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Research Article

The Most Influencing Factors on the Causes of Construction Claims and Disputes in the EPC Contract Model of Infrastructure Projects in Indonesia

Iskandar[1]

Civil Engineering Doctoral Program, Universitas Tarumanagara-Jakarta, Indonesia

Sarwono Hardjomuljadi[2]

Mercu Buana University, Jakarta Indonesia

Hendrik Sulistio[3]

Civil Engineering Doctoral Program, Universitas Tarumanagara-Jakarta, Indonesia

Abstract

EPC (Engineering, Procurement and Construction) is a project management concept that delegates responsibility for design activities (Engineering), procurement of materials/equipment (Procurement) and implementation of construction (Construction) to EPC contractors. The EPC contract model in many infrastructure projects still does not run as it should be. There are still many claims and disputes between users and service providers, the resolution of which takes a considerable amount of time, money and energy. Because claims and conflicts are frequent and recurring, it is necessary to have a good and mature understanding to anticipate and minimize the occurrence of claims, disputes, and their impacts. The auditor's finding that there is a state loss due to overpayments to service providers causes the auditor element to be included in the study. The lumpsum payment method is one-factor driving claims even though it follows the EPC contract. The research shows different perceptions of the parties involved in a project with the EPC contract model that raises claims and disputes. It appears that construction service companies still believe that other parties are the primary cause of claims and disputes. They think they are in the correct position. Contract aspects, such as contract administration, ambiguous definition of contract documents, understanding of the EPC contract, and claims for extension of time, land handovers, and late completion of work by contractors are the leading causes of claims and disputes on infrastructure projects using the EPC contract model. It needs serious attention to minimize lawsuits and disputes in the future.

Keywords

Infrastructure, construction contracts, EPC (Engineering, Procurement and Construction), disputes and claims.

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BACKGROUND

The construction industry makes a significant contribution to Indonesia's economic growth. The Republic of Indonesia's Government is actively carrying out development in the infrastructure sector to encourage economic growth, which is in decline, and prepare a better economic foundation to reduce distribution costs. The construction industry's contribution is to provide labour to the community to reduce the number of unemployed people or increase the community's amount of income and consumption, which ultimately contributes positively to development.

The implementation of large public construction projects organized by the State Ministry and State-Owned Enterprises (BUMN) is carried out by a third party appointed as a construction service provider through a construction contract. In practice, almost all agreements refer to the FIDIC Conditions of Contract as a law model. Therefore, an understanding of the construction contract model, claims management and settlement of construction disputes in general and the construction contract model issued by FIDIC, headquartered in Geneva-Switzerland, is an absolute requirement for construction success work (Kabirifar & Mojtahedi, 2019).

The reason lending institutions, such as the World Bank, ADB, JICA, and others, recommend using the FIDIC Conditions of Contract is an obvious risk-sharing in the FIDIC Conditions of Contract. It is considered very fair. (Kabirifar & Mojtahedi, 2019).The general terms of a fair and balanced contract have an essential meaning for service providers/contractors and service users. The general terms of an unfair and balanced contract (unilateral contract) can lead to disputes between service users and service providers/contractors, which results in the service user being the loser (Employer is the looser). If the contractor wins, the service user must pay compensation to the contractor. Conversely, if the service user wins, the service user still has to pay the dispute's cost. Due to the possibility of poor quality or delays in completing work, it ultimately results in the delay in revenue expected from the assets' operation.

Projects that use the EPC contract model have very high challenges and complexities. It starts from the interdependence of existing activities, overlaps of phases between each activity, the breakdown of activities into more detailed work activities, the complexity of the organizational structure, and uncertainty in the accuracy of predictions that arise during the implementation period. The most challenging exercise in a project is making a project budget and implementation schedule because it must be completed and known before the project starts.

The implementation of projects using the EPC (Engineering, Procurement and Construction) contract model in infrastructure projects in Indonesia is increasingly being carried out in line with the acceleration of infrastructure development by the Indonesian Government, such as the Light Rail Transit (LRT) construction project, the High-Speed Railway (HSR) construction project, toll road construction, power plant construction, and others.

Service users, especially Government institutions, choose the EPC/Turnkey Project (Silver Book) contract model to understand that the model is a lump sum due to a detailed design's unpreparedness. However, the adoption is not followed by an adequate implementation. Many claims and disputes arise because government regulations have not explicitly stated in a mandatory manner (Tang et al., 2020; Owolabi et al., 2020; Subiyanto & Rini, 2020).

Project implementation using the EPC contract model still does not run as it should be. There are still many claims and disputes between users and service providers, the resolution of which takes a significant amount of time, money and energy. Because claims and disputes are frequent and recurring, it is necessary to have a good and mature

understanding to anticipate, minimize, and reduce claims, disputes, and impacts.

The auditor's finding that there is a state loss due to overpayments to service providers causes the auditor element to be included in this study. The lumpsum payment method is a factor in the emergence of claims even though everything follows the EPC contract. Incorrect understanding regarding a project that uses the EPC contract model using lumpsum payments is one of the causes of claims and disputes. Besides, making decisions on claims and disputes consumes energy, costs and takes a long time to cause new problems for the parties in the future.

Definition

Ahuja et al., (1994) state that a claim is a request for compensation whenever any cost is incurred by the contractor, which he feels is not covered by the contract agreement. Martin (2002) explains that a claim is a demand for a remedy or ascertain of a right, especially the suitable case to court (right of action).

According to Black's Law Dictionary, a dispute is defined as a dispute or conflict (Garner, 2004). According to the Dictionary of Law, a dispute is a disagreement or difference of opinion between the parties (Yang & Ou, 2008; Perez et al., 2017; Love et al., 2015; Du et al., 2016).

Garner (2004) argues that a contract is an agreement between two or more parties creating obligations that are enforceable or otherwise recognizable at law, or a promise or set of commitments by a party to a transaction, enforceable or otherwise recognizable at law.

Martin (2002) states that a contract is a legally binding agreement. The agreement arises from offer and acceptance, but several other requirements must be satisfied for a deal to be legally binding. A contract is a legally binding agreement.

Garner (2004) defines a construction contract as a contract setting forth the specifications for a building project's construction. Shehu et al., (2014) defines a construction contract as an entire contract for the sale of goods and work and labour for a lump sum price payable by instalments as the goods are delivered and the job is done. Decisions have to be made from time to time about several essential matters: the making of variation orders, the expenditure of provisional and prime cost sums, and the extension of time for the carrying out the work under the contract (Memon et al., 2011; Pall et al., 2016).

Cleland et al., (1997) define a project as an organization of people dedicated to specific goals and objectives. Prasad et al., (2019) argue that a project can be loosely defined as a breakdown of work that requires planning, organizing, using resources and spending funds to produce a concept, product, or factory.

Garner (2004) states that infrastructure is the underlying framework of a system, esp., public services and facilities (such as highways, schools, bridges, sewers, and water systems) needed to support commerce and economic and residential development. Mankiw (2015) argues that, in economics, the meaning of infrastructure is a form of public capital consisting of public roads, bridges, sewer systems, and others, as an investment made by the Government.

Research Instruments

The research's material originated from the actual project implementation phenomenon with the EPC contract model, which still does not run as it should be. It has resulted in many claims and disputes between users and service providers.

Field data follows the criteria for research needs. It is necessary to determine the source of the causes of claims and arguments to support research objectives. Field data is obtained through a research instrument in the form of a questionnaire distributed to

respondents and supported by interviews, either directly or indirectly through communication tools. These data must reflect the overall design process's effect, primarily those directly related to the design process's various variables (independent variables) determined previously.

A research instrument is a form in which there are questions related to the research data and must be answered objectively by the respondent to describe the actual situation. This study's target respondents are the main actors of construction services involved in implementing infrastructure project development with the EPC contract model, users, service providers, and auditors. The selected respondents have a minimum educational background of a Bachelor's degree. They have work experience implementing infrastructure project development with the EPC contract model for both Government, State-Owned and Private projects for a minimum of five years.

The form and content of the questionnaire that is submitted to respondents to obtain research data consisted of three main parts, namely:

1. Data on the characteristics of respondents;
2. Data on independent variables affecting claims and disputes variables in the project with the EP contract model;
3. Data for the dependent variable, namely the variable claims and disputes in the project with the EPC contract model.

In processing the data, a Likert scale is used. The Likert scale uses the Likert scale to measure the level of approval or disapproval of respondents against a series of statements that measure an object (Aziz & Abdel-Hakam, 2016).

The Likert scale used is in the scale range 1 to 5, where the meaning of each scale is stated as follows:

- Scale 1 states Strongly Disagree (STS)
- Scale 2 states Disagree (TS)
- Scale 3 states Neutral (N)
- Scale 4 states Agree (S)
- Scale 5 states Strongly Agree (SS)

The type of population chosen is a homogeneous population. The population consists of construction service business actors directly involved in applying the EPC contract model for infrastructure projects.

The population is projected using a 5% margin of error with a sample size of 116 respondents, consisting of:

- Owner/Service User: 48 people
- Contractors: 37 people
- Consultants: 16 people
- Auditors: 15 people

Researchers use SPSS v23 software as the tools to process validity and reliability testing.

D. Validity Test Results

1. Owner/Service User

One variable (L7 - the Contractor proposes a variation to perform Value Engineering) that does not pass from the 77 variables whose validity is tested. It can be seen by comparing r-count and r-table, where r-count shows a result of 0.227 while r-table = 0.2787.

2. Contractor

There are six invalid variables from 77 variables whose validity is tested. It can be seen by comparing r-count and r-table, where each r-count variable shows a result of:

Table 1.

Contractor Validity Test Results

Var	Description	r-count	r-table
A4	Construction contract agreements are not well enforced	0.225	0,3160
B2	The Service User is slow in giving instructions to the contractor.	0.187	
H9	Acceleration orders by the Service User resulting in additional human resources and equipment	0.259	
L1	Written variation orders from the Service User	0.272	
L7	Contractors submit variations to perform Value Engineering.	0.123	
L10	Adjustment of contract prices due to changes in laws/government regulations	0.289	

3. Consultant

There are thirteen invalid variables from 77 variables whose validity is tested. It can be seen by comparing r-count and r-table, where each r-count variable shows a result of:

Table 2.

Consultant Validity Test Results

Var	Description	r-count	r-table
A2	Ambiguous contract documents (different interpretations of contracts)	0.315	0.4683
H7	Delays in work due to Government action	0.286	
H9	Acceleration orders by the Service User resulting in additional human resources and equipment	0.272	
K2	Failure to correct quality defects	0.447	
L1	Written variation orders from the Service User	0.146	
L4	Variation in quantity	0.407	
L6	Variations in job site conditions	0.307	
L7	Contractors submit variations to perform Value Engineering.	0.081	
L9	Service Users do not have reserve funds to make variations.	0.329	
L10	Adjustment of contract prices due to changes in laws/government regulations	0.285	
N2	The contractor, for no apparent reason, failed to continue with the work.	0.430	
N3	The contractor goes bankrupt / company is liquidated.	0.408	
Q2	Contractor's claim for extension of time (EOT) and its impact	0.412	

4. Auditor

There are nine invalid variables from 77 variables whose validity is tested. It can be seen by comparing r-count and r-table, where each r-count variable shows a result of:

Table 3.

Auditor Validity Test Results

Var	Description	r-count	r-table
A3	Communication between parties is not / not good / smooth	0.442	0.4821
E2	The contractor's design was overdue.	0.459	
H1	Delay in orders to start work from the Service User	0.464	
I1	Does not pass the test on completion of repeated work	0.258	
L1	Written variation orders from the Service User	0.146	
L6	Variations in job site conditions	0.378	
L10	Adjustment of contract prices due to changes in laws/government regulations	0.338	
R1	Government auditors have different views on EPC contracts.	0.262	
R3	Different understanding of the EPC contract between the contractor and the Service User	0.429	

5. Consolidation

All variables are valid from 77 variables whose validity is tested. In this case, the possible causes for all variables are valid because the r-count as a whole accumulates algorithmically. It can be seen by comparing r-count and r-table, where the result of r-count is greater than r-table for the number of respondents (N) 116 = 0.1809.

E. Reliability Test Result

The results of the reliability test for each group of respondents can be seen in the following table:

Table 4.

Reliability Test Results

Case Processing Summary & Reliability Statistics

Group		N	%	Cronbach's Alpha	N of Items
Owners Case	Valid	47	97.9		
	Excluded [a]	1	2.1	0.973	76
	Total	48	100.0		
Contractors Case	Valid	37	100.0		
	Excluded [a]	0	0	0.978	71
	Total	37	100.0		
Consultants Case	Valid	16	100.0		
	Excluded [a]	0	0.0	0.988	64
	Total	16	100.0		
Auditors Case	Valid	14	93.3	0.974	65

	Excluded [a]	1	6,7		
	Total	15	100.0		
Consolidated Case	Valid	115	99.1		
	Excluded [a]	1	0.9	0.976	77
	Total	116	100.0		

a. Listwise deletion based on all variables in the procedure.

The SPSS reliability test results for Owner/Service User respondents show a Cronbach Alpha value = 0.973, which is greater than r-Table (0.2787). It means that the questionnaire is consistent. The Contractor group shows a Cronbach Alpha value = 0.972 more significant than the r-Table (0.3160), which means that the questionnaire is consistent. The SPSS reliability test results for Consultant and Auditor respondents show a Cronbach Alpha value of 0.988 and 0.974, respectively. The numbers are more significant than the r-Table of 0.4683 and 0.4821. Both results prove that the questionnaire is consistent. Finally, the SPSS reliability test results for Consolidation (Combined) show the Cronbach Alpha value = 0.976, which is greater than the r-table (0.1809). It means that the questionnaire is consistent.

F. Relative Importance Index (RII)

1. Owner/Service User

In the Owner/Service User respondent group, the input results in the RII formula resulting in ranking data are as follows:

Table 5.

Ranking of Main Cause Sources of Claims and Disputes for Group of Owners / Service Users in the EPC Contract Model

RANK	VAR.	DESCRIPTION	RII
1	H3	Delay in completion of work by the Contractor	0.862500
2	D2	The contractor cannot provide project resources.	0.854167
3	D3	The contractor neglected to fulfil his obligations.	0.845833
4	D5	The subcontractor used is problematic / default.	0.833333
5	A1	Inadequate contract administration	0.829167

2. Contractor

In the Contractor respondent group, the input results in the RII formula resulting in ranking data are as follows:

Table 6.

Rank Sources of Main Causes of Claims and Disputes for Contractors in the EPC Contract Model

RANK	VAR.	DESCRIPTION	RII
1	B1	Late handover of land	0.875676
2	Q2	Contractor's claim for extension of time (EOT) and its impact	0.848649
3	H9	Acceleration orders by the Service User resulting in additional human resources and equipment	0.843243
	L3	Change in scope of work	
4	Q3	The Employer rejects the additional payment claim, which is the contractor's right	0.837838
5	A1	Inadequate contract administration	0.832432
	A2	The meaning of the contract document	
	R3	Different understanding of the EPC contract between the contractor and the Service User	

3. Consultant

In the Consultant respondent group, the input results in the RII formula resulting in ranking data are as follows:

Table 7.

Ranking of Main Causes of Claims and Disputes for Consultant Groups in the EPC Contract Model

RANK	VAR.	DESCRIPTION	RII
1	E4	Design, contractor documents, work implementation, not following technical standards.	0.900 000
2	A1	Inadequate contract administration	0.862 500
3	H3	Delay in completion of work by the Contractor	0.837 500
4	D10	Inadequate site investigation by Contractor	0.825 000
5	Q2	Contractor's claim for extension of time (EOT) and its impact	0.812 500

4. Auditor

In the Auditor respondent group, the input results in the RII formula resulting in ranking data are as follows:

Table 8.

Ranking of the Main Cause of Claims and Disputes for the Auditor Group in the EPC Contract Model

Rank	Var.	Description	Rii
1	L1	Written variation orders from the Service User	0.840 000
2	H3	Delay in completion of work by the Contractor	0.800 000
3	D3	The contractor neglected to fulfil his obligations	0.786 667
	D9	The work of the contractor is not following quality assurance	0.786 667
4	A4	Construction agreements/contracts are not well enforced	0.773 333
	D5	The subcontractor used is problematic / default	0.773 333
	D11	The contractor made a mistake in calculating the cost	0.773 333
	D12	The contractor is not proficient at calculating the cost difficulty	0.773 333
	N1	The contractor neglects the work and shows the intention not to continue the work following the contract	0.773 333
	Q5	The failure of the parties to resolve the dispute by deliberation	0.773 333
5	A3	Communication between parties is not good/smooth.	0.760 000
	B1	Late handover of land	0.760 000
	D10	Inadequate site investigation by Contractor	0.760 000
	G1	Service User Personnel delay / late in checking and testing the work that has been done	0.760 000
	H8	The contractor is unable to accelerate the completion of the work according to the contract	0.760 000
	J1	The contractor failed in handing over the work and part of the work to the Employer	0.760 000
	L3	Change in scope of work	0.760 000
	N2	The contractor, for no apparent reason, failed to continue the work	0.760 000

5. Consolidation

In the consolidated (combined) group of respondents, the results of the input in the RII formula yield data in the form of rankings, which are as follows:

Table 9.

Rank Sources of Main Causes of Claims and Disputes for Consolidated Groups (Combined) in the EPC Contract Model

Rank	Var.	Description	Rii
1	A1	Inadequate contract administration	0.824138
2	B1	Late handover of land	0.820690
3	A2	The meaning of the contract document	0.810345
	H3	Delay in completion of work by the Contractor	0.810345
4	R3	Different understanding of the EPC contract between the contractor and the Service User	0.782759
5	Q2	Contractor's claim for extension of time (EOT) and its impact	0.781034

Discussions

Validity Test

The validity and reliability tests using the SPPS v.23 software show that each respondent has different results. The Consultant Group has the most non-qualifying variables, namely eleven variables, although it is not the most significant number of respondents (16 people). The Owner / Service User group, with 48 respondents, only results in one variable that did not pass the validity test.

The validity test in a consolidated (combined) manner even results in all variables passing.

Reliability Test

The reliability test results show that all groups of respondents state that the research instrument used was consistent. It is indicated by the Cronbach alpha values, which all exceed the r-Table value.

Relative Importance Index (RII)

The results of the RII calculation for each group of respondents show different results. The contractor places the top three ranks as the leading cause of claims and disputes (variable H3- Delay in completion of work by the contractor, D2- The contractor cannot provide project resources and D3- The contractor is negligent in fulfilling its obligations) in the Owner/Service User Group.

In Contractor group 3, the top three sources of the causes of claims and disputes are the respective variables B1 - Late land handover; Q2- Claims for extension of time (EOT) from the contractor and its impacts, and H9-Orders for acceleration by the Service User resulting in additional human resources and equipment.

In the Consultant group, the top three causes of claims and disputes in projects with the EPC contract model are occupied by E4-Design variables, contractor documents, work implementation not following technical standards; A1-Inadequate contract administration, and H3-Delay in completion of work by Contractors.

While the Auditor group shows that the variable L1- A written variation order from the Service User; H3-Delay in completion of work by the contractor; and D3-Contractor negligent in fulfilling its obligations, is in the top rank of all variables as a source of causes

for claims and disputes on projects with the EPC contract model.

The calculation of RII Consolidated (Combined) shows the results that, in fact, variable A1- Inadequate contract administration ranks first, followed by variables B1-Late land handover and A2- Significance of contract documents, as a source of causes for claims and disputes.

The ranking matrix of the RII calculation results for each group of respondents, including the Consolidated group, can be seen in the following table:table:

Table 10.

Ranking of Sources of Main Causes of Claims and Disputes in the EPC Contract Model

Rank	Owner	Contractor	Consultant	Auditor	Consolidated
1	H3	B1	E4	L1	A1
2	D2	Q2	A1	H3	B1
3	D3	H9	H3	D3	A2

By using a weighting method, it can be stated that the variable A1 (first rank in the Consolidated group and second rank in the Consultants group) is the primary source of causes of claims and disputes. It is followed by the variable H3 (first rank in the Owner / Service User group and third rank in the Consultant group) and D3 variable (third in the Owner / Service User group and third in the Auditor group), as the leading cause of claims and disputes in the EPC contract model.

Conclusions

1. The results of the RII indicate different perceptions of the parties involved in a project using the EPC contract model. It raises claims and disputes between the parties, Service Users, Service Providers (Consultants and Contractors) and State Auditors, particularly for EPC contracts financed by the Government in Indonesia. It can be seen that Construction Service companies still consider other parties the leading cause of claims and disputes. They believe that they are in the correct position.
2. Contract aspects (contract administration, ambiguous contract documents, understanding EPC contracts, and time extension claims), land handovers, and late completion of work by contractors are the leading causes of claims and disputes in projects using the EPC contract model. It needs serious attention to minimize claims and disputes in the future.
3. The results of RII calculations and ratings for the Owner/Service User, Consultant, and Auditor group, show that the variable H3-Delay in completion of work by Contractors is the leading cause of claims and disputes projects using the EPC contract model and is ranked the highest.
4. The results of RII calculations and ratings in the Consultant and Consolidation group (combined) show that the variable A1-Contract Administration is inadequate is the leading cause of claims and disputes in projects that use the EPC contract model and ranks second.
5. The results of RII calculations and ratings in the Consultant and Consolidation group (combined) show that the variable D3 - Contractor neglecting to fulfil its obligations, is the leading cause of claims and disputes in projects that use the EPC contract model and ranks third.

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