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FACTORS AFFECTING THE DELAY OF THE LONG SEGMENT SCHEME ROAD MAINTENANCE PROJECT IN CENTRAL SULAWESI PROVINCE

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Abstract: Road maintenance is a road handling activity in the form of prevention, maintenance, and repair so that it continues to function optimally to serve traffic. The long segment road maintenance scheme is divided into effective and non-effective scopes. The effective scope of the implementation period is determined by the specific terms of the contract, and the non-effective scope ends December 31 of the current year. Implementation control is determined in the schedule. The project is considered critical if it is minus (-10%) for period I and minus (-5%) for period II. If it is critical, control is carried out by conducting a Show Cause Meeting (SCM). The non-effective scope applies performance indicators (IK) in the first 90 days. Financial sanctions are imposed on service providers if minus (-5%) is in the critical (late) category. The purpose of this study is to determine the factors that have a positive and significant effect on project delays. The method used is descriptive quantitative analysis method and Smart PLS version 3 analysis tool, with a sample size of 82 respondents. The results of the study (T-statistics), human resource factor (0.161), financial factor (3.400), material factor (0.024), equipment factor (2.097), and implementation method factor (2.144), had a significant effect if T-statistic > 1, 96, the dependent variable is the delay in the long segment scheme project in Central Sulawesi Province.

Keyword: Land Use, Road Performance, National Road

I. INTRODUCTION

The Directorate General of Highways, through the Directorate of Road Preservation, has implemented a policy of road maintenance using the long segment method with a limit of one continuous segment (can be more than one segment) which is carried out to obtain uniform road conditions and stable and standard roads throughout the segment. The implementation of road maintenance handling with the long segment scheme was started in 2016 using reference/standard documents for procurement of road preservation works for long segment packaging by the Circular Letter of the Director-General of Highways No.09/SE/Db/2015. One of the fulfillment of road service levels, in the implementation of the long segment scheme project, time is given to the Service Provider to restore conditions in the effective segment and functional segment, namely by closing potholes, with a maximum implementation time of 90 days and then after passing 90 days, it will performance indicators are applied. The implementation of these performance indicators will be monitored by a supervisory consultant, from which a report will be made, which will be the basis for calculating financial sanctions that will be imposed on service providers.

This supervisory consultant is also the person in charge of both quality and volume, so its presence in the field is very important. The Central Sulawesi National Road Implementation Center handles 2,373.4 Km roads with the number of packages in 2019 consisting of 22 packages and nine packages late with details: (i) The Regional I National Road Implementation Unit for Central Sulawesi Province consists of 7 late packages six packages, (ii) the Regional II Central Sulawesi Province National Road Implementation Unit consisting of 5 packages, no late packages, (iii) Central Sulawesi Province National Road Implementation Unit III consisting of 8 packages, three late packages and (iv) The Central Sulawesi Regional Apparatus Work Unit consists of 2 packages, no packages are late. From this data, 40.91% of long segment packages experienced delays, so we are interested in researching what factors affect the delay in road maintenance on the long segment scheme in Central Sulawesi Province.

II. THEORY

Delay is a part of the implementation time that cannot be utilized according to the plan, causing some of the activities that follow to be delayed or not completed exactly according to the planned schedule. If the Provider is late in carrying out the work as scheduled, the Employer must give a written warning or enforce critical/late contract provisions.

Road maintenance is a road handling activity in the form of prevention, maintenance, and repair needed to maintain road conditions so that they always function optimally to serve traffic so that the specified design life can be achieved: several road-handling activities, namely routine maintenance, periodic maintenance, and road rehabilitation.

In 2016 the Directorate General of Highways through the Directorate of Road Preservation will implement a maintenance policy with a long segment scheme for national road preservation. The long segment concept is a contract system that allows one contract package with several handling outputs, namely widening to standard, preservation of road reconstruction/rehabilitation, preservation of routine road maintenance, bridge preservation, and routine maintenance of bridges. The work included in this long segment must include road performance maintenance work to ensure that road pavement, road shoulders, drainage systems, complementary road buildings, and road equipment are maintained at all times and in a steady service condition based on the required performance.

One of the data analysis tools is Partial Least Square (PLS) is a multivariate statics technique that performs comparisons between the dependent variable and the independent variable. It is a variant-based SEM statics method designed to solve multiple regression when specific problems occur in the data, such as sample size: small research, missing values , and multicollinearity. Partial Least Square (PLS) analysis generally consists of 2 sub-models: the measurement model, often called the outer model, and the structural model, often referred to as the inner model. The measurement model shows how the manifest or observed variables represent the variables to be measured. On the other hand, the structural model displays the power of estimation between latent variables or constructs.

The outer model specifies the relationship between latent variables and indicators. Evaluation of the measurement model (Outer model) was conducted to assess the validity and reliability.

1. Validity Test

Validity consists of external and internal validity, and external validity indicates that the research result search is valid and can be generalized to all objects, situations, and different times and times. Internal validity indicates the ability of research instruments to measure what should be measured from a concept

2. Reliability Test

Reliability test to measure the internal consistency of measuring instruments; reliability shows the accuracy, consistency, and accuracy of a measuring instrument in making measurements. The reliability test can be seen from the value of Cronbach's alpha and the value of Composite reliability, to say that a construct is reliable, the Cronbach's alpha value must be > 0.6, and the Composite reliability value must be > 0.7. The reliability test is carried out by looking at the composite reliability value of the indicator block that measures the construct. The results of composite reliability will show a good value if it is above 0.7.

3. Multicollinearity Test

This multicollinearity test is intended to test whether there is a high or perfect correlation between the independent variables or not in the regression model to detect a high correlation between independent variables, it can be done in several ways, one of which is by using the Tolerance and Variance Inflation Factor (VIF) (Ghozali et al., 2015)

Assumptions of tolerance and Variance Inflation Factor (VIF) can be stated as follows:

a. If VIF > 10 and Tolerance value < 0.10 then multicollinearity occurs.
b. If the VIF < 10 and the Tolerance value > 0.10, then there is no multicollinearity.

III. METHODS AND ANALYSIS

A. Research Design

This research is descriptive and verification research conducted through data collection in the field to obtain data to determine the relationship between the dependent and independent variables. Furthermore, hypothesis testing is carried out. In this study, causal relationship research is used, a research unit that looks for the influence and relationship between one variable and other variables.

B. Research Locations

Population is a generalization area consisting of objects/subjects that have certain qualities and characteristics determined by the researcher to be studied and then draw conclusions

C. Data Collection Techniques

Data collection techniques in this research use the following methods:

1. Questionnaire

This technique is done by giving a list of questions to respondents to answer, and then from the answers to each question, the score is determined using a Likert scale.

2. Documentation

Documentation data of data collection techniques that are not directly shown to research subjects.

D. Data Analysis Technique

The data analysis technique in this study used Partial Least Square (PLS). PLS is a Structural Equation Modeling (SEM) equation model with an approach based on variance or component-based structural equation modeling.

1. Descriptive Statistical Test (outer reflective)

Descriptive statistics are statistics that function to describe or provide an overview of the object under study through sample or population data as it is, without analyzing and making conclusions that apply to the public.

2. Measurement model (Outer Model)

- **Validity Test (Convergent Validity)**

Convergent validity of the measurement model with reflexive indicators can be seen from the correlation between item scores/indicators and their construct scores. The individual reflective measure is high if it has a correlation of more than 0.70 with the construct to be measured.

- **Discriminant Validity**

Discriminant validity indicators can be seen in the cross-loading between the indicators and their constructs. If the correlation between the constructs and their indicators is higher than the correlations between the indicators and other constructs, it indicates that the latent constructs predict indicators in their block better than other ones.

3. Reliability

Reliability test to measure the internal consistency of measuring instruments; reliability shows the accuracy, consistency, and accuracy of a measuring instrument in making measurements.

4. Structural Model Test (Inner Model)

The structural or inner model shows the relationship or the strength of estimates between latent variables or constructs based on substantive theory.

- **R-Square**

In assessing the structural model, first assess the R-Square for each endogenous latent variable as the predictive power of the structural model. Changes in the value of R-Square can be used to explain the effect of certain exogenous latent variables on endogenous latent variables whether they have a substantive effect. R-Square values of 0.75, 0.50, and 0.25 can be concluded that the model is strong, moderate, and weak.

- **F-Square**

This f-square test was conducted to determine the goodness of the model. The f-square values of 0.02, 0.15, and 0.35 can be interpreted as whether the latent variable predictor has a weak, medium, or large influence at the structural level

- **Estimate For Path Coefficients**

The next test is to see the significance of the effect between variables by looking at the parameter coefficient values and the T-statistical significance value, namely through the bootstrapping method

5. Hypothesis Testing Test

Hypothesis testing can be done using statistical tests, using the Smart PLS program, as a basis for conducting further analysis to prove the hypothesis. After the estimated model meets the Outer Model criteria, the next step is to test the structural model (Inner model). The results of hypothesis testing can be obtained by running the program with bootstrapping. The hypothesis is accepted if it has a T-statistic value of more than 1.96.The hypothesis is a logically estimated relationship between two or more variables expressed in the form of a statement that can be tested

With the following hypothetical formula:

- Ho: = 0, meaning that each independent variable cannot affect the dependent variable.
- Ha: 0, meaning that each independent variable can affect the dependent variable.

By comparing the sig values with = 0.05, if the calculation shows:

- If Sig (0.00) <, then Ho is rejected, with an error probability of less than 5%, then Ho is rejected, and Ha is accepted, meaning that the variation of the regression model successfully explains the variation of the independent variables together having a significant effect on the dependent variable.
- If Sig (0.00) >, then Ho is accepted, with an error probability of less and 5%, then Ho is accepted, and Ha is rejected, meaning that the variation and the regression model fail to explain that the independent variables together have no significant effect to the dependent variable.

IV. RESULTS AND DISCUSSION

A. Descriptive Research Variables

To provide a clearer picture of the results of data collection in the field, in this study, questionnaires were distributed to respondents via a google form. A total of 102 questionnaires were distributed, and 82 questionnaires were successfully returned to consultant personnel who were on duty on long segment packages on ongoing national roads.

Statistical test with the Smart PLS version 3.00 program, previously a descriptive analysis of the variables will be carried out on the question items by looking at the characteristics of the respondents to the answers that have been filled in on the questionnaire, as follows:

1) Human Resources Factor (X1)
2) Financial Factor (X2)
3) Material Factor (X3)
4) Equipment Factor (X4)
5) Implementation Method Factor (X5)
6) Project Delay (Y)

B. Testing the Measurement Model (Outer Model)

In this study, hypothesis testing uses the Partial Least Square (PLS) analysis technique with the smart PLS 3.0 program. The following is a schematic of the PLS program model tested:

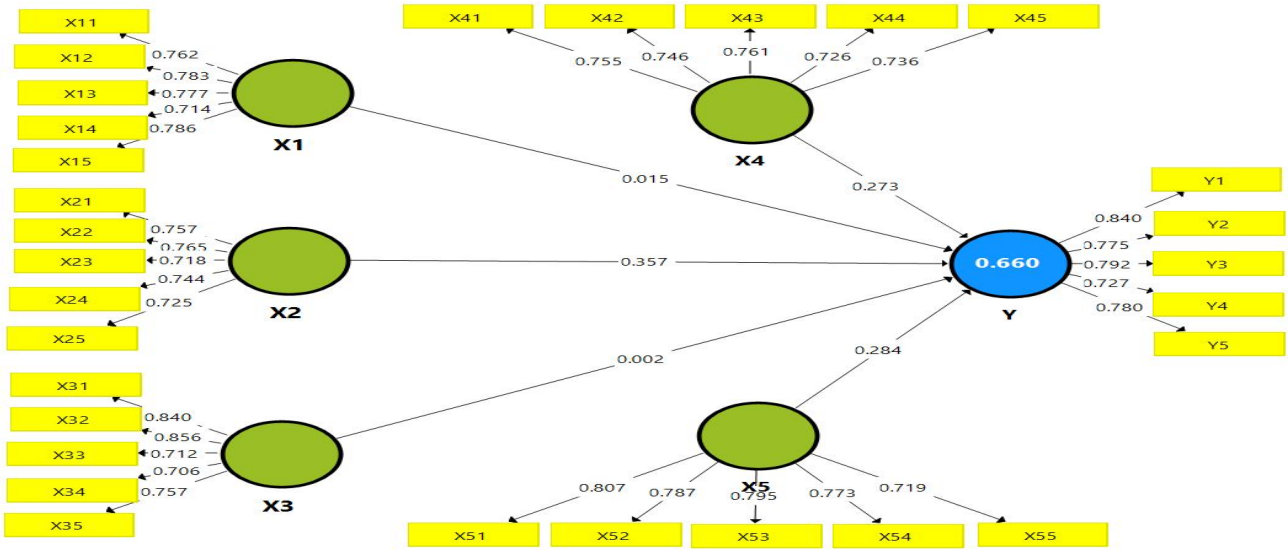

Figure 1. Outer Model

1. Convergent Validity Test

The results of processing using Smart PLS can be seen in Figure 4.5. The value of the outer model or the correlation between the construct and the variable has met convergent validity because the indicator already has a loading factor/Cross Loading value above 0.70. With that, it can be concluded that all constructs or latent variables already have Convergent validity better than indicators in other blocks.

2. Discriminant Validity Test

the outer loading value or loading factor is used. An indicator is declared to meet convergent validity in a good category if the outer loading value is > 0.7. It is known that each indicator on the research variables has the largest Outer loadings value on the variables it forms compared to the values of the Outer loading on other variables. Based on the results obtained, it can be stated that the indicators used in this study have good discriminant validity in compiling their respective variables.

3. Average Variance Extracted Test

In addition to observing the value of Outer loadings, discriminant validity can also be known through other methods by looking at the average variant extracted (AVE) value for each indicator. It is required that the value must be > 0.5 for a good model. Thus, it can be stated that each variable has good convergent validity. That all constructs meet the criteria of discriminant validity.

4. Composite Reliability Test and Cronbach Alpha Test

Composite Reliability measures the real reliability value of a variable while Crombach Alpha measures the lowest (lower bound) Reliability of a variable so that the Composite Reliability value is > 0.7 and the Cronbach Alpha value is > 0.70. These results indicate that each variable has met Composite Reliability, so it can be concluded that all variables have a high level of Reliability.

5. Multicollinearity Test

The multicollinearity test is when some or all of the independent (independent) variables are highly correlated. The method used to detect the presence or absence of multicollinearity symptoms is to look at the VIF (Variance Inflation Factor) value if the VIF value < 10 indicates no multicollinearity.

6. Goodness of Fit Test

The results of data analysis that has been carried out using the smart PLS 3.0 program obtained the R-Square value as follows:

TABLE I - R-SQUARE. VALUE

No.	Research Variables	R Square	R Square Adjusted	Prediction Model
Y	Project Delay	0,660	0,637	Moderate

The R-square value in Table I shows that human resource factors, financial factors, material factors, equipment factors, and implementation methods factors can explain the project delay variable by 66.0%, and other constructs explain the remaining 34.0%. Beyond those studied in this study.

C. Structural Model Testing (Inner Model)

After testing the outer model met, the next step is testing the structural model (inner model). The structural model can be evaluated by looking at the R-square (coefficient of determination) for the independent variables and the T-test and the significance of the coefficients of the structural path parameters. The higher the R-square value, the better the prediction model of the proposed research model. The path coefficients value indicates the level of significance in hypothesis testing.

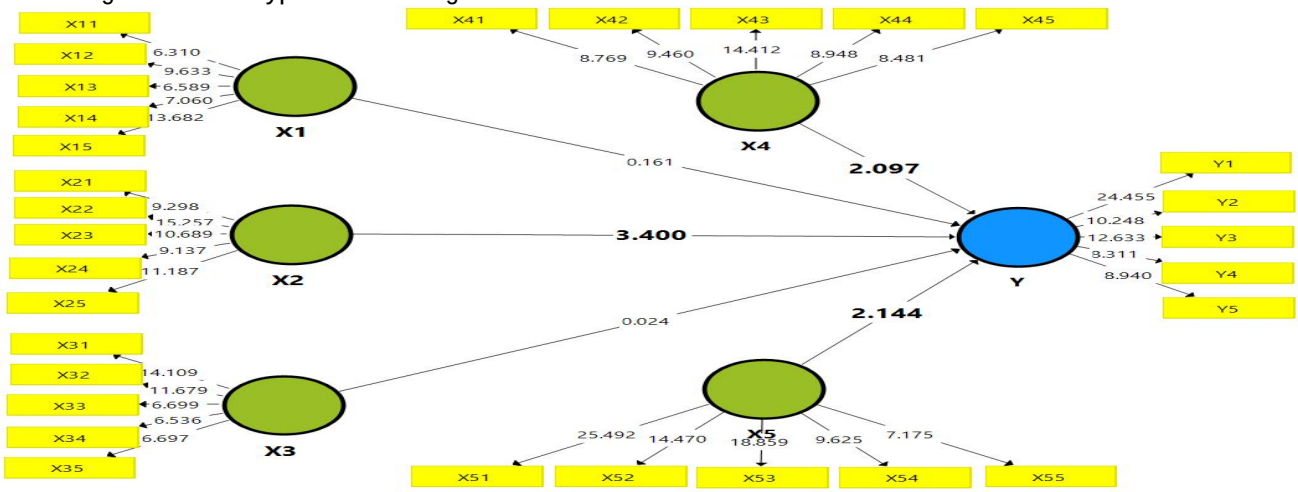

Figure 2. Inner Model

1. Test-Path Coefficients

Path coefficient evaluation is used to show how strong the effect or influence of the independent variable is on the dependent variable. Based on the inner model scheme that has been shown in Figure 4.6, it can be explained that the financial factor indicates the largest path coefficient value on project delays of 3,400. The second-largest influence is the implementation method factor of 2.144. The third effect is the equipment factor of 2.097, and the smallest is human and material resources are 0.161 and 0.024, respectively.

TABLE II - PATH COEFFICIENT

Hipotesis	Original Sample	Sample Mean	Standard Deviation	T-Statistics	P-Values
$X_1 \rightarrow Y$	0,015	0,011	0,096	0,161	0,872
$X_2 \rightarrow Y$	0,357	0,357	0,105	3,400	0,001
$X_3 \rightarrow Y$	0,002	0,011	0,095	0,024	0,981
$X_4 \rightarrow Y$	0,273	0,254	0,130	2,097	0,037
$X_5 \rightarrow Y$	0,284	0,304	0,133	2,144	0,032

2. Test the Value of the Relevance Level of the Construct Model

Furthermore, to determine the value of the prediction relevance level of a construct model. The analysis process uses the value of Q Square. If Q Square > 0.05, it can be concluded that a construct model is relevant. That is, the exogenous variables used to predict endogenous variables are correct. Evaluation of Construct Crossvalidated Redundancy is used to see the value of the prediction relevance level of a construct model. The result of Q2 = 0.366 is greater than 0.05, then the independent variables (exogenous) used to predict the dependent variable (endogenous) are correct.

3. Hypothesis Testing Results

Based on the description of the results of the analysis, it shows that the results of both direct and indirect analysis can be summarized as follows:

TABLE III - HYPOTHESIS TEST RESULTS

Hypothesis	Construct	Decision
1	Human resource factors positively and significantly impact the delay in long segment projects.	Hypothesis 1 is rejected
2	Financial factors positively and significantly affect delays in long segment projects.	Hypothesis 2 is accepted
3	Material factors positively and significantly affect delays in long segment projects.	Hypothesis 3 is rejected
4	Equipment factor has a positive and significant effect on the delay in long segment projects.	Hypothesis 4 is accepted
5	The implementation method factors positively and significantly impact the delay in long segment projects.	Hypothesis 5 is accepted.

D. Discussion of Research Results

This study consists of 5 (five) hypotheses that have been tested based on the results of research that has been carried out by distributing 98 questionnaires which returned as many as 82 questionnaires; based on the results of these studies. Based on the test results as described previously, it was stated that partially the X variable had a significant positive effect and some were not significant on the delay in the long segment road maintenance project in Central Sulawesi Province (Y); the full description is as follows:

1. Human Resource Factor

The T-Statistics value of the human resource factor variable is 0.161 smaller than the t-table (1.96) with a significance value (P-Values) which is 0.872 greater than the value of (0.05) with a 95% confidence level. The human resource factor variable has a positive but not significant (meaningful) effect on the delay in the long segment road maintenance project in Central Sulawesi Province. The study results indicate that human resources have a positive effect but are not significant, although respondents generally answered that they had a powerful influence on the delay in road maintenance projects with extended segment schemes in Central Sulawesi Province.

2. Financial Factor

The T-Statistics value of the financial factor variable is 3.400 greater than the t-table (1.96) with a significance value (P-Values) which is 0.001 smaller than the value of (0.05) with a 95% confidence level. The financial factor variable has a positive and significant (meaningful) effect on the delay in the long segment road maintenance project in Central Sulawesi Province. Based on the results of hypothesis testing on the variable financial factors influence the delay in the long segment road maintenance project in Central Sulawesi Province. The reality on the ground is that nothing can run without financial support.

3. Material Factor

The T-Statistics value of the material factor variable is 0.024 smaller than the t-table (1.96) with a significance value (P-Values) which is 0.981 greater than the value of (0.05) with a 95% confidence level. The material variable has a positive but not significant (meaningful) effect on the delay in the long segment road maintenance project in Central Sulawesi Province. Based on the results of hypothesis testing, the material factor variable has a positive but not significant effect on the delay in the long segment road maintenance project in Central Sulawesi Province. However, this material is very much needed and can determine the success or failure of a construction project, and it is different in Central Sulawesi Province; almost all regions have materials needed. However, it is difficult to get material (stone) in certain areas. It can still be imported from the city of Palu, where Palu is a pretty good producer of crushed stone.

4. Equipment Factor

The T-Statistics value of the equipment factor variable is 2.097, which is greater than the t-table (1.96) with a significance value (P-Values) which is 0.037 less than the value of (0.05) with a 95% confidence level. The equipment factor variable has a positive but not significant (meaningful) effect on the delay in the long segment road maintenance project in Central Sulawesi Province. Based on the results of hypothesis testing, the equipment factor is a factor that affects the delay in the long segment road maintenance project, and this is due to the reality in the field that without the equipment, it can affect delays, it takes a long time to find this equipment.

5. Implementation Method Factor

The T-Statistics value of the implementation method factor variable is 2.144, which is greater than the T-table (1.96) with a significance value (P-Values) which is 0.032, which is smaller than the value of (0.05) with a 95% confidence level. The variable implementation method has a positive and significant (meaningful) effect on the delay in the long segment road maintenance project in Central Sulawesi Province. Based on the results of hypothesis testing, the implementation method factor is a factor that affects the delay in the long segment road maintenance project, and this is because this implementation method is one of the instructions or directions, what must be done and the sequence of work implementation, so there is no this implementation method can hinder the implementation of the work.

V. CONCLUSIONS

The results of testing the first hypothesis prove that partially the human resource factor variable (X1) has a positive (unidirectional) effect. Human resources are still needed in road maintenance projects. However, not significant (meaningful) means that human resources are not is the cause of project delays. Maintenance projects with this long segment scheme, only work that is not difficult and does not require special skills so that human resources have no significant effect on delays in road maintenance projects with long segment schemes in Central Sulawesi Province (Y).

The results of testing the second hypothesis prove that partially the financial factor variable (X2) has a positive (unidirectional) effect. Finance is very much needed in road maintenance projects with a long segment scheme, and significant (meaningful) means that finance is one of the factors that influence project delays. Almost all parts/divisions cannot move if finances do not support them, so financial factors affect the delay in the long segment road maintenance project in Central Sulawesi Province (Y).

The results of testing the third hypothesis prove that partially the material factor variable (X3) has a positive (unidirectional) effect. Materials or materials are needed in road maintenance projects but are not significant (meaningful), meaning that materials or materials are not the cause of delays project. The maintenance project with the long segment scheme is spread across all national roads in Central Sulawesi Province. Almost all project locations have the required materials/materials, except for only a small part which is difficult to find. Hence, the materials/materials do not significantly affect the delay in the long segment road maintenance project in Central Sulawesi Province (Y).

The results of testing the fourth hypothesis prove that partially the equipment factor variable (X4) has a positive (unidirectional) effect. Equipment is needed in road maintenance projects with a long segment scheme, and significant (meaningful) means that equipment is one of the factors which greatly affects project delays. The equipment needed is a special tool that may be difficult to obtain in certain areas. Hence, it is necessary to make preparations from the start. Even if the service provider does not have the tools, it is permissible to rent the equipment needed, so that the equipment is one of the factors that influence project delays is the delay in the long segment road maintenance project in Central Sulawesi Province (Y).

The results of testing the fifth hypothesis prove that partially the implementation method factor variable (X5) has a positive (unidirectional) effect; implementation method is needed in road maintenance projects with a long segment scheme, and significant (meaningful) means that the implementation method is one of the factors that greatly influence project delays. The implementation method is one proof that service providers can work on or complete a job if they can master the implementation method. Hence, the implementation method is one factor that affects the delay in the long scheme road maintenance project. Segment in Central Sulawesi Province (Y).

Ranking influencing factors are financial factors (3,400), implementation method factors (2,144), implementation methods factors (2,097), human resources factors (0.161), and material factors (0.024).

REFERENCES

1. A. Rani, Hafnidar. 2018. Manajemen Proyek Konstruksi. Yogyakarta: s.n., 2018.
2. Ahli Jalan dan Jembatan, Workshop. 2016. Preservasi Jalan Konsep dan Program. 2016.
3. Ahyari, Agus. 1987. Pengendalian system Produksi, Buku 1 dan 2. Yogyakarta: BPEF, 1987.
4. Austen, A. D. dan Neale, R. H. 1991. Manajemen Konstruksi (Pedoman, Proses dan Prosedur) terjemahan. Jakarta: IPPM dan PT. Pustaka Binaman Pressindo, 1991.
5. Baddu, Yayong. 2015. Investigasi Faktor Penyebab Keterlambatan Pada Pekerjaan Jalan Menggunakan Analisis Jalur (Studi Kasus Kota Jayapura). Bandung: s.n., 2015.
6. Barie, Donal S. 1984. Delay Coused by Owner on His Agent. 1984.
7. Barrie Donald S. dan Paulson Jr, Boyd C. 1995. Manajemen Konstruksi Profesional (terjemahan). Jakarta : s.n., 1995.
8. Budi Lukito, Andri and Mulyono, Agus Taufik. 2016. Kesiapan Kontraktor terhadap Kebijakan Preservasi Jalan Nasional di Sumatera Selatan. Sumatera Selatan: s.n., 2016. pp. 133-142.
9. Dipohusodo. 1996. Manajemen Proyek dan Konstruksi. Yogyakarta: s.n., 1996.

10. Dipohusodo, Istimawan. 1996. Manajemen Proyek dan Konstruksi. Yogyakarta: Kan Nisius, 1996.. Manajemen Proyek dan Konstruksi. Yogyakarta: s.n., 1996.
11. Direktorat Preservasi, Dirjen Bina Marga Kementerian PUPR. 2017. Bahan Paparan Longsegment. Jakarta : s.n., 2017.
12. Dirjen. Bina Konstruksi Dok Pemilihan, Kementerian PUPR. 2021. Dokumen Pemilihan Kementerian Pekerjaan Umum Direktorat Jenderal Bina Konstruksi. Jakarta: s.n., 2021.
13. El-Razek, M. E. Abd, Bassioni, H. A. and Mobarak, and A. M. 2008. Causes of Delay in Building Construction Projects in Egypt. Mesir: s.n., 2008.
14. Erivianto, Wulfram I. 2005. Manajemen Proyek Konstruksi. Yogyakarta: s.n., 2005.
15. Ervianto, Wulfram I. 2002. Manajemen Proyek Konstruksi. Yogyakarta: s.n., 2002.
16. Ervianto, Wulfram I. 2018. Teori - Aplikasi Manajemen Proyek Konstruksi (Edisi Revisi). Yogyakarta: Andi Offset, 2018.
17. Ghozali, Imam and Latan, Hengky. 2015. Partial Least Squares. Semarang: Undip, 2015.
18. Ghozali, Imam, Con, M. and Hengky, Latan. 2015. Partial Least Squares Konsep, Teknik dan Aplikasi Program Menggunakan Program Smart PLS. Semarang: s.n., 2015.
19. Hansen, Seng. 2017. Manajemen Kontrak Konstruksi (Pedoman Praktis dala Mengelola Proyek Konstruksi). Jakarta : PT. Gramedia, 2017.
20. Herujito, Yayat M. 2001. Dasar-dasar Manajemen. Jakarta: Gramedia Widiasarana Indonesia, 2001.
21. Husen, Abrar. 2011. Manajemen Proyek, Perencanaan, Penjadwalan, dan Pengendalian Proyek. Yogyakarta: s.n., 2011.
22. —. 2010. Manajemen Proyek (Perencanaan, Penjadwalan, dan Pengendalian Proyek). Yogyakarta: s.n., 2010.
23. Iek, Jeksion Paulus. 2019. Studi Penerapan Kontrak Long segment Untuk Preservasi Jalan di Kabupaten Sorong Papua Barat. Yogyakarta: s.n., 2019.
24. Jasa Konstruksi, Republik Indonesia. 2017. Undang-undang Republik Indonesia No. 2 Tahun 2017 Tentang Jasa Konstruksi. 2017.
25. Jogiyanto. 2011. Konsep dan Aplikasi Structural Equation Modeling (Berbasis Varian Dalam Penelitian Bisnis). Yogyakarta: STIM YKPN, 2011.
26. Kertohardjono, Sri Budiyani dan Aripurnomo. 2015. Penyebab Utama Keterlambatan Pelaksanaan Konstruksi Bebas Hambatan Akses Tanjung Periok. Jakarta: s.n., 2015.
27. Kesiapan Kontraktor Terhadap Kebijakan Preservasi Jalan Nasional di Sumatera Selatan. Mulyono. 2016. 2016.
28. Menteri Pekerjaan Umum. 2019. Tata Cara Penjamin dan Pengendalian Mutu Pekerjaan Konstruksi. Jakarta : Surat Edaran Menteri PU No. 15/SE/M/2019 Tentang, 2019.
29. Menteri PUPR. 2020. No. 14 Tahun. Standar dan Pedoman Pengdaan Jasa Konsultansi Melalui Penyedia Jasa. Jakarta : s.n., 2020.
30. Mistra. 2012. Struktur dan Konstruksi Bangunan Tinggi Sistem Top and Down. Jakarta: Griya Kreasi, 2012.
31. Muhamed M. Marzouk, Tarek I El-Rasass. 2012. Analyzing Delay Causes In Egyptian Construction Projects. Cairo : s.n., 2012.
32. Mulyono, Andri Budilukito dan Agus Taufuk. 2016. Kesiapan Kontraktor Terhadap Kebijakan Preservasi Jalan Nasional di Sumatera Selatan. Yogyakarta: s.n., 2016.
33. Ni Luh Yulih Ekawati, GAP Candra Dharmayanti, dan I. W. Yansen. 2015. Analisis Faktor-faktor yang Mempengaruhi Keterlambatan Proyek Jalan Lingkungan Permukiman di Kabupaten Badung. Denpasar: s.n., 2015.
34. Nugraha, Paul. 2021. Penjadwalan Proyek Konstruksi (Dari Metode Jalur Kritis sampai Pengenalan Pemodelan Informasi Bangunan 4D. Yogyakarta: PT. Kanisius, 2021.
35. P. Sinaga, Harlan. 2011. Manajemen Preservasi Jalan Untuk Pengelolaan Jaringan Jalan Wilayah. s.l., Bandung, Indonesia: Pusjatan, 2011.
36. P. Sinaga, Harlan. 2011. Manajemen Preservasi Jalan Untuk Pengelolaan Jaringan Jalan Wilayah. Bandung : s.n., 2011.
37. Permen PUPR No. 13, Menteri Pekerjaan Umum. 2011. Peraturan Menteri Pekerjaan Umum No. 13/PRT/M/2011 Tentang Tata Cara Pemeliharaan dan Penilikan Jalan. Jakarta: s.n., 2011.
38. Republik Indonesia. 2004. Undang-undang No. 38 Tentang Jalan. Jakarta: s.n., 2004.
39. Riduwan. 2009. Metode dan Teknik Menyusun Tesis. Bandung: Alfabeta, 2009.
40. Saleh Al Hadi Tumi, Abdel Naser Omran, and Abdul Hamid Kadir Pakir. 2009. Causes Of Delay In Construction Industry Libya. Libya: s.n., 2009.
41. SE. Dirjen. Bina Marga Dok Standar, Kementerian PUPR. 2017. Surat Edaran No. 06/SE/Db/2017 Tentang. Perubahan Standar Dokumen Pengadaan Pekerjaan Preservasi Jalan dengan Skema Long segment. 2017.
42. SE. Dirjen. Bina Marga No. 9, Kementerian PUPR. 2015. Surat Edaran Dirjen. Bina Marga No. 9 Tahun 2015 Tentang Pemeliharaan Jalan dengan Skema Long segment. Jakarta: s.n., 2015.
43. SE. No. 06/SE/Db/2017 Dirjen Bina Marga, Kementerian PUPR. 2017. Tentang Perubahan Standar Dokumen Pengadaan Pekerjaan Preservasi Jalan dengan Skema Longsegment. Jakarta: s.n., 2017.

44. Sekaran, Uma. 2007. Metodologi Penelitian untuk Bisnis, Edisi Bahasa Indonesia. Jakarta: Salemba Empat, 2007.
45. Soeharto, Iman. 2014. Manajemen Proyek (Dari Konseptual Sampai Operasional). Jakarta: Erlangga, 2014.
46. Soehartono, Irawan. 2008. Metode Penelitian Sosial. Bandung: PT. Remaja Rosdakarya, 2008.
47. Spesifikasi Dirjen. Bina Marga, Kementerian PUPR. 2018. Spesifikasi Umum. Jakarta: s.n., 2018.
48. Sri Sejati, Retina. 2012. Dasar-dasar Manajemen. Yogyakarta: CV. Budi Utama, 2012.
49. Studi Penerpan Kontrak Longsement Untuk Preservasi Jalan di Kabupaten Sorong Papua. Iek Paulus, Jekson. 2019. 2019, Agregat, pp. 303-311.
50. Sugiyono. 2004. Metode Penelitian Bisnis. Bandung: Alfabeta, 2004.
51.—. 2019. Metode Penelitian Bisnis. Bandung: Alfabeta, 2019.
52. Umum Menteri Pekerjaan. 2011. Peraturan Menteri Pekerjaan Umum No. 13/PRT/M/2011 Tentang Tata Cara Pemeliharaan dan Penilikan Jalan. Jakarta: s.n., 2011.
53. Undang-undang RI, Republik Indonesia. 2017. Undang-undang RI No. 2 Tentang Jasa Konstruksi. Jakarta: s.n., 2017.
54.Z. Ren, M. Atout and J. Jones. 2008. Delays in Building Construction Projects in Ghana. Dubai: s.n., 2008.