Relationship Between Time Control And Cost In The Implementation Of Maintenance Project On Harun Nafsi To H.M. Rifadin Street, Samarinda, East Borneo

Harudi AS, Kustamar, Edi Hargono Dwi Putranto

Abstract: This research aimed to describe a number of variables relating to the issue and learn about the phenomenon. In this research, the technique used to collect research data was by using questionnaire, as an instrument to answer a set of questions or a written statement from the respondents. Respondents of the research were 100 respondents. Sample determination of the research used purposive sampling method. This research used Structural Equation Modeling (SEM) analysis with Analysis Moment of Structure (AMOS) and Special Package for Statistics Science (SPSS) software. Based on the results of the research, it was obtained 1) project performance has a positive and significant impact on time intensity of road maintenance project, which means if time increases with coefficient of 0.218, it will increase project performance of road maintenance project, 2) project performance has a positive and significant impact on cost of road maintenance project, which means if project performance increases with coefficient of 0.764, it will increase cost of road maintenance project, 3) cost has a positive and significant impact on time intensity of road maintenance project, which means if time increases with coefficient of 0.798, it will increase cost of road maintenance project.

Index Terms: cost, project performance, time.

1 INTRODUCTION

Process of project planning cannot guarantee that the implementation will run well. It is because problems keep growing every day, such as weather factors, material delays, labor shortages, equipment damage, labor accidents and other conditions that may disrupt the original planning [1]. In an ongoing project, some changes are needed during the implementation process; such changes may be due to the willingness of the owner, planner or contractor. Control is an activity that binds the overall activities that exist in the project management. Planning and organizing are indeed activities that affect the project, but effective project control is the most important thing. In this case, we can make some discreetness in planning and organizing, but we should not make mistakes in project control [2]. Cost and project progress schedule control has become the project target of the project control system since 1970 [3].

Implementation Document, as a project control tool, is required to anticipate the deviations that may occur by providing an early warning; how much performance of the work to be achieved at any given time through the reference standard that is used as the basis for the measurement, so that in case of deviation, corrective action may take place before a more serious problem occurs [4]. According to Kerzner [5], project management is planning, organizing, leading and controlling the company's resources to achieve short-term goals that have been determined. Next, project management uses a systematic approach and vertical and horizontal hierarchy (stream of activities). Implementation of a project is actually a process of transforming certain resources and funds in an organized manner into a solid development outcome in accordance with the initial objectives and expectations; all must be implemented within a certain period. A project can be defined as a temporary activity that lasts for a limited time with a certain allocation of resources and is intended to carry out tasks with clearly defined targets [6]. Planning is one of the vital functions in project management activities. Therefore, to achieve the project objectives, the management must make proactive steps in conducting comprehensive planning so that goals and objectives can be achieved. Planning is considered as good if the entire process of activities in it can be implemented in accordance with the goals and objectives that have been set with minimal deviation rate and the maximum result [7]. The project can be defined as a temporary activity that lasts for a limited time with a certain allocation of resources and is intended to carry out tasks with clearly defined targets [6]. Construction maintenance is the stage of testing and examination of the results of physical construction implementation. In this period of maintenance, the construction service provider shall be obligated to fix any defects or damages and deficiencies incurred during the construction period. During the maintenance period, all equipment installed inside and outside the building must be tested according to its function. Performance refers to the level of success in performing the task and ability to achieve the goals. Performance is considered as good and successful if the

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desired goal can be achieved well [3]. The criteria
assessments for project performance are those that will be
examined in the quality control problem on the aspect of cost
and time performance. The function of planning intends to put
the basic objectives of the project, namely schedule, budget
and time. The process of control consists of a variety of steps
that are performed systematically; in order to have a control
system that runs effectively, the following elements will be
required [8]
a. Clear benchmarks.
b. Devices that can process quickly and precisely.
c. Accurate forecasts
d. Action plan.

Control actors are all parties involved during the construction
process, including: owners, contractors, consultants and other
related parties. The control devices include; implementation
schedule, technical design drawings (work drawings),
organizational structure of work, report of coordination
meeting/control project, project implementation report,
employment contract, field monitoring report, and so on. The
schedule, change of work, government regulations,
procurement of materials and tools, affect the construction
time [9]. Project time schedule is a tool that can indicate when
each activity is taking place, so that it can be used in planning
the activities as well as for overall project implementation
control. Direct cost of the project is cost associated directly
with the implementation of construction work in the field [6].
These costs are materials costs, labor costs/wage and
equipment costs. The construction process of a project is
essentially a series of activities based on a system of
construction engineering; it is unique to each project [10]. In
the process of construction implementation, there are 4
aspects that need to be considered for the control that consists
of:
a. Cost aspect
b. Time aspect
c. Quality aspect
d. Health and Safety (K3) aspect.

If the four aspects are not planned and controlled properly,
they will degrade the performance of the implementation and
will result in the decline in the product performance of cost,
time and quality. According to the Constitution of the Republic
of Indonesia No. 38 of 2004, concerning roads, road is a land
transportation in any form includes all parts of the road
including complementary buildings and its equipment which is
intended for traffic. Road has a role to encourage the
development of all units of development areas, in an effort to
achieve inter-regional development. Road is a unified road
network system that binds and connects growth centers with
other areas. Road construction is a construction made in such
a way that it can carry the traffic load (vehicle) that passes
over it without undergoing structural changes on the road
surface. With the development of land transportation,
especially motor vehicles that cover the type of size and
quantity, the problem of the smooth flow of traffic, safety,
comfort and carrying capacity of the pavement should be a
main concern [11]. Road structure based on pavement
structure can be divided into 4 (four) important parts, namely:

a. Surfaces Course
1) Hardened retaining wheel course, the course has high
stability to retain the wheel load during service period.
2) Waterproof course, so that the rain falling on it does not
seep into the course below and weaken the courses.
3) Wear course, a course that immediately suffers from
friction of brake so that it is easy to wear out.
4) Courses that spread the burden to lower course so that
it can be borne by other courses that have a poorer
carrying capacity.

b. Base Course
1) The pavement section that holds the latitude of the
wheel load and spreads the load to the course below it.
2) The permeating course for the bottom foundation
course.
3) Bearing of surface course.

c. Sub-Base Course
1) Part of pavement construction to spread the wheel load
to the base ground.
2) Efficiency of material use and reducing the thickness of
the course above.
3) Permeating course, so that groundwater is not
collected in the foundation.
4) Courses to prevent fine particles from the base soil
rises to the base course.

d. Sub-Grade Course
Courses of soil as thick as 50-100 m will be placed under the
sub-base course called the base ground. The sub-grade
course can be the original soil if the original soil is good, the
soil is imported from another place and compacted or the soil
is stabilized with lime or other materials. Physical quality of the
road is a kind of road surface conditions in providing services.
The physical quality of the road is considered as good if the
services provided are maximal on the road users in
accordance with the development plan, namely in terms of
comfort, safety and durability. To overcome this, we need a
method to make the road condition to remain stable in quality
and remain comfortable to use through the preparation of road
maintenance programs, both routine maintenance and
periodic maintenance whenever needed. Road maintenance is
a good/medium conditioned road handling activity that must be
prioritized to be handled, so that the road be functioning in
accordance with the calculation and keep the road surface
close to its original condition.

2 RESEARCH METHOD
Research is a long and thorough process which begins with an
interest in knowing a particular phenomenon. From the results
of the observations, it is obtained data in the form of
information to be analyzed and finally to draw the necessary
conclusions. The method to be used in this research is
"Descriptive Statistics", which is the data collection was
obtained from collecting the data in the field or in the
laboratory. By using the research method, the research was
conducted quantitatively and qualitatively.

2.1 Research Constructs
Based on the subject matter, the variables in the analysis can
be identified in outline as follows. In this research there are
two types of constructs that will be used that are independent
constructs or often known as exogenous constructs and dependent constructs known as endogenous constructs.

2.2 Population and Sample
Population is a generalization region consisting of objects or subjects that have certain qualities and characteristics [12]. Population in this research is job director/technical team representing the job owner, service provider/contractor, consultant planner and supervisory consultant who have been involved in maintenance project of Harun Nafsi - H. M. Rifadin Street of Samarinda namely, PT. Wijaya Karya/ Wijaya Karya Inc., PT. Nindya Karya/ Nindya Karya Inc., PT. Citra Kalimantan Pratama/ Citra Kalimantan Pratama Inc., PT. Trialfa Indonesia/ Trialfa Indonesia Inc. and PT. Rexford Pandega/ Rexford Pandega Inc. Sample is part of the population number owned by the population [13]. It is in accordance with the analysis tool used: Structural Equation Modeling (SEM).

2.3 Data Collection Method
Technique of collecting data in this research is interview. The interviews are divided into two, namely structured and unstructured interviews. Structured interviews are the way of collecting data through direct meetings or face-to-face with respondents by preparing a list of questions written and alternative answers have also been prepared that are used to obtain information about the assessment of the respondents about the object of research [14].

2.4 Research Instruments
The research instrument is a tool used to measure the observed natural and social phenomena [14]. The instrument used in this study is questionnaire.

a. Measurement Scale
The measurement scale used in this research is Likert scale; it is a scale that has been widely used to ask respondents to mark the degree of approval or disapproval of a series of stimulus objects. Likert scales generally use scale points and degree of approval from strongly disagree to strongly agree. The research used the range from 1 to 5; the value of 1 is categorized as the size of assessment of strongly disagree (STS), the value of 2 shows the size of the assessment of disagree (TS), the value 3 shows the size of the neutral assessment (N), the value 4 shows the size of assessment of agree (S) and value 5 shows the size of the assessment of strongly agree (SS).

b. Reliability Test
Reliability shows the consistency and stability of a score (measurement scale) [15]. Basically the reliability test shows the extent to which a measuring instrument can give relatively the same results when it is re-measured on the same subject.

c. Test Validity
The way used in testing the level of validity is by using internal variables; it is to test whether there is suitability between the instruments as a whole. To measure, point analysis is used. Measurement on the point analysis is conducted by having the existing scores then they are correlated by using product moment correlation formula.

3 RESULTS AND DISCUSSION

4.1 RESEARCH RESULTS

a. Characteristics of Respondents
The data were obtained from the questionnaires that have been distributed to 100 respondents. Based on the data, it was obtained the characteristics of respondents as presented in Table 1.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Sex</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Male</td>
<td>Female</td>
</tr>
<tr>
<td></td>
<td>70</td>
<td>30</td>
</tr>
<tr>
<td></td>
<td>100</td>
<td>100</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Age (year)</th>
<th>17 - 30</th>
<th>&gt;30 - 40</th>
<th>&gt;40 - 50</th>
<th>&gt;50 - 60</th>
<th>≥60</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>22</td>
<td>41</td>
<td>21</td>
<td>11</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Education</th>
<th>Senior High School</th>
<th>Diploma</th>
<th>Bachelor’s Degree51</th>
<th>Master’s Degree52</th>
<th>Doctoral Degree/53</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>31</td>
<td>14</td>
<td>39</td>
<td>16</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>100</td>
<td></td>
<td>100</td>
<td>100</td>
<td></td>
</tr>
</tbody>
</table>

b. Analysis of Respondents’ Perception Descriptions
The description analysis of respondent perception is also using Chi-Square test. Chi-Square test is used to determine any relationships between researches constructs with the characteristics of each respondent.

c. The Results of Construction Reliability Test
Basically, the reliability test shows the extent to which a measuring instrument can give the same relative results when it is re-measured on the same subject. The reliability test in SEM is obtained through (1).

\[
\text{Construct Reliability} = \frac{\sum \tan \text{ of dardloading}^2}{\sum \tan \text{ of dardloading}^2 + \sum \varepsilon_j} \quad (1)
\]

<table>
<thead>
<tr>
<th>Construct</th>
<th>Construction Reliability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Planning Design Drawings</td>
<td>0.86</td>
</tr>
<tr>
<td>Quality of Service Provider</td>
<td>0.78</td>
</tr>
<tr>
<td>Quality of Service Provider Resources</td>
<td>0.78</td>
</tr>
<tr>
<td>Design Revision</td>
<td>0.83</td>
</tr>
<tr>
<td>Project Control</td>
<td>0.79</td>
</tr>
<tr>
<td>Performance Time</td>
<td>0.83</td>
</tr>
<tr>
<td>Project Performance</td>
<td>0.81</td>
</tr>
</tbody>
</table>

d. The Results of SEM Assumption Test
It is based on the SEM output that was analyzed by using AMOS. The determinant of the sample covariant matrix is 0.003 which means the value of the dimension or construct is
< 0.85 and it means that it is not exposed to multicollinearity [16]; therefore this data is appropriate to use.

e. The Results of Measurement Model Test
Based on the results of the analysis, all probability values for each indicator are smaller than 0.05 and the loading factor value is above 0.5.

f. The Results of Structural Equation Test of SEM Model
The overall model feasibility test is performed by using SEM which is simultaneously used to analyze the proposed hypothesis. It means that the model fit with the sample data. The result of goodness of fit test of SEM model can be seen in Table 3.

<table>
<thead>
<tr>
<th>TABLE 3: THE RESULTS OF GOODNESS OF FIT OF MODEL SEM TEST</th>
</tr>
</thead>
<tbody>
<tr>
<td>Goodness of Fit Index</td>
</tr>
<tr>
<td>-----------------------</td>
</tr>
<tr>
<td>X²-Chi Square</td>
</tr>
<tr>
<td>Probability</td>
</tr>
<tr>
<td>RMSEA</td>
</tr>
<tr>
<td>GFI</td>
</tr>
<tr>
<td>AGFI</td>
</tr>
<tr>
<td>CMIN/DF</td>
</tr>
<tr>
<td>TLI</td>
</tr>
<tr>
<td>CFI</td>
</tr>
</tbody>
</table>

The results of data processing showed that all constructs were used to form a research model on the process of confirmatory factor analysis; Probability, RMSEA, GFI, AGFI, CMIN/DF, TLI and CFI have fulfilled the predetermined goodness of fit criteria. GFI and AGFI are under the cut off value, but are still within tolerable margins or often called marginal.

g. Test Results
Testing of the effect of project performance on cost performance and road maintenance time performance is conducted by observing the probability (p) of estimation result of regression weights model of structural equation. If the p value is less than 0.05 then the hypothesis is accepted.

<table>
<thead>
<tr>
<th>TABLE 4: ESTIMATION OF REGRESSION WEIGHTS OF STRUCTURAL EQUATION MODEL – INFLUENCE OF PROJECT PERFORMANCE TO COST AND TIME PERFORMANCE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Estimate Standardized</td>
</tr>
<tr>
<td>Project Performance</td>
</tr>
<tr>
<td>Project Performance</td>
</tr>
<tr>
<td>Time Performance</td>
</tr>
</tbody>
</table>

1) The Effect of Project Performance on Time Performance Based on the results of the data, it showed that the project performance has a positive and significant effect on the time performance at α = 5% (p = 0.041) with the coefficient of 0.218, it can be stated that a better project performance can make the time intensity increase.

2) The Effect of Project Performance on Cost Performance Based on hypothesis test result, α = 5% (p = 0.000) with coefficient of 0.764. It showed that the influence of the five dimensions value is not much different, which means that all the dimensions have the same effect on the performance of the project.

3) The Effect of Time Performance on Cost Performance The result of hypothesis testing proved that there is positive and significant relationship between time and cost at 5% (p = 0.000) with coefficient of 0.798. It means that the longer the settlement time, the higher the cost incurred.

4 Conclusions and Recommendations

4.1 Conclusions
a. Project performance has a positive and significant effect on the time of the road maintenance project with coefficient of 0.218; it means that if the project performance increases, it will increase the time intensity of the road maintenance project.

b. Project performance has a positive and significant effect on the cost of the road maintenance project with coefficient of 0.764; it means that if the project performance increases, it will increase the cost of road maintenance projects.

c. Time performance has a positive and significant effect on the cost of the road improvement project with coefficient of 0.798; it means that if the time of the road maintenance project increases then the project will increase the cost.

4.2 Recommendations
Project performance has a positive and significant effect on the time of the road maintenance project with coefficient of 0.218; it means that if the project performance increases
a. Descriptive analysis of respondents' perception showed that there are differences of respondent perception on human resource quality. It shall be consequences for the management to be more familiar with human resources. Because experienced human resources usually have more demands.

b. The project managers need to pay attention to the performance of the project, especially in terms of quality of human resources and offering service providers; from the results of research, it has a quite influential value.

c. The future researchers are expected to be able to improve the value of assumption test of SEM: it is multivariate value that has not been normally distributed, by using wider respondents and many other research objects.

References


