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The Influence of Risk on The Performance Project of Framework Agreement Construction

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ABSTRACT

The contract is an important aspect that is crucial in the implementation of construction projects. Framework agreement is one of the model contracts that are still limited implementation in the construction world in Indonesia. This study aims to assess the application of Framework agreement in the construction field, especially from the aspect of risk; it starts from identification to the risk allocation of the aspect of construction contracts. The research is done in the form of a survey by capturing the opinions or perceptions, experiences, and attitudes of respondents consisted of contracting, procurement, vendor, and the project owner. From the results of the study note that the most influential risk level is variable Fossil (X8), Testing (X9), Termination of employment (X16), Delay Testing (X18), handover of some of the work ((X20), Procedure variation (X28), the Right Contractor to Halt Work (X33), the risk of service users (X36), the consequences of the risk of service users (X37) and exemption from the obligation to force majeure (X44).

Keywords: Risk identification, Framework agreement, and construction projects

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1. INTRODUCTION

The system of procurement and contract execution is an important step in the construction cycle. Framework agreement is one of the models are still limited procurement application in construction contracts in Indonesia. Things are different in other countries such as Britain that its application has been performed widely in the field of construction, and there is a standard framework agreement, NEC3 in the field of construction. Meanwhile in Indonesia framework agreement system is still limited to the procurement of materials and services as the maintenance of which are implemented by LKPP (Institute for Procurement Policy and Government Services in Indonesia) [1].

The implementation of framework agreement on the construction work will be important to know against the risk they pose before the execution of the contract begins, so that these risks can be identified as early as possible so that the execution of the contract work is done to run a successful time, quality and cost [8].

The uncertainty of risk that will cause no risk predictability that will be accepted the impact, so that the necessary identification and risk analysis, so the risk project will be averted and predicted as early as possible. The project implementers should strive to be minimized and uncertainties that are anticipated to provide some alternative actions to deal with the uncertainty, in other words, the risk must be managed in the best possible way so that the goals and objectives of the project are appropriate, timely and cost [2].

The risks inherent to the contract clauses such as FIDIC General Conditions of contruct obtained a number of variables relevant risks that can be used on a framework agreement as follows [4], Nidar (2012)[5], Ben Edwards (2011)[6] and Kusayanagi (2011)[7] about:

Table 1: Risk Variable Construction Contracts

No	Variable Risk
1	Delay Figure Plan or Instruction
2	The right to enter the Field
3	Cooperation
4	Installation of signs Limit
5	Field Data
6	Physical Condition that Cannot Be Estimated Previous
7	Electricity, Water and Gas
8	Fossil
9	Testing
10	Rejection
11	Repair Work
12	Extension of Time Settlement
13	Delay Due to action ruler
14	Level Job Advancement
15	Penalty Due to Delay
16	Termination of Employment
17	Consequences of Termination
18	Delay Testing
19	Not Passed Tests at the End of Work
20	Handover Some Work
21	Disruption of Testing at the End of Work
22	Quality Defects Notification Period Extension
23	Failure to Improve the Quality Defects
24	Investigations by the Contractor
25	Evaluation
26	Elimination
27	Value engineering
28	Variation Procedure
29	Adjustment due Amendment
30	Payment Schedule
31	Late Payment
32	Payments after Termination
33	Right to Stop Work Contractors
34	Payment of Termination When Using
35	Provision of Torts
36	Risk User Services
37	Consequences for Risk User Services
38	General Requirements for Insurance
39	Insurance for Works and Contractor's Equipment
40	Human and Accident Insurance for Damage Possession
41	Force Majeure
42	Consequences of Force Majeure
43	Options for Termination, Payment and Liberation
44	Exemption of Liability Implementation

2. MATERIALS AND EXPERIMENTAL METHODS

The research method is applied in the form of survey research. The research surveys are generally conducted to take a generalization of observations that are not deep. The survey research technique was done by capturing the opinions or perceptions, experiences, and attitudes of the respondents about the risk factors that could potentially arise and affect the project cycle and forms handling taken to anticipate those risks.

A. Data Collection

The collecting data in this study using questionnaires or questionnaire with Likert scale measurement. This questionnaire is a technique where data collection is done by giving a set of questions or a written statement to the respondent to answer it. This is an efficient data collection technique when researchers know for certain variables measured and know what to expect from the respondents. The samples in this study are those who have or are involved in the execution of the contract paying a total of 140 respondents.

B. The Influence of Risk on Performance Project

Analyzes were performed using SPSS 22.0 and Monte Carlo PCA. Data analysis includes the analysis of factors and path analysis is the level of risk and performance relationship [9].

Considering the number of risk variables obtained from the literature review that 44 variables in four groups of risk, then the amount necessary for the subsequent analysis of factor analysis to obtain the dominant cause of the occurrence of the risk on an umbrella contract. Factor analysis was conducted in two parts. In Part 1 the procedure is the data and extract the assessment factor. From this stage the test results obtained in the form of tables Total Variance Explained or eigenvalues obtained in SPSS to be compared with the value corresponding to the random outcome of a parallel analysis (Monte

Carlo PCA). If the value of the SPSS output is greater than the value of the parallel analysis criterion, then the factor retained for further analysis. Conversely, if the lower eigenvalues, then these factors in the exhaust. In part 2 additional procedures required to rotate with Varimax method and interpret the factor scores with regression method [10].

Path analysis is a technique the development of multiple linear regressions. This technique is used to examine the contribution of which is shown by the path coefficient on each path diagram of causal relationships between variables X1 X2 and X3 to Y and their impact on Z [10]. To determine the effect of risk on the performance of the project can be structural similarities regression as:

$$Y1 = 0{,}483\ X1 - 0{,}284\ X2 - 0{,}221\ X3 + 0{,}241\ e1 \quad (2)$$

$$Y2 = 0{,}208\ X1 + 0{,}297\ X2 + 0{,}202\ e1 \quad (3)$$

$$Y3 = 0{,}171\ X1 + 0{,}304\ X2 + 0{,}155\ X3 + 0{,}195\ e1 \quad (4)$$

$$Y4 = 0{,}858\ X1 + 0{,}135X2 + 0{,}302\ e1$$

3. RESULT AND DISCUSSION

The respondents were surveyed about 140 people both from implementing the framework agreement who have or are working on a framework agreement project construction project implementation in Indonesia spread both government agencies and the private individual who has a reputation in the execution of construction framework agreement.

A. Risk Influence on Performance Project

To determine the effect of risk on the performance of the project carried out analysis factor and path analysis as follows:

From the results of the factor analysis of the obtained four groups of factors that qualify as illustrated in the table below:

Table 2. Results of Factor Analysis Risk Group

	Rotated Component Matrix[a]			
	Component			
	1	2	3	4
1	,991	,992	,988	,987
2	,987	,988	,987	,985
3	,987	,988	,986	,702
4	,985	,988	,982	,113
5	,983	,988	,982	,094
6	,983	,987	,980	
7	,981	,987	,931	
8	,980	,986	,910	
9	,980	,986	,072	
10	,980	,985		
11	,979	,980		
12	,978	,979		
13	,973	,971		
14	,970			
15	,967			
16	,962			
17	,704			

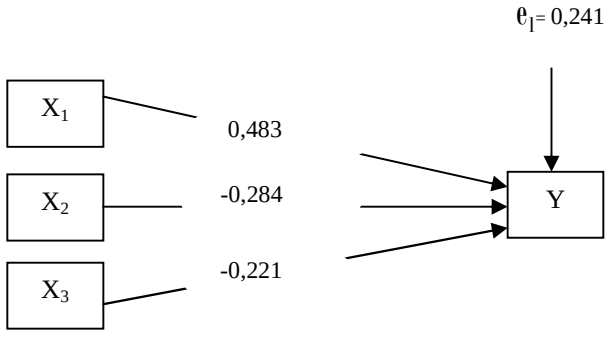

Figure 1. Model of Risk Factors Recursif Line 1

- Extraction Method: Principal Component Analysis.
- Rotation Method: Varimax with Kaiser Normalization.[a.]

a. Rotation converged in 4 iterations.

Based on the calculation results of factor analysis, obtained 4 of 4 groups of risk factors that will be used for further analysis, namely regression analysis and path analysis [9].

From some models of existing lines, in this test model is used to track the type recursive or unidirectional arrows. The following image is the result of path analysis with examples of four risk groups [9]:

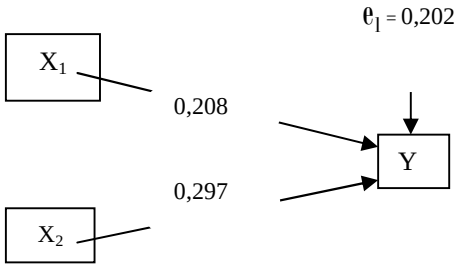

Figure 2. Model of Risk Factors Recursive Line 2

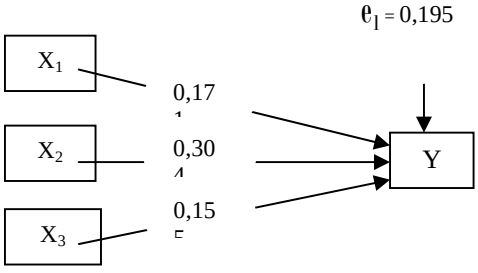

Figure 3. Model of Risk Factors Recursive Line 3

After multiple regression analysis results obtained path analysis for risk group 4 as shown in the following table:

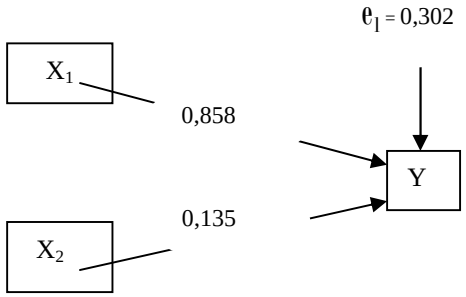

Figure 4. Model of Risk Factors Recursive Line 4

Table 3. Results of Path Analysis Group 1

Sub structural (X_1 X_2 X_3 ke Y)				
Model	Koefisien Jalur	t	P	R^2
X_1 (ρ yX_1)	0,483	2,335	,021	
X_2 (ρ yX_2)	– 0,284	-2,105	,037	0,942
X_3 (ρ yX_3)	– 0,221	-2,081	,040	

Table 3. Results of Path Analysis Group 2

Sub structural (X_1 X_2 ke Y)				
Model	Koefisien Jalur	t	p	R^2
X_1 (ρ yX_1)	0,208	1,778	,078	0,959
X_2 (ρ yX_2)	0,297	2,668	,009	

Table 3. Results of Path Analysis Group 3

Sub structural (X_1 X_2 X_3 ke Y)				
Model	Koefisien Jalur	T	p	R^2
X_1 (ρ yX_1)	0,171	3,310	,001	
X_2 (ρ yX_2)	0,304	2,706	,008	0,962
X_3 (ρ yX_3)	0,155	4,425	,000	

Table 3. Results of Path Analysis Group 4

Sub structural (X_1 X_2 ke Y)				
Model	Koefisien Jalur	t	p	R^2
X_1 (ρ yX_1)	0,858	24,873	,000	0,909
X_2 (ρ yX_2)	0,135	3,921	,000	

Overall, the effects of sub-structural formed can be described through structural equation is:

$$Y = \rho\, yX1 + \rho\, yX2 + \rho\, yX3 + Є2, \text{ or} \quad (6)$$

$$Y1 = 0{,}483\ X1 - 0{,}284\ X2 - 0{,}221\ X3 + 0{,}241\ e1 \quad (2)$$

$$Y2 = 0{,}208\ X1 + 0{,}297\ X2 + 0{,}202\ e1 \quad (3)$$

$$Y3 = 0{,}171\ X1 + 0{,}304\ X2 + 0{,}155\ X3 + 0{,}195\ e1 \quad (4)$$

$$Y4 = 0{,}858\ X1 + 0{,}135X2 + 0{,}302\ e1 \quad (5)$$

From four structural equations, it can be seen that there are 10 variables that influence the risk of contractual risk that there is a variable X20, X28, X33, X8, X9, X36, X37, X44, X16, X18. From analysis above path, found the highest Beta value indicates that the risk variables affect the performance of the project on an umbrella contract is as described in the table below:

Table 7. The Beta Based on Regression Results.

NO. Factor	Beta	Variable
1	0,483	20
2	0,297	9
3	0,304	37
4	0,858	16

If in the review of aspects of the allocation of risk to the parties in contractor and employer (owner) according to the respondents, the obtained distribution of risk as shown in Table 8 below:

Table 8. Allocation of Risk Based Risk Group Influential

GROUP	1	2	3	4
Contractor	20, 33	8	37	9,18
Employer	28	-	36, 44	16

Table 8 above shows that the greatest risk allocation occurs framework agreement risk load balance between service users and service providers.

4. CONCLUSION

1. From the results of the regression analysis found only 10 of the 44 risk variables that affect the performance of the framework agreement project 10 risk variables that affect the contractual risk that there is a variable among others: Fossil (X_8), testing (X_9), Termination of employment (X_{16}) , Delay Testing (X_{18}) Handing over some of the work (X_{20}), Procedure variation (X_{28}), Right to Stop Work Contractors (X_{33}), the risk of service users (X_{36}), the consequences of the risk of service users (X_{37}) and exemption from the obligation to force majeure (X_{44}).
2. Based on path analysis obtained four structural equations for each risk group.
3. Risk of framework agreement is allocated by the purview of contractor 40 % and employer 60% Conslusion
4. From the results of the regression analysis found only 10 of the 44 risk variables that affect the performance of the framework agreement project 10 risk variables that affect the contractual risk that there is a variable among others: Fossil (X_8), testing (X_9), Termination of employment (X_{16}) , Delay Testing (X_{18}) Handing over some of the work (X_{20}),

Procedure variation (X_{28}), Right to Stop Work Contractors (X_{33}), the risk of service users (X_{36}), the consequences of the risk of service users (X_{37}) and exemption from the obligation to force majeure (X_{44}).

5. Based on path analysis obtained four structural equations for each risk group.
6. Risk of framework agreement is allocated by the purview of contractor 40 % and employer 60%

5. REFERENCES

[1] Perka LKPP No. 14., 2012, "Petunjuk Teknis Pepres 70".

[2] PMI (Project Management Institute, Inc), 2004, A Guide To The Project Management Body Of Knowledge (PMBOK) 3rd edition, Newtown Square, Pennsylvania, USA.

[3] Anita Ceric, May, 2003, A Fremework For Process-Driven Risk Management in Construction Project, Research Institute for the Built & Human Environment School of Construction and Property Management University of Salford, Salford, UK Submitted

[4] Shuibo, Z., 2008, Risk Allocations in FIDIC Model Contracts, Tianjin University.

[5] Nadar, A., 2012, The FIDIC Experience with Dispute Boards Procurement and Dispute Resolution Consultant Visiting Research Fellow, Construction Contracts and Dispute Resolution, Queen Mary, UoL 6, Member, FIDIC Update Task.

[6] Edwards, B., 2011, Contract Management From the Contractors *Perspective*, Kier Contruction, FIDIC Contracts in Use in International Projects.

[7] Niraula, R and Kusayanagi, S., 2008, Journal Risk Allocations in FIDIC Model Contracts, contract administration for a construction project under FIDIC redbook contract in Asian Developing countries,Tianjin University.

[8] Sweet and Maxwell, 2011, Framework Agreemant

[9] Astutik, S., 2007, *Modul Pelatihan SPSS untuk Ilmu-ilmu Sosial*. Universitas Brawijaya, Malang.

[10] Ismaliana, R., 2003, *Kajian Analisis Lintas Sistem Sebab Akibat (Path Analisis of Causal System)*. Universitas Brawijaya, Malang.