



Analysis of Contractors' Performance on Road Facilities Maintenance Project at Public Works Office of Bina Marga at Malang Regency

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ABSTRACT: Malang is the second-largest regency in Indonesia. Its area is surrounded by mountains and lowlands. Therefore, roads facilities are crucial to ensure smooth movement of people and goods from one area to others in and outside Malang District. Road facilities such as traffic sign, road markings, road lighting, guardrail and traffic barriers are also important to ensure the Safety of road users. Road facilities maintenance in Malang regency is under the Road Facilities Division of Public Works Office of Bina Marga. Due to the importance of road facilities maintenance project, there is a need to analyse the performance of road facilities contractors. This study employs case survey design with qualitative approach. Questionnaires are used to obtain data from the sample. Then based on the data, performance analysis on the part of road maintenance contractor will be conducted by using Importance Performance Analysis. The analysis will then result in performance mapping in the form of Cartesian Diagram. From the diagram, we will obtain performance factors that should be maintained and improved from road maintenance contractors.

KEYWORDS: Road Facilities, Performance, Maintenance, Contractors

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I. INTRODUCTION

Malang is the second largest regency in Indonesia. Its wide areas are surrounded by mountains and lowlands. Several areas in Malang regency have good quality of yield crops such as coffee beans and others. The yields are transported to other areas in and outside Malang regency. Therefore, roads play crucial role for land transportation system and development of areas in Malang regency. They connect one area to others in or outside Malang regency. In addition, roads support smooth movement of people and goods influence economic aspects. Good road will make prices of public good reasonable. In turn, it will result in improvement of Economic prosperity in relevant areas. However, in order that the roads might function properly, they should be equipped with proper road facilities and equipment..

Road facilities have important role for safety of road users. Thus, there should be regular maintenance program not only for the road but also the road facilities. The maintenance programs for road and road facilities in Malang regency are the responsibility of Road Facilities Division of Public Work Office of Bina Marga. Lubis and Mulyono (2015) states that regional government are responsible in conducting supervision and maintenance program for roads and their facilities. Regulation of Public Minister of Indonesia no 13/PRT/M/2011 states that road facilities are buildings to support safety and function of roads. Road facilities are bridges, tunnels, elevated road, underpass, parking area, water tunnel and retaining wall.

Road facilities maintenance programs are supervised by Road Facilities Division of Public Work Office of Bina Marga. The division is responsible for selecting contractors for maintenance program of road facilities. It has to make sure that the contractors have good performance in conducting the maintenance works. The contractors should not only be able to meet deadline of the project and but also to deliver good quality of project based on pre determined technical specification of the projects. Excellent performance on the part of contractors for maintenance project of road facilities are crucial because road facilities improves the safety of road users when using the road. Therefore, it is important to Measures contractors' performance for road

facilities maintenance project. In addition, this study aims at analyzing contractors' performance for road facilities maintenance program supervised by Road Facilities Division of Public Works Office of Bina Marga at Malang Regency.

II. LITERATURE REVIEWS

A. Contractors' Performance

Performance is comparison between realization and target of output, outcome and benefit/impact. Output is good or service resulting from planned activities to achieve goals and objectives. Outcome is functions of output resulting from activities or programs. In addition, benefit and impact are those reflecting and indirect use which result from the successful implementation of programs. Cushway (2022) states that performance is also the basis to assess work process of contractors compared to predetermined target.

In this study, contractors' performance will be assessed based on five aspects. They are productivity, service quality, responsiveness, responsibility and accountability. Dwiyanto (2006) states that the result of contractors' performance measurement might be used to

1. Develop list of qualified contractors.
2. Design program for contractors' quality improvement.
3. Develop assessment system for service providers.

The purpose of measuring contractors' performance is to set standard, target and basis for organization improvement. It also facilitates communication of organizational strategies and behavior transformation of organization personnels. Specifically, performance measurement aims at

1. Realizing good project implementation to ensure excellent qualities given by service provider.
2. Obtaining reliable profile of service provider based on their performance.
3. Conducting risk mitigation for project implementation.
4. Giving feedback for service supplier to improve their performance.
5. Providing indicators for capacity improvement on the part of service provider.

B. Methods for Measuring Performance

There are three methods that may be used to measure performance. They are as follows

1. Category method
This method aims at evaluating and composing list of factors influencing performance variables. The variables are developed based on the need of each working areas. This method is suitable to be used for low budget and low risk procurement activities. The result of this measurement method is stated in the form of predicate such as "Fail", "Pass", "Beyond Standard" "below Standard" etc. Main weakness of this method is that it is subjective in nature. The evaluator using this method should be able to minimize the subjective side of this performance measurement method..
2. Weight method
This method is conducted by determining weight for each performance variable. The weight should reflect the gap between performance values and expectation for the performance variables therefore, it will result in different weight for performance variables.
3. Cost ratio method
This method requires determination of all cost for procurement and supplies which are categorized based on performance areas (quality, availability and service). Then, those costs are divided by delivery costs during certain period of time. It will result in accurate cost ratio. The higher the cost ratio, the lower rating given to service provider.
This method is very detailed and it needs proper system to monitor all costs including cost of staff communication and communication, business loss and etc.

C. Performance Evaluation Based on Regulation of National Public Procurement Agency of Indonesia

Regulation of National Public Procurement Agency of Indonesia no 4 of 2021 states that procedures for assessing performance of suppliers should be based on principle of simplicity, applicativeness, transparance, objectivity, professionalism and integrity. The followings are aspect of performance assesment and their wight on the part of service suppliers/contractors.

1. Quality and quantity (30%)
2. Expenses (20%).
3. Time Allotment (30%)
4. Service (20%).

In this study, there are five aspects will be elaborated into indicators and they will be used for measuring contractors' performance for road facilities maintenance project in Malang regency. The performance variables and their indicators is stated in following table

Table 1. Performance Variables and their indicators

Variables	Indicators
Quality and Quantity of Work	1. Quality of material. 2. Quantity of material. 3. Quality of manpower 4. Quantity of manpower 5. Quality of project 6. Quantity of project
Budget	7. Budget plan 8. The use of budget 9. Budget control
Time Allotment	10. Project planning 11. Project finishing
Service	12. Responsive 13. communicative
Human Resources	14. Competence. 15. Responsiveness.

Then the indicators are elaborated into performance factors that will be put in questionnaire. They are as follow

- Contractors' performance to provide high quality material.
- Contractors' performance to provide adequate material for project.
- Contractors' performance to provide manpower who has suitable competences for project.
- Contractors' performance to provide adequate manpower for project.
- Contractors' performance to deliver high quality of work
- Contractors' performance to meet quality specification for project result as stated in contract.
- Contractors' performance to make budget plan.
- Contractors' performance to make use of project budget.
- Contractors' performance to control project budget.
- Contractors' performance to plan for project implementation.
- Contractors' performance to finish the project.
- Contractors' performance to give positive response for request from project owner.
- Contractors' performance to give response for complaint from project owner
- Contractors' performance to communicate with relevant parties.
- Contractors' performance to provide competent manpower for project.
- Contractors' performance to assign manpower based on their skill.
- Contractors' performance to provide discipline manpower.

D. Construction Project

A project is series of interrelated activities conducted to achieve certain goals by overcoming potentials drawbacks related to budget, time and quality of desired output of construction (Ervianto, 2002). The success of project is measured based on its output to achieve expectation of stakeholders. There are five stages of construction project.

1. Concept development stage

This stage consists of preliminary activities for construction project such as site survey and other inquiries to obtain information such as cost for manpower, material, government license, local supplier and potential problems during construction project.

2. Planning stage
Activities conducted in this stage are writing proposal, follow up survey, making preliminary design and detailed design. This stage aims at elaborating final plan concerning work categorization and detailed activities for project construction.
3. Auction stage
Activities conducted in this stage are composing documents for project auction until approving companies for construction project.
4. Construction stage
Project construction is started by site preparation until finishing the construction. In this stage, control for budget and project schedule is crucial.
5. Operation Stage
After the construction project is finished, then contractor hands the project over to the owner. However, contractors are still responsible for construction maintenance during agreed certain time frame.

E. Importance Performance Analysis (IPA)

Importance performance analysis (IPA) is a method to measure correlation between consumers' perception and priority of improving product or service quality. Importance Performance Analysis was first introduced by Martila & Jams (Khasani et al 2013). It is conducted by comparing level of expectation and level of reality. Level of reality Concern with output performance of person/organization and level of expectation is degree of expectation for service attribute given by organization. In this study, IPA is used to analyse and Measures contractors' performance for road facilities maintenance project in Malang regency.

The followings are steps to conduct Importance Performance Analysis (IPA).

1. To calculate conformity level based on significance and performance level.
2. To calculate average score of significance for each performance item.
3. To calculate average score of significance and performance level for all performance item
4. To compose Cartesian diagram to map performance item into four quadrants.

. IPA is also known as quadrant analysis because it divides performance into four quadrants by using Cartesian Diagram. The following is sample of Cartesian Diagram.

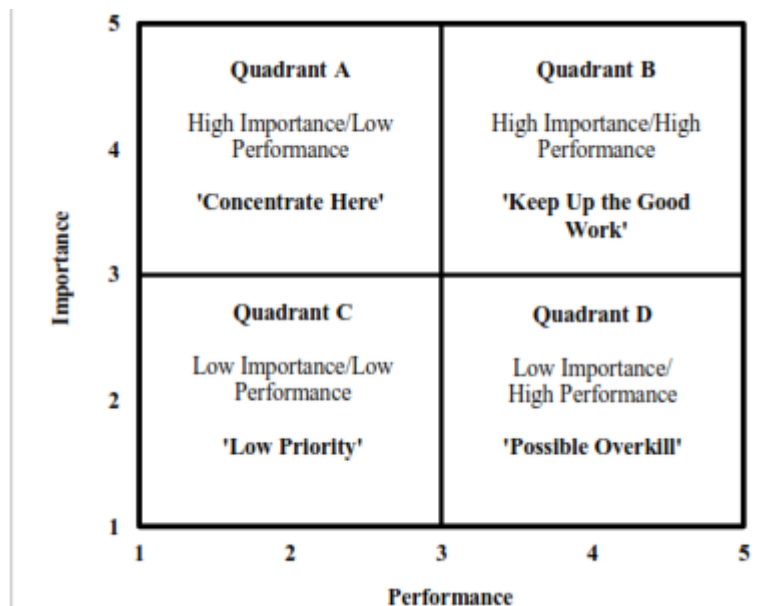


Figure 1 Sample Cartesian Diagram

There are four quadrants in Cartesian diagram and each has different interpretation.

- a. Quadrant A/I
This quadrant represents performance variables that are very important but level of performance on the part of contractors is below average. Contractors should focus on this area to improve their performance.

- b. **Quadrant B/II**
Performance variables in these quadrants are evaluated with high importance and performance and represent opportunities to gain competitive advantages.
- c. **Quadrant C/III**
The performance variables in quadrant C are considered less importance and contractors' performance level are below average. It is not necessary for contractors to focus on this area.
- d. **Quadrant D/IV**
Performance variables in this quadrant are evaluated with high performance and low importance. This implies that resources committed with these variables would be better used for others.

III. RESEARCH METHOD

3. 1. Research Design

This study employs case study design. It focuses on certain objects which are contractors for road facilities maintenance project in Public Work Office of Bina Marga at Malang regency. Cresswell (2014) states that a case study aims at conducting detail investigation on certain kind of object by collecting detail information using various kind of data collection procedures. This study aims at contractors performance for road facilities maintenance project in Malang regency.

3. 2. Research Operational Variables

There are five research variables which are going to be studied. They are

- a. **Quality and Quantity of work**
I refers to Products or service without any defect or flaws. They mete required standards for good Products or Services which are beneficial for customers. In addition, working quantity is work level achieved by service providers.
- b. **Budget**
It is all spending for production process of good or services.
- c. **Time Allotment**
It refers to time frame of project completion as stated in contract starting from preparation stage up to completion stage.
- d. **Service**
This variable is concerned with the ability of contractor to give positive responses for request or problems during project completion.
- e. **Human Resources**
It deals with qualities of manpower involved in project that should meet requirement of budget and quality.

Those variables are then broken down into indicators. Those indicators are then elaborated into questionnaire items.

3. 3. Type of Data

There are two types of data used in this study namely primary and secondary data.

- a. **Primary data** are those obtained from direct sources. In this study, primary data are from questionnaires given to respondents. It is intended to measure performance of contractors.
- b. **Secondary data** are data obtained from intermediate sources. Secondary data used in this study are those obtained from journal, books and relevant studies to support this study (Indriantoro and Supomo, 2013).

3. 4. Population and Sample

Population of this study are contractors of road facilities maintenance project in Malang Regency. they are 111 contractors of road facilities maintenance project. Number of sample is taken by using Slovin formula as follows

$$n = \frac{N}{1+Ne^2}$$

where

- n = sample size
- N = Population size
- e = percentage of error tolerance in drawing sample (5%)

By using Slovin formula, the number of sample used in this study is 87 project owners.

3. 5. Research Instrument

This study uses questionnaires to collect data on performance variables of contractors of road facilities maintenance project in Malang regency. There are four parts of questionnaires namely Instruction, Scoring guidelines, Respondent Identity and questionnaires items consisting of . The are 34 items that should be answered by respondents. Likert scale is used for respondents' answer ranging from score of 1 – 5.

3. 6. Data Analysis

This study employs non statistical data analysis. It is in line with the objective of this study which is to analyse contractors' performance for road facilities maintenance project in Malang regency. Steps of Important Performance Analysis are as follows

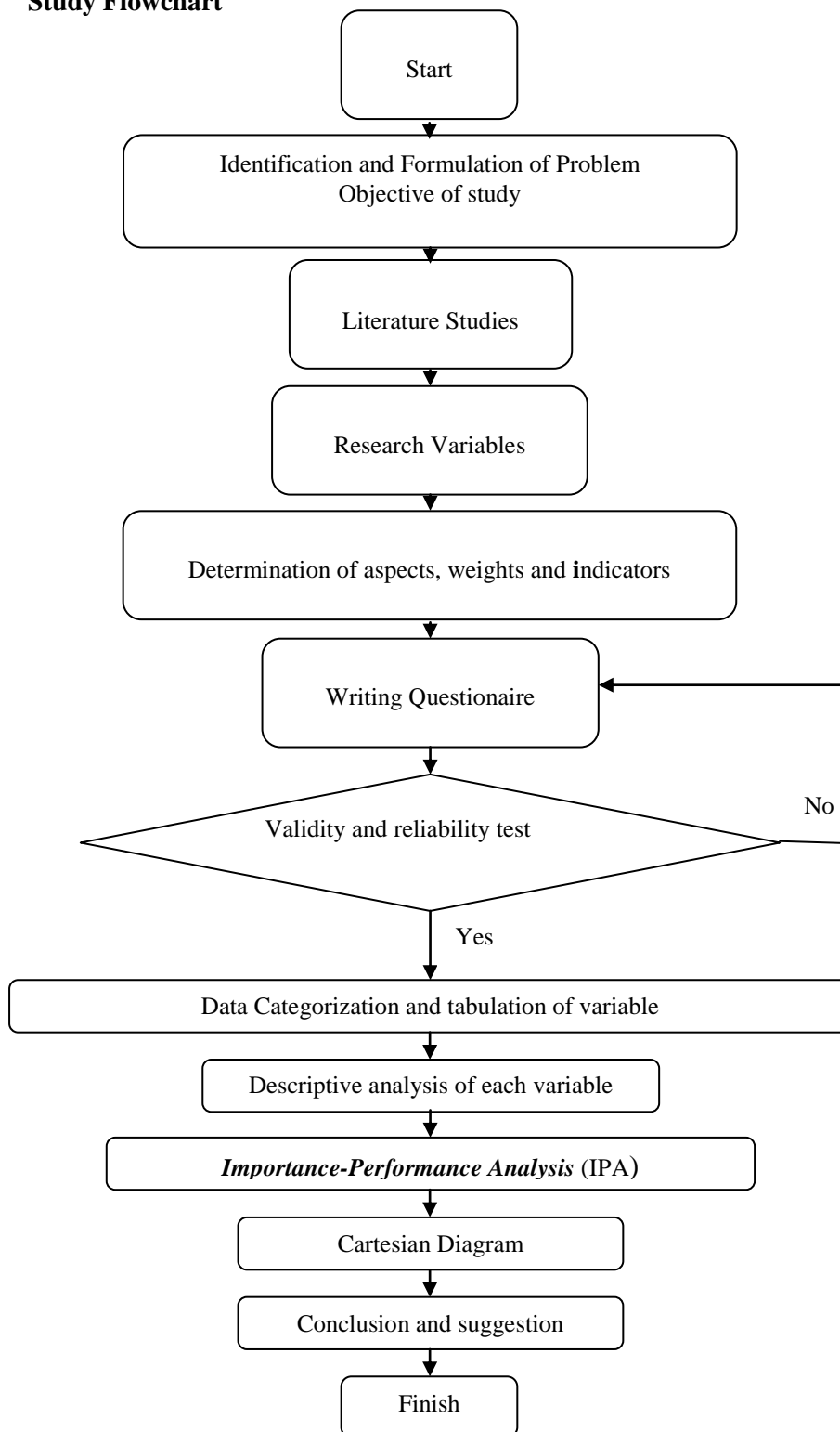
- Counting conformity level between significance level and satisfaction level by using the following formula.

$$CL = \frac{X_i}{Y_i} \times 100\%$$

CL = Conformity level
Y = Score of significance level of performance
X = Score of satisfaction level.

- Calculating average score of significance level and satisfaction level for each performance variable.
- Calculating average score of significance level and satisfaction level for all performance variables.
- Composing Cartesian Diagram to map performance items of contractors into four quadrants.

3.7. Study Flowchart



IV. RESULT AND DISCUSSION

4.1. Test Of Instrument

a. Test of validity

Validity test is conducted by using *corrected correlation of Product Moment* test. The test results in score of calculated r for each item. Then, the calculated r is compared with score of t_{table} to determine each item validity. The result of validity test shows that all questionnaires items are valid. The result of validity test is presented in following table.

Table 2 The Result of Validity Test

Item No	Calculated r for Satisfaction Level	Calculated r for significance level	R table	Status
1	0,3965	0,4971	0.2108	Valid
2	0,6568	0,6722	0.2108	Valid
3	0,4583	0,5983	0.2108	Valid
4	0,4563	0,7532	0.2108	Valid
5	0,7727	0,6957	0.2108	Valid
6	0,5699	0,7329	0.2108	Valid
7	0,3890	0,3746	0.2108	Valid
8	0,7929	0,5675	0.2108	Valid
9	0,2494	0,7576	0.2108	Valid
10	0,4904	0,7584	0.2108	Valid
11	0,2560	0,4870	0.2108	Valid
12	0,4856	0,2988	0.2108	Valid
13	0,4615	0,3787	0.2108	Valid
14	0,5958	0,7226	0.2108	Valid
15	0,8592	0,5824	0.2108	Valid
16	0,4824	0,3165	0.2108	Valid
17	0,7980	0,2732	0.2108	Valid

b. Test of reliability

In this study, Cronbach Alpha is used for reliability test. The instrument is deemed to be reliable if its score of reliability coefficient shown by Cronbach Alpha score is ≥ 0.8 . Cronbach Alpha score obtained from the reliability test is 0,825. It means that the questionnaire is highly reliable.

4.2. Importance Performance Analysis

Importance Performance Analysis aims at finding out performance variables that should be improved and maintained. The analysis is conducted as follows

a. Calculating score of conformity level

The scores are obtained by comparing score of performance satisfaction and those of performance significance. The scores are presented t following table

Table 3 Score of Conformity Level

Item No	Performance Item	CL SCORE
1	Contractors' performance to provide high quality material.	98,37
2	Contractors' performance to provide adequate material for project.	95,25
3	Contractors' performance to provide manpower who has suitable competences for project.	102,97
4	Contractors' performance to provide adequate manpower for project.	93,78
5	Contractors' performance to deliver high quality of work	99,25
6	Contractors' performance to meet quality specification for project result as stated in contract.	96,87
7	Contractors' performance to make budget plan.	136,60
8	Contractors' performance to make use of project budget.	98,08
9	Contractors' performance to control project budget.	97,12
10	Contractors' performance to plan for project implementation.	100,26
11	Contractors' performance to finish the project.	97,02
12	Contractors' performance to give positive response for request from project owner.	89,79
13	Contractors' performance to give response for complaint from project owner	89,41
14	Contractors' performance to communicate with relevant parties.	89,13
15	Contractors' performance to provide competent manpower for project.	95,02

16	Contractors' performance to assign manpower based on their skill.	100,75
17	Contractors' performance to provide discipline manpower.	101,48

- b. Calculating Average Score of Performance Satisfaction level (X) and Score of Performance Significance Level (Y)

$$X = 6779$$

$$Y = 6470$$

- c. Calculating Total Score of Performance Satisfaction level (X) and Score of Performance Significance Level (Y).

It is conducted by dividing X score by Y score and multiplying it by 100. The result is 104,8

- d. Composing Cartesian Diagram by determining axis point for X and Y.
It is obtained by the following formula

$$\bar{Y}_1 = \frac{\sum_{i=1}^k \bar{Y}_i}{n}$$

$$\bar{X}_1 = \frac{\sum_{i=1}^k \bar{X}_i}{n}$$

The score for X is 4,58 and Y is 4,67.

Resulting Cartesian Diagram is presented in the following

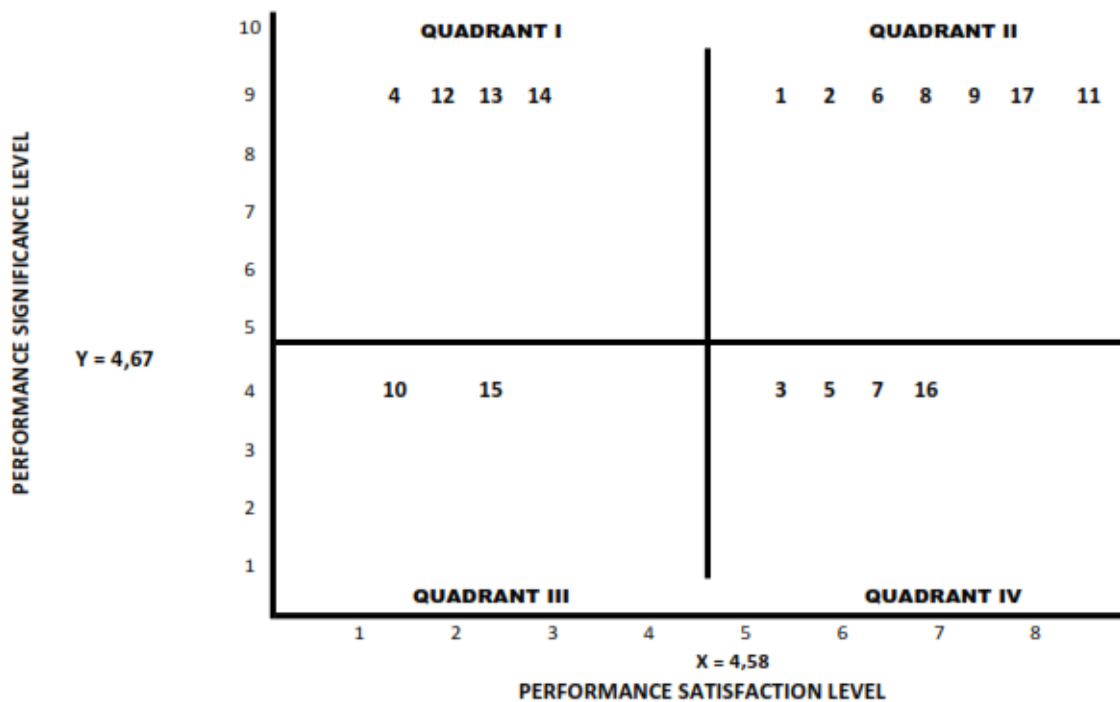


Figure 1 Cartesian Diagram

Based on the Cartesian Diagram, we find that

- a. Quadrant I

There are four performance variables that fall into quadrant I. those are highly recommended to be improved due to high significance level and low satisfaction level of performance. They are

- Contractors' performance to provide adequate manpower for project
- Contractors' performance to give positive response for request from project owner.
- Contractors' performance to give response for complaint from project owner
- Contractors' performance to communicate with relevant parties

b. Quadrant II

Performance variables falling into this quadrant are those that should be maintained by contractors of road maintenance project in Malang Regency. It is because the performances are significance and the owners are highly satisfied with the performance. The performance variables in this quadrant are

- Contractors' performance to provide high quality material.
- Contractors' performance to provide adequate material for project..
- Contractors' performance to meet quality specification for project result as stated in contract.
- Contractors' performance to make use of project budget.
- Contractors' performance to control project budget
- Contractors' performance to finish the project

c. Quadrant III

There are two performance variables in this quadrant. They are performance variables that have low priority to be improved. It is because the performance variables are considered insignificant and the level of satisfaction for those performances are low. They performance variables are

- Contractors' performance to plan for project implementation.
- Contractors' performance to provide competent manpower for project.

d. Quadrant IV

Performances in quadrant IV are those that are considered to be excessive. It is because the performances are considered insignificant and contractors' performance for that are satisfying for project owners. The performance variables are

- Contractors' performance to provide manpower who has suitable competences for project.
- Contractors' performance to deliver high quality of work.
- Contractors' performance to make budget plan..
- Contractors' performance to assign manpower based on their skill.

V. CONCLUSION

There are 17 performance variables of contractors of road facilities maintenance project that can be identified based on literature review and field observation. Questionnaire is used to elicit data from respondent who give responses on significance level and satisfaction level for those performance variables. Then the data are analysed by using Importance Performance Analysis.

The result of analysis shows that there are four performance variables that should be improved by road facilities project contractors. They are Contractors' performance to provide adequate manpower for project, Contractors' performance to give positive response for request from project owner, Contractors' performance to give response for complaint from project owner, and Contractors' performance to communicate with relevant parties. The result confirms the finding of previous study conducted by Khasani (2013).

There are seven performance variables that must be maintained by contractors. They are Contractors' performance to provide high quality material, Contractors' performance to provide adequate material for project, Contractors' performance to meet quality specification for project result as stated in contract, Contractors' performance to make use of project budget, Contractors' performance to control project budget and Contractors' performance to finish the project. it is in line with the result of study conducted by Tomigulung (2013)

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