, an outer model was also carried out by testing the reliability of a construct. Testing the reliability of a construct can be carried out using two methods: Cronbach's Alpha and Composite Reliability. Cronbach's alpha value and composite reliability value were 0.7, thus declared reliable. The results of the composite reliability calculations are presented in Table 7 as follows.

Table 7. The Results of Cronbach's Alpha and Composite Reliability Analysis

Variable	*Cronbach's Alpha*	*Composite Reliability*	Description
Providers Capacity	0.910	0.911	Reliable
Project Characteristics	0.907	0.909	Reliable
Competition	0.919	0.920	Reliable
Tender Bidding	0.891	0.893	Reliable

Source: SMARTPLS 4 Data Processing (2025)

Based on Table 7 above, the Cronbach's alpha and composite reliability values for all latent variables and constructs are > 0.70. Thus, all latent variables had good reliability and met the predetermined requirements, so that structural model testing was followed.

Structural model (Inner Model) testing was carried out by examining the following tests, where the results of the analysis of the steps are elaborated as follows:

4.4 Goodness of Fit (GoF)

Goodness of Fit (GoF) was used to measure the level of model feasibility, whether the model is suitable or not with the data. GoF value was measured using the Normed Fit Index (NFI) value with a value range between 0 and 1. A model is declared to have a high Goodness of Fit if the value is close to 1 (Ghozali, 2021), and the model, Henseler et al. (2015), is considered fit if the SRMR value is < 0.08. Moreover, a research model is considered in a fit condition if the SRMR value is < 0.08, indicating that the model is in a Fit or good condition. The following presents the model fit table from the results of the test using SmartPLS 4:

Table 8. The Results of the Model Fit Test

	Saturated model	Estimated model
SRMR	0.067	0.067
NFI	0.734	0.734

Source: SMARTPLS 4 Data Processing (2025)

Table 8 above shows that the SRMR value is 0.067, indicating that the model has an overall good fit. Moreover, the NFI value of 0.734 showed moderate model fit. NFI and SRMR values were respectively below the threshold, so it can be concluded that the structural model developed has met the requirements of Goodness of Fit based on the SRMR and NFI approaches. Thus, the model in this study was considered feasible structurally because it had adequate Goodness of Fit.

4.5 Multicollinearity Test (VIF)

A VIF test was carried out to determine whether there is collinearity between constructs. The multicollinearity test has a criterion: if the value is < 5, then there is no collinearity between constructs. However, if the value is > 5, then there is collinearity

between constructs (Ghozali, 2021). The following is the Table of the results of the multicollinearity test (VIF) conducted using SmartPLS 4:

Table 9. The Results of Multicollinearity Tests (VIF)

	VIF
Provider Capacity → Tender Bidding	2.411
Project Characteristics → Tender Bidding	2.419
Competition → Tender Bidding	2.048

Source: SMARTPLS 4 Data Processing (2025)

Based on Table 9, all VIF values are under the threshold of 5, which ranges from 2.048 to 2.419. This indicates that there is no multicollinearity between constructs in this model, so that independent variables of Competition, Project Characteristics, and Provider Capacity can be considered independent and not excessively influencing each other. Thus, the model can be interpreted as more reliable, and the results of parameter estimation are not distorted due to high correlation between independent variables. This finding strengthens the validity of the structural model in examining the influence of each variable.

4.6 R - Square (R^2)

R-Square values of 0.67, 0.33, and 0.19 indicate strong, moderate, and weak models, respectively (Chin, 1998b). The R-Square test was carried out to determine the extent to which the influence of independent variables on the dependent variable. The following table presents the results of the R-Square calculation using SmartPLS 4:

Table 10. The Results of R-Square Analysis

Variable	*R-Square Adjusted*
Tender Bidding	0.582

Source: SMARTPLS 4 Data Processing (2025)

R-Square value of 0.582 indicates that 58.2% of variations in tender bidding decision can be explained by variables of Competition, Project Characteristics, and Provider Capacity. The remaining 41.8% is influenced by other factors outside this research model. This R-Square value is considered a moderate to strong model, indicating that this model has a good explanatory capability for the dependent variable.

4.7 Q – Square Predictive Relevance

In SmartPLS 4, PLS-Predict or Cross-Validated Predictive Ability Test/CVPAT is a method to evaluate the out-of-sample predictive ability of the model, which shows how the model is able to predict values of new data. Q^2 Predict in this context was calculated by comparing the residual value of the PLS model with the benchmark model. If the PLS model generates a smaller prediction error, the model is declared to have a good predictive ability. The interpretation of Q^2 Predict value is that if Q^2 Predict > 0, then it has a model with predictive ability, while if Q^2 Predict ≈ 0 or < 0, then there is no predictive ability, so that the higher the Q^2 Predict, the greater the model predictive ability (Shmueli et al., 2019).

Table 11. The Results of Q-Square Predict Analysis

Variable	Q-Square Predict
Tender Bidding	56.2%

Source: SMARTPLS 4 Data Processing (2025)

Based on Table 11, the Q^2 Predict value is 56.2% for the Tender Bidding variable. This value indicates that the model has a very good predictive ability in predicting tender bidding decisions. Since Q^2 Predict is greater than 0, it can be concluded that the model has met the criterion of out-of-sample predictive validity as suggested in the PLS-Predict approach. This result indicates that the variables of Competition, Project Characteristics, and Provider Capacity are collectively able to predict tender bidding decisions accurately and stably.

4.8 F – Square

The F-Square test was used to evaluate the magnitude of the influence of each exogenous latent variable on the endogenous latent variable in the structural model. F-Square measures the relative contribution of an independent variable to the increase in R-Square value when the variable is included in the model. According to Chin (1998), the interpretation category of F-Square value is that if $0.02 \leq f^2 < 0.15$, the influence is considered weak; if $0.15 \leq f^2 < 0.35$, the influence is considered moderate; and if $f^2 \geq 0.35$, the influence is considered strong. The results of the testing for this study are:

Table 12. The Results of the F-Square Test

	f-square
Provider Capacity → Tender Bidding	0.060
Project Characteristics → Tender Bidding	0.050
Competition → Tender Bidding	0.195

Source: SMARTPLS 4 Data Processing (2025)

F-test based on the results above, it can be concluded that the Competition variable has a moderate influence on the Tender Bidding variable with the f^2 value of 0.195. Meanwhile, variables of Provider Capacity and Project Characteristics had a weak influence with a f^2 value of 0.060 and 0.050, respectively. It can be concluded that out of three exogenous variables tested, Competition is the most significant factor influencing tender bidding decision, while the other two variables have a contribution but in a weak category.

The significance test aims to examine the direction of direct influence and significance of variables studied, which can be carried out by observing the values between the latent variables in the path coefficient. The bootstrapping method in this study applied significance criteria of t-statistic value > 1.96 and p-value < 0.05. The following presents the results of the significance test of direct influence:

Table 13. The Results of the Significance Test of Direct Influence

Variable	**Original Sample**	**T Statistics**	**P Values**	**Description**
Competition -> Tender Bidding	0.402	3.968	0.000	Significance
Project Characteristics -> Tender Bidding	0.222	2.188	0.029	Significance
Provider Capacity -> Tender Bidding	0.241	2.552	0.011	Significance

Source: SMARTPLS 4 Data Processing (2025)

Based on Table 13, it can be concluded that the results of the hypothesis test are as follows:

H1: Competition Factor Has an Influence on Tender Bidding

Based on the results of the test, the construct variable of Competition on Tender Bidding had an original sample value of 0.402 (positive), a t-statistic value of 3.968, and a p-value of 0.000. Thus, it can be declared that H1 was accepted and concluded that the Competition variable had a positive influence on tender Bidding.

This positive influence indicates that the higher the intensity of healthy and fair competition, either in the number of tender participants, job requirements, project risk, or the clarity of applicable regulations, the higher the tendency of providers to submit tender bidding. This finding is in line with the attribution theory (Heider, 1958), where providers assess the external condition/situational attribution as a foundation in decision-making. In this context, competition is seen as external pressure that encourages providers to act more strategically.

This is in accordance with a study by Chua & Li (2000), who stated that construction service providers will be more motivated to participate in submitting tender bids when seeing healthy and fair competition to win the tender project. A high level of competitiveness often reflects a transparent, open, and competitive market, which is in line with the principles of goods/services procurement. Healthy competitive environment in tender process will tend to increase provider participation in tender bidding due to tender process. In other words, the stronger the provider's perception towards winning an opportunity through open and professional competition, the higher the provider's desire to participate in the tender.

H2: Project Characteristics Factor Has an Influence on Tender Bidding

Based on the results of the test, the construct variable of Project Characteristics on Tender Bidding had an original sample value of 0.222 (positive), a t-statistic value of 2.188, and a p-value of 0.029. Thus, it can be declared that H2 was accepted, and it was concluded that the Project Characteristics variable had a positive influence on Tender Bidding.

From the perspective of attribution theory, the project characteristics variable was categorized as situational attribution, where providers adjust their behavior based on the perception of the project environment, which they cannot directly control but influence their perception of the feasibility of tender participation[8]. Complete information on project characteristics provides a positive signal to providers that the project is feasible to participate in.

This is in line with the study by Oo et al (2022) that the project complexity and ambiguity of tender information become one of the main constraints for the providers' participation, particularly for government tenders. Unclear project information tends to increase the perceived risk of unfair or manipulative practices during the tender process. Limited, inconsistent, and unexplained project information will lead providers to perceive a higher risk of tender failure or financial loss.

This indicates that well-structured, clear, realistic, and comprehensive project characteristics will encourage providers to participate in tender bidding because providers can adjust their bidding strategies, minimize technical risks, and increase the success of project completion implementation. On the other hand, unclear and ambiguous project characteristics will reduce providers' participation in the tender.

H3: Provider Capacity Factor Has an Influence on Tender Bidding

Based on the results of the test, the construct variable of Provider Capacity on Tender Bidding had an original sample value of 0.241 (positive), a t-statistic value of 2.552, and a p-value of 0.011. Thus, it can be declared that H3 was accepted and concluded that the Provider Capacity variable had a positive influence on Tender Bidding.

This influence reflects that providers with adequate experience, sufficient resources, such as equipment and labor, and strong financial capability will tend to participate in the tender. These factors are the personal attribution, which is the internal characteristics owned by providers in attribution theory. This means that the decision to bid is not only influenced by external factors, such as market and project conditions, but also really depends on the internal assessment of the company's readiness and capacity [8].

This is in line with the study by Sancoko & Pratama (2020), who showed that providers with healthy financial management

and who have their resources and broader experiences will be more willing to compete in tender bidding. Adequate provider capacity and competitive advantages enable providers to be better prepared for tender documents and make more accurate cost estimations.

Providers with strong financial capability and broader tender experience will be more confident to take the risk by participating in tender bidding, including bearing the costs of document preparation, guarantees, and implementation when winning. Moreover, they are also more able to meet the complex technical and administrative requirements and are able to manage the project efficiently when they successfully obtain the contract. The higher the providers' capability, the higher the providers' possibility of submitting a tender bid.

5. CONCLUSION

This study aims to analyze the influence of competition, project characteristics, and providers' capacity on providers' decisions in submitting tender bids in construction work in Jember Regency using the Partial Least Squares–Structural Equation Modelling (PLS-SEM) approach.

The results of the analysis show that there are three independent variables that have a significant influence on tender bidding. First, competition has a positive influence, indicating that the perception of a healthy, transparent, and non-interventionist tender encourages providers' participation. Second, project characteristics also demonstrate a positive influence, where a clear and realistic project specification increases providers' attractiveness to participate. Third, provider capacity has a significant influence, indicating that internal readiness, such as experiences, resources, and financial capabilities, are important factors in making the decision to bid.

This finding emphasizes the importance of a transparent and competitive procurement environment, as well as concern for project design and empowerment of business actor capacity is required. Practical implication of this study encourages strengthening public procurement policies at the regional level, particularly in designing informative projects and creating a competitive and fair tender ecosystem.

This study has limitations, including a limited scope of variables and a perception-based quantitative approach. Thus, it is suggested for further study to consider using mediating or moderating variables, expanding the dimensions of institutional factors, such as the e-procurement system, and increasing the scope of samples and diversification of methods. Further studies can also be directed to analyze the relationship between low bidding values and the performance of tender project implementation to support more sustainable procurement practices.

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