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Factors Affecting Bidding Strategy in Construction

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A R T I C L E I N F O	A B S T R A C T
	Strategy is a comprehensive action plan that specifies guidance and a critical direction for the allocation of resources to achieve long-term goals of the organization. Bidding strategy in construction defines as a management skills of using all available resources both physical and financial, in order to offer a comprehensive and competitive bidding through consider various aspects, including internal, external and environment, with aim to win the bidding competition, and provide maximum project performance. There are many factors that influence the bidding strategy. These factors influence depend on the situation, when the research done. This research was conducted in four major cities in Indonesia. The method used is survey and interviews of 61 major contractors who is believed to have a good strategy. The analysis used is Structural Equation Modeling Partial Least Squares. The results obtained that the economic situation and the competition is crucial environmental factors. Besides, external factors such as the contract, characteristics of the client, company experience and project characteristics are very influential. Internal factors that should be concern are the characteristics of the company, benefit, and the project financing.

INTRODUCTION

Bidding strategy is the most decisive competitiveness factor, for the contractor success (Lu, Shen, Asce, & Yam, 2008) . Frame (2002) in Bagies & Fortune (2006) also states that, selecting projects carefully are the first step to a successfully of construction company. Bageis & Fortune (2009) in his research found that, 95% agree the consideration of project selection phase, is very important. Furthermore 89% agree that consideration of this phase, will increase the company's business performance. Contractor must build their strategy with considered many factors. Bagies & Fortune (2006) on his research which identified from intensive literature review, found 95 (ninety five) indicators with 10 (ten) classifications factors that affect bid/no bid decision. Strategic decision making in bidding incorporates into three broad groups of factors i.e. internal, external and environmental factors. The internal factors are those related to the company such as experience, resources, capabilities etc. External factors, outside the company include the

Table 1.

number of bidder, bidding risk, type of project, cash flow requirements etc. The environment factors as social and economic conditions, availability of other project, availability of qualified labor, availability of qualified staff, availability of equipment (Banki *et al.*, 2008).

MATERIALS AND METHODS

The study was conducted in four major cities in Indonesia, and data were collected through a questionnaire and interviews with 61 big contractors who got tendering and carried out the project between 2013 and 2014. Data were analyzed using Structural Equation Modeling Partial Least Square with Smart PLS 2.0 M3.

Data And Analysis:

According to Bagies & Fortune (2006), the 10 (ten) dimensions and 50 (fifty) indicators available, in the variable of bidding strategy are listed as shown in

Validity of Construct:

Confirmatory Factor Analysis (CFA) is often used to examine the dimensional of construct.

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Construct with reflective indicators examined through convergent and discriminant validity. Convergent validity related to the principle that the indicators (manifest variables) of construct should have a high correlation. Convergent validity test of reflective indicators through Smart PLS2.0 M3 can be seen from the loading factor for each indicator of the constructs. Rule of Thumb commonly used to assess the validity of convergent is the loading factor

Table 1 testing was conducted through two levels, namely first order CFA which the analysis is done from the latent constructs dimension to their indicators, and the second order CFA which the analysis is done from latent constructs to construct dimensions. Repeat indicators approach is used to analyzing the second order CFA. In the second order CFA construct bidding strategy is measured with ten

must be greater than 0.70 for the confirmatory research and loading factor between 0.6 to 0,70 for the exploratory research. Also the value of Average Variance Extracted (AVE) should be greater than 0.50. However, the early stages development of the measurement scale, loading factor from 0.50 to 0.60 was considered. (Ghozali, 2012; Latan & Ghozali, 2012).

According to first-order such as client characteristics, project characteristics, contract, profit, project financing, company characteristics, company experience, bidding situation, economic situation and competition, with each indicators. By using the approach repeat indicators, all the indicators of each dimension is used as an indicator of second order analysis. Loading factor of each indicators after iterations as shown in Fig. 1.

Table 1: Bidding Strategy dimension and indicators.

Dimension		Indicator
External	1.Client Characteristics	1. Local custom 2. Relationship with owner 3. The client reputation among contractors 4. The client requirements 5. Owner (Private/Public) 6. Prompt payment habit from owner 7. The client financial capacity
	2. Project Characteristics	8. Contract Size 9. Duration of the project 10. Type of project 11. Methods of construction 12. The project's stakeholder 13. Safety hazards
	3. Contract	14. Contract type 15. Use of Nominated Sub-contractors 16. Fines for delay 17. Clearness of the work and specifications 18. The contract special requirements
Internal	4. Benefit of Business	19. The benefits expected 20. Need for continuity 21. Establishing long relationship with owner
	5. Project Financing	22. Original price estimate by client 23. Project cash flow 24. Project Markup 25. Percentage of insurance 26. Anticipated value of liquidated damage 27. Tax liability 28. Market Share
	6. Company Characteristics	29. Availability of required cash 30. Ability of doing the job 31. Availability of required equipment 32. Availability of qualified human resources 33. Current workload 34. Project matching with the company strategy 35. Specific features that provide competitive advantage
	7. Company Experience	36. Past experience with similar project 37. Past profit in similar job 38. Past experience with general contractor
Environment	8. Bidding Situation	39. Required bond capacity 40. Time allowed to submitting bids 41. Bidding document price 42. Prequalification requirements 43. Bidding methods
	9. Economic Condition	44. Risk involved 45. Overall economic situation 46. Fluctuation in material and labor
	10. Competition	47. Who else likely to bid for this job? 48. How many bidders will there be? 49. Future project

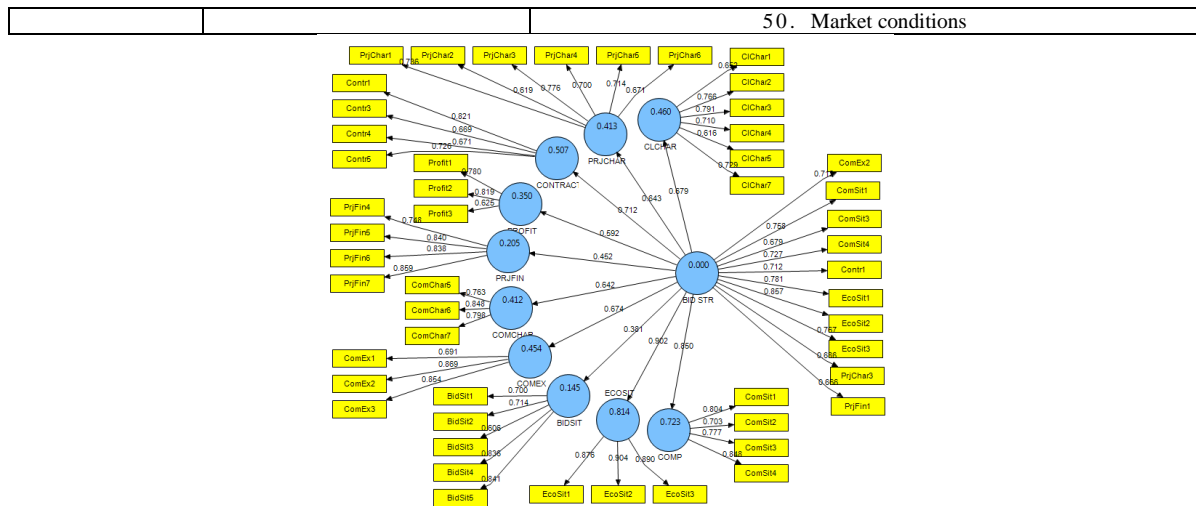|		5 0 . Market conditions

Fig. 1 : Loading Factor.

There are many loading factor below 0.5 at the first measurement. The invalid indicator was removed from the model, then the model run again, until finally obtained a model with loading factor greater than 0.5 as shown in Fig. 1. This is shows that all construct indicators is valid. Table 2 shows AVE and Communality value greater than 0,50, means the convergent validity requirement fulfilled.

Table 2 : Value of Average Variance Extracted (AVE) and Communality

No.	Construct	AVE	Communality
1	Bidding Situation	0.554708	0.554708
2	Client Characteristics	0.508756	0.508756
3	Contract	0.524536	0.524536
4	Company Characteristic	0.645658	0.645658
5	Company Experience	0.654482	0.654482
6	Competition Situation	0.615807	0.615807
7	Economic Situation	0.792020	0.792020
8	Bidding Strategy	0.542276	0.542276
9	Project Characteristics	0.596279	0.596279
10	Project Financing	0.676745	0.676745
11	Profit/Benefit	0.556085	0.556085

Reliability of Construct:

Reliability test is intended to establish the consistency and accuracy of the instrument in measuring the construct. In PLS-SEM through Smart PLS 2.0 reliability of construct measurement done in two ways, namely Cronbach's Alpha and Composite Reliability. Rule of Thumb commonly used the Cronbach's Alpha and Composite Reliability must be greater than 0,70. Table 3 shows value of Cronbach's Alpha and Composite Reliability.

Table 3 : Value of Cronbach's Alpha and Composite Reliability.

No.	Construct	Cronbach's Alpha	Composite Reliability
1	Bidding Situation	0.829518	0.859931
2	Client Characteristics	0.804415	0.860501
3	Contract	0.711875	0.814164
4	Company Characteristic	0.725398	0.845110
5	Company Experience	0.749537	0.849086
6	Competition Situation	0.794113	0.864540
7	Economic Situation	0.868782	0.919501
8	Bidding Strategy	0.905238	0.921765
9	Project Characteristics	0.808543	0.854704
10	Project Financing	0.853520	0.893060
11	Profit/Benefit	0.606990	0.787716

Table 3 shown that all the value of Cronbach's Alpha and Composite Reliability are greater than 0.70, which means that the instruments used in the model was appropriate and consistent to measure the construct.

Significance of Construct:

To determine the significance of the construct can be seen from the path diagram and path coefficient as shown in Fig. 2 and Table 4.

From the path coefficient it seen that all first order construct generate a significant effect on

second order construct, which the value of T-Statistics for all first order is greater than T- table = 2,000 with 5% level of significance. This means that all the first-order construct is the dimensional construct of bidding strategy.
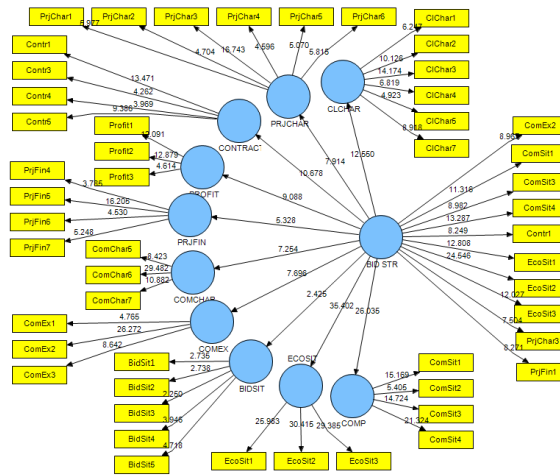

Fig. 2 Path Diagram.

Table 4 : Path Coefficient .

No.	Construct	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	Standard Error (STERR)	T Statistics (|OSTERR)
1	Bidding Strategy → Bidding Situation	0.380776	0.423836	0.156998	0.156998	2.425356
2	Bidding Strategy → Client Characteristics	0.678572	0.690919	0.054072	0.054072	12.549531
3	Bidding Strategy → Contract	0.711839	0.732116	0.066662	0.066662	10.678366
4	Bidding Strategy → Company Characteristic	0.642127	0.660827	0.088523	0.088523	7.253807
5	Bidding Strategy → Company Experience	0.673824	0.691971	0.087550	0.087550	7.696432
6	Bidding Strategy → Competition Situation	0.850177	0.854307	0.032655	0.032655	26.035311
7	Bidding Strategy → Economic Situation	0.902232	0.903760	0.025485	0.025485	35.402043
8	Bidding Strategy → Project Characteristics	0.642505	0.664401	0.081183	0.081183	7.914317
9	Bidding Strategy → Project Financing	0.452298	0.485601	0.084886	0.084886	5.328293
10	Bidding Strategy → Profit/Benefit	0.591786	0.602294	0.065118	0.065118	9.087971

Conclusion:

The ten factors such as client characteristics, project characteristics, contract, profit, project financing, company characteristics, company experience, bidding situation, economic situation and competition are forming a dimensional construct of bidding strategy. It is evidenced through path coeficient with T-statistics greater than T-table. The most influence factors of environmental as the economic situation, and the competition. While external factors and internal factors respectively is contract, client characteristics, project characteristics, and company experience, company characteristics, profit/benefit, project financing, are the important factors. The influence factors can be considered as guidance for contractors in preparing their bidding strategy in order to win the competition and obtain the best results.

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