Risks of Public Procurement for Construction Works

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Abstract. Conducting a public procurement process is prone to conflict if it deviates from procurement principles. Based on Presidential Regulation number 16 of 2018, the public procurement principles are efficient, effective, transparent, open, competitive, fair, and accountable. Problems in public procurement process may occur at every stage, starting from identifying procurement needs to delivering the results of the completed work. Many problems are likely to occur if risk identification is not implemented at public procurement process. If the risk is not identified early, it will be a potentially significant budget loss of government’s construction projects. This paper is an initial research to discover the risk variables in the public procurement process. The purpose of this study is to identify risks that may arise in the process of public procurement. Research variables in this study were obtained from related literature studies. The data in this study were acquired from questionnaires and interviews with several parties related with the public procurement. Mean and Standard Deviation (SD) were employed to assess the relevant variables from questionnaires. According to the experts’ opinion, there were 13 variables in the Planning and Preparation Stages and 9 variables in the Implementation Stage.

1. Introduction

A procurement is the client’s effort to obtain goods or services from prospective suppliers using certain methods and processes for determined budget, time, quality and others. Public procurement process involves several related parties who have to comply with ethics, norms and principles to regulate the procurement. In contrast with the past, procurement process is currently conducted as an internet-based activity named as e-procurement. E-procurement refers to procurement processes carried out online and through information and networking systems, which can provide several benefits such as reducing cycle time, levelling uneven expenses, increasing visibility, and lowering costs as outputs of efficient, integrated and automated processes [1]. E-procurement provides a sense of security and comfort in the procurement process because it has to comply with the rules regulated electronically by prioritizing the procurement principles. E-procurement system is expected to resolve manual procurement problems which are severe condition of corruption, collusion, and nepotism, because e-procurement system restricts physical contact between client and prospective suppliers in Procurement Service Unit. All activities are recorded by ICT system which makes it easier to be checked and supervised.

Inadequate governance in procurement process can interfere the implementation of construction work, cause detrimental effects to stakeholders, and inflict impact on the owner budget. Close interaction between client and prospective suppliers makes public procurement process have several risks. Many cases of government’s construction works were behind schedule, over budget, low quality, and inefficient because the public procurement process was deviated from the procurement principles. Public
procurement process has three stages, in which there are several elements of risk inherent in every stage. Therefore, client needs to deliver an exhaustive risk management to handle the impact to optimize the chances of procurement process to succeed.

Important aspects that must be considered in analysing risk are finding and differentiating the problems that generate risks [2]. The first step of risk management is identifying risks. Risk identification is used to find risk variables that may arise in public procurement process. Risks are explained as events that can arise throughout the project and affect critical factors of the project [35]. Furthermore, managing the risks associated with public procurement process is very important for the success of the upcoming construction work [36]. However, the rules and regulations set by the government are not easy to implement as the intended purpose.

Each construction work cannot avoid risk [3] because the project has dynamic and complex nature with a lot of uncertainties [4]. Public procurement process becomes more complex because of the involvement of various parties, including the government as the client and the public sectors as the prospective suppliers. The risk management approach is considered able to provide a concept that is appropriate enough to see the various problems in the public procurement process. Risk management is a proactive approach so it is expected to minimize negative impacts and maximize positive impacts. The risk management approach can also provide a way to find out the risk response and risk allocation to the eligible party. An appropriate risk response can be applied to maintain or transfer the negative impacts [5]. By using a risk concept approach, problems that might occur in the public procurement process can be seen from a broader view and make it easier to determine appropriate handle of the risk priorities.

Based on the description above, this research takes a risk management approach to solve the problems occurring in public procurement process. Risk variables were obtained from various literature studies. The data in this study were collected by questionnaires and interviews with several parties involved in public procurement process. Identifying risks was conducted to observe risk variables that may arise in public procurement process and to determine the next steps for further analysis. In addition, risk identification can contribute to related parties before the implementation of public procurement process.

2. Literature review

2.1. Public procurement

Indonesia as a developing country continues to carrying out its national development efforts, especially in infrastructure sector. Infrastructure development programs are implemented by the national and local governments. Continuous economic growth in Indonesia has resulted in the construction industry rise. According to data released by the Ministry of Finance, there are about 5.9% year-on-year growth of infrastructure development budget provided by the national government, amounted to 423.3 trillion in 2020.

Every construction project undertaken by the government needs a good public procurement process. Procurement is an activity to acquire goods or services in a transparent, effective, and efficient manner as well as compliance with the needs and desires of the client [6]. Public procurement process needs involvement from several parties who have to comply with ethics, norms, and principles in its implementation.

Procurement is client’s endeavour to obtain or fulfil the desired goods or services using certain methods and processes to reach an agreement on price, time, and other arrangements [2]. Traditional procurement process was implemented manually by face-to-face interactions, but nowadays procurement process is conducted by electronic systems named as e-procurement [19]. E-procurement is the process of procurement by utilizing information and communication technology facilities as the statutory regulations [33]. The parties involved in the procurement process can be classified into three main participants, namely: Client, Supplier, and Procurement Service Unit [7].

Each client uses different methods of obtaining goods or services, depending on the type and quantity of goods or services to be purchased, the location of the purchase, budget availability, and other considerations [8]. The methods of selecting suppliers are e-purchasing, direct procurement, direct appointment, quick tender, and tender [9]. E-purchasing is a procedure for purchasing goods and services that have been listed at an official electronic catalogue system. Direct Procurement is a method
of direct elections to the goods or services prospective suppliers without any auction process or selection. Direct Appointment is a method of selection by directly appointing a goods or services prospective supplier in certain circumstances. Quick Tender is a selection process of qualified suppliers listed in Client’s Suppliers Performance Information Systems. Moreover, tender is an open selection of suppliers of goods or construction works and other services that meet the predefined requirements.

Tender is a series of bidding activities carried out to select a prospective supplier that is suitable and feasible to do a job [10]. The tenders examined in this study are a series of selection, evaluation, election, and determination of prospective suppliers to perform construction work funded by government and related on applicable government regulations in its throughout process. This study takes the process of selecting a tender for the construction work as the object because it can represent all the stages of the process and other methods, and tender can be followed by all potential suppliers of goods or services. The stages of public procurement process are divided into three stages, namely preparation, planning, and implementation [9]. The stages are arranged to the public procurement process, but there are still various problems and violations even though it has been carried out electronically [11]. Collusion carried out on public procurement process can create fake competition among bidders [12].

Violation caused by weak governance can obstruct competition in procurement markets and raise the prices paid by the administration for acquiring goods or services, and as the result, it will have a direct impact on higher public expenditure [13]. Referring to several cases of procurement, violations that often occur are inaccuracy in technical specifications and owner estimate (OE) price documents [14]. The common procedure for selecting suppliers for construction works in public procurement is traditionally decided based on the lowest bid price [15], [17], [19]. This method can lead to eliminating more qualified contractors, selecting inappropriate contractors, and accepting parties who cannot carry out the project successfully. As a result, it has impacts on poor project quality, schedule delays, and additional costs due to rework, leading to claims and disputes [18], [19], [20], [24]. Considering lowest bid prices as the sole selection criterion is not the best approach [21], [24]. Therefore [22], [24] the selection criteria have been classified into three aspects: 1. Technology: related to quality control capabilities, design, technical capabilities, and engineering solutions. 2. Bid prices: in the public sector, bid prices remain as a main criterion for selecting a prospective supplier due to public accountability of the client [23], [24]. 3. Health, safety and environment (HSE): this aspect includes the supplier’s HSE policies, plans, and performances. In this case, this aspect focuses on supplier’s ability to be socially responsible for its employees and the wider community affected by the construction work.

2.2. Review of public procurement process from the risk concept
Procurement is a risk-prone activity. Risk is an uncertain event or condition that can occur because of the current process or further process in the future [25]. Risk in procurement process is a condition faced by a person or institution when there is a possibility of negative consequence [26]. Risk Source is a fundamental driver that causes risks in a project or organization. In carrying out the business process, a client will encounter various risks that have impacts on its business process [27]. Therefore, Client’s Procurement Work Unit must be responsible for its expenditure to manage public procurement process. Therefore, [28] the framework for procurement risk is divided based on the following principles: (i) based on a risk management process, (ii) applies to different organizational/entity levels, (iii) applies to all stages of procurement, (iv) sustainable and applied throughout all stages of procurement, (v) identified risks must be managed.

There are three important elements in public procurement risk: events or conditions, probability, and impact on objectives. Events or conditions indicate what may or will happen. Probability indicates the likelihood of an event or situation to occur. Impact on objectives signifies the consequences of the risk event. Risk analysis is used to determine the probability and impact of the identified risks. The approach to managing risk is known as risk management. However, risk management is becoming more complex not only because of the increase in various risks, but also because the relationship between risk variables and risk sources is rising [27]. Therefore, the importance of analysing risk is to separate small risks that can be accepted from large risks that have to be avoided. It also can be used as data for prioritizing risks. Many studies indicate that the highest risk level occurs during the bidding evaluation process [24]. The risk factors related to public procurement process potentially generate destruction, damage, or loss [24].
Even qualified suppliers still have to manage their own risk factors such as financial risk, inadequate tender management, and internal miscommunication among their employees [24].

Based on previous research, there are several discussions of risk identification in public procurement process. A research by [12] conducted to map the fraud risks in auditing process of the public procurement. The background of this research is the rampant corruption cases that occur in public procurement process. A qualitative descriptive method is used to analyse problems and subsequently provide problem solving. As research findings, there are 15 stages of cheating mode in public procurement process. These stages include procurement planning, appointment of procurement committee, selection of the procurement system, determination of schedules, preparation of Owner Estimate price, preparation of procurement documents, announcement of registration, determination of qualification stages for suppliers, aanwijzing (information session), bidding document opening, bidding evaluation, verification of suppliers’ qualification, minutes of bidding result documents, award notification, objection and appeal of bidding result, contract signing, and handover of the completed work. One of the frauds committed in procurement planning is a conduction of a procurement which does not comply with the Client’s real needs. Therefore, it is very important to understand the critical stages in the procurement process to find potential fraud at every stage. A study is conducted by [30] on the risk management analysis of procurement process in Klaten district. The background of the problems in this study is that the public procurement in Klaten has not fully paid attention to the procurement principles, resulting in 30 identified risk variables in the public procurement. The most dominant risk category that occurs is the legislative and regulatory frameworks. Meanwhile, other categories are between moderate and high risks.

Table 1. Risk variables of public procurement in the planning and preparation stages

| No. | Variable                                                                 | Source                        |
|-----|--------------------------------------------------------------------------|-------------------------------|
| A1  | Public procurement does not comply with client’s needs                    | [6], [12], [26]              |
| A2  | Political intervention/leadership or controlled by other parties         | [2], [36]                    |
| A3  | Error in determining procurement system (Method, Evaluation Criteria, and Document Submission) | [26]                          |
| A4  | Client Project Manager does not understand the work package/activity items in the budget planning | [12], [26]                    |
| A5  | Intervention from other parties in the preparation of bidding documents  | [29]                         |
| A6  | Lack of coordination between Client Project Manager and Procurement Service Unit resulting in the different perceptions at scope of work | [29], [34], [36]            |
| A7  | Incorrect goods or services technical specification determination by Client Project Manager | [2]                          |
| A8  | Client Project Manager does not understand the construction method of the work being tendered | [26], [29]                    |
| A9  | Different perception between Client Project Manager and Client for the tendered work | [29], [36]                    |
| A10 | Misinterpreting the technical aspects of goods or services needed        | [29]                         |
| A11 | Lack of competence of officers and staffs in the preparation of Owner Estimate price | [26], [36]                    |
| A12 | Biased specifications                                                    | [26]                         |
| A13 | Procurement plan advantages certain parties                               | [2], [6]                     |
| A14 | Inflated budget in procurement plan document                              | [2], [6], [12], [26]         |
| A15 | Procurement documents are leaked before the bidding process starts officially | [6], [29]                    |
| A16 | Incorrect in splitting/merging the bidding scope package                 | [2], [12]                    |
| A17 | Procurement plan is incomplete                                           | [2], [6]                     |
| A18 | Evaluation criteria are unfair and violate the regulations               | [26]                         |

A research by [29] focused on identification and analysis of the issues of public procurement for construction works. The purpose of this study is to identify any problems that occur in any procurement process of construction works, from preparation stage to implementation stage. As a result, there are 135 identified problems in procurement process. The main problems are the lack of technology in e-
procurement, lack of details on rules and policies related to procurement, and limited capable human resources. Several risk variables for public procurement summarized from previous studies are presented in Table 1 and Table 2.

### Table 2. Risk variables of public procurement in the implementation stage

| No. | Variable                                                                                                           | Source               |
|-----|--------------------------------------------------------------------------------------------------------------------|----------------------|
| B1  | Technical problems of internet access for downloading and uploading documents                                      | [29]                 |
| B2  | Passive bidder                                                                                                     | [29]                 |
| B3  | Lack of communication among Client Project Manager, Procurement Service Unit, and the Group of Expert at the bidding stage | [2], [36]            |
| B4  | Procurement Service Unit does not understand the technical substance and important information that will be described in aanwijzing (information session) | [29]                 |
| B5  | The ICT system is being hacked to intervene bidding                                                                   | [12], [26]           |
| B6  | Client’s Audit Officer (PPHP) doesn’t understand the contents of the contract                                       | [29]                 |
| B7  | Status in the ICT system notifies a successfully uploading process, but the contents of document is empty when downloaded | [29]                 |
| B8  | There is no client’s periodic evaluation of the public procurement process                                             | [2]                  |
| B9  | Limiting bandwidth server to intervene the participants to submit the bidding documents                              | [30]                 |
| B10 | Bidding file is corrupted and cannot be opened                                                                     | [29]                 |
| B11 | Procurement Service Unit delivers less accurate result due to excessive amount of bidding evaluation processes        | [29]                 |
| B12 | Leakage of Owner Estimate price including the detailed unit price analysis                                           | [2], [36]            |
| B13 | No clear standards and criteria to determine fair-price evaluation                                                    | [12], [29]           |
| B14 | Aanwijzing (information session) duration is too short for complex construction work                                 | [2]                  |
| B15 | Acceptance criteria of goods or services are biased                                                                  | [2]                  |
| B16 | Not all client’s officer understands the technical construction method                                              | [2]                  |
| B17 | Horizontal conspiracy among prospective suppliers to generate unfair competition                                      | [2], [11]            |
| B18 | The content of the award notification does not meet the minimum standard of announcement                              | [12]                 |

#### 3. Research methodology

Methods used in this paper are risk identification, preliminary survey, and data analysis. After identifying the risk variables, a preliminary survey was conducted by involving four experts directly involved in the public procurement. The number of experts participated in survey is three or more experts, which will be considered as proof of content validity [37]. The experts involved in this preliminary survey are those who have experience at least 5 years in public procurement subject.

Preliminary survey was conducted to verify the relevance of identified variables from the literature study to this research. The rating scale used in this study was a scale of 1-5. This scale was used to calculate relevance attributes based on experts’ opinion. Scale 1 represents a highly irrelevant variable and scale 5 represents a highly relevant variable. The next step of the preliminary survey was determining the sample, designing the questionnaire, conducting a trial survey, and distributing the questionnaire. Data obtained from the preliminary survey through a questionnaire were then analysed.

The data analysis was carried out with validity and reliability tests. Validity test was conducted to determine the accuracy of the questionnaire. An instrument can be said valid if it successfully measures what must be measured and the results obtained can meet all the requirements of scientific research [31]. Meanwhile, a reliability test was needed to ensure that the measurement instrument has consistency to assess variables repeatedly. Reliability test shows how far the instrument can be used without bias (error free) [31]. Reliability was usually measured using the Cronbach Alpha coefficient and an instrument is said reliable if this coefficient is greater than 0.60 [32].
4. Result and analysis
This paper presents the results of preliminary survey to determine risk variables that may occur in the public procurement process of construction works. The result of preliminary survey was risk variable rank based on its relevance to public procurement process.

Data analysis from the experts’ opinion was presented as mean and standard deviation (SD) which can be seen in Table 3 and Table 4. Because this study used a scale of 1-5, therefore, scale 3 was taken to determine the relevance because its value is the middle score between 1 to 5. Then, the variable was considered relevant if the mean of the variable is greater than three (>3). Based on the preliminary survey analysis, there were several risk variables omitted because they were considered irrelevant with values of less than three.

Table 3. Variable risk of public procurement in the planning and preparation stage results

| No. | Variable                                                                 | Rank | Mean  | STD  |
|-----|--------------------------------------------------------------------------|------|-------|------|
| A6  | Lack of coordination between Client Project Manager and Procurement Service Unit results in the different perceptions at scope of work | 1    | 4.00  | 0.00 |
| A12 | Biased specifications                                                   | 2    | 4.00  | 0.00 |
| A16 | Incorrect in splitting/merging the bidding scope package                | 3    | 4.00  | 0.00 |
| A17 | Procurement plan is incomplete                                          | 4    | 4.00  | 0.00 |
| A3  | Error in determining procurement system (Method, Evaluation Criteria, and Document Submission) | 5    | 3.75  | 0.50 |
| A5  | Intervention from other parties in the preparation of bidding documents  | 6    | 3.50  | 0.58 |
| A18 | Evaluation criteria are unfair and violate the regulations              | 7    | 3.50  | 1.00 |
| A7  | Incorrect goods or services technical specifications determination by Client Project Manager | 8    | 3.25  | 0.96 |
| A13 | Procurement plan advantages certain parties                             | 9    | 3.25  | 1.50 |
| A15 | Procurement documents are leaked before the bidding process starts officially | 10   | 3.25  | 0.96 |
| A2  | Political intervention/leadership or controlled by other parties        | 11   | 3.00  | 1.41 |
| A9  | Different perceptions between Client Project Manager and Client for the tendered work | 12   | 3.00  | 1.41 |
| A11 | Lack of competence of officers and staffs in the preparation of Owner Estimate price | 13   | 3.00  | 1.83 |
| A14 | Inflated budget in procurement plan document                            | 14   | 2.75  | 1.50 |
| A8  | Client Project Manager does not understand the construction method of the work being tendered | 15   | 2.50  | 1.29 |
| A10 | Misinterpreting the technical aspects of goods or services needed       | 16   | 2.50  | 1.29 |
| A4  | Client Project Manager does not understand the work package/activity items in the budget planning | 17   | 2.25  | 1.26 |
| A1  | Public procurement does not comply with client’s need                   | 18   | 2.00  | 1.41 |

There were five irrelevant risk variables at the preparation and planning variables. The irrelevant variables were Public procurement does not comply with client’s need (A1), Client Project Manager does not understand the work package/activity items in the budget planning (A4), Misinterpreting the technical aspects of goods or services needed (A10), Client Project Manager does not understand the construction method of the work being tendered (A8), and Inflated budget in procurement plan document (A14).

In experts’ opinion, the variable of public procurement does not comply with client’s need (A1) is not relevant with the process because it is based on [9] paragraph 18 which had been regulated in the procurement process. In addition, [16] it has been regulated in Chapter 3 that the procurement planning consists of the task and authority, planning activities, and identification of the needs of goods or services. In the planning process, procurement has to comply with the national government in accordance with Short-Term, Medium-Term, and Long-Term Development Plans.
Then, Client Project Manager does not understand the work package/activity items in the budget planning (A4), Misinterpreting the technical aspects of goods or services needed (A10), Client Project Manager does not understand the construction method of the work being tendered (A8), Inflated budget in procurement plan document (A14) were considered irrelevant because all arrangements for planning and procurement preparations had been determined in the regulation [9] [16]. The preparation of a public procurement plan is the first step to increase the efficiency and effectiveness of a clear and profitable procurement, therefore, the implementation needs to be monitored and controlled.

In addition, there were 9 irrelevant risk variables at the implementation stage according to experts’ opinion as the results of preliminary survey. The irrelevant variables were: Technical problems of internet access for downloading and uploading documents (B1), Procurement Service Unit does not understand the technical substance and important information that will be described in aanwijzing (information session) (B4), Bidding file is corrupted and cannot be opened (B10), Not all client’s officer understands the technical construction method (B16), Passive bidder (B2), Limiting bandwidth server to intervene the participants to submit the bidding documents (B9), The ICT system is being hacked to intervene bidding (B5), Status in the ICT system notifies a successfully uploading process, but the contents of document are empty when downloaded (B7), The content of the award notification does not meet the minimum standard of announcement (B18)

| No. | Variable                                                                 | Rank | Mean | STD  |
|-----|--------------------------------------------------------------------------|------|------|------|
| B11 | Procurement Service Unit delivers less accurate result due to excessive amount of bidding evaluation processes | 1    | 4.00 | 0.00 |
| B12 | Leakage of Owner Estimate price including the detailed unit price analysis | 2    | 4.00 | 0.00 |
| B14 | Aanwijzing (information session) duration is too short for complex construction work | 3    | 4.00 | 0.00 |
| B17 | Horizontal conspiracy among prospective suppliers to generate unfair competition | 4    | 3.75 | 0.50 |
| B3  | Lack of communication among Client Project Manager, Procurement Service Unit, and the Group of Expert at the bidding stage | 5    | 3.50 | 0.58 |
| B6  | Client’s Audit Officer (PPHP) doesn’t understand the contents of the contract | 6    | 3.50 | 1.73 |
| B13 | No clear standards and criteria to determine fair-price evaluation | 7    | 3.50 | 1.00 |
| B8  | There is no client’s periodic evaluation of the public procurement process | 8    | 3.25 | 1.50 |
| B15 | Acceptance criteria of goods or services are biased | 9    | 3.25 | 1.50 |
| B1  | Technical problems of internet access for downloading and uploading documents | 10   | 2.75 | 1.50 |
| B4  | Procurement Service Unit does not understand the technical substance and important information that will be described in aanwijzing (information session) | 11   | 2.75 | 1.50 |
| B10 | Bidding file is corrupted and cannot be opened | 12   | 2.75 | 1.26 |
| B16 | Not all client’s officer understands the technical construction method | 13   | 2.75 | 1.50 |
| B2  | Passive bidder | 14   | 2.50 | 1.29 |
| B9  | Limiting bandwidth server to intervene the participants to submit the bidding documents | 15   | 2.50 | 1.29 |
| B5  | The ICT system is being hacked to intervene bidding | 16   | 2.25 | 1.26 |
| B7  | Status in the ICT system notifies a successfully uploading process, but the contents of document are empty when downloaded | 17   | 2.25 | 1.26 |
| B18 | The content of the award notification does not meet the minimum standard of announcement | 18   | 1.75 | 0.96 |

Based on experts’ opinion, variable of Bidding file is corrupted and cannot be opened (B10) is not the responsibility of the Procurement Service Unit. Prospective suppliers must follow document submission procedure generated by ICT system to minimize failures in uploading bidding documents. Technical problems of internet access for downloading and uploading documents (B1), Limiting bandwidth server to intervene the participants to submit the bidding documents (B9), The ICT system
is being hacked to intervene bidding (B5), Status in the ICT system notifies a successfully uploading process, but the contents of document are empty when downloaded (B7), and The content of the award notification does not meet the minimum standard of announcement (B18) variables considered irrelevant because they have been already regulated [9] [16] and afterward implemented using nationwide e-procurement system developed and managed by national government.

Other irrelevant variables are considered having a low influence on the purpose of public procurement, so it can be omitted from risk register.

In addition to the discussion of irrelevant variables, this study focuses on relevant variables based on experts’ opinion. Experts declared that at the planning and preparation stages, there were 13 relevant variables in the public procurement process. The complete list of these variables can be seen in table 3. Four out of thirteen variables are claimed as the most relevant variables.

The first variable is Lack of coordination between Client Project Manager and Procurement Service Unit results in the different perceptions at scope of work (A6), which is caused by lack of maturity of tender preparation. Moreover, inconsistency in using many terms/names for certain items leads to different perceptions that inhibit procurement process and give significant impact on procurement objectives. Biased specifications (A12) is the second most relevant variable, caused by non-standardized process, choosing goods or services which are not suitable with current conditions, tendency to determine specification based on its availability (not based on actual need), and having less functional contribution.

The third variable is Incorrect in splitting/merging the bidding scope package (A16) to avoid open tender [29]. This variable might occur because there was an unprofessional planning process that leads to causing collusion and nepotism [29], causing unfair competition among prospective suppliers and giving benefit for certain parties. The last most relevant variable is Procurement plan is incomplete (A17) causing procurement process cannot be executed as soon as possible, so that eventually it is often carried out at the end of the fiscal year [29].

There were 9 variables considered relevant at the implementation stage according to experts’ opinion. Three out of nine variables are determined as the most relevant variables. The first variable was Procurement Service Unit delivers less accurate result due to excessive amount of bidding evaluation processes (B11). This variable existed because a lot of bidding processes were conducted at the same time, in contrast to limited number of Procurement Service Unit staffs.

Leakage of Owner Estimate price including the detailed unit price analysis was the second variable considered the most relevant. This variable might occur because the existence of hidden interests, and no client’s financial statements, and collusion [29] that leads to unhealthy procurement process. Aanwijzing (information session) duration is too short for complex construction work was the third most relevant variable. It was raised because Aanwijzing (information session) usually focuses on discussing the fulfilment of administrative requirements rather than that of the technical, afterward result in construction work delays due to lack of understanding of construction method [29].

This result may be explained by the fact that these variables are relevant in the public procurement for construction projects. These relevant variables can be further analysed to determine the level of risk in the public procurement process. Identifying variables is very important to do at an early stage because these variables become the objects of observation to be studied.

5. Conclusion and recommendation
In accordance with the research background and literature review conducted, there were 18 risk variables in the Planning and Preparation Stages and 18 risk variables in Implementation Stage of Public Procurement. Preliminary survey determined 13 variables at the Planning and Preparation Stages as relevant, and another 5 variables as irrelevant based on experts’ opinion. On the other hand, for the Implementation Stage, 9 variables were found relevant to the Public Procurement process and the other 9 variables were claimed irrelevant based on experts’ opinion.

Acknowledgements
The authors appreciate the experts involved in the preliminary survey of this research in 2020.
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