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Research Paper

Strategies for Improving Road Maintenance Project Initiation at Public Works Office of Bina Marga at Malang Regency

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ABSTRACT: *Road maintenance project is one of program priorities for regional government of Malang and it is under Public Work Office of Bina Marga Malang. The project is crucial because Malang regency has wide area surrounded by mountains and lowlands. Thus, good condition of roads is crucial to ensure movement of people and public good in Malang Regency. It, in turns, results in economic improvement in relevant areas. However, one of the problems of road maintenance project is project initiation. Many projects take longer time to be initiated. Therefore, this study aims at investigating factors influencing project initiation of road maintenance in Malang Regency. This is a descriptive study using survey approach. Instruments used to gather data is questionnaire given to 57 respondents. In addition, Simple and Multiple Regression Analysis is used to analyse the data. Simple regression analysis is used to investigate partial correlation between independent and dependent variables. Furthermore, multiple regression analysis is to investigate simultaneous The analysis is conducted to find out factors influencing road maintenance project initiation in Malang Regency.*

KEYWORDS: *Project Initiation, Road Maintenance, Multiple Regression*

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I. INTRODUCTION

Malang Regency has an area of 3,238.26 km2 and is the district with the second-largest area after Banyuwangi Regency of all the regencies and cities in East Java. Geographical conditions and the size of the area, as well as the potential for agricultural products in the district of Malang, present a challenge for the local government in the construction and maintenance of roads in the district of Malang. Based on data from the Technical Development Sector of the Public Works Department of Highways, Malang Regency, district roads in the Malang Regency area consist of 421 sections with a total length of 1,668.76 km, consisting of 189 regency roads and 232 regency city roads (Malang Regent Decree No. 180/146/KEP/421.013/2009 of 2009). Based on data from the Central Bureau of Statistics for Malang Regency in 2019, it is known that Malang Regency has roads with road conditions divided into four categories, namely good, moderate, damaged, and heavily damaged. For roads in damaged and heavily damaged conditions, they have a length of 282.66 km and 265.19 km, respectively

Regarding the afore-mentioned condition, road maintenance is very crucial. Periodical and planned road maintenance program should be conducted to make sure smooth movement of people and public goods from one area to other areas in or outside Malang regency. In addition, road maintenance project is very crucial for Malang regency due to its wide areas surrounded by mountains and lowlands. Good condition of road is influential for improving the quality of life and human welfare, including increasing the value of consumption, increasing labour productivity, and increasing access to employment, as well as increasing real prosperity and realizing macroeconomic stabilization, namely fiscal sustainability, the development of credit markets, and its impact on the labour market.

In carrying out road maintenance project, the contractor, as the service provider, has the obligation to carry out and complete his obligations in accordance with the obligations stipulated in the contract so that the construction project can be completed properly. The tolerance that makes the benchmark in project implementation is a maximum of 30%; this was conveyed by research conducted by Jonbi et al. (2020).. However, the projects have several problems and one of them is project initiation. There are significant number

of road maintenance projects which are started too late due to various kinds of problems. Therefore, there is a need to analyse factors influencing road maintenance project initiation in Malang Regency.

II. LITERATURE REVIEWS

A. Acceleration of Project Implementation

Acceleration of project time is often done when project progress is considered to have delayed the plan. In time management based on the PMBOK 5th Edition, project acceleration or schedule compression is used to speed up the project schedule during planning and during implementation. There are two types of schedule compression, namely crashing and fast tracking. Crashing techniques generally try to shorten the duration of activities, which tend to have the consequence of increasing costs due to additional resources and work duration (overtime). whereas fast tracking generally tries to do work in overlap, which changes the dependency relationship between activities and tends to have technical risk consequences that can impact quality as well as costs. PMBOK describes that there are five processes contained in project management. In other studies, there are several aspects that form the basis for accelerating a development project (Himawan, 2017):

1. Aspects of Scheduling and Planning

   Planning is one of the vital functions in project management activities. The benefits of project scheduling are divided into two categories: those for the project owner and those for implementers. The benefits of scheduling for project owners and implementers include:

   1. The project owner gets an overview of the start and finish times of the project.
   2. The project owner can evaluate and assess whether the project's time and cost have changed.
   3. The project owner can plan cash flow.
   4. Executors can plan for all material, equipment, and labor requirements.
   5. The executor can arrange the time for the involvement of subcontractors.

   Indicators of Project Scheduling Planning:

   1. Schedule, well-organized, integrated work sequence
   2. Identification of document completeness and work plan of the definite owner
   3. Duration and method of construction or implementation of proper work

2. Aspects of Project Scope and documents

   The company as a vehicle for economic development is regulated in the Civil Code, the Commercial Code, and statutory regulations. In carrying out business activities under the business legal order in Indonesia, there are three types of business entities: private companies, state-owned enterprises, and cooperatives. There are two main elements contained in a company, namely the form of business entity that runs every type of business, either in the form of an association or business entity that is established, works, and is domiciled in Indonesia, and the type of business in the form of activities in the business sector that are carried out continuously for profit. (Priharto, 2020). Indicators of Project Scope Aspects Several factors affect environmental aspects and legality documents, as follows (Priharto, 2020):

   1. Planning contains complete drawings, designs, and specifications.
   2. The scope of work is certain at the time of implementation.
   3. Understandings, agreements, and agreements are made in accordance with the rules of work implementation.

3. Aspects of Integration and Communication

   The priority role of development communication is to educate and motivate people, not to provide unrealistic reports of facts or self-assertion. The purpose of development communication is to instill ideas, mental attitudes, and teach skills needed by a developing country. Community involvement in the development process (Zulkarimen Nasution 2013) is not due to mobilization but rather a form of participation based on determination and intelligence. In the development process, society is not only treated as an object but rather as a subject. (Soetomo, 2013) The role of development communication in question is to educate and motivate the community so that it participates in development. In development, the community is treated as a subject, not an object, of the development being carried out, meaning that the community has the right to express their ideas or ideas in development because the community itself knows the potential of their village. Organizational, coordination, and communication elements are described as follows (Abidin, 2015). Indicators of project integration and communication

   1. Good technical and managerial qualifications from professional personnel in their fields
   2. Inspection, coordination, and control of bureaucratic work by the owner
   3. Good coordination and communication between divisions within the contractor's work organization in the provision of work tools
   4. Ensure work safety.

4. Aspects of Project resource

Human resource management is an important indicator of achieving organizational goals effectively and efficiently. Management comes from the word "manage," which means to manage (Hasibuan, 2011). Management is a process to realize the desired goals. "Management" is the process of utilizing raw materials and human resources to achieve the goals set. This process involves the organization, direction, coordination, and evaluation of people in order to achieve these goals (Henry, 2003). Project resource aspect indicators include the following:

1. Mobilization of Resources (Materials, Tools, and Labor)
2. Qualification of expertise and skills, as well as worker motivation
3. Accuracy of subcontracting work and good funding in planned project activities.
4. The contractor is paid properly according to his rights.

5. Aspects of Control and Evaluation

Success in achieving goals is determined half by predetermined plans and the other half by supervision or monitoring. In general, management emphasizes the importance of these two functions, namely planning and monitoring. Monitoring activities are intended to determine the suitability and accuracy of the activities carried out with the plans that have been prepared. Evaluation is the process of determining the value or price of a program, course, or other initiative with the ultimate goal of making a decision regarding the acceptance, rejection, or improvement of the innovation. There are two types of evaluation, namely formative evaluation and summative evaluation. Indicators of aspects of control and evaluation of project work:

1. Sample materials by a scheduled contractor
2. The process of requesting and approval of material samples by the owner and testing and evaluation of material tests
3. The process for approval of work permits and the preparation of reports on the results of work that are correct with an agreed-upon evaluation procedure

6. Other factors (force majeure/beyond the Owner's and Contractor's abilities)

It is a condition that arises or occurs after the parties make an agreement, in which the condition becomes a barrier for one of the parties to fulfill its performance. Force majeure is a condition that occurs after the agreement is made and prevents the debtor from fulfilling his performance. In this case, the debtor cannot be blamed, does not have to bear the risk, and cannot suspect that something will happen when the agreement is made. From some of the definitions above, it can be concluded that what is meant by "force majeure" is a situation where something happens outside of human control that can cause the achievement of the debtor to be unable to be fulfilled, and the debtor is not obliged to bear this risk. According to Purwahid Patrik, the force indicator states that there are 3 conditions for force majeure to take effect, namely:

1. There must be obstacles to fulfilling their obligations;
2. The obstruction occurred not because of the debtor's fault;
3. Not caused by circumstances that are a risk to the debtor.

B. Acceleration Strategy

The definition of strategy is "a plan for the distribution and use of military and material forces in specific areas to achieve specific action objectives" (Fandy Tjiptono: 2008). Strategy is a unified, broad, and integrated plan that links the company's strategic advantages with environmental challenges, designed to ensure that the main goals of the company can be achieved through proper implementation by the organization. There are three groups of effective acceleration strategies in construction projects, namely:

3. 1. Managerial aspect

It refers to a process to achieve certain goals or objectives during certain period of time by using resources effectively and efficiently. Proper project management is greatly influential for project completion especially related to quality of project.

3. 2. Design aspect

To accelerate project initiation, technical design used for project should fulfill several criteria. They are

- Materials used should be multi-functions.
- Using ready-to-use materials.
- Using high-prefabrication design.
- Using typical and uniform structural design.
- Using high quality material.
- Using maximum factor safety

3. 3. Implementation aspect

In order to accelerate project initiation, the project should be

- Using prefabrication method.
- Applying modularization method.
- Applying two-way implementation method.
- Removing interdependency activities.
- Transporting important materials quickly.
- Anticipating condition of nature.
- Applying special strategy during concrete ossification.
- Using existing building structure for temporary work structure.

III. RESEARCH METHOD

3. 1. Research Design

This study employs survey design. It aims at investigating factors influencing road maintenance project initiation. The investigation is conducted by measuring correlation between those factors and road maintenance project initiation. This study also aims at finding out factors which is the most influential for road maintenance project initiation. Those factors are obtained from preliminary study, journal, relevant studies and observation.

3. 2. Type of Data

This study uses two types of data. They are primary and secondary data

1. Primary data are those obtained from respondents' response to questionnaire items given.
2. Secondary data are obtained from preliminary study, journal and books which support this study.

3. 3. Research Operational Variables

There are two kinds of variables used in this study. They are independent and dependent variables. The independent variables are adopted from previous study and relevant sources. The variables are then elaborated into indicators that will be put in questionnaire. The variables are presented in the following table

Table 1 Variables of Study

Independent Variables	**Indicators**
Project Planning (X1)	1. Well-organized schedule and work sequence 2. Identification of documents and work plans. 3. Proper project duration and construction method.
Project Scope (X2)	4. Complete design, specification and sketches 5. Fixed scope for project 6. Fixed agreement and approval based on prevailing regulations
Integration and Communication (X3)	7. Proper technical qualification and managerial competence for related personnel. 8. Routine project inspection, coordination and control by project owner 9. Good coordination and communication between divisions to provide project equipment. 10. Guarantee for work safety.
Human Resources (X4)	11. Mobilization of resources.. 12. Skill and motivation of manpower. 13. Proper subcontractor. 14. On-time payment for contractor
Control and Evaluation of Project (X5)	15. Scheduled presentation of sample material by contractor. 16. Process of request and approval by project owner and material test. 17. Approval for work permit and good report of project by using agreed evaluation process.
Force Majeure Aspects (X6)	18. Condition and environment which are different to project nature such as transportation, accommodation, material mobilization to project location. 19. Unexpected factors such as fire, flood. Storm, earthquake, and landslide. 20. Labour demonstration, social riot, war, or damage caused by third parties and changes in terms of political or economic policy.
Dependent Variable	**Indicators**
Acceleration of Project initiation	1. Plan, Design, and implementation of Project. 2. Adequate supply for material, equipment and other supporting infrastructure for project. 3. Good inspection, coordination and control for project to ensure work safety 4. Supply for competent, reliable and adequate manpower. 5. Contract signing by taking existing condition into account. 6. Unexpected condition.

3. 4. Population and Sample

In this study, the population is those involved in road maintenance project in Malang Regency. They personnel from Public Work Office of Bina Marga (Budget User, Commitment Making officials, technical project implementer officials and Members of supporting Team), Contractors, consultants and personnel from Goods/Service Procurement Unit. The number of population is 109.

To obtain sample, Slovin formula is used.

$n = N / (1 + (N \times e^2))$
$n = 109 / (1 + (109 \times 0.1^2))$
$n = 109 / (1 + (109 \times 0,01)$
$n = 109 / (1 + (1,09)$
$n = 109 / (2,09)$
$n = 52,153$

Then, sample for this study is 53.

3. 5. Research Instrument

In this study, questionnaire is used to gather data on factor affecting road maintenance project initiation in Malang Regency. In addition, Likert Scale, ranging from 1 for totally disagree up to 5 for totally agree is used for response from respondent . There are three parts of questionnaire namely respondent profile, project information and questionnaire items.

3. 6. Data Analysis

a. Tests of Instrument

Since this study uses questionnaire to gather data, then its validity and reliability should be measured first. Validity test for instrument uses *Product Moment Analysis.* The score of calculated r for each item is compared to that of r_{table}. If score of calculated r is higher than that of $r_{table,}$ then the item is valid. Reliability of questionnaire is measured by using *Cronbach Alpha*. If the score of Cronbach Alpha is 0.80 – 10.00 then, it is believed that the questionnaire is highly reliable.

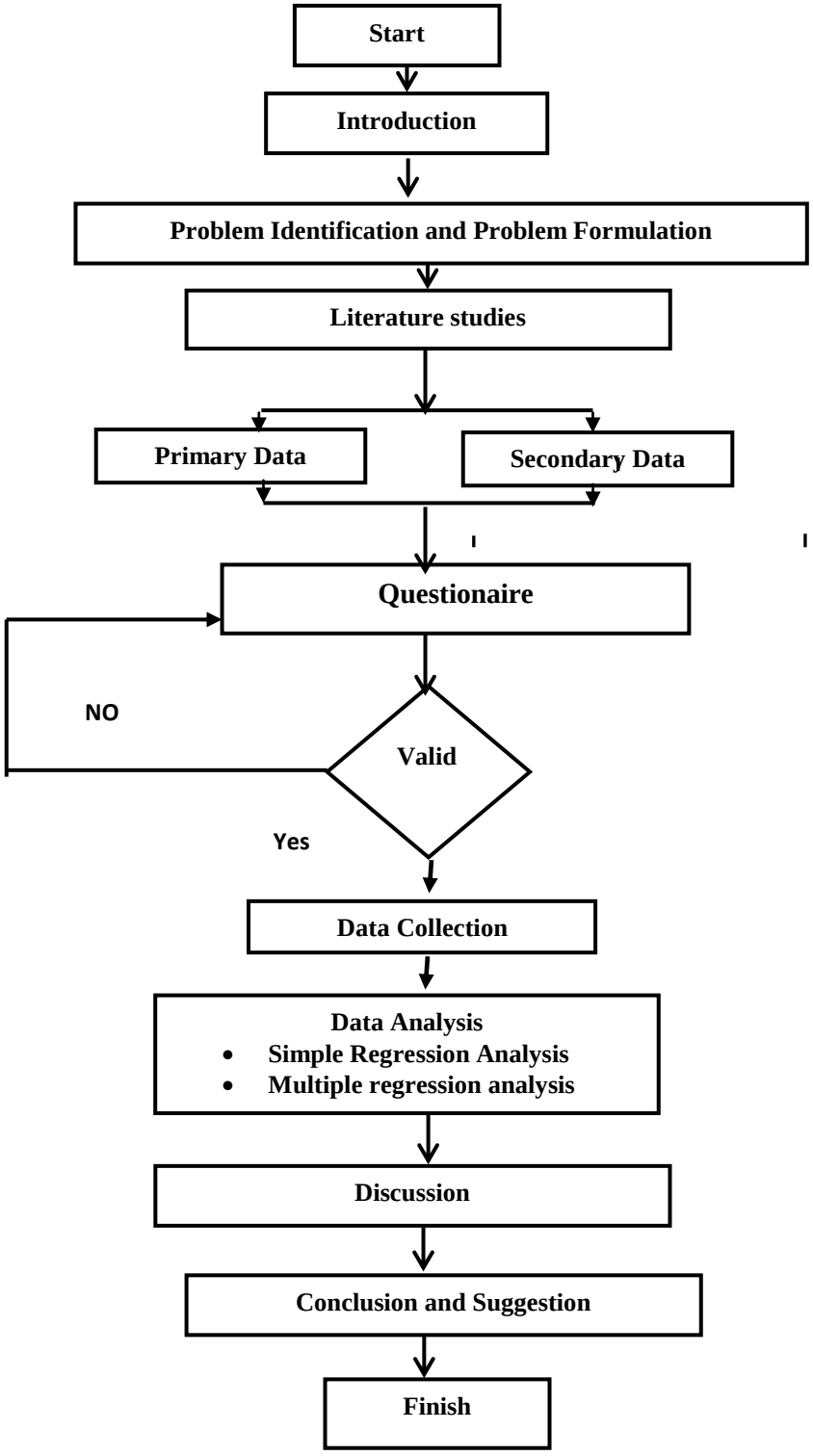
b. Simple Regression Analysis

Simple regression analysis is used to investigate partial correlation between independent and dependent variable. T-test is used for this analysis. If score of significance is >0.05, then there is significant correlation among the two variables.

c. Multiple Regression Analysis

It is used to investigate simultaneous correlation among several independent variables to single dependent one. F test is used and resulting f score is compared to that of f table. If score of calculated f is higher than $f_{table,}$ then we are convinced that there significant simultaneous correlation between several independent variables to that of dependent variable.

3. 7. Flowchart of Study



IV. RESULT AND DISCUSSION

4.1. Test of Instrument

a. Test of Validity

Test of validity is conducted by using *Product moment* test. It results in score of calculated r for each item which is then compared to score of r_{table}. The result of validity test is presented in following table

Table 1 The result of Validity Test

Item No	Calculated r	R table	Status
X1.1	0,889	0,2609	Valid
X1.2	0,875	0,2609	Valid
X1.3	0,825	0,2609	Valid
X2.1	0,908	0,2609	Valid
X2.2	0,923	0,2609	Valid
X2.3	0,928	0,2609	Valid
X3.1	0,931	0,2609	Valid
X3.2	0,898	0,2609	Valid
X3.3	0,902	0,2609	Valid
X3.4	0,891	0,2609	Valid
X4.1	0,833	0,2609	Valid
X4.2	0,920	0,2609	Valid
X4.3	0,858	0,2609	Valid
X4.4	0,701	0,2609	Valid
X5.1	0,925	0,2609	Valid
X5.2	0,943	0,2609	Valid
X5.3	0,873	0,2609	Valid
X6.1	0,850	0,2609	Valid
X6.2	0,876	0,2609	Valid
X6.3	0,894	0,2609	Valid
Y1	0,915	0,2609	Valid
Y2	0,802	0,2609	Valid
Y3	0,793	0,2609	Valid

b. Test of Reliability

To test questionnaire's reliability, Cronbach Alpha is used for reliability test. The instrument is deemed to be reliable if the score of Cronbach Alpha is >0,8. It means that the questionnaire is highly reliable. The result of Cronbach Alpha analysis is presented in following table

Table 2 The result of Reliability Test

Item No	Cronbach Alpha	Status
X1	0,816	Reliable
X2	0,904	Reliable
X3	0,926	Reliable
X4	0,850	Reliable
X5	0,901	Reliable
X6	0,837	Reliable
Y	0,934	Reliable

From the table presented above, we are convinced that the questionnaire is highly reliable because the score of Cronbach Alpha is >0,80

4.2. Regression Analysis

Before conducting regression analysis, there are several mandatory test that should be conducted. normality test should be completed. They are normality, heteroscedasticity and linearity test. Test of normality aims at finding out whether nor not data are normally distributed. One-sample Kolmogorov Smirnov test is used for test of normality. The criteria for normality test is that score of significance has to be more than 0,05. The result of One-sample Kolmogorov Smirnov results in significance score of 0,200. It shows that the data obtained from questionnaire is normally distributed.

Heteroscedasticity test aims at finding out whether or not there are variance differences among one observation to others. The result of heteroscedacity test is presented in following figure

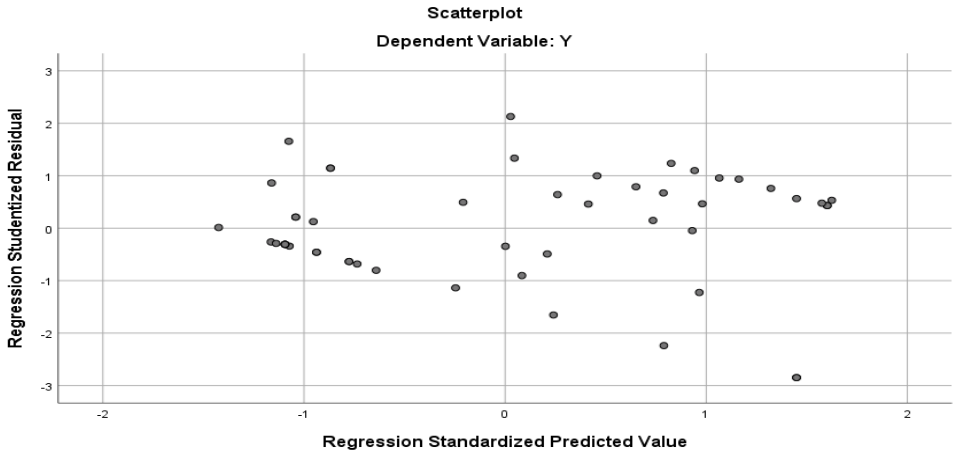


Figure 2 Result of Heteroscedasticity test

From the figure above, we found out that there is no concentration of dots. It means that there is no heteroscedasticity problem on data.

The last is linearity test. This test aims at investigating whether or not there is significant and linear correlation between two variables. The criteria for linearity is that score of calculated F must be higher than that of F table. The result of linearity test is presented in following table

Table 3 The result of Linearity Test

Item No	Calculated F	F table
X1	3,818	2,570
X2	4,148	2,570
X3	5,613	2,570
X4	6,537	2,570
X5	5,682	2,570
X6	3,402	2,570

a. Simple Regression Analysis

T test is applied in this analysis. It aims at finding out partial correlation between one single independent variable to that of dependent variable. The criteria for this test are that score of t test should be higher than score of t table. In this case, the score of t table is 1,67469. The result of t test for each independent variable is presented in following table

Table 3 the result of T Test

Item No	Calculated t	T table
X1	-0,118	1,67469
X2	-0,492	1,67469
X3	2,190	1,67469
X4	3,174	1,67469
X5	-1,387	1,67469
X6	0,8272	1,67469

From the table above, we found out that

- Variable of Project Planning (X1) does not influence acceleration of project initiation variable (Y) because the result of t test is lower than that of t table.
- Variable of Project Scope (X2) does not influence acceleration of project initiation variable (Y) because the result of t test is lower than that of t table.
- Variable of Integration and Communication (X3) has significant influence on acceleration of project initiation variable (Y) because the result of t test is lower than that of t table variable (Y).
- Variable of Human Resources (X4) has significant influence on acceleration of project initiation variable (Y) because the result of t test is lower than that of t table variable (Y).

- Variable of Control and Evaluation of Project (X5) does not influence acceleration of project initiation variable (Y) because the result of t test is lower than that of t table
- Variable of Force Majeure aspects (X6) does not influence acceleration of project initiation variable (Y) because the result of t test is lower than that of t table.

b. Multiple Regression Analysis

Multiple regression analysis in the form of f test is used to investigate simultaneous correlation between all independent variable to one single dependent variable. The criteria for f test is that if score of calculated f is higher than that of f table meaning that there is significant simultaneous correlation between all independent variables to dependent variable. In this study, score of F table is 2.28. The result of F test is presented in following figure

Tabel 3. Result of F test

ANOVA[a]

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	647,686	6	107,948	29,324	,000[b]
	Residual	169,333	46	3,681		
	Total	817,019	52			

a. Dependent Variable: Acceleration of project initiation

b. Predictors: (Constant), forcemajeure aspect, Project Scope, Control and Evaluation of Project , Project Planning, Human Resources, Integration and Communication of Project

From the table above, we found out that the score of calculated F is higher than score of F table. T means that there is positive and significant influence of independent variable to dependent variable. Specifically, Project Planning (X1), Project Scope (X2), Integration and Communication (X3). Human Resources (X4), Control and Evaluation of Project (X5), and Force Majeure Aspects (X6) simultaneously give positive influence on acceleration of project initiation.

V. CONCLUSION

In this study, there are six independent variables that are identified and investigated for their correlation to one dependent variable. To gather data, questionnaire is used in which respondents give their response. t test and f test is used to analyse the data.

The result of analysis shows that there are there are four independent variables that partially do not have influence to acceleration of project initiation. They are variable of project planning, project scope, control and evaluation and Force Majeure aspects of Road maintenance project. there are two variables namely Human Resources and Integration and Communication variables which simultaneously have significant influence on acceleration of project initiation.

For simultaneous influence from independent to dependent variables, we found out that the six independent variables, namely Project Planning (X1), Project Scope (X2), Integration and Communication (X3). Human Resources (X4), Control and Evaluation of Project (X5), and Force Majeure Aspects (X6) have positive influence on Acceleration of initiation of road maintenance project in Malang Regency.

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