Analysis Of Dominant Factors Affecting Construction Service Providers On Tender Electronically In Malang Raya 2021

Nabila Ayu Sabrina[1*], Indradi Wijatmiko[2] , Wisnumurti[3]

[1] Student Faculty of Engineering Universitas Brawijaya, Indonesia.
[2,3] Department of Civil Engineering, Faculty of Engineering Universitas Brawijaya, East Java, Indonesia.
[*]Corresponding Author:
Email: naysanabila@student.ub.ac.id

Abstract.
Provider process service construction participates in tenders electronics in Malang Raya; provider service construction will upload an offer or no for a project and make an offer that requires commitment source power. The influencing factors include the characteristics project, the ability company, the challenge operational project, the Economy, the environment, the market, and the government. The study aims to know the dominant factor influencing _ provider service construction bids on delicate electronics located in Malang Raya in 2021. Five hundred and fifty-nine respondents are provider service construction ever _ upload requirements nor only view tenders _ electronics at LPSE Malang Raya. Method research used _ is interviews and questionnaires — data analysis using Structure Equation Modeling (SEM) with SmartPLS (Partial Least Square) software.Modeling results bid Y = 0.123 X1 + 0.325 X2 + 0.196 X3 + 0.406 X4 Effect dominant leading provider service construction bid on Tender directly electronics at LPSE Malang Raya is a category of Economy, Environment, Market, and Government (X4) with Variable Replacement Value loss (X4.4). Influence dominant second that is category Enterprise Capability (X2) with variable Profitability (X2.3). Influence chief third category Challenge Operational Project (X3) with variable Availability another project (X3.4). And Influence dominant final category Characteristics Project (X1) with variable Tender Method (One File) (X1.8) Keywords: Tender, Construction Service Provider, Structural Equation Modeling (SEM), SmartPLS (Partial Least Square)

Keywords: *Tender, Contractor, Structural Equation Modeling (SEM), and SmartPLS (Partial Least Square)*

I. INTRODUCTION

Participation rate provider for the procurement profession neither construction nor reach the target raises question factors what affects the provider profession construction for entering an offer or not in job tenders construction [1]. one important decision taken by the contractor is to submit offer or no for something project. This is because of complexity and uncertainty about the decision, which is influenced by many factors [2]. Study this aim to identify factors that significantly influence the decision to offer project infrastructure [3]. Bid decision or no bidding is significant for successful contractor construction [4].Procurement of government goods /services called Procurement Goods /Services are activity Procurement Goods /Services by Ministries/Institutions/ Regional Apparatuses financed by the APBN/APBD whose process since identification needs, until with hand over accept results work [5]. Implementation Procurement of Government Goods /Services through Provider conducted through the application System Procurement By Electronics (SPSE) and systems supporters.

In Malang City Government, Government Malang Regency and Batu City Government (Malang Raya Government), value ceiling profession construction over 200 million implementation of tenders/ selection conducted via e-purchasing using application Service Procurement By Electronics (LPSE) where The Government of Greater Malang uses version 4.4. Provider process service construction participation in the Tender of the Government of Greater Malang divided Becomes two aspect important. The first decision is whether provider service construction will bid or not for a project. The importance decides the Tender appears from the consequences of his finances. one risk from the decision is that provider service construction could cause a lot of money loss, no decision determined by value course. If the provider service construction does not submit an offer, there may be a lost opportunity for the following project. If the provider service construction decides to bid, they must estimate the cost project. The second decision in offer work, provider service construction, is to make an offer that requires commitment source power (e.g., guarantee offer, document offer, material availability used, etc.).

II. METHODS

According to the study before, discussion influencing factors provider service construction bid or no bid most not classified according to the category. Temporarily, the researcher classified according to category and added several adjusting factors system electronics in Indonesia, LPSE, and experience in the field.The method used in the research previously uses regression. So from that, research this complete study that influences factors provider service construction bid on delicate electronics in Malang Raya with SEM (Structural Equation Modeling) SmartPLS software.

For explanation details can seen in Table 1.

Table 1. Variable from researcher previously

NO.	Category	Notation	Variable	Measurement Scale			Information
				Very Important	Important	Not Important	
1	Characteristics Project (X1)	X1.1	Size / coverage project	1 2 3 4 6 7 8 11 12 14	-	13	From researchers previously
2		X1.2	Needs will profession	1 2 3 4 8 9	13	-	From researchers previously
3		X1.3	Type contract	1 2 4 14	3 13	-	From researchers previously
4		X1.4	Type project	1 2 6 9 11	3 4 13	-	From researchers previously
5		X1.5	Project location	1 2 3 7 8 13	4	-	From researchers previously
6		X1.6	Tender duration	1 2 8 10 13 14	3 4	5	From researchers previously
7		X1.7	Method (Postqualification)	1 13	3	2 4	From researchers before , development from LPSE system
8		X1.8	Method (One File)	1 13	3	2 4	From researchers before , development from LPSE system
9		X1.9	Tender method (Lowest Price System)	1 13	3	2 4	From researchers before , development from LPSE system
10		X1.10	Tender method (Contract Unit Price)	1 13	3	2 4	From researchers before , development from LPSE system
11	Capability (X2)	X2.1	Availability of capital	2 4 8 9 13 14	1 3	-	From researchers previously
12		X2.2	Fulfill requirements for tender	13	1 2 4	3	From researchers previously
13		X2.3	Profitability (potential profit)	1 2 3 4 5 12	13	-	From researchers previously
14		X2.4	Availability power work / equipment	2 4 6 7 10 13	1 3	-	From researchers previously
15	Capability (X2)	X2.5	Experience in project kind of	1 2 3 4 7 8 14	-	13	From researchers previously
16		X2.6	Completeness document	10	1 2 4	3 7 13	From researchers previously
17	Challenge Operationa	X3.1	General overhead	-	2 3 4	1	From researchers previously

18	l Project (X3)	X3.2	Difficulty technology project outside ability company	6 10	1 2 4	7 13	From researchers previously
19		X3.3	Workload moment this	1 3 13	-	2 4	From researchers previously
20		X3.4	Availability other projects	13	1 3	2 4	From researchers previously
21		X3.5	Initial capital expenditure contractor before term liquid	-	-	-	Frequently _ happening in the field
22	Economy, environment , market and government (X4)	X4.1	Opportunity for get profession	2 4 13	1	-	From researchers previously
23		X4.2	Anticipated rate of return	3 6 7 10 11	1 2 4 13	-	From researchers previously
24		X4.3	Risks involved in investation	3 5 7 8	1 2 4 13	-	From researchers previously
25		X4.4	Replacement value make a loss	3	1 2 13	4	From researchers previously
26		X4.5	Amount competitors	1 3 5 7 9 10 12	13	2 4	From researchers previously

Description :

1 = Sancoko & Pratama, (2020) ; 2 = Chua, (2000) ; 3 = Dulaimi & Shan, (2002) ; 4 = Oyeyipo et al., (2016) ; 5 = Shokri-Ghasabeh & Chileshe, (2016) ; 6 = Olatunji et al., (2017) ; 7 = Respawan et al., (2017) ; 8 = Marzouk & Mohamed, (2018) ; 9 = Perera et al., (2021) ; 10 = Oyeyipo et al., (2016) ; 11 = Alsaedi et al., (2019) ; 12 = Ha et al., (2020) ; 13 = Shash, (2006) ; 14 = Mohamed et al., (2022).

Respondents used purposive sampling, provider service designated construction (respondent) only ever bid (see nor upload bids) on tenders electronics in Malang Raya, so results analysis by accurate about influencing factors provider service construction bid on delicate electronics.Selected respondents are 221 providers of service construction, including document offers, and 283 providers of service construction that only view Tender electronically at LPSE Malang Raya on February 2 – August 31, 2021. The questionnaire only addressed to provider service construction ever bid on Tender electronically or purposive. Method research used is technique interviews and questionnaires using SEM SmartPLS software.SEM is a method of analysis of statistics multivariate for analyzing several variable studies simultaneously. Factor provider service construction bid tender electronics. Because of that writer uses SEM because relevant to destination research. The variable research that will analyze could seen in Table 2.

Table 2. Research design

Category	Question	Scale
1	Name of PT / CV of Construction Service Provider	Nominal
2	Address of PT / CV Construction Service Provider	Nominal
3	Number Phone / WA that can be contacted	Nominal
4	Appointment Respondent	Ordinal
5	Age Respondent	Ordinal
6	Qualification Academic	Ordinal
7	Qualification Professional	Ordinal
8	Experience Construction	Ordinal
9	Background Behind Professional	Ordinal
10	Class Contractor	Comparison
11	Type Ownership	Comparison
12	Company Activities	Comparison
13	Once attend seminars or training Procurement Government goods /services in 3 years last :	Yes No
Characteristics Project (X_1)		

X1.1	Size/coverage project	Ordinal
X1.2	Needs will profession	Ordinal
X1.3	Type contract	Ordinal
X1.4	Type project	Ordinal
X1.5	Project location	Ordinal
X1.6	Tender duration	Ordinal
X1.7	method (Postqualification)	Ordinal
X1.8	method (One File)	Ordinal
X1.9	Tender method (Lowest Price System)	Ordinal
X1.10	Tender method (Unit Price Contract)	Ordinal
Capability (X_2)		
X2.1	Availability of capital	Ordinal
X2.2	Fulfill requirements for Tender	Ordinal
X2.3	Profitability (potential profit)	Ordinal
X2.4	Availability of power work / equipment	Ordinal
X2.5	Experience in project kind of	Ordinal
X2.6	Completeness document	Ordinal
Challenge Operational Project (X_3)		
X3.1	General overhead	Ordinal
X3.2	Difficulty with technology project outside _ the ability company	Ordinal
X3.3	Workload moment this	Ordinal
X3.4	Availability other projects	Ordinal
X3.5	Initial capital expenditure contractor before term liquid	Ordinal
Economy, environment, market, and government (X_4)		
X4.1	Opportunity for getting profession	Ordinal
X4.2	Anticipated rate of return	Ordinal
X4.3	Risks involved in investigation	Ordinal
X4.4	Replacement value makes a loss	Ordinal
X4.5	Amount competitors	Ordinal

Table on show design research that influences provider service construction bid tender electronic based on Characteristics Project (X 1): size/coverage project, will job, type contract, type project, location project, tender duration and tender method (postqualification, single File, system price lowest, contract price unit). Characteristics Company's ability (X 2): availability of capital, meeting requirements for tenders, profitability (potential advantage), Availability power work/equipment, experience in project kind and accessories document, Characteristics Challenge Operational Project (X 3): general overhead, difficulty technology project outside ability company, expense work moment here, availability other projects and initial capital expenditure contractor before term liquid. Economic, environmental, market, and government characteristics (X 4): opportunities for getting a job, anticipated returns, risks involved in investment, value change loss, and amount of competitors.

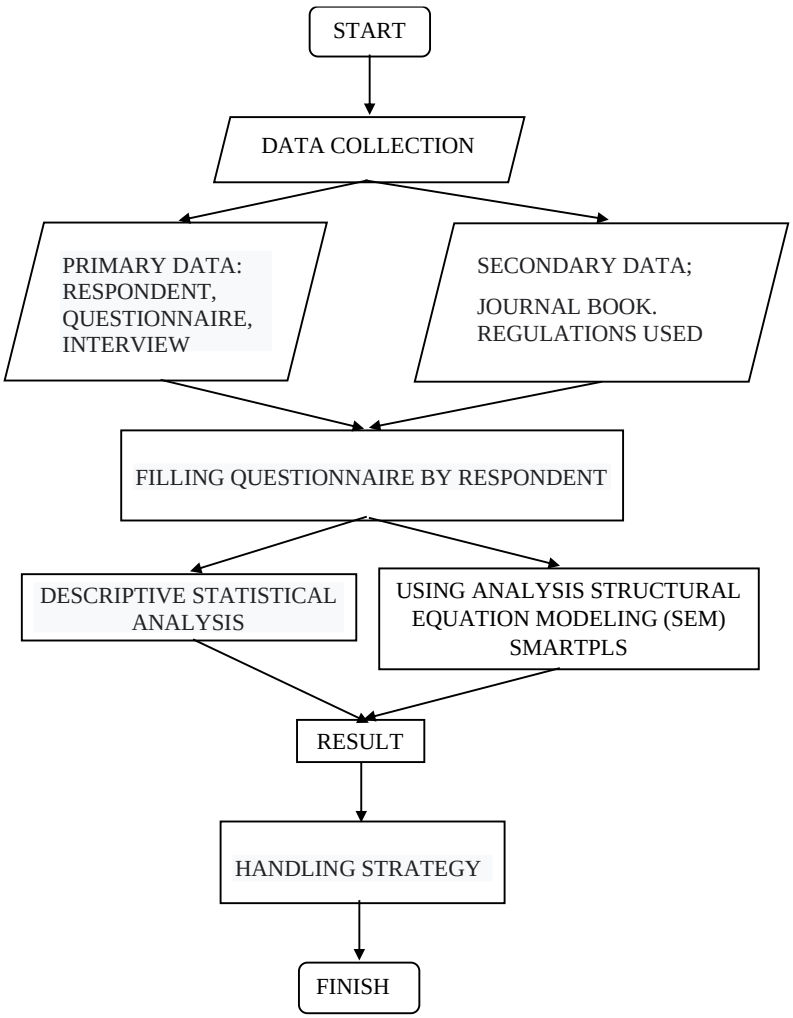

Fig 1. Flowchart

The flow chart depicts the steps taken by the author in obtaining data and conducting data analysis to determine the factors that influence construction service providers to bid for tenders electronically, as shown in Figure 1.

III. RESULT AND DISCUSSION

3.1 Results of the Prediction Model of the Factors Affecting Construction Service Providers Bidding on Electronic Tenders

a. Feasibility Test / Model Validity

This test aims to describe how well the factors in this study can be used as instruments to measure latent variables. With Loading Factor (LF) > 0,5 (Valid), Average Variance Extracted (AVE) > 0,5 (Valid), and Construct Reliability (CR) > 0.7). As in Table 2, the feasibility test.

Table 2. Feasibility test

Latent Variable	Observed Variables	Partial Validity (Per Indicator)		Overall Validity (Per Construct)		Composite Reliability	
		(LF > 0.5=Valid)		(AVE > 0.5=Valid)		(CR > 0.7)	
		Outer Loading	Note:	AVE	Conclusion	CR	Information
Project Characteristics (X1)	X1.5	0.894	Valid	0.609	Valid	0.885	Reliable
Company Capability (X2)	X2.3	0.894	Valid	0.577	Valid	0.890	Reliable
Project	X3.4	0.890	Valid	0.561	Valid	0.863	Reliable

Operational Challenges (X3)							
Economy, environment, market, and government (X4)	X4.4	0.891	Valid	0.657	Valid	0.884	Reliable
Factors Driving Interest in Bidding Tenders (Y)	Y4	0.907	Valid	0.525	Valid	0.916	Reliable

Table 2 explains that influencing category provider service bid tender with a valid value for feasibility test. X1.5 represents Project location, X2.3 represents Profitability-potential advantage, X3.4 represents Availability project else, X4.4 represents Replace value make a loss role Economic, environmental, market and government factors (X4) in order to be able to make Construction Service Provider Bid Tenders. The dominant factor in provider service construction bidding for the category of Economy, environment, market, and government (X4) is Variable Replacement Value loss (X4.4) with a weight factor the largest is 0.891.

b. Dominant Test

Dominant test determine categories and variables become factor dominant in provider service construction bid tender electronics consideration for provider service construction for taking steps for handling strategies to get on the call list candidate tender winner test results dominant as seen in Table 4 below this.

Table 4. Dominant test

The influence between Latent variables			**Path Coef.**	**Rank-ing**	**Dominant Variable**	**Dominant Indicator**
Project Characteristics (X1)	→	Factor Tender (Y)	0.123	4	Fourth priority	X1.5 (Project location)
Company Capability (X2)	→		0.325	2	Second priority	X2.3 (Profitability / profit potential)
Project Operational Challenges (X3)	→		0.196	3	Third priority	X3.4 (Availability of other projects)
Economy, environment, market and government (X4)	→		**0.406**	**1**	**First Priority**	**X4.4 (Amount of compensation)**

Explanation of the table above is the result of the dominant test, the first dominant factor that needs to be considered for service providers bidding electronically is the category of Economy, environment, market and government (X 4) in the variable value of compensation (X 4.4). The second dominant factor is the category of Company Ability (X 2), on the Profitability / profit potential variable (X 2.3). The third dominant factor is category Project Operational Challenges (X 3), on variable Availability of other projects (X 3.4). The last priority is the Project Characteristics (X 1), on the Project location variable (X 1.5).

c. Goodness of Fit

Goodness of Fit in question is an index and a measure of the goodness of the relationship between latent variables (inner model). This test explains that the path coefficient formed represents the data that has been studied. The R-square coefficient value is between 0 to 100.0%, the greater the coefficient value, the greater the path coefficient that can represent the data studied. The results of the inner model test can be seen in Table 4.

Table 4. Goodness of Fit

Influence			**R Square**	**Information**
Project Characteristics (X_1)	→	Factor Tender (Y)	0.772	77 , 2 %
Company Capability (X_2)	→			
Project Operational Challenges (X_3)	→			

Economy, environment, market and government (X_4)	→			

The coefficient of determination (R-square) obtained from the Project Characteristics model (X 1), Company Capability (X 2), Project Operational Challenges (X 3), Economy, environment, market and government (X 4) on the Factors that Drive Interest in Bidding Tender (Y) is 0.772, so it can be explained that the accuracy of measuring Project Characteristics (X 1), Company Capability (X 2), Project Operational Challenges (X 3), Economy, environment, market and government (X 4) to Tender Bidding Factors (Y) of 77.2% and the remaining 22.8% is influenced by other variables outside the study.

3.2 Tender Bid Prediction Model

The path coefficients in the structural model and the weight values of the manifest variables are depicted in the path diagrams of the measurement model and the structural model in Figure 1.

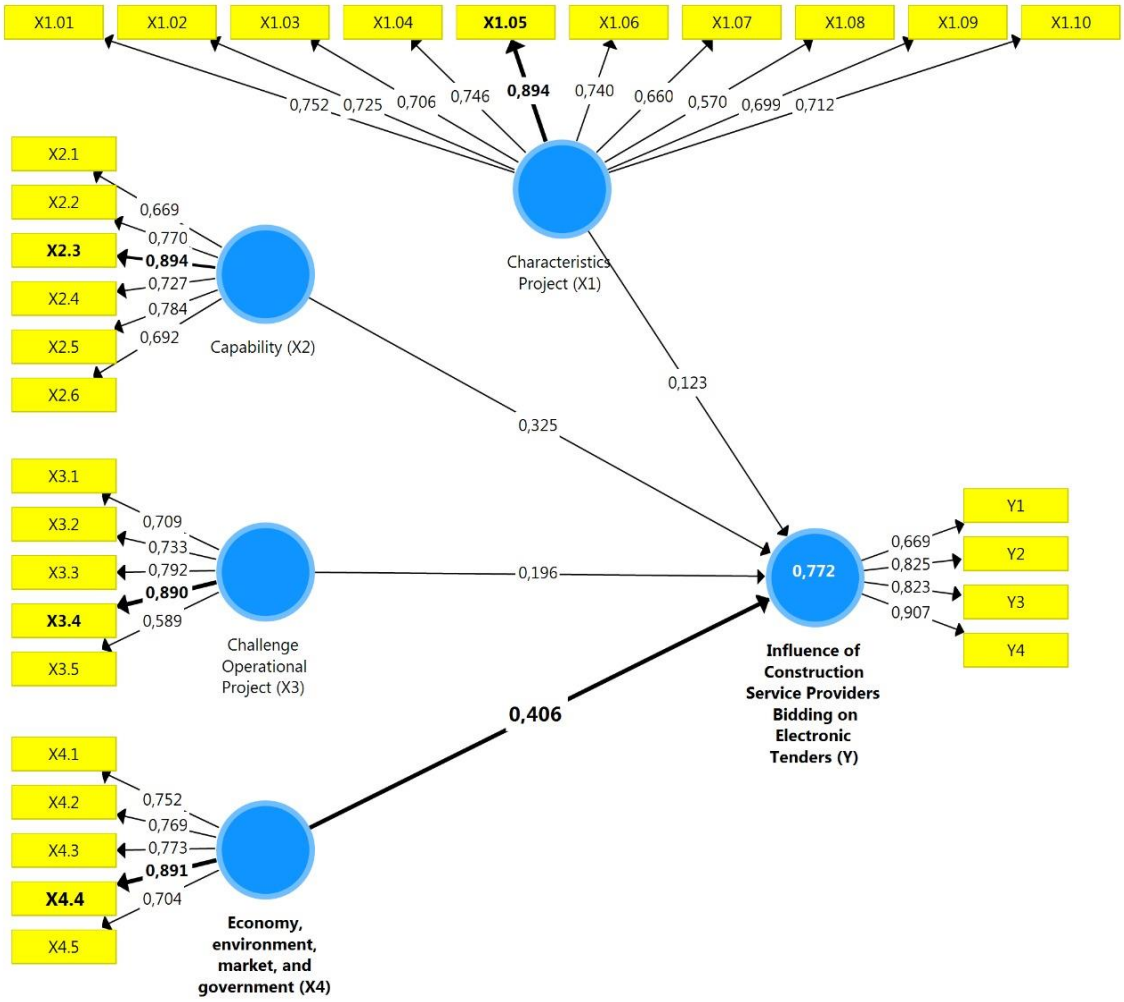

Fig 2. Path Chart

Prediction Model Y = 0.123 X1 + 0.325 X2 + 0.196 X3 + 0.406 X4

Figure 2 above explains the value of each category and variable, where the most significant path coefficient is 0.406 in the category of Economy, environment, market and government (X 4) with the most significant factor weighting 0.891, namely the compensation value variable (X 4.4). And the second most significant path coefficient is 0.325 in the category of Company Ability (X 2), with a factor weight of 0.894, namely Profitability/profit potential (X 2.3).

3.3 Discussion

Analysis result provider service construction bid on electronic Tender with using SEM, we get that factor provider service bid on tender electronics in the category Economy, environment , market and government (X 4) with Variable Replacement Value loss (X 4.4) gain significant results to get on the call list candidate tender winner (Table 3, dominant test) with weight factor the largest is 0.891. This result is in line

with research conducted [6] where the replacement value loss (X4.4) still Becomes reason main happening provider service bid on tenders.

Study this use SEM method with SmartPLS software . Profit using SEM are :

- Ability to handle complex relationship Among variable. Variable could character hypothetical or no could observed (latent variable).
- Estimating all coefficient in the model simultaneously allows you to evaluate importance and power connection specific in full model context.
- Eliminate the ability to consider multicollinearity and error measurement to make coefficient more useful [7]. A studies with Lisrel analyze behavior provider service construction also provides the same variable for bid tender electronics in Malang.

However , the generation SEM method second still used in a study this. Device soft SmartPLS more easily accessible and does not need many assumptions. Deficiency from study this is many related variables with cause of tender electronics by provider service construction no analyzed. Author 's Hope for study next is study in detail the underlying variables provider service construction conduct tenders electronically, streamlining electronic tenders and overcoming existing problems. Method Analytical must also developed using the latest SEM version. Research in other fields with characteristics that are almost the same can developed .

IV. CONCLUSION

1. Factors that influence construction service providers bidding on electronic tenders in Malang Raya 2021, namely:
   a. Project characteristics consist of 10 categories, namely Project size/scope, Need for work, Type of contract, Type of project, Project location, Tender duration, Tender method (Post-qualification), Tender method (One File), Tender method (Lowest Price System), Tender method (Unit Price Contract).
   b. Company characteristics consist of 6 categories, namely Capital Availability, Fulfillment of requirements for tenders, Profitability (profit potential), Availability of labor/equipment, Experience in similar projects and Completeness of documents.
   c. The characteristics of Project Operational Challenges consist of 5 categories, namely General overhead, Project technological difficulties beyond the company's capabilities, Current workload, Availability of other projects and Initial contractor capital expenditure before the term is liquidated.
   d. Economic, Environmental, Market and Government characteristics consist of 5 categories, namely Opportunity to get a job, Anticipated rate of return, Risk involved in investment, Compensation value and Number of competitors.
2. The most dominant factor for construction service providers bidding on electronic tenders in Malang Raya 2021 is the Economic, Environmental, Market and Government Characteristics factor Compensation value (X4.4) with a loading factor value of 0.891.

V. ACKNOWLEDGMENTS

The authors are grateful to the parents, family, friends and contractor have help and encouragement in making study.

REFERENCES

[1] Alsaedi, M., Assaf, S., Hassanain, M. A., & Abdallah, A. (2019). Factors affecting contractors' bidding decisions for construction projects in Saudi Arabia. *Buildings*, *9*(2), 1–13. https://doi.org/10.3390/buildings9020033

[2] Chua, L. (2000). Key Factor in Bid Reasoning Model. *Sim - Bidding Strategy*, *126*(October), 46–57.

[3] Dulaimi, M. F., & Shan, H. G. (2002). The factors influencing bid mark-up decisions of large- and medium-size contractors in Singapore. *Construction Management and Economics*, *20*(7), 601–610. https://doi.org/10.1080/01446190210159890

[4] Ha, S. T., Tran, M. L., Hoang, H. V., & Tran, V. H. (2020). External factors influencing bid/no-bid decision for

supervision consultant service: A case of construction project in Hanoi. ***Journal of Asian Finance, Economics and Business,*** *7*(6), 417–425. https://doi.org/10.13106/JAFEB.2020.VOL7.NO6.417

[5] Marzouk, M., & Mohamed, E. (2018). Modeling bid/no bid decisions using fuzzy fault tree. *Construction Innovation*, *18*(1), 90–108. https://doi.org/10.1108/CI-11-2016-0060

[6] Mohamed, E., Jafari, P., & Hammad, A. (2022). Mixed qualitative–quantitative approach for bidding decisions in construction. *Engineering, Construction and Architectural Management*, *29*(6), 2328–2357. https://doi.org/10.1108/ECAM-12-2020-1060

[7] Olatunji, O. A., Aje, O. I., & Makanjuola, S. (2017). Bid or no-bid decision factors of indigenous contractors in Nigeria. *Engineering, Construction and Architectural Management*, *24*(3), 378–392. https://doi.org/10.1108/ECAM-01-2016-0029

[8] Oyeyipo, O. O., Odusami, K. T., Ojelabi, R. A., & Afolabi, A. O. (2016). Factors affecting contractors' bidding decisions for construction projects in Nigeria. ***Journal of Construction in Developing Countries,*** *21*(2), 21–35. https://doi.org/10.21315/jcdc2016.21.2.2

[9] Perera, B. A. K. S., Wijewickrama, M. K. C. S., Ranaweera, W. R. S. C., & Gamage, I. S. W. (2021). Significant factors influencing the bid mark-up decision of infrastructure projects in Sri Lanka. ***International Journal of Construction Management,*** *21*(8), 769–783. https://doi.org/10.1080/15623599.2019.1583849

[10] Respawan, M., Sudarsana, I. K., & Nadiasa, M. (2017). Analisis Faktor Yang Mempengaruhi Partisipasi Dan Nilai Penawaran Peserta Lelang Elektronik (E-Procurement) Jasa Konstruksi Di Kabupaten Buleleng. ***Jurnal Spektran,*** *5*(1), 58–64. https://doi.org/10.24843/spektran.2017.v05.i01.p01

[11] Sancoko, B., & Pratama, B. R. (2020). Analisis Faktor-Faktor yang Memengaruhi Keputusan Penyedia untuk Memasukkan Penawaran pada Tender Pekerjaan Konstruksi di Kementerian Keuangan. ***Jurnal Wacana Kinerja: Kajian Praktis-Akademis Kinerja Dan Administrasi Pelayanan Publik,*** *23*(1), 63. https://doi.org/10.31845/jwk.v23i1.194

[12] Shash, A. A. (2006). Construction Management and Economics Factors Considered in Tendering Decisions by Top UK Contractors. *Construction Management and Economics*, *11*(2), 111–118. http://www.tandfonline.com/action/journalInformation?journalCode=rcme20%5Cnhttp://dx.doi.org/10.1080/01446199300000004

[13] Shokri-Ghasabeh, M., & Chileshe, N. (2016). Critical factors influencing the bid/no bid decision in the Australian construction industry. In *Construction Innovation* (Vol. 16, Issue 2). https://doi.org/10.1108/CI-04-2015-0021