

THE INFLUENCE OF POLICY ON SMELTER DEVELOPMENT PROJECTS ON IMPROVING PROJECT TIME PERFORMANCE

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ABSTRACT

To facilitate downstreaming in mining industry, the law requires holders of Mining Business Permits (IUP) and Work Contracts (KK) to establish smelters, namely mining processing facilities that function to increase metal content to a level that meets standards as raw materials for final products. From the policy factors found that policy has a role in the problem of delays in smelter construction in Indonesia. Therefore, evaluation and improvement of regulations as a solution to the problem need to be carried out so that smelter construction as an effort to implement mining downstreaming can be implemented properly. The study was conducted by collecting qualitative primary data which was analyzed using Structural Equation Modeling (SEM). In the relationship between policy variables and project time performance variables, Variable X3 Supervision and Variable X6 Force Majeure has a significant effect on the project time performance variable, while other variables do not have a significant effect.

Keywords : smelter, policy, project time performance, SEM-PLS

INTRODUCTION

A smelter is a mining processing facility that functions to increase the metal content of raw mining products such as tin ore, nickel ore, or copper, gold, and silver concentrates to a level that meets the standards as raw materials for final products such as alumina to ferronickel. During the reign of 2009-2014, the government reformed Indonesia's mineral resource management policy through Law Number 4 of 2009 concerning Minerals and Coal, to encourage the transition of mineral management from upstream to downstream or downstreaming. To facilitate downstreaming, the law requires holders of Business Licenses Mining (IUP) and Work Contract (KK) to establish a smelter.

To oversee the implementation of the regulation on the obligation to establish smelters, the Ministry of Energy and Mineral Resources (ESDM) issued ESDM Ministerial Regulation Number 25 of 2018. The regulation regulates the granting of mineral export permits for holders of Special Mining Business Permits (IUPK) for Production Operations, where Article 51 paragraph 2 states that export permits are granted if the physical progress of the construction of refining facilities (smelters) has met the level of progress, in accordance with the plan that has been verified by an independent verifier. The government is pursuing a target of operating 57 smelters by 2022. This target is in accordance with the roadmap for shifting exports of raw mineral commodities to the domestic mineral product downstream industry. It is planned that there will be an additional 3 copper smelters, 16 nickel smelters, 5 bauxite smelters, 2 iron smelters and 4 lead and zinc smelters, but until 2023 this target has not been achieved.

Obstacles in the smelter construction process that were identified include (1) Smelter Construction Permits, (2) Smelter Construction Capital, (3) Smelter Raw Materials, and (4) Political Intervention (Contesa et al, 2018). To apply for a smelter construction permit, new investors who are going to build have several criteria that must be met, namely: (1) Attaching a letter of application for an IUP OPK Processing and Refining; (2) Completing the information in the IUP OPK Processing and Refining application form; and (3) Completing the checklist of documents for the application for an IUP OPK Processing and Refining. After obtaining a permit, business actors must also have capital in the construction of a smelter which is quite large so that many investors are ultimately less interested in making investments. In the implementation of smelter operations later, business actors are also required to have a guarantee of raw materials that are certain in terms of quantity and source. On the external side, business actors also have the risk of intervention from political interests which are often a strong reason for the government's inconsistency in enforcing smelter regulations.

From the policy factors that have been explained, it was found that policy has a role in the problem of delays in smelter construction in Indonesia. Therefore, evaluation and improvement of regulations as a solution to the problem need to be done so that smelter construction as an effort to implement mining downstreaming can be implemented properly. In this study, it was examined what policy factors influence delays in smelter construction by mining entrepreneurs as part of the mining downstreaming policy and how the relationship between policy factors and time performance in smelter construction projects.

Urgency of Smelter Development

The obligation to build a smelter was first stated in Law No. 4/2009 concerning Minerals and Coal or Minerba, where the regulations include regulating the export of unrefined mining materials and a ban on mining companies in Indonesia from exporting raw mining materials starting January 2014. The construction of a smelter in Indonesia is considered important, among other things, because Indonesia has large ore resources and reserves, so that it can encourage domestic metal production capacity and ultimately increase state revenues (Tapada, Tampanguma, & Mawuntu, 2022).

Smelter Construction Method

The construction method used in the smelter construction project is the construction method with an EPC (Engineering Procurement & Construction) contract. According to Attachment VI of the Regulation of the Minister of Energy and Mineral Resources of the Republic of Indonesia Number 25 of 2018 concerning Mineral and Coal Mining Business which explains the criteria for implementing the verification of the refining facility construction plan, to submit a smelter construction plan, in the Technology Selection chapter the company is required to include information on the process technology used, and at least complete with information on offers from technology providers, EPC contractors, and equipment suppliers.

Smelter Construction Stages

Based on Attachment VI of the Regulation of the Minister of Energy and Mineral Resources of the Republic of Indonesia Number 25 of 2018 concerning Mineral and Coal Mining Business which explains the criteria for implementing verification of the refining facility construction plan, the stages of smelter construction are divided into 6 stages, including (1) Initial Preparation (Preliminary) including the Feasibility Study process (Appointment of Consultants, Field Data Collection, Reports), preparation of Environment Study or AMDAL permit management (Document Preparation, Submission of Documents to the Ministry of Environment, BA AMDAL Commission, Submission of Environmental Permit), to the Land Acquisition stage (Principle Permit, Location Permit, Land Status (registered/unregistered), Release of Rights, AJB), (2) Project Preparation (Project preparation) including the project preparation stage can include studies such as

Soil Investigation, Site & Topography Survey, Bathymetry Survey, preparation of Engineering documents both Insite Battery Limit and Outsite Battery Limit (Basic Design, Plant Layout, Detail Engineering Design), Site Preparation, and Bidding Stage, (3) Project Implementation (Insite battery limit project execution) includes Kick Off/Contract Effective Date, Procurement, Contractor Site Office & Area Arrangement, until completion of Construction, (4) Utilities Development includes construction of Industrial Water utilities, Water Treatment, Power Generating, Fuel tankages (MFO, IDO & HSD), and other utilities according to smelter needs, (5) Supporting Infrastructure Development (Offsite battery limit) includes construction of supporting infrastructure which can include Ports, Roads, offices, and other infrastructure according to smelter needs, (6) Commissioning and start up includes Production Trial, Performance Test and Plant Acceptance, Owner Staff & Operators Recruitment, up to Operators Training, and (7) Handover

Smelter Construction Time Performance Measurement

Based on Attachment VIII of the Regulation of the Minister of Energy and Mineral Resources of the Republic of Indonesia Number 25 of 2018 concerning Mineral and Coal Mining Business point B which explains the Calculation of Physical Realization of the Construction of Refining Facilities, verification of physical progress is based on the physical progress of refining facilities which is validated by the achievement of activities in the form of documents or physical evidence of refining facility construction activities with the S Curve. The S Curve is an activity timeline containing information on the time period and targets to be achieved in accordance with the reasonableness of the provisions for calculating progress on the S curve. Then in Article 55 paragraph 5 of the regulation it is explained that the physical progress of the construction of the Refining facility must reach at least 90% (ninety percent) of the physical progress plan for the construction of the refining facility which is calculated cumulatively up to the last 1 (one) month by the Independent Verifier.

Smelter Development Policy

One of the characteristics of the mining industry is that it is non-renewable, so its management must be optimal, efficient, sustainable and environmentally friendly. The Indonesian government has established the Mining Law (UU) as a regulation in carrying out mineral and coal mining activities. The mining law is Law No. 11 of 1967 and was replaced by Law No. 04 of 2009. The implementing regulation of Law No. 04 of 2009 is the Government Regulation (PP) and to implement the PP, a Ministerial Regulation is issued.

With the enactment of Law No. 04 of 2009, every mining company is required to build a smelter for processing and refining within five years, thus allowing for PNT of minerals, including nickel. Based on this time period, in 2014 the ban on exports of raw ore was enforced until

now. This has an impact on the decline in nickel ore exports in Indonesia. In Indonesia, the construction of smelters is used to process and refine nickel with a content above 2%, but in Indonesia itself there is still nickel ore with a content below that content. Therefore, Regulation No. 05 of 2017 was stipulated to overcome this problem, which has now been replaced by Regulation No. 25 of 2018.

Ministry of Energy and Mineral Resources (ESDM) Regulation No. 25 of 2018

The delay of mining companies in building and completing processing and refining facilities (smelters) is a violation of a number of provisions of laws and regulations that require the construction of smelters, one of which is ESDM Ministerial Regulation No. 25 of 2018 concerning Mineral and Coal Mining Business (Ruben, Sondakh, & Soeikromo, 2021). The obligation to build a smelter is explained in ESDM Ministerial Regulation No. 25 of 2018 in Article 16 Paragraph 1 which reads "(1) Holders of IUP Production Operations and IUPK Production Operations are required to increase the added value of minerals and coal.", and explained in Paragraph 2 which reads "(2) The increase in added value as referred to in paragraph (1) is carried out through the following activities: (a.) Processing and/or refining for metal mineral mining commodities; (b.) processing for coal mining commodities; (c.) processing for non-metallic mineral mining commodities; or (d.) processing for rock mining commodities." This regulation covers the variables studied in the research with the following structure:

Table 1. Research Variables and Indicators

Variables & Indicators		Source
X	Independent Variables	
X1	Licensing	
X1.1	Verification of planning for construction of refining facilities	(Article 57 paragraph 1 of ESDM Regulation No. 25, 2018)
X1.2	Criteria for the implementation of verification of planning for the construction of refining facilities	(Attachment VI Point A of ESDM Regulation No. 25, 2018)
X1.3	Format of verification report for planning construction of refining facilities	(Attachment VII of ESDM Regulation No. 25, 2018)
X1.4	Licensing aspects of the building entity	(Attachment VI of ESDM Regulation No. 25, 2018)
X1.5	Location aspect licensing	(Appendix VI Article 57 paragraph 1 of ESDM Regulation No. 25, 2018)
X2	Time period	
X2.1	Final timeframe for construction of refining facility	(Article 47 Paragraph 1 of ESDM Regulation No. 25, 2018)

Variables & Indicators		Source
X2.2	Timeframe for completion stages per year	(Article 51 of ESDM Regulation No. 25, 2018)
X3	Supervision	
X3.1	Verification of physical progress of construction of refining facilities	(Article 57 paragraph 1 of ESDM Regulation No. 25, 2018)
X3.2	Aspects & criteria for implementing verification of physical progress of construction of refining facilities	(Article 55 paragraph 1 & Attachment VIII point A of ESDM Regulation No. 25, 2018)
X3.3	Format of physical progress verification report for construction of refining facilities	(Attachment IX of ESDM Regulation No. 25, 2018)
X3.4	Verification execution interval	(Article 57 paragraph 2 of ESDM Regulation No. 25, 2018)
X3.5	Supervisory instruments in verification	(Attachment VI Point B of ESDM Regulation No. 25, 2018)
X3.6	Calculation of physical realization of development during verification	(Attachment VIII point B of ESDM Regulation No. 25, 2018)
X3.7	Supervision through verification at any time	(Article 57 Paragraph 3 of ESDM Regulation No. 25, 2018)
X4	Sanctions	
X4.1	Criteria for imposing sanctions	(Article 55 Paragraph 5 & 7 of ESDM Regulation No. 25, 2018)
X4.2	Time period for imposing sanctions	(Article 55 Paragraph 7 of ESDM Regulation No. 25, 2018)
X4.3	Sanctions of revocation of export approval	(Article 55 Paragraph 7 of ESDM Regulation No. 25, 2018)
X4.4	Administrative fine sanctions	(Article 55 Paragraph 8 of ESDM Regulation No. 25, 2018)
X4.5	Amount of administrative fines	(Article 55 Paragraph 8 of ESDM Regulation No. 25, 2018)
X4.6	Sanctions for depositing a guarantee of sincerity	(Article 58 Point d of ESDM Regulation No. 25, 2018)
X4.7	Criteria for sanctions guarantee of seriousness	(Article 58 Point d of ESDM Regulation No. 25, 2018)
X5	Incentive	
X5.1	Ore export incentives	(Article 46 Paragraph 1 of ESDM Regulation No. 25, 2018)

Variables & Indicators		Source
X5.2	Export incentives for processed and refined products	(Article 47 Paragraph 1 & Article 48 Paragraph 1 of ESDM Regulation No. 25, 2018)
X5.3	Criteria for granting incentives	(Article 46 Paragraph 2, Article 47 Paragraph 2, & Article 48 Paragraph 2 of ESDM Regulation No. 25, 2018)
X5.4	Incentive granting mechanism	(Article 50 & 52 of ESDM Regulation No. 25, 2018)
X5.5	Period of time for granting incentives	(Article 46 Paragraph 1, Article 47 Paragraph 1, & Article 48 Paragraph 1 of ESDM Regulation No. 25, 2018)
X5.6	Amount of incentives given	(Article 53 Paragraph 1 of ESDM Regulation No. 25, 2018)
X6	Force Majeure	
X6.1	Force majeure category	(Article 55 Paragraph 6 of ESDM Regulation No. 25, 2018)
X6.2	Supporting documents for force majeure	(Article 55 Paragraph 6 of ESDM Regulation No. 25, 2018)
X6.3	Follow-up to force majeure	(Article 55 Paragraph 6 of ESDM Regulation No. 25, 2018)
Y	Dependent Variable	
Y1	Time Performance	
Y1.1	Physical Progress	(Article 55 Paragraph 1 Point B Number 1 of ESDM Regulation No. 25, 2018)
Y1.2	Percentage of physical progress compared to plan	(Article 55 Paragraph 5 of ESDM Regulation No. 25, 2018)

METHOD

The method used in this study is a qualitative method. At the stage of theory development, variables are arranged in the form of factors causing project delays that affect time performance, which are obtained from literature studies as secondary data. At the stage of primary data collection, the variables are then analyzed using Structural Equation Modeling (SEM). The variables that have been analyzed are then summarized and validated to experts to obtain optimal results. The results of the SEM analysis are then arranged into questions in a questionnaire as a single case data collection. Data collection in case studies is carried out through structured

interviews that have been arranged in a questionnaire. Interviews are an essential source of information for case studies (Yin, 2003).

In this study, the variable that is said to be independent or the free variable is the cause of the delay in the form of policy. The dependent variable, or bound variable used in this study is project performance. In this study, a case study was used which was built with case selection and data selection design. The study will be conducted with a case design on the project. At the stage of theory development, variables are arranged in the form of identifying project delay factors on time performance on the smelter construction project. At the primary data collection stage, the variables are then validated and reduced by experts. The results of the Delphi analysis are then compiled into questions in a survey questionnaire for respondents.

Data collection for the study includes the collection of secondary data and primary data conducted in this study divided into several stages. Stage I or Initial Expert Validation is carried out by conducting observations and interviews with experts involved in the construction project implementation process to identify the influence of project delay factors on time performance in the smelter construction project. After the questionnaire results were obtained from each expert, the next step was to tabulate the data. The results of the expert validation produced a list of causes of delay and final indicators used in the study.

Phase II or Pilot Survey was conducted by conducting a pilot questionnaire survey on respondents for variables causing delays in construction projects obtained from the results of literature studies and interview results. Experts were asked to provide an assessment of project delay factors on time performance in smelter construction projects. This questionnaire survey was conducted to reduce the variables that had been obtained from the literature.

The second stage of data collection is a pilot survey, which uses an open questionnaire with interview and brainstorming techniques for prospective respondents to obtain opinions on whether the variables are easy to understand or still need simplification. In addition, the pilot survey is also a trial of the questionnaire in order to obtain improvements before the questionnaire is delivered to the actual respondents. The Pilot Survey conducted had a number of respondents of 10% of the total planned sample (Conelly, 2008), where the total planned sample in this study was 60 people, so the pilot survey respondents determined were as many as 10 people.

Phase III or Respondent Questionnaire is conducted after the pilot survey is completed and with the validated delay-causing variables, a questionnaire survey is then conducted on the core team of the construction company project who have been directly involved in the implementation of construction projects and have at least 3 years of experience. Respondents are asked to provide

an assessment of the level of influence of project delay factors on time performance on the smelter construction project based on their experience. The minimum sample size used is 10 times the number of indicators or arrows pointing to the variable (Hair, Hult, Ringle, & Sarstedt, 2013).

The measurement scale used in this respondent questionnaire is the scale that is considered the easiest to use in a survey questionnaire, namely the Likert scale, where the scale uses several questions to measure individual behavior with 5 choices, namely strongly agree, agree, undecided, disagree, and strongly disagree (Budiaji, 2013).

The method used for the analysis of respondent questionnaire data is the Structural Equation Modeling SEM method. Solihin (2013) stated that SEM is one type of multivariate analysis in social sciences. Multivariate analysis is the application of statistical methods to analyze several research variables simultaneously or simultaneously. The use of SEM -PLS is to estimate the relationship between variables that cause delays. From the explanation in Chapter 3, namely in the research process section, it has been explained about the flow of thought in building a hypothesis in the form of a relationship model. Furthermore, the data from the results of primary data collection are entered into the model to be further processed with the Smart PLS 3.0 program as a method for evaluating. After statistical analysis using Smart PLS software is carried out to obtain dominant variables. After obtaining the dominant variables, recommendations will be prepared from the results of data collection with a questionnaire in the form of improving policies to improve time performance in smelter construction projects.

Stage IV or Final Expert Validation is carried out after obtaining a model of the relationship pattern and work plan of project delay factors on time performance in the smelter construction project, expert validation is carried out using interview techniques. According to Nazir (1983, p. 234), an interview is a process of obtaining information for research purposes by means of face-to-face questions and answers between the questioner or interviewer and the answerer or respondent using a tool called an interview guide. Several factors that influence the flow of information in an interview, namely the interviewer, respondent, interview guide, and interview situation. The type of interview conducted is a structured interview because the author has known for sure what information he wants to dig up from the respondents so that the list of questions has been made systematically in the questionnaire.

RESULTS AND DISCUSSION

From 78 research respondents, data processing was carried out using the PLS-SEM application and the following results were obtained:

Outer Model Evaluation

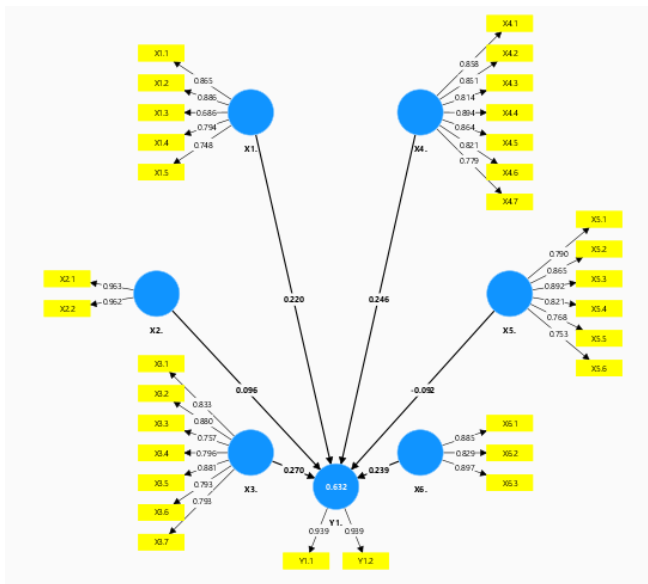


Figure 1. Results of SEM-PLS Outer Model Evaluation

Outer model testing was conducted using the SEM-PLS application with the requirement of outer loading value > 0.7 . In the initial outer model evaluation, the following model was obtained:

One indicator variable, namely X.1.3 Format of verification report of construction planning of refining facilities, obtained an outer loading value > 0.7 , namely 0.686, which means it does not meet the requirements, so the indicator was deleted. The results of the outer loading evaluation after deleting indicator X.1.3 are as follows:

Table 1. Results of Outer Loading Evaluation of Research

	X1	X2	X3	X4	X5	X6	Y1
X1.1	0.876						
X1.2	0.901						
X1.4	0.818						
X1.5	0.744						
X2.1		0.963					
X2.2		0.962					
X3.1			0.833				
X3.2			0.880				
X3.3			0.757				
X3.4			0.796				
X3.5			0.881				
X3.6			0.793				
X3.7			0.793				
X4.1				0.858			
X4.2				0.851			
X4.3				0.814			
X4.4				0.894			

	X1	X2	X3	X4	X5	X6	Y1
X4.5				0.864			
X4.6				0.821			
X4.7				0.779			
X5.1					0.790		
X5.2					0.865		
X5.3					0.892		
X5.4					0.821		
X5.5					0.768		
X5.6					0.753		
X6.1						0.885	
X6.2						0.829	
X6.3						0.897	
Y1.1							0.940
Y1.2							0.938

After all indicator variables meet the outer loading value > 0.7 , then the Average Variant Extracted (AVE) value is checked with the condition that the value is > 0.5 . The results of the AVE value check are as follows:

Table 2. Average Variance Extracted (AVE) value of the study

	Cronbach's Alpha	Composite Reliability (rho_a)	Composite Reliability (rho_c)	Average Variance Extracted (AVE)
X1	0.860	0.894	0.903	0.700
X2	0.921	0.921	0.962	0.927
X3	0.919	0.929	0.935	0.673
X4	0.931	0.935	0.944	0.707
X5	0.899	0.905	0.923	0.667
X6	0.844	0.885	0.904	0.758
Y1	0.866	0.866	0.937	0.882

Based on the examination of the AVE value, all variables have met the test value requirement of > 0.5 .

Next, a validity test is conducted on discriminant validity using the Fornell Lacker test. In this test, the AVE value requirement for each variable must exceed the value of the other variables. The results of the Fornell Lacker value are as follows

Table 3. Results of Fornell Larcker Research Calculations

	X1	X2	X3	X4	X5	X6	Y1
X1	0.837						
X2	0.554	0.963					
X3	0.793	0.556	0.820				
X4	0.550	0.547	0.619	0.841			
X5	0.586	0.570	0.586	0.605	0.816		

X6	0.435	0.398	0.408	0.451	0.548	0.871	
Y1	0.683	0.542	0.703	0.638	0.531	0.547	0.939

Inner Model Evaluation**Table 4. Results of Research Cross Loadings Evaluation**

	X1	X2	X3	X4	X5	X6	Y1
X1.1	0.876	0.528	0.767	0.497	0.480	0.360	0.648
X1.2	0.901	0.579	0.766	0.562	0.568	0.384	0.678
X1.4	0.818	0.344	0.539	0.411	0.419	0.337	0.500
X1.5	0.744	0.343	0.524	0.317	0.501	0.398	0.390
X2.1	0.552	0.963	0.550	0.542	0.541	0.339	0.526
X2.2	0.515	0.962	0.521	0.511	0.557	0.429	0.518
X3.1	0.656	0.534	0.833	0.495	0.570	0.319	0.527
X3.2	0.778	0.603	0.880	0.587	0.534	0.294	0.701
X3.3	0.576	0.341	0.757	0.265	0.398	0.234	0.425
X3.4	0.498	0.378	0.796	0.474	0.409	0.379	0.607
X3.5	0.736	0.540	0.881	0.604	0.580	0.342	0.624
X3.6	0.672	0.346	0.793	0.470	0.380	0.328	0.585
X3.7	0.612	0.405	0.793	0.600	0.483	0.454	0.499
X4.1	0.534	0.606	0.593	0.858	0.568	0.322	0.583
X4.2	0.472	0.477	0.540	0.851	0.463	0.400	0.537
X4.3	0.475	0.464	0.502	0.814	0.432	0.318	0.510
X4.4	0.419	0.434	0.462	0.894	0.489	0.337	0.513
X4.5	0.369	0.441	0.409	0.864	0.499	0.384	0.440
X4.6	0.530	0.433	0.550	0.821	0.556	0.500	0.628
X4.7	0.396	0.339	0.549	0.779	0.534	0.370	0.499
X5.1	0.349	0.427	0.491	0.465	0.790	0.441	0.399
X5.2	0.442	0.569	0.438	0.491	0.865	0.558	0.446
X5.3	0.554	0.549	0.502	0.548	0.892	0.464	0.480
X5.4	0.541	0.450	0.559	0.580	0.821	0.330	0.449
X5.5	0.507	0.389	0.495	0.494	0.768	0.415	0.454
X5.6	0.462	0.393	0.369	0.359	0.753	0.492	0.355
X6.1	0.389	0.377	0.313	0.392	0.368	0.885	0.441
X6.2	0.385	0.244	0.423	0.341	0.458	0.829	0.371
X6.3	0.372	0.393	0.349	0.430	0.579	0.897	0.576
Y1.1	0.671	0.509	0.675	0.577	0.495	0.500	0.940
Y1.2	0.611	0.510	0.645	0.622	0.502	0.527	0.938

Based on the comparison of AVE and cross loading values, all loading values of each indicator are greater than the cross loading value, so the Fornell Lacker test is met.

Model Fit: Standardized Root Mean Square

The model can be identified by looking at the SRMR value which has a minimum requirement of less than <0.1. The results of the SRMR calculation are as follows:

Table 5. Results of Residual Value (SRMR) of the Research

	Saturated Model	Estimated Model
SRMR	0.086	0.086
d_ ULS	3,640	3,640
d_ G	3,086	3,086
Chi-square	1,073,956	1,073,956
NFI	0.600	0.600

From the SRMR value, the model can be stated to meet the model fit because the SRMR value meets the minimum requirements of less than <0.1.

For that reason, the results of hypothesis testing can be known by conducting a T-Statistic test, where if the T-Statistic is greater than 1.96 (significance level 5%), then the independent variable has a significant effect. The results of the T-Statistic calculation for each variable are as follows:

Table 6. Results of the T-Statistic calculation for the research

	T Statistics	Against 1.96	Interpretation
X1 -> Y1	1.298	Smaller	Insignificant Impact
X2 -> Y1	0.679	Smaller	Insignificant Impact
X3 -> Y1	1,962	Bigger	Have a significant impact
X4 -> Y1	1,567	Smaller	Insignificant Impact
X5 -> Y1	0.696	Smaller	Insignificant Impact
X6 -> Y1	1,999	Bigger	Have a significant impact

CONCLUSION

Based on quantitative research on 78 respondents on the relationship between policy variables and project time performance variables, Variable X3 Supervision with indicators including X3.1 Verification of physical progress of construction of refining facilities, X3.2 Aspects & criteria for implementing verification of physical progress of construction of refining facilities, X3.3 Format of verification report of physical progress of construction of refining facilities, X3.4 Interval of implementation of verification, X3.5 Supervision instruments in verification, X3.6 Calculation physical realization of development during verification, X3.7 Supervision through verification at any time, and Variable X6 Force Majeure with indicators including X6.1 Category of force majeure, X6.2 Supporting documents for force majeure, X6.3 Action Furthermore, force majeure has a significant effect on the project time performance variable, while other variables do not have a significant effect.

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