

# Probabilities of Failures in Construction Works Completion in Governmental Institutions, an Analysis on the Causing Factors

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## Abstract

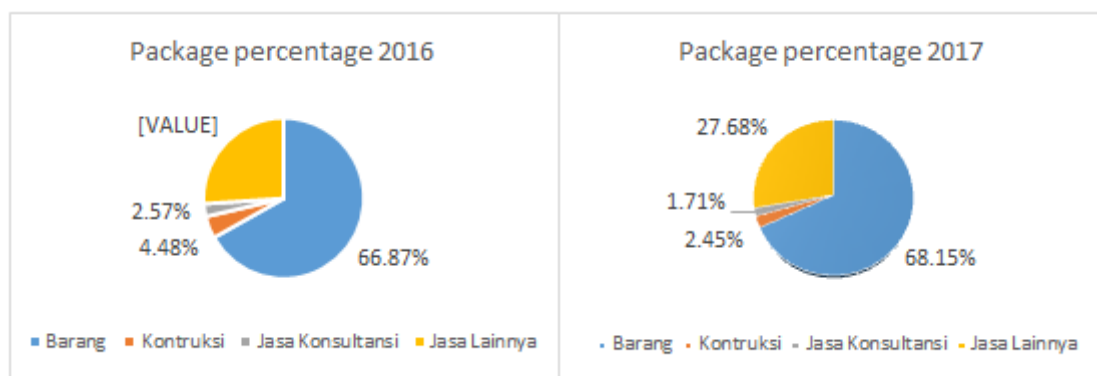
There are always goods/services procurements each year in governmental institutions, both central and local governments. However, there are often failures in the completion, causing the work progresses slowly, the quality is not well-controlled, the contract is terminated, and some works are even abandoned. The research's object is the probabilities of failures in construction works in governmental institutions, while the respondents were officers of governmental institutions involved or once involved or understanding participations of all parties involved in the construction works. Their involvements were in each of work stages, starting from preparing procurement, contacting procurement committee, making contract, planning, executing, controlling, and completing the work. Competence of the Commitment Making Official (CMO/PPK), technical skills of the contractors, planners, supervisors, and technical teams were factors considered to be playing a role in the failures. In addition, however, managerial skills of the administrators, natural/non-technical conditions, post of the CMO in the organisation, position issues, and period of work were also researched as the other non-ignorable factors that may cause the failures. The data were collected from questionnaires distributed to some selected respondents from various governmental institutions in some provinces in Indonesia. Furthermore, using probit model method, the data were processed and analysed. According to the results, only managerial skills of the administrator, technical skills of the contractor and supervising consultant, skills of the Procurement Service Unit (PSU/ULP) committee, position and period of work of the construction executing team had influence on the probabilities of failures in the construction works completion, while the other factors did not have any significant influence.

**Keywords:** Failure in completion, Technical and administrative competences, Commitment Making Official, non-technical conditions, probit.

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## INTRODUCTION

The budget ceiling of Finance Ministry for 2017 is Rp40.8 trillions, increasing from that for 2016 which is Rp38.1 trillions, consisting of Personnel Expenditures Rp17,710,231,052, Goods and Services Expenditures Rp21,923,963,517 and Capital Expenditures Rp1,139,924,854. With the quite big allocated budget, the Finance Minister certainly has thousands of procurement packages, both for goods and services expenditures and for capital expenditures.



**Fig-1: Percentages of Goods and Services Procurement Packages**

Source: Electronic Procurement Agency (LPSE), Ministry of Finance

**Table-1: Goods/Services Procurement (PBJ) packages based on Procurement Types**

PROC PACK GROUP Budget Year 2017	Amt of Goods Exp Package	Ceiling of Goods Expenditures	Amt of Capital Expe Package	Ceiling of Capital Expenditures	Amount of Expenditure Package	Ceiling Amount
Goods	6374	1,562,000,750,079	1662	543,129,509,460	8036	2,105,130,259,539
Construction	134	69,699,517,000	155	317,239,654,889	289	386,939,171,889
Consulting Services	23	5,524,749,000	179	30,256,896,080	202	35,781,645,080
Other Services	3243	2,907,092,793,755	21	59,813,011,000	3264	2,966,905,804,755
	9765	4,544,317,809,834	2017	950,439,071,429	11782	5,494,756,881,263

Source: LPSE

The thousands procurement packages are distributed to various work units in 11 first echelons. For 2017, the most procurements package is goods procurement with 8036 packages and budget ceiling of Rp2,105,130,259,539, followed by other services procurement with 3264 packages and budget ceiling of Rp2,966,905,804,755, construction services procurements with 289 packages and budget ceiling of Rp386,939,171,889, and consultancy service procurement with 202 packages and budget ceiling of Rp35.781.645.080. In the Finance Ministry itself for 2017 capital expenditures, there are about 289 construction works packages with ceiling value of Rp334,904,685,356. The packages and values of construction works in the Finance Ministry decrease compared to those of the previous years. The construction works spread in some first echelons such as General Secretary with 18 packages and ceiling value of Rp26,926,436,000, Directorate General of Budget with 1 package and ceiling value of Rp4,456,734,000, Directorate General of Tax with 64 packages and ceiling value of Rp 93,730,675,000, Finance Education and Training Agency with 24 packages and ceiling value of Rp9,200,210,000, Directorate General of State Assets Management with 26 packages with ceiling value of Rp21,403,609,000, Directorate General of Treasury with 83 packages with ceiling value of Rp40,230,042,000, Fiscal Policy Agency with 1 package and ceiling value of Rp633 millions, Directorate General of Customs and Excise with 65 packages and ceiling value of Rp136,345,389,000, Directorate General of Fiscal Balance (DJPK) with 2 packages and ceiling value of Rp 1,852,524,000, and Inspectorate General with 3 packages with ceiling value of Rp176,425,000.

The ceiling values of construction packages are relatively smaller compared to those of the other goods and services packages. However, audit results show that most problems are found in these construction works. The problems are found in the auctions, plannings, supervisions, and executions (in form of miscalculations, errors in drawings, lack of work volumes, slowness of work, and other administrative issues). The contractors often must return some of the fund to the State Treasury for being allegedly overpaid or must be probed further due to the alleged state loss.

In 2016 there were about 1079 work units in the Finance Ministry. If a work unit has a Commitment Making Official (CMO), it means there were at least 1070 CMOs in the ministry. Although a work unit may have more than one CMOs, in general there is only one CMO for each work unit. A CMOS should meet certain requirements so that it is not easy to have a CMO that masters various aspects regarding various types of procurement packages. Although a CMO has a staff and other assistants and competent consulting assistances from other agencies, the decisions on a work are still only made by the CMO him/herself. Furthermore, a CMOS (usually has a certain structural position) may get a mutation. If the mutation really happens, a new CMO will be on duty with minimum experience or with experience in certain fields but still having to adapt to the new environment. It also often happens that a former CMO is not willing to work as a CMO again.

Failures in auction of goods and services procurements or failures/incompleteness in planning, execution, and supervision that make the works postponed will make budget absorption happens not on time. Furthermore, this in turn will cause a low and disproportional budget absorption. Miliasih [1] describes three impacts of low budget absorption. First impact, activities postponed or not immediately carried out in the beginning of the year will cause tardiness in meeting the needs for public services. Second impact, postponed fund disbursement for goods and/or services procurements will cause multiplier effect and fiscal stimulus on the government expenditure will not achieve the targets on the people's economy at the beginning of the year. Third impact, the postponement at the beginning of the year that caused accumulating bill for the state at the end of the year will heavily weigh on the state treasury and is feared to cause cash mismatch.

Tanaka and Hayasi [2] since their initial research explained failures in goods and services procurements in Japan that caused tendency of collusion between committees and service providers. In addition, still in the same research, the failures in goods and services procurements would make profits obtained by the government decrease drastically.

### Research Problems Formulation

Based on the problem backgrounds mentioned above, the problem to be answered in this research are:

- How does competence of CMO influence probabilities of failures in construction works in governmental institutions?
- How do technical skills of planner, supervisors, contractors, procurement committees/PSU, and non-technical conditions influence probabilities of failures in construction works in governmental institutions?
- How do administrator managerial skills influence probabilities of failures in construction works in governmental institutions?
- How do post of CMO and organizational structures of Goods and Services Procurement manager influence probabilities of failures in construction works in governmental institutions?
- Is an involved officer having a certain position or not and period of work making any differences in the probabilities of failures in construction works in governmental institutions?

### Purposes and Benefits of the Research

This research is intended to analyse more deeply the influences of competence of CMOs, technical skills of planner, supervisors, contractors, and procurement committees/PSU and non-technical conditions on probabilities of failures in construction works in governmental institutions. In addition, this research also analyses whether administrator managerial skills, post of CMO and procurement organisational structure, period of work, and position also have influence of probabilities of failures in construction works in governmental institutions.

Benefit of this research is academically providing inputs for policy makers in the ministry of finance, National Public Procurement Agency (LKPP), and other governmental institutions in formulating and establishing policies. In addition, this research practically provides inputs for parties involved in a project both in procurement and execution stages to avoid failures in construction works completion.

## LITERATURE REVIEW

### Agency Theory

Agency theory states that agency relationship is an agreement (contract) between two parties which are the principal and the agent, in which the principal authorises the agent to make decisions on behalf of the principal [3].

This theory may explain relationship in a procurement organization, like Proxy of Budget User (PBU/KPA) (as the principal) and CMO (as the agent), or between CMO and procurement official (as the agent). As a principal, PBU cannot fully control CMO in executing construction works. Likewise, CMO, when acting as a principal, cannot fully control the procurement official.

### Contract Theory

Wechsler [4] defines contract as follow, “contract is an agreement of formal binding between two or more parties in interest with a certain purpose and approval of what should do and what should not do by each party”. Jehn [5] mentioned by Suryo [6] as explaining that in a complex goods/services procurement, contract is very helpful since it provides a clear definition on role and responsibilities of each party. Contract also may ensure that the parties understand expectancy of each other, so that reducing detrimental effect if a dispute arises.

The contract theory itself as mentioned Laffont *et al.* [7] is a theory that principally studies how economic actors can build an efficient/optimum contract agreement, generally in uncertainty and with asymmetric information. Uncertainty arises since parties cannot fully predict and pour into a contract what will happen during the contract period, during which those happenings will influence rights and duties of the parties.

In its development, the contract theory is divided into two types often used as references for goods and services procurements, which are complete contract theory and incomplete contract theory.

### Complete Contract Theory (Incentive Theory)

This theory assumes that parties can make a contract completely, so it sees procurement contract as an incentive issue. According to Laffont and Tirole [7], in principal-agent model, the government as the principal faces problem of asymmetric information since they cannot obtain some important informations about the provider (the agent), mainly in connection with efforts that will be made by the provider.

The efforts made in this respect may describe the types of the providers (for example efficient or inefficient provider, risk-taker or risk adverse provider). In this regard, the government as the buyer cannot fully differentiate between efficient and inefficient providers, and they also cannot monitor how much efforts are made by the provider to

meet as much as possible the government's interest as the buyers as mentioned in the contract.

Therefore, the problem faced by the government as the buyer is how to design an incentive (contract scheme) so that the provider will give information or adopt behaviours that meet the buyer's expectations. In connection with stages of the procurement process, the incentive theory focuses on contract design before the contract is signed.

### **Incomplete Contract Theory (Transaction Cost Theory)**

The incentive theory's assumption that parties can perform their rights and obligation for all the possibilities that will happen does not apply in the transaction cost theory. In fact, almost all contracts (including procurement contracts) are incomplete contracts. Grossman, S J & Hart O D [8] explains that incompleteness of a contract is inevitable because of the high transaction costs required in making a complete contract mainly information costs, bonded rationality, inability to see or predict contingent things, and other causes.

In economical model, contract is "contingently incomplete" since in the contract language, the parties cannot maximise transaction benefits in each future contingency [9]. In this theory, incompleteness of a contract is also caused by inability of responsible institutions to ensure contract performance (which is court institution), since they cannot enforce provisions which are difficult to verify or cannot be verified. Since this theory assumes that law enforcers also have bonded rationality, contract performance cannot be ensured by external mechanism (court institution). Williamson [10] calls this condition institution failure.

### **Trust Theory**

According to Rousseau *et al.* [11], trust is a psychological state comprising the intention to accept vulnerability based upon positive expectations of the intentions or behavior of another. Consumers trust is defined as willingness of one party to assume risks from other party's action based on expectations that the other party will do important things for the trusting party, apart from ability to supervise and control the trusted party [12]. Trust happens when a person believes the reliability and integrity of the trusted person [13].

According to Doney and Canon [14], the initial creation of partner relationship with customer is based on trust. A similar thing is also proposed by McKnight, Kacmar, and Choudry [15] by saying that trust is built before certain parties know each other through interactions or transactions. Furthermore, online trust refers to trust in a virtual environment.

According to Rosseau, Sitkin, dan Camere [11], definition of trust in various contexts is willingness of a person to assume risk. Adapted from the definition, Lim *et al.* [16] states that consumer trust in internet shopping is consumer willingness to expose themselves to the potential loss from shopping transaction on the Internet, based on expectation that the seller will provide transactions satisfying the consumer and able to deliver the promise goods and services.

### **Theories on procurement**

- Failed work execution
- Failures in construction works fall into two categories. First, failures caused by construction technical problems, and second, failures caused by non-technical factors.
- Implementation of e-procurement

### **Procurement Organisation**

Article 1 of Presidential Regulation Number 64 of 2010 on Government Goods and Services Procurement has been amended some times, lastly with Presidential Regulation Number 5 of 2015 stating that:

Government goods and services procurement hereafter mentioned as goods and services procurement are activities for procuring goods and services by Ministries/Agencies/Work Units/Other Institutions whose process starts from planning of needs to the completion of the activities of procuring goods and services.

In executing goods and services procurement, there are parties in charge of executing government procurement hereafter mentioned as Procurement Organisation, consisting of Budget User/Proxy of Budget User, Commitment Making Official, Procurement Service Unit/Procurement Official, and Procurement Result Examination Official/Committee.

With regard to procurement organization, Ivan Lavin writes that in accordance with Presidential Regulations of 54/2010 and 70/2012, government goods and services procurement organisation consists of various parties with the relationship as shown in the attached figures. In Presidential Regulations of 54/2010, Procurement Service Unit/Procurement Official is only involved in procurement system through goods and services providers. However, in Presidential Regulation of 70/2012, the regulations are changed so that self-managed procurements also involve

Procurement Service Unit/Procurement Official.

Furthermore, Article 3 of Presidential Regulation 54/2010 states that procurement committee is given 2 (two) choices in determining method of procuring goods/services, which are self-management or through goods and services providers. The method often used so far is through goods and services providers.

### **Competence of CMO**

Competence in this regard according to Presidential Regulation 54/2010 is ability of officials in managing their work using principles of efficient, effective, transparent, open, competitive, fair/not discriminative, accountable, and equipped with certificate guarantee as a proof of recognition from the government for the professional ability and competence in the field of goods and services procurement.

Wibowo [17] outlines six indicators of competence of a CMO as follow: (1) knowledge of work, (2) ability to complete work, (3) ability to communicate with work partners, (4) skills in accordance with the specified task, (5) mastery of Information Technology, and (6) employee attitude in building togetherness.

A CMO is responsible for the planning, execution of goods and services procurement, and budget spent for the goods and services procurement. A CMO is an official meeting the requirements and regarded as competent in the procurement process proved by expert certificate in the field of goods and services procurement. Goods and services procurements are financed by State Budget/Local Budget or people money and executed to improve people welfare by meeting people needs, improving service to people, and so on. The relationship between people as the owner of the budget (the principal) and CMO (the agent) in management science can be explained in the agency theory.

From the theories explained above, it can be seen that competence of CMO influences the success of goods and services procurement process. Likewise, CMO also has influence on failure in procurement auction. If the CMO completely understands the goods and services procurement process with high competence, then a failed procurement process can be anticipated as best as possible.

### **Types of Procurements**

According to Article 1 of Presidential Regulation 54/2010, there are four types of procurements, which are Procurements of Goods, Construction works, Consulting Services, and Other Services.

In Indonesia, construction works procurements are regulated more detailed in the Regulation of Head of National Public Procurement Agency (LKPP) Number 14 of 2012 Chapter III concerning construction works procurement, including "Reexamination of Terms of Reference is done to examine and ensure following things:

- Clarity of activities outline to be executed including:
- Clarity of types, content, and amount of reports that should be made (if needed);
- Clarity of time execution needed, including when the work should be made available at related activity/sub-activity sites, by considering end limit of the budget year/effective end limit of the budget year;
- Schedule of work execution in accordance with the plan;
- Clarity of the work's technical specifications;
- Clarity of the total amount of work cost;
- Inclusion of sorts, types, capacities, and amount of the minimum main equipments required;
- Clarity of requirements for providers and/or qualifications for experts and amount of main personnel hired by not preferring to certain providers, except for confidential works;
- Inclusion of requirements for materials to be used in the work execution;
- Inclusion of requirements for testing materials and product results;
- Work drawings should be complete and clear;
- Inclusion of criteria for expected products performance;
- Inclusion of measurement procedures;
- Clarity of analysis of experts necessity (relations between scope, expected outcomes, qualifications and amount of experts, types and amount of reports, and period of work execution); and
- Guarantee certificate period (if needed) and/or maintenance time.

### **Construction Project**

According to Soeharto [18], project activity can be defined as a temporary activity that happens in a limited period, with a certain fund allocation, and is intended to perform duty whose targets have been determined strictly. The considerable amounts of activities and involved parties in the work execution may cause complex problems. Construction project has main project characteristics as follow [18]: (1) Having special objectives in the form of final products or final

work results, (2) The amount of cost, schedule target, and criteria for quality in the process of achieving the objectives have been determined previously, (3) Temporary, meaning projects are generally limited by the task completion. Start and end points are determined clearly, (4) Not regular and not repeating. Types and intensities of the activities change throughout the project.

The criteria conceptual framework for evaluating contractor competence mainly can be consisting of 5 (five) main criteria provided that these criteria do not refer to certain projects, but only for evaluating the contractor's historical data in initial evaluation such as in periodical prequalification or certification phases, or in determining long list of contractors in an governmental instution or organization having more than 1 (one) projects. The main criteria are financial strength, past experience, past performance, technical and managerial strength, and compliance with regulations [19]. Other than Indonesia, those five criteria for evaluating contractor competence above are also commonly used in prequalification systems in various countries such as United States of America, Australia, United Kingdom, Japan, and Malaysia [20]; Kunishima and Shoji [21]; Mangitung and Emsley [19]; Ng and Skitmore [22]; Queensland Government [23]; Rashid [24]; Russell and Skibniewski [25]; Taha [26]. The main objective of collecting data for contractor competence criteria evaluation from the parties involved in the construction project life cycle is to standardise the usage of permanent and consistent criteria to obtain legal certainty in evaluation system of contractor competence. In addition, the user of contract work (the client) will get a provider of contract work (the contractor) who can complete the construction work on time and with proper cost and can meet the qualities required in accordance with the project's characteristic needs, including the type and value range of the project with certain complexity and technology.

### **Delay in Project Construction**

Project delay is delay in completion project of work due to various obstacles. According to Alifen *et al.* [27], project delay often becomes source of dispute and demand between the owner and contractor, so that the project will be costly both for the contractor and the owner. The contractor will get penalty fine based on the contract. In addition, the contractor will need to incur additional overhead cost as long as the project still continues. From the owner's side, the project delay will decrease revenue due to the delay of his/her facilities' operation. The management's active role is one of main keys for success of a project management. Examination of project schedule is required to determine the basic change steps to avoid or reduce delay of project completion. Delay factors researched in this research is a group of delay factors outlined by Proboyo [22], Andi *et al.* [27], and Assaf A [13], consisting of 11 factors which are labors, materials, equipments, site characteristics, financing, environment, change, contract documents, planning and scheduling, inspection system, work control and evaluation, and managerial.

Robert M. Arasa dan John O. Achuora [4] carried out a research titled "*Antecedents to Successful Adoption of E-procurement in Textile and Apparel Firms in Kenya*" According to the result, partially organization, environment, and technology factors have positive influence on implementation of *e-procurement* as proved by regression test.

Furthermore, IN.R. Karyasa, IM. Alit K. Salain, and Mayun Nadiasa [28] in their research entitled (translated into English) "*Analysis of Factors Influencing Electronic Government Goods and Services Procurement Auction (E-procurement) in Badung Regency*" explain that there are five important factors that causes a failed auction as follow: (1) Not ready with electronic procurement system, (2) Offer Letter does not match documents, (3) Work execution method is not suitable (not explaining work completion), (4) The auction does not comply with presidential regulations, and (5) Mistakes in predicting price fluctuation. Furthermore, according to a reseach by Muhammad Taufik dan Heru Fahlevi Darwanis (2016) titled (translated into English) "*Influence of Implementation of E-procurement and Competence of Commitment Making Officials on Absorption of Capital Expenditures (Study at Payment Work Unit of Local Treasury Office of Banda Aceh)*", implementation of e-procurement and competence of commitment making officials on goods and services procurement shows positive and considerably close relations based on the test results

## **RESEARCH METHODOLOGY**

Object of this research is the probabilities of failures in construction works execution. The research was carried out on work units of central and local governments particularly those who once dealt or have been dealing with construction works around Indonesia. In the Ministry of Finance itself, replacements of CMOs often happen together with mutation/promotion of officials in the ministry. With regard to construction-related works, the problems of failed auctions, work delays, contract terminations, and poor quality works still happen from year to year.

Population of this research is Commitment Making Officials or those who once served as CMOs, asset and finance officials, members of procurement committee, or other officials involved or once involved in procurement, finance, or asset department at work units in government institutions. Meanwhile, samples were collected in this research by using purposive sampling method, with consideration that the samples represent large islands in Indonesia.

The type of data used in this research is primary data collected through questionnaires distributed to 500 respondents. The questionnaires were distributed directly or electronically (through Google Forms) to the respondents and were collected at the agreed time.

With regard to research variable of Commitment Making Officials, Thaufiq [29] states that there are six indicators in measuring competence of CMOs, which are (1) Knowledge of work, (2) Ability to complete work, (3) Ability to communicate with work partners, (4) Skills in accordance with the specified task, (5) Mastery of information technology, and (6) Employee attitude in building togetherness.

With regard to research variable of Planning Consultant, according to Wala & Robert [30], the main aspects of a Planning Consultant's performance are (1) Quality of Planning Documents, (2) Planning Time, (3) Planning Cost, and (4) Term of Reference. With regard to research variable of Supervising Consultant, a research by Astita & Retno [31] reveals the criteria for assessing supervision. The criteria assessed are (1) Company Experiences, a. Same-type project experience within the last 7 (seven) years; b. Work experience in other projects at the present project site; c. Experience of collaboration in the past/present; d. Company capacity in completing work; (2) Approach and Methodology, a. Understanding of Terms of Reference; b. Quality of the methodology; c. Work plan; d. Proposal presentations; e. Experts Qualifications.

With regard to research variable of Contractor, Donny M. Mangitung in his research proposes 5 factors of construction execution system, which are (1) Project finance and technical experiences, (2) Performance, (3) Time and quality control, (4) Access to local knowledge for cost control, and (5) Compliance with non-technical regulations.

Research variable of failure in construction works executions uses following indicators, (1) Completion exceeds the agreed time on the contract, (2) Delayed but time extension is given and fine is charged, (3) Delayment exceeds the time extension, (4) Delayment causes contract termination, (5) Abandoned works, and (6) Auditing finds many problems on the work.

**Research Model**

In this research Probit Model is used, this theory is a development from logit model. Probit model is developed based on utility theory or rational choice theory developed by Mc Fadden [32]. Formulation of probit mode is as follow:

$$P_i = \frac{1}{\sqrt{2\pi}} \int_{-\infty}^{T_i} e^{-t^2/2} dt, \text{ in which } T_i = \beta_1 + \beta_2 X_i \text{ From the formulation, we obtain utility index value:}$$

$$I_i = F^{-1}(P_i) = \beta_1 + \beta_2 X_i, \quad I_i \text{ is also called normal equivalent deviate}$$

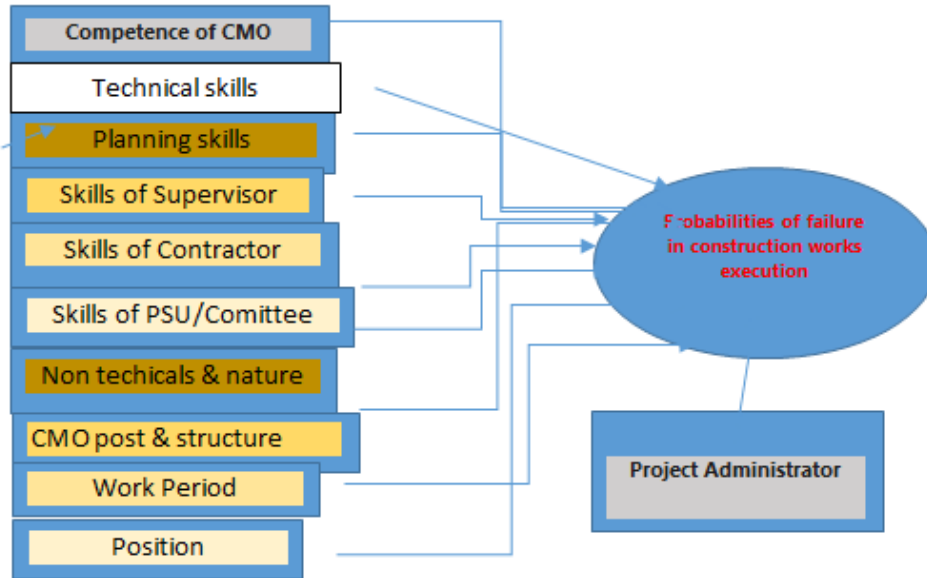
The model equation for this research is written as follow:

$$Y = a + \alpha_1 B_1 + \alpha_2 B_2 + \alpha_3 B_3 + \alpha_4 B_4 + \alpha_5 B_5 + \alpha_6 B_6 + \alpha_7 B_7 + \alpha_8 B_8 + \alpha_9 B_9 + \alpha_{10} B_{10} + \epsilon$$

In which:

Y = probabilities of failure in construction works completion	B <sub>5</sub> = Skills of Supervising Consultant
a = Constant	B <sub>6</sub> = Skills of Procurement Service Unit /PSU
B <sub>1</sub> = Competence of CMO	B <sub>7</sub> = Natural and project non-technical conditions
B <sub>2</sub> = Managerial skills of Contractor Administrator	B <sub>8</sub> = Post of CMO and goods and services procurement managing organisation
B <sub>3</sub> = Skills of Planning Consultant	B <sub>9</sub> = Position dummy
B <sub>4</sub> = Technical Skills of Contractor	B <sub>10</sub> = Work period dummy

This model is made to analyse the causes of failures in construction works as showed in frame of reference in this following figure:



**Fig-2: Frame of Reference**  
Source: Terms of reference of the researchers

## RESULTS

### Respondents' Profile

Respondents of this research consist of 115 respondents in various islands. Among 67% of them are men and 33% women. Respondents with work period below 10 year are 43,5% and 56,5% work more than 10 years. 52,2% of the respondents have a certificate of Goods and Services Procurement and 47,8% of them don't have it.

Respondents distribution is as follow 37% from Jakarta, 15% from Banten, 12% from West Java, 11% from East Java, 11% from Sumatera, 10% from Bali, West Nusa Tenggara and East Nusa Tenggara, 8% from Sulawesi, 6% from Central Java and Yogya, and 5% from Papua and Maluku.

**Table-2: Reliability and Validity Tests**

Reliability Statistics		
Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.652	.687	13

From this test result, the data is stated as valid and credible since the Cronbach's alpha is more than 0.5

**Table-4: To find out how much independent variables have influence on dependent variable, the odd ratios should be calculated firstly as follow**

Variable	Coefficient	Significance	odd ratio	%
C	12.52064	***	276,109.15	276
B1	-1.065464	0.3162	0.344336037	0.34
B2	-1.958923	**	0.140835772	0.14
B3	-0.093429	0.8615	0.910748914	0.91
B4	1.426294	**	4.166995394	4.17
B5	-1.868506	*	0.154171961	0.15
B6	1.214801	**	3.372210988	3.37
B7	-0.537954	0.3267	0.583743315	0.58
B8	-0.017031	0.9743	0.983102628	0.98
B9	-0.945178	*	0.388378368	0.39
B10	-0.284716	*	0.752092538	0.75

Model equation after test results

$$Y = 12,521 - 1.065B_1 - 1.959B_2 - 0,934B_3 + 1.426B_4 - 1,87B_5 + 1.215B_6 - 0,538B_7 - 0,017B_8 - 0,945B_9 - 0,284B_{10} + \epsilon$$



**Results of model probit test**

**Table-3: Results of statistical tests, by using the probit model are as follow**

Dependent Variable: GAGAL2				
Variable	Coefficient	Std. Error	z-Statistic	Prob.
C	12.52064	4.005408	3.125934	***
B1	-1.065464	1.062986	-1.002331	0.3162
B2	-1.958923	0.859989	-2.277845	**
B3	-0.093429	0.535609	-0.174436	0.8615
B4	1.426294	0.686628	2.077245	**
B5	-1.868506	1.004913	-1.859371	*
B6	1.214801	0.597887	2.031822	**
B7	-0.537954	0.548451	-0.980861	0.3267
B8	-0.017031	0.528445	-0.032228	0.9743
B9	-0.945178	0.526507	-1.795185	*
B10	-0.284716	0.174566	-1.630994	*
McFadden R-squared	0.323903	Mean dependent var	0.921739	
S.D. dependent var	0.269757	S.E. of regression	0.247497	
Akaike info criterion	0.562483	Sum squared resid	6.370489	
Schwarz criterion	0.825042	Log likelihood	-21.34280	
Hannan-Quinn criter.	0.669055	Deviance	42.68559	
Restr. Deviance	63.13526	Restr. log likelihood	-31.56763	
LR statistic	20.44967	Avg. log likelihood	-0.185590	
Prob(LR statistic)	0.025275			
Obs with Dep=0	9	Total obs	115	
Obs with Dep=1	106			

mark \* significant at 10% \*\* significant at 5% \*\*\*\* significant at 1%.

**DISCUSSION**

Factors whose influence on probabilities of failures in construction works completion are tested:

**Competence of CMO**

Competence of CMO does not influence the probabilities of failures in construction works. Actually competence of CMO can highly influence whether a project will fail or not, but this research shows different results, so that there is an interesting phenomenon that competence of the CMO does not influence success of a project. The possible cause is that maybe the CMO of a construction work often delegate tasks to those who understand the technical know-how of construction works such as planning consultant, supervising consultant, or even the contractor him/herself. In addition, the CMO is also accompanied by a technical team consisting of workers who understand construction. That competence of CMO does not influence success of a construction work may also mean that there is a standard procedure that protects a CMO from causing a failure or that maybe the CMO does not care much about success of failure of the construction work since there are indeed a lot of CMOs in the sites where the respondents work who do not understand much about construction works.

Agency theory can explain why this research shows that competence of CMO does not influence success of a construction work. There is maybe an agency problem on the CMO, if he is success with the role, he will be assigned that position again in the future, while he does not like the position much. Therefore, the CMO prefers to be passive but still properly carries out his task of executing the construction work which is not his competence.

Considering this research’s result, the decision makers should still select CMOs who can handle construction works. The not-influencing of competence of CMOs is indeed because some of the CMOs themselves do not have significant competence in construction works.

**Managerial skills of project administrator**

According to the result of statistics test, variable of managerial skills of administrator influences success of a construction works at confidence level of 95%. By calculating the odd ratio, 0.1408 is obtained, meaning that in executing construction works in governmental institutions, having managerial skills of administrator of 1 point will have the probabilities of being failed in completing the work as much as 14.08%, *ceteris paribus*.

By using contract theory as a reference, we can explain why this factor influences the probabilities of failure. A

failure may happen if one of the parties breaks the agreed contract. The cause may be administrative negligence, mainly on the part of the contractor, so that the contract cannot be fulfilled. Initial negligences which may start with administrative inaccuracy in the offer document, wrong price analysis, wrong unit inputting, and imbalanced unit price are often found in administration which is not carried out properly and causing loss that may lead to failure.

The contract administrator team sometimes does not pay enough attention to the contract signing process by ignoring initial administrative procedures. For example, as built drawings are sometimes made very lately and causing mismatch problems that take a long time to solve. In addition, the administrative processes for obtaining bank loan sometimes are not carefully handled and may disturb the smooth run of the work. Administration of material needs, employees, and work progress is sometimes reported not properly and may cause project loss. When Change Contract Order (CCO) is made, the slow administrative process may delay completion of the work which is in turn increasing the cost incurred.

Administrative incompliance may cause delay in receiving of bill payment and this may disturb the contractor's cash flow. In addition, inability to manage administration may be found by auditor in the future, so that some works will possibly be regarded as causing loss for the state or the project itself even will be considered as failed. Managerial skills of administrator should be paid attention as best as possible both by the CMO and the contractor since the lack of these may cause failure in construction works completion.

### **Technical skills of parties involved in goods and services procurements**

In order to understand how technical skills of the involved parties have influence or not on probabilities of failures, trust theory can be used to explain how trust among the parties support success of construction works in governmental institutions. Trust between consultant and land owner and trust between consultant and PSU and technical team are important. If one of the parties lose trust on the others then probabilities of failure of work becomes higher.

- According to the result of statistical test, skills of the planning consultant do not influence on probabilities of failures in construction works completion in governmental institutions. It maybe because the planning consultant's task has been completed when the auction to look for contractor is announced. If there is Construction Management (CM), then the planning result can be evaluated previously by the CM. In addition, at the starting stage the contractor should make as built drawings so if there are things different from planning, then opinions of the consultant and the work owner can be asked.
- According to the statistical test result, technical skills of contractor have influence on success or failure of construction works at confidence level of 95%. By calculating the odd ratio, 4.167 is obtained which means that in executing construction works in governmental institutions, having technical skills of contractor of 1 point will have the probabilities of being failed in completing the work as much as 416.67%, *ceteris paribus*. It means that the variable of technical skills of contractor highly influences probabilities of failure in completing construction works in governmental institutions. There a lot of things that make a contractor finds difficulties in completing the work in a proper way from capital, since contractors rely on bank loans, to technical and administrative human resources which are not highly qualified. The turnover of human resources in a lot of contractor companies is considerably high since the human resourcers often change so that their technical abilities are fluctuating. Enforcing regulations are needed on the contract companies' obligation to hire only qualified human resources.
- Supervising consultant has influence on success or failure of construction works at confidence level of 90%. By calculating the odd ratio, 0.1542 is obtained which means that in executing construction works in governmental institutions, having technical skills of supervising consultant of 1 point will have the probabilities of being failed in completing the work as much as 15.42 %, *ceteris paribus*. Different from planning consultant, skills of supervising consultant who provides daily supervision has important influence on failure or success of a construction work. Inability of the supervisor in doing his tasks will have a big impact on failure in construction works completion.
- Procurement committee/Procurement Service Unit have influence on success or failure of a construction work at confidence level of 95%. This statistical test result confirms the assumption that skills of procurement committee/Procurement Service Unit significantly influence probabilities of failure in construction works completion. By calculating the odd ratio, 3.372 is obtained which means that in executing construction works in governmental institutions, having skills of procurement committee/Procurement Service Unit of 1 point will have the probabilities of being failed in completing the work as much as 337.21 %, *ceteris paribus*. Procurement committee/Procurement Service Unit has an important role in determining the winning contractor and consultant if the auction for that should be carried out. Their probabilities of failure of work can be accepted, since they have an important role in selecting contractor or consultants which have high responsibility and skills, not only meeting standards of in administration of offer document. One of important points for success or failure of a construction or other work is selecting the right people to do the works and this is the task of Procurement committee/Procurement Service Unit.

### **Non-technical and natural conditions**

The statistical test result shows that non-technical and natural conditions do not have a significant influence on success or failure of a construction work. Weather, local security, goods receiving team, pressure of local government, culture, and political pressure factors often become the reasons for delay of work completion. However, this research shows that those factors are not factors that may cause failures in construction works completion. This may mean that the society are getting more aware of the importance of development by the government, since the results are for the society themselves. Political pressure at present also does not have much influence with the arrest of some political figures involved in various cases of corruption, collusion, and nepotism. Furthermore, the weather is the most predictable and manageable factor at present.

### **Post of CMO and organisational structure**

The post of CMO (PPK) sometimes is held by a structural official or even by a Proxy of Budget User (KPA). It is recommended that the post of CMO is held by Procurement Service Unit or Procurement Unit who indeed have background of construction education. In terms of organisational structure, the post of CMO should not be held by a structural official but may be held by a functional CMO. However, those points are not regarded by respondents as the factors that may make a construction work successful. Therefore, the statistic test result shows that position of CMO and existing organisational structure at present do not have influence on failures in construction works completion.

### **Position**

Is an involved officer having a position or not making any difference on failure in construction works completion? Position influences success of construction works at confidence level of 90%. By calculating the odd ratio, 0.388 is obtained which means that in executing construction works in governmental institutions, having position of 1 point will have the probabilities of being failed in completing the work as much as 38.81 %, *ceteris paribus*. There is difference between an official and a non-official in influencing failure of a construction works completion. An official may have weight and expectation that are too high so that may probably cause failure of the project.

### **Period of work**

It turns out that period of work has a significant influence on success or failure of a construction work completion. By calculating the odd ratio, 0.752 is obtained which means that in executing construction works in governmental institutions, having  $B_{10}$  (Period of work) of 1 point will have the probabilities of being failed in completing the work as much as 0.752 %, *ceteris paribus*. A person with work period more than 10 years will have probabilities to cause failure in construction works completion. This can be understood since an experienced person will be more careful in taking actions so when deciding on a work different from usual specifications he/she will take more time and not easily follow the contractor's urge.

## **CONCLUSION**

### **From discussion there are some conclusions that can be drawn**

The assumption that probabilities of failures in construction works in governmental institutions particularly Ministry of Finance is influenced by competence of CMO turns out not proved statistically. Likewise, skills of planning consultant, post of CMO and organisational structure, and natural conditions and non-technical factors are not factors that influence construction works in governmental institutions. This does not mean that CMO should not be separated from structural position and that competence in construction is not needed by a CMO, or that political pressure and gangsterism ("premanism") are no longer exist. At present, those factors are not significant to be paid main attention. However, the decision makers cannot ignore the non-influencing factors since they should understand why the factors do not have influence as consideration for making decisions in the future.

The factor of technical skills of contractors has the highest significant influence on probabilities of failure in construction works in governmental institutions. This can be understood since the contractor handles the work directly. Technical skills of Procurement Committee/Procurement Service Unit have the second biggest significant influence after technical skills of contractor. This is because Procurement Committee/Procurement Service Unit is the determiner in selecting the winner of the auction. Another factor that has significant is the managerial skills of administrator and technical skills of supervisor. Since the contractor factor is the most dominant technically and administratively, regulation on controlling and protection against probabilities of failure in construction works in governmental institutions should be improved, although on the other side, there should be easiness in administrative requirements and legal certainty. Likewise, skills of Procurement Committee/Procurement Service Unit should be absolutely improved to be able to maintain the quality decision of selecting the most competitive auction participant and high trust level on the personnel's integrity.

On the other side, status of position and period of work also have significant influence on the probabilities of failures in construction works in governmental institutions. These factors should be considered to be more careful in

relying on non-position employees who are newly employed although they may already have a Goods and Services Procurement certificate since they may not really understand the complexity of construction works.

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