

# **Understanding Level of Construction Actors in the Environment Local Government of Indonesia Regarding Design and Build Projects**

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## **Abstract**

A design and build (called DB) project is a work contract from the owner to an integrated contractor (with a design and construction contract system in one unit). These advantages come from the initial participation in the design process, and include a reduction in project turnaround time, lower costs and improved communication. The purpose of this study is to review the understanding of stakeholders in the design and build (DB) implementation system for government projects in Indonesia. To measure agreement, this questionnaire uses a likert type scale, as a scale and technique for measuring sikap. The likert scale technique presents a set of attitude statements. In this case using a six-point likert scale. The study show that of the 37 respondents who gave their opinions, 49% of respondents expressed disagreement about the statement that design and build procurement requires high technology and 65% disagreed with the statement design and build is used for high-risk projects that could endanger public safety, human life, and the environment.

## **Introduction**

A project procurement system can be defined as the process by which a construction project is comprehensively designed and built for the owner including a definition of the

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scope of the project; organization of designers, constructors and various consultants; sequence of design and construction operations; execution of design and construction; and closeout and start-up". Thus, the project procurement system is a procurement method in which "the owner of the procurement and performance risks for design and construction are transferred to another party. Typically these parties are design entities that have responsibility for design, and contractors who have responsibility for construction performance (Georgia State Financing and Investment Commission 2003). The project Procurement system involves the roles, responsibilities, and relationships that are shared among the project team members to carry out the project.[1]

A design and build project is a work contract from the owner to an integrated contractor (with a design and construction contract system in one unit). The DB system is that the contractor has the responsibility to carry out the design and construction stages and this brings the system some advantages. These advantages come from the initial participation in the design process, and include a reduction in project turnaround times, lower costs and improved communication. This procurement system meets the need to reach the project early and with less overall expenses and additional costs.[2]

Preliminary observations made by the author found that some local governments have implemented Design and Build as in the national capital. The Special Capital Region of Jakarta has carried out construction projects, both roads and buildings, ranging from new construction, repairs, and maintenance. Meanwhile, areas outside the country's capital city, have only been found in the East Java regional government which implements the Joyoboyo Terminal project by the Surabaya City Government Transportation Office; Soewandhie Regional General Hospital by the Department of Public Housing and Settlement Areas, Cipta Karya and Spatial Planning of the Surabaya City Government as well as the construction of a Type C Hospital in West Sidoarjo which was built using the Sidoarjo Regional Budget.

The purpose of this study is to review the understanding of stakeholders in the design and build (DB) implementation system in local government projects in Indonesia. The results of this research are expected to enrich the literature, especially related to the implementation of projects carried out with design and build, are expected to be able to provide scientific development in research in the field of construction project management and are expected to provide stakeholder information benefits in the implementation of projects with design and build. In addition, this research is expected to give an overview to the project team, especially in design and build projects.

## **Theoretical Framework**

The implementation of the procurement of construction work in Indonesia has been regulated in several Government Regulations and Laws, including: first, Government Regulation of the Republic of Indonesia Number 14 of 2021 concerning Amendments to Government Regulation Number 22 of 2020 concerning Regulations for the Implementation of Law Number 2 of 2017 concerning Construction Services [3]. Second, Regulation of the Minister of Public Works and Public Housing of the Republic of Indonesia Number 25 of 2020 concerning Amendments to the Regulation of the Minister of Public Works and Public Housing Number 1 of 2020 concerning Standards and Guidelines for Procurement of Integrated Construction Work Design through Providers [4]. Third, Regulation of the Government of the Government of Goods/Services Procurement Policy Institute of the

Republic of Indonesia Number 12 of 2021 concerning Guidelines for the Implementation of Government Procurement of Goods/Services through Providers.[5].

Referring to Presidential Regulation Number 12 of 2021 concerning Amendments to Presidential Regulation Number 16 of 2018 concerning Government Procurement of Goods/Services, it is possible to carry out work with an Integrated Design and Build System. The old pattern of development is design and then auction (bid) and development (build). However, with this new regulation, the new pattern is design and construction at the same time (Design & Build).[6]

The Design and Build (DB) system is derived from the concept of a "master builder" and has a number of definitions that have been supported by different researchers. According to Masterman, the term "design-build" is almost unanimously defined as one of the fully responsible contractors.[7]

The meaning of Design and Build is to put design and construction in one company: design builders. This natural enterprise was formed when the general contractor hired an architect and engineer as a team to provide a full-service association. In this arrangement, it can be said that the contractor will design and build the project. [8],

Design and Build (DB) is defined as an integrated procurement system that provides design and construction services under a single contract. In this system, one entity (institution / business entity) performs design and construction and is responsible for all aspects [9],

In the Design and Build system, there is only one tender step to select one such business entity to complete the project. Thus, it has significant time savings compared to traditional systems that require two tender steps. Design and construction, whether in part or in whole, can be done by one design/builder or can be subcontracted to another contractor. In DB systems, designers work under contractors as a team [10][11].

The design and build project procurement system definition review highlights several aspects of the DB project procurement system, namely: the client deals directly with the constructor for complete design and construction, the constructor builder/designer has a single responsibility, the constructor will design and build the project, and the project is run by a single entity/organization. Based on this, the main feature of the DB project implementation system is a single responsibility.

The Design and Build project procurement system also has several variations. Masterman lists commonly used Design and Build variations, as follows [7] : package offerings, turnkey methods, developing and building.

Db project maintenance systems are also used in high-risk projects. High-risk projects can be indicated as follows: may endanger public safety and human life; may harm the environment; may result in harm; and may endanger the workforce at the project site [12].

The procurement of the DB project system is carried out once, this single procurement is carried out for design and construction and the tender process is carried out through limited tenders [13], [14].

Gambo et al. 2015 in their journal *Project Characteristics for Design and Build Procurement Approach in Malaysian Construction Industry* defines the characteristics of DB as follows:

**Table 1.** *Design and Build Characteristics*

| <b>Characteristics of the DB Approach</b>         | <b>Writer</b>   |
|---|---|
| Single Point Responsibility                       | Zinc & Yousof, (2006); Skitmore & Ng, (2002)                    |
| Complexity  | Abdulrashid, (2002); Oztas & Okmen, (2004)                      |
| Risk Allocation                                   | Hassim et., al. (2008); Muhammad, (2005); Beard et., al. (2001) |
| Compressed Delivery Schedule                      | Abdulrashid, (2002); Chan & Yu (2005)                           |
| Communication                                     | Chan et., al. (2001); Levy, (2006)                              |
| Effective Client Representation                   | Lam et., al. (2004); Peterson & Murpheree, (2004)               |
| Facilitates use of latest innovative technologies | Ling, Chong & Ee (2004); Abdulrashid, (2002)                    |

The classic view of stakeholders is put forward by Freeman, who defines that stakeholders are "any group or individual that can influence or be influenced by the achievement of organizational goals". Another view of the stakeholders is anyone who influences the project process and/or the final result, whose existence is positively or negatively affected by the project, and who receives direct and indirect benefits and benefits and disadvantages of the project. Stakeholders include local communities, consumer groups, housing associations, individuals, and anyone who can influence the political and social context of the project. In another researcher's study, informal stakeholder relationships were classified into four types; including collaborative relationships, information/knowledge exchange relationships, power/influence relationships, and interpersonal relationships (e.g. emotional support and trust). The term stakeholder engagement emerged as a means to describe a broader, more inclusive, and sustainable process between the company and those potentially affected that includes a wide range of activities and approaches, and covers the life of the project. The main components of stakeholder engagement are the identification and analysis of stakeholders, disclosure of information, stakeholder consultation, negotiation and partnership, management of management, involvement of stakeholders in project monitoring, reporting to stakeholders and management functions. Defining stakeholders, researchers define in the form of people (groups/individuals) who have processes, people whose activities affect a process, or people who have to interact with a process or group. The above view shows that the introduction of stakeholders answers not only the question of who the stakeholders are at issue, but also the nature of the stakeholder relationship with the stakeholders' problems, attitudes, and influences. These aspects are very important to analyze to get to know stakeholders [16][17][18][19].

Each stakeholder has their own interests, therefore their views and perceptions of the potential implementation of the DB project procurement system may vary. For the most part, the perceptions of stakeholders come from their own main concerns and perceived benefits. Thus, the level of understanding of the implementation of the DB project procurement system is important. The stakeholders are interdependent and in one way or another influence each other when conducting projects. However, their interdependence and importance vary according to the different phases of development during the life of a project [20]. Then, [21] classifying stakeholders into three types: (1) responsible stakeholders, referring to

organizations or individuals who have some degree of responsibility or obligation in connection with the development process, (2) affected stakeholders, referring to organizations or individuals that are directly or indirectly affected by the development process, and (3) interested stakeholders, refers to organizations or individuals who are not directly affected by the project, but who want to participate and give their opinion in the process of infrastructure construction.

Project stakeholders can be classified into direct and indirect stakeholders. Direct stakeholders can be divided into primary and secondary stakeholders. Key stakeholders include those with power, authority, responsibility or claims to resources. This is central to any project initiative. Secondary stakeholders are those who have an indirect interest in the outcome. Indirect stakeholders can be divided into external stakeholders and expanded stakeholders. External stakeholders are groups that are recognized as having an impact on the project but not being a direct part of the project team, while the extended stakeholders are individuals who do not correspond to any of the previous groups [22][23].

## Methodology

Robert K. Yin put forward that surveys are the preferred method for this type of question. This method is also used to answer the second research question. In particular, this study used a Delphi questionnaire survey. There are several reasons to conduct the Delphi study as follows [24][25] : (1) Delphi studies are suitable for fields that do not have sufficient historical data for the use of other methods; and (2) This is precisely when the problem does not fit into the proper analytical techniques but can benefit from subjective judgment collectively. Even if the collective judgment of experts consists of subjective opinions, this is considered more reliable than individual statements. As a result, the Delphi study was able to extract the maximum amount of unbiased information from a panel of experts.

The Delphi technique was originally developed by the RAND Corporation to reach consensus among U.S. military experts on sensitive issues without face-to-face discussion. The goal is to gain the most reliable consensus of opinion from a group of experts through a series of intensive questionnaires interspersed with controlled opinion feedback [20].

This technique gathers the opinions of experts to provide a more complete and better understanding. Implementing a DB procurement system in local government projects in Indonesia is not an easy task because it is still a debatable issue among stakeholders. It is believed to be a complex problem.

Delphi has been used in many fields and for different purposes the field of construction management is no exception. Its use depends on the research problem. Delphi can be used in situations such as defining areas with an agreed lack of knowledge or incorporating fragmentary perspectives into collective understanding; examples of construction management topics suitable for Delphi include health and safety, risk management, procurement system selection, contractor selection, and sustainability [26].

As for the purpose of the Delphi method, it is to establish the opinions of expert groups and reach consensus on specific issues, providing a means to synthesize information of various kinds through experts. In addition, delphi studies are a method of structuring the process of group communication so that the process is effective in allowing the individual to face complex problems [25][27][26].



## Findings and Discussion

The method used in this study is a quantitative descriptive method with literature studies, case studies, surveys, interviews and questionnaires. As a first step, a literature study was carried out to find out how the organizers of the construction projects understood the procurement of Design and Build (DB). Then the questionnaire will be distributed as an instrument, especially in data collection to find out what is happening in the field.

- Since the information gathered in this study requires in-depth knowledge and substantial experience of project delivery systems, in particular DB project delivery systems, the following criteria are used to select qualified participants in this Delphi survey:
- Experts who are in the decision-making role in organizations or institutions related to road infrastructure projects.
- Experts who have recently been engaged in road infrastructure projects.
- Practitioners or stakeholders who are considered to have knowledge of project delivery systems in particular DB project delivery systems and have extensive work experience in DB project delivery systems.
- Academician from the university who has extensive knowledge of all project delivery system options, in particular the DB project delivery system.

To measure agreement, this questionnaire uses a likert type scale. The Likert scale was introduced as a scale and technique to measure attitudes . This scale is widely used in many studies. The likert scale technique presents a set of attitude statements.[28]

The six-point Likert scale is used to assess participants' approval, although the six-point Likert scale is not used as often as the five-point or seven-point Likert scale. All of these odd-numbered scales have a middle value that is often labeled a neutral option. Neutral choices can be seen as easy choices to take when respondents are unsure. This case is common in Southeast Asian countries. By removing the neutral option, the participants are forced to make a decision. Therefore, this study used a six-point likert scale.

The six-point Likert scale consists of 1 = strongly disagree; 2 = disagree; 3 = somewhat disagree; 4 = a little agreed; 5 = agree; and 6 = strongly agree.

A Preliminary Survey of the Understanding of Construction Project Organizers on Design and Build (DB) was conducted by distributing questionnaires in Bali Province. The targets of the survey were the private sector, construction business actors and the government as project organizers with a Design and Build (DB) procurement system of 37 respondents.

To get answers about the understanding of the construction project organizers, there are 3 important things raised, namely:

1. Understanding the definition of a Design Build project procurement system
2. Understanding of the appropriate statement regarding procurement and contract characteristics of the Design Build project
3. Understanding of the characteristics of a DB project

Of the three important things above, it is translated into 18 questions in the questionnaire that respondents must answer, including:

1. The client is in direct contact with the construct regarding the design stages and construction stages
2. the constructor has responsibility for the design and construction process
3. Projects are implemented by a single entity/organization of planners and implementers
4. The construct of creating a design as well as working on the implementation
5. Contracts based on Lumpsum Fixed Price price
6. Construction design and execution contract integrated in 1 contract
7. The process of auctioning the design and execution is carried out at the same time
8. The auction process can be done on a limited basis
9. Includes Technical Auctions and and Construction Auctions
10. Design and Construction is paid in a single financial transaction
11. Requires a lot of details related to how the project is implemented
12. Requires high technology
13. Has conditions of high uncertainty
14. Used for high-risk projects that could endanger public safety, human lives, and the environment
15. Have a variety of activities in a scope of work
16. Requires a specialist in a scope of work
17. Construction design and execution work is not enough time if it is carried out separately
18. Design and Build projects funded by the APBD are determined by the Governor or Regent/Mayor

Of the 18 questions submitted, there were 2 questions answered by respondents with the most disagreement scores. The questions in question are:

1. Requires high technology
2. Used for high-risk projects that could endanger public safety, human lives, and the environment

The results of collecting questionnaires on the Likert scale obtained the following results:

**Table 2.** Respondents' Answer Results to the Question "Requires High Technology"

| Requires high technology | Likert Scale Value | Number of Respondents |
|--------------------------|--------------------|-----------------------|
| Strongly Agree           | 6                  | 2                     |
| Agree                    | 5                  | 4                     |
| Somewhat Agree           | 4                  | 6                     |
| Disagree                 | 3                  | 18                    |
| Disagree                 | 2                  | 7                     |

|                   |   |   |
|-------------------|---|---|
| Strongly Disagree | 1 | 0 |
|-------------------|---|---|

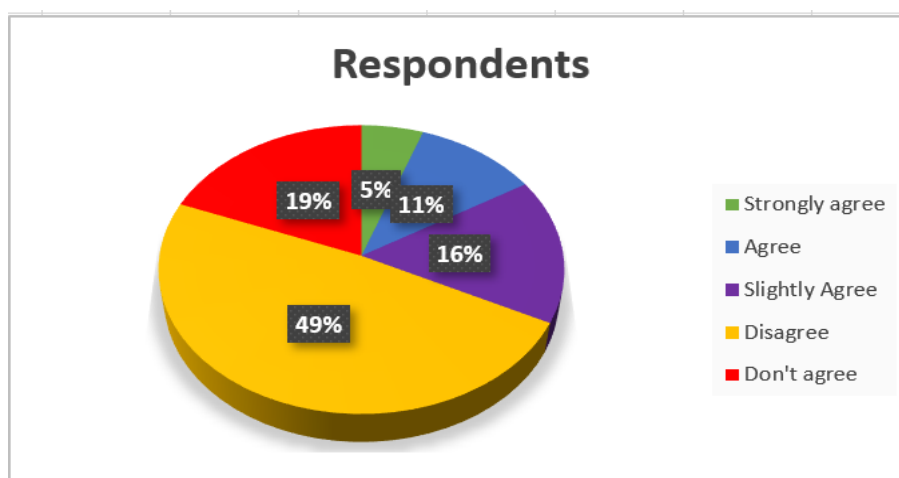
The table above explains that 18 respondents expressed disagreements about the design and build question of high-tech.

**Table 3.** Results of Respondents' Answers to the Question "Used For High-Risk Projects That Could Endanger Public Safety, Human Lives, and the Environment"

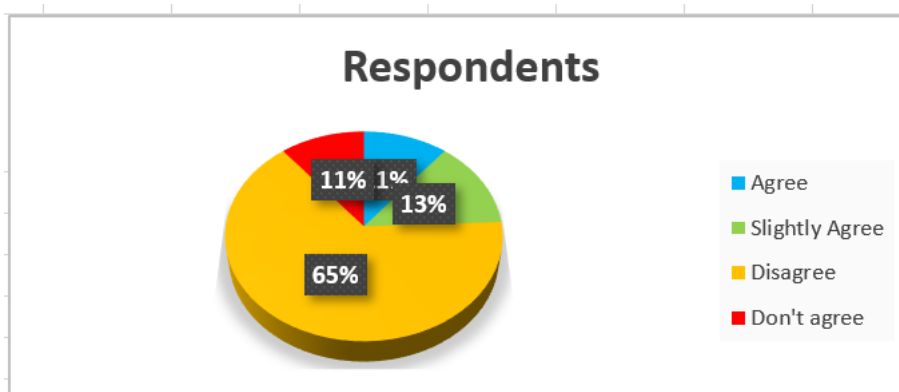
| Used for high-risk projects that could endanger public safety, human lives, and the environment | Likert Scale Value | Number of Respondents |
|---|--------------------|-----------------------|
| Strongly Agree  | 6                  | 0                     |
| Agree   | 5                  | 4                     |
| Somewhat Agree  | 4                  | 5                     |
| Disagree  | 3                  | 24                    |
| Disagree  | 2                  | 4                     |
| Strongly Disagree   | 1                  | 0                     |

The table above explains that 24 respondents expressed disagreement about the question of Design and Build being used for high-risk projects that could endanger public safety, human lives, and the environment.

Based on the table above, the results can be detailed with a pie chart as follows:



**Figure 1.** Pie Chart of Respondents' Answers to "Requires High Technology" Questions





**Figure 2.** *Pie Chart of Respondents' Answers to the Question "Used For High-Risk Projects That Could Endanger Public Safety, Human Lives, and the Environment"*

Figure 1 shows that 49% of respondents expressed disagreement about the assertion that design and build procurement requires high technology. Whereas Figure 2 shows that 65% disagree with the Design and Build statement being used for high-risk projects that could endanger public safety, human lives, and the environment.

## Conclusion

From the discussion above, it shows that there are still many respondents who have a lack of understanding of the design and build procurement system. This shows that there are still many project organizers who do not understand the design and build implementation system that has been regulated in the Government Regulation of the Republic of Indonesia Number 14 of 2021, Regulation of the Minister of Public Works and Public Housing of the Republic of Indonesia Number 25 of 2020 and Regulation of the Government of The Republic of Indonesia Procurement Policy Institute Number 12 of 2021. Thus, it is necessary to re-socialize about the applicable regulations in order to have the same understanding of the system of implementing design and build in local governments,

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