



A Comparative Study Between Contractors' Performance of Road Maintenance Project Using Self-Management and Contractual Mechanism of 2022 in Malang Regency

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ABSTRACT: In this paper, two mechanisms of road rehabilitation projects in Malang Regency will be discussed and compared. The comparison will be based on satisfaction level of stakeholders on the contractors' performance using the two mechanisms. This comparative study is conducted due to that road maintenance projects are crucial for Malang Regency having large areas surrounded by mountains and lowlands. Good road ensures smooth movement of people and goods. It affects economic sectors in Malang. There are two kinds of mechanisms for Road maintenance projects in Malang Regency. They are self-management and contractual mechanism. The two mechanisms, for similar type of projects have their own characteristics. Therefore, this study aims at investigating the two mechanism based on the satisfaction level of stakeholders by using Customer Satisfaction Index analysis. Then Importance Performance Analysis is used to investigate performance variables that should be improved and maintained. At last, t test is used to compare the satisfaction of stakeholders on contractors' performance using self-management mechanism to those using contractual mechanism.

KEYWORDS: Road Maintenance, Contractor Performance, Self-Management, Contractual mechanism

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I. INTRODUCTION

One of the public infrastructures which is important for economic growth is road. The number and condition of road influence quality of land transportation system. In turn, it will affect economic aspects. Prices of goods are kept reasonable because of smooth movement of people and goods from one area to other area. Therefore, road maintenance project is one of the priority programs for regional government. It is stated in Law no 38 of 2004 that road maintenance is responsibility of regional government in Indonesia including Malang Regency

Malang Regency is the second largest regency in Indonesia after Banyuwangi. It is located at 250-300 metres above sea level. It is surrounded by mountains and lowlands. Malang regency is also famous for its superior yield crops sent to other areas creating income for people of Malang Regency. Thus, to send the yield crops to other area, they need good road. Data shows that length of road in Malang regency is 1.668,76 km. 282,66 km is moderately damaged and 265,19 km is highly damaged (BPS, 2019). Of course, it becomes the focus of regional government of Malang to handle since good road is crucial for either people and goods movement.

Road maintenance in Malang Regency is under supervision of Office of Public Works. There are two mechanisms used for road maintenance work. They are self-management and contractual mechanism. The two mechanisms have their own characteristics and procedures. Self-management mechanism is procedure for procuring goods or services for which related regional office/organization or civic organizations are responsible for the procurement process. In addition, contractual mechanism involves appointed supplier. Presidential Regulation of Indonesia no 12 of 2021 on Government Procurement states that procurement through supplier is a process of goods/services procurement supplied by business entities.

Two mechanisms for similar construction work raises questions on the comparison between them. Therefore, in this study self-management and contractual mechanism will be compared. The comparative analysis

will be based on satisfaction level of stakeholders for project management performance of contractors using self-management mechanism and contractual mechanism. This study also investigates performance aspects that should be improved and maintained from contractors using self-management and contractual mechanism.

II. LITERATURE REVIEWS

A. Management of Project Construction

Indonesian Law no 2 of 2017 states that construction projects are parts or whole activities of building, operating, maintaining, demolishing and rebuilding certain kind of structure. Construction projects are usually related to multi-storey building, bridge, dam, road, etc. On the other side, project management is process of planning, organizing, and directing and controlling company's resources to achieve predetermined goals. It is driven by the need of management approach which is in line with characteristics and demand of construction project activities. There are two crucial requirements for good management of project construction. They are careful planning, good organizing and making use of all company's resources in the form of human and equipment. Therefore, in order to achieve stakeholders' satisfaction, there should be effective and efficient management of human and equipment.

In *Project Body Management of Knowledge (PMBOK)*, it is stated that project management is process of planning, organizing and making use of companies' resources to create unique products or services (PMI, 2017). There are five process involved in project management. They are project initiation, project planning, project execution, project supervision and control and project closing. It is also stated in PMBOK that there are ten important domains in project management. They are

- Management of project integration
It concerns with processes and activities to identify, determine, combine and coordinate all processes and activities of projects.
- Management of project scope
It concerns with all processes and activities required for project completion.
- Management of project schedule
It concerns with all processes and activities need to manage project punctually
- Management of project budget
It deals with all processes and activities needed to manage project spending to meet the approved budget
- Management of project quality
It deals with all processes and activities to take quality principles on planning, managing and supervising project into account in order to fulfil stakeholders 'need.
- Management of project resources
It concerns with all processes and activities to identify, obtain, and manage resources for project completion.
- Management of project communication,
It deals with all activities and processes to ensure that all project information are accessible for stakeholders.
- Management of project risk
It deals with processes and measures to improve positive impact and to reduce negative impact of risk.
- Management of project procurement
It concerns with all processes and activities required to purchase product, service or others needed for project completion.
- Management of project stakeholders
It deals with efforts to identify person, groups or organization which are able to influence the project, to analyse their expectation and their impact for the project and to formulate management strategy to involve the stakeholders

B. Satisfaction of Stakeholders

It is stated in Oxford Advanced Learner's Dictionary (2002) that satisfaction is the good feeling that you have when you achieved something or when something that you wanted to happen does happen, the act of fulfilling a need or desire, an acceptable way of dealing with complaint, a debt, an injury etc. On the other side, stakeholders are those possessing power to influence the use of economic resources of company or organization. Therefore, companies operate not only to seek profit for them but also to give benefit of stakeholders (Ghozali & Chariri, 2007).

There are several ways of how to measure satisfaction namely complaint and suggestion, ghost shipping, lost customer analysis and survey of satisfaction. Complaint and suggestion method allows stakeholders to give their complaints and suggestion. The second, lost customer analysis is by asking several people to be stakeholders from rival company. The third, lost customer analysis is conducted by obtaining

information from customers who stop buying products from one company and move to others. The last is survey of satisfaction. It is aiming at obtaining responses and positive impressions for products or performances. Type of satisfaction survey used in this study is Customer Satisfaction Index (CSI). After conducting CSI, Importance Performance Analysis (IPA) will also be conducted to investigate performance variables that should be maintained or improved.

In this study, there are twenty one performance variables of road maintenance contractor using self-management and contractual mechanism that will be investigated. Those performance variables are elicited from analysing Project Body Management of Knowledge, reviewing preliminary studies and observation. The performance variables of contractors are

- Performance to make project plan.
- Performance to manage stages and division of projects.
- Performance to supervise and control projects
- Performance to make documents for project closing
- Performance to plan for scope of project based on work order.
- Performance to control scope of project
- Performance to make project schedule
- Performance to control the project deadline.
- Performance to make plan for project budget.
- Performance to control project spending
- Performance to make project quality plan.
- Performance to ensure project quality
- Performance to manage teams of project
- Performance to control team and other resources of project
- Performance to manage internal and external communication.
- Performance to make plan for risk management of project
- Performance to give respons for work risks.
- Performance to make purchasing plan for project equipment and material.
- Performance to purchase project equipment and material
- Performance to control purchasing process of project equipment and material.
- Performance to communicate progress of project to stakeholders.

C. Customer Satisfaction Index (CSI)

Customer satisfaction index is a method to measure satisfaction level by using total score of customers' satisfaction. It is based on the score of satisfaction on the part of customers on product, service or performance from certain company or organization Suryanto (2017). In addition, Dickinson in Fitriana et all (2014) states that Customer Satisfaction Index analysis is conducted by using four steps. They are

1. To calculate mean importance score (MIS) and mean satisfaction score (MSS) by obtaining average significance and satisfaction level of stakeholders.
2. To calculate weight factor (WF) by obtaining the percentage of MIS score of each variable attribute to all MIS score.
3. To calculate Weighted Score (WS) by multiplying score of weight factor and mean satisfaction score (MSS).
4. To calculate Weighted average total (WAT) by summing up weighted score (WS)
5. To calculate score of Customer satisfaction Index.

D. 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 all 2013). IPA is also known as quadrant analysis because it divides performance into four quadrants by using Cartesian Diagram. In this study, IPA is used to analyse and compare performance of contractors using self-management and contractual mechanism with their satisfaction level. 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 untuk map performance item into four quadrants.

E. Government Procurement for Products/services

Government Procurement for products/services is under Presidential Decree no 16 of 2008. It is stated that there are two mechanism for that namely self-management mechanism and mechanism through service provider which is commonly known as contractual mechanism.

1. Self-management mechanism.

It is stated in Presidential Decree no 12 of 2021 that, self-management is mechanism of procuring goods or services by regional government, government offices or civil organization. The advantage of this mechanism is that it is responsive in nature. This mechanism is suitable for urgent road maintenance. Another advantage is that it is right mechanism for procuring confidential goods or services. However, it also has disadvantages. One of them is that relevant regional office or civic organization should have their own equipment and their operators. It of course raises concerns on maintenance budget for those equipment.

2. Contractual mechanism

Contractual mechanism is conducted by appointed supplier. The advantages is that project owner, in this case Government of Malang Regency, do not need to have equipment and operators. Those are the responsibility of supplier. However, it also has disadvantages. Usually maintenance project using this mechanism could not be conducted fast due to contract process.

Concerning the advantages and disadvantages of the two mechanisms, there is a need to compare the two mechanisms based on stakeholders' satisfaction.

III. RESEARCH METHOD

3.1. Research Design

This study employs survey design. The objective of this study is to compare performance of contractors using self-management mechanism and contractual mechanism for road maintenance project of 2022 in Malang regency. The comparison will be based on satisfaction level of stakeholders to contractors' performance using the two mechanisms. In this study, the stakeholders are project owners, supporting team and consultants.

3.2. Data Type

This study employs two types of data namely primary and secondary data.

- a. Primary data are obtained from questionnaire given to respondents. It aims at measuring the stakeholders' satisfaction.
- b. Secondary data are those obtained from journal, relevant studies and books to support this study.

3.3. Respondent of Study

In this study, the respondents are stakeholders of road maintenance projects which are conducted by using self-management mechanism and contractual mechanism. There are 30 respondents involved. They are Commitment Making Officials (CMO), Technical Project Implementer Officials, Members of Supporting Team and Consultants.

3.4. Research Instruments

Questionnaire is used to collect data on performance variables of contractors of road maintenance project using self-management and contractual mechanism. There are four parts of questionnaires. They are respondent profile, project information, performance satisfaction measurement and performance significance measurement. In addition, Likert Scale is used for respondents' response

3.5. Data Analysis

After obtaining data from questionnaire, then they will be analysed by Customer Satisfaction Index (CSI) in order to measure level of satisfaction, Importance Performance Analysis (IPA) to map performance variables into four quadrant and t-test to compare level of satisfaction of road maintenance contractors using self-management mechanism and contractual mechanism.

a. Customer Satisfaction Index (CSI)

The steps of conducting CSI are

- To calculate Mean Importance Score (MIS)
- Calculating Weight Importance Score by obtaining percentage of MIS from total MIS score using the following formula

$$WF = \frac{MIS}{Total MIS} \times 100\%$$

- Calculating Weighted Score (WS) by multiplying WF with Mean Satisfaction Score (MSS) for each performance variable.
- Calculating Weighted Average Total (WAT) by summing up all Weighted Score (WS) from all performance variables.
- Determining Customer Satisfaction index by using the following formula

$$CSI = \frac{WAT}{HS} \times 100\%$$

b. Importance Performance Analysis (IPA)

This analysis aims at mapping performance variables of road maintenance contractors using self-management mechanism and contractual mechanism into four quadrants. Quadrant I is for performance variables with high priority to be improved. Quadrant II is for those who need to be maintained. Quadrant III is for performance variables with low priority to be improved and Quadrant IV is for performance variables which are not important but satisfying for stakeholders. The steps for Importance Performance Analysis are

- Calculating conformity level between significance level and satisfaction level of performance 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

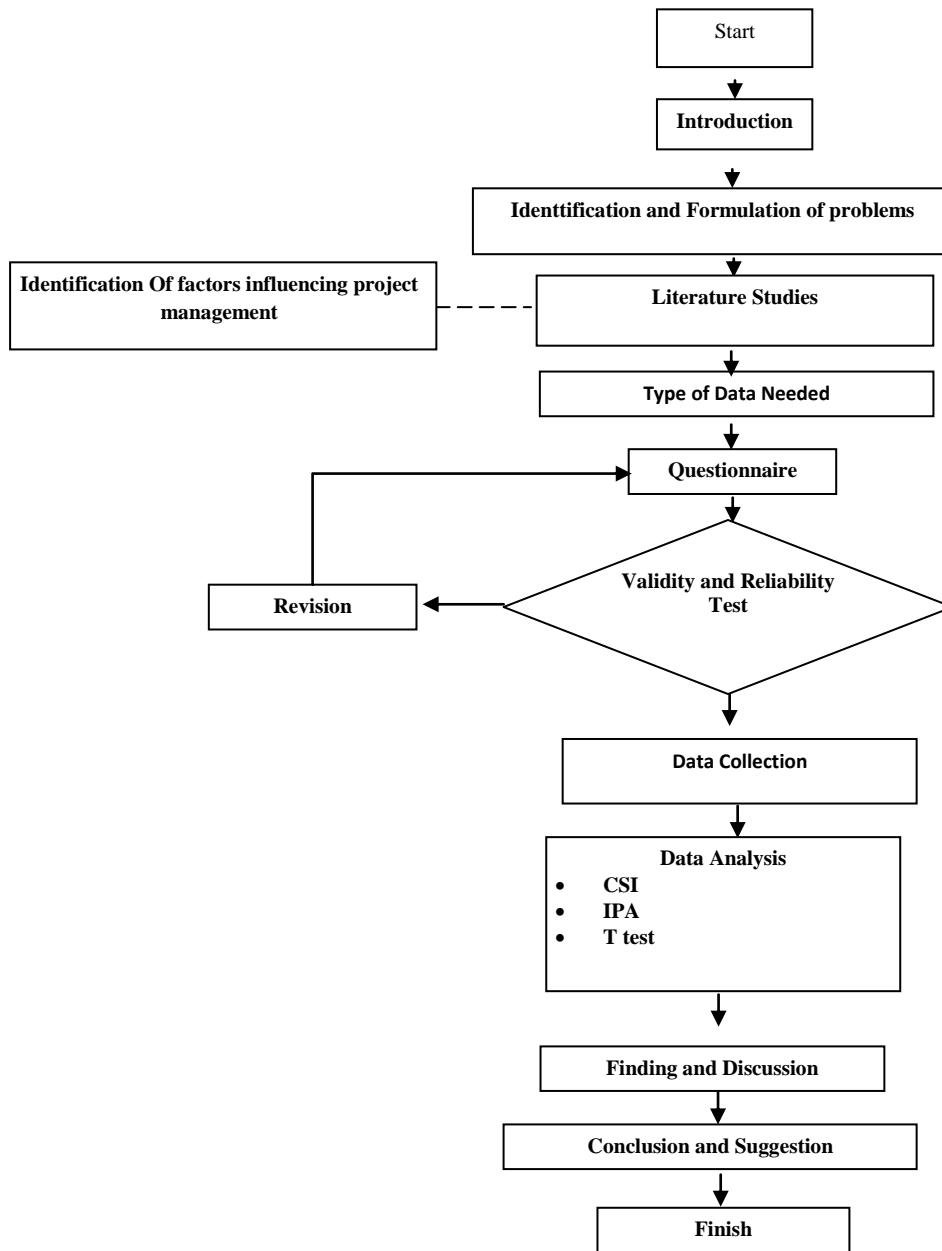
- Calculating average score of significance level and satisfaction level for each performance variable.
- Calculating average score significance level and satisfaction level for all performance variables.
- Calculating Cartesian diagram to map performance items of contractors into four quadrant

c. T-test

t-test is conducted to investigate whether or not there is significant difference between stakeholders' satisfaction for performance of road maintenance contractor using self-management mechanism and those using contractual mechanism. The criteria used are

- If score of significance (Sig) is less than $< 0, 05$, it can be taken into conclusion that there are significant differences among the two.
- If the score of significance (Sig) is higher than $< 0, 05$, then there is no significant differences among the two level of satisfaction

3. 6. Flowchart of Study



IV. RESULT AND DISCUSSION

4.1. Test of Instrument

a. Test of Validity

To make sure that the questionnaire item is valid, Product Moment Correlation test is used. The test result shows that all items in questionnaire are valid. The score of calculated r for 21 items are higher than score of r_{table} which is 0,355.

b. Test of Reliability

Reliability test is conducted by using Cronbach Alpha. The test result shows that score of Cronbach Alpha for questionnaire is 0,904. It means that the questionnaire is highly reliable since the score of good reliability of item is between 0,8 – 10.

4.2. Customer Satisfaction Index Analysis

The data obtained from questionnaire is analysed by using analysis of Customer Satisfaction Index. The steps of analysis are as follows

a. To Calculate Mean Importance Score (MIS) and Mean Satisfaction Score (MSS).

Based on responses from questionnaire for road management contractors using self-management mechanism and contractual mechanism, then MIS and MSS are calculated for the two. The scores are presented in the following table.

Table 4.1 MIS and MSS score for Contractors using self-management mechanism

No Item	MIS	MSS	No Item	MIS	MSS
1.	4,23	4,47	11.	4,27	4,63
2.	4,30	4,60	12.	4,07	4,40
3.	4,27	4,10	13.	4,27	4,47
4.	4,20	4,57	14.	4,37	4,50
5.	4,30	4,47	15.	4,47	4,60
6.	3,83	4,43	16.	4,27	4,40
7.	4,13	4,40	17.	4,37	4,67
8.	4,40	4,53	18.	3,90	4,40
9.	4,47	4,47	19.	4,07	4,50
10.	4,23	4,43	20	4,27	4,50
			21	4,47	4,57
Total				89,13	94,10

Table 4.2. MIS and MSS Score for Contractors using contractual mechanism

No Item	MIS	MSS	No Item	MIS	MSS
1.	5,00	4,67	11.	4,00	4,63
2.	4,60	4,43	12.	4,33	4,60
3.	4,00	4,47	13.	4,33	4,53
4.	4,70	4,37	14.	4,60	4,63
5.	4,17	4,37	15.	4,57	4,63
6.	4,63	4,52	16.	4,63	4,47
7.	3,07	4,30	17.	5,00	4,37
8.	4,57	4,53	18.	4,60	4,53
9.	4,57	4,53	19.	4,00	4,63
10.	4,30	4,57	20	4,67	4,57
			21	4,67	4,73
Total				93,00	95,08

b. To Calculate Weigh Importance Score (WF) and Weight Score

Score of WF and WS for Contractors' performance using self-management and contractual mechanism is presented below. The scores are obtained using the following formula

Table 4.3. Score of WF and WS for Contractors using self-management mechanism

No Item	WF	WS	No Item	WF	WS
1.	4,75	21,21	11.	4,79	22,18
2.	4,82	22,19	12.	4,56	20,07
3.	4,79	19,63	13.	4,79	21,38
4.	4,71	21,52	14.	4,90	22,05
5.	4,82	21,55	15.	5,01	23,05
6.	4,30	19,07	16.	4,79	21,06
7.	4,64	20,40	17.	4,90	22,86
8.	4,94	22,38	18.	4,38	19,25
9.	5,01	22,38	19.	4,56	20,53
10.	4,75	21,06	20	4,79	21,54
			21	5,01	22,88
WAT					448,25

Table 4.4. Score of WF and WS for Contractors using contractual mechanism

No Item	WF	WS	No Item	WF	WS
1.	5,38	25,09	11.	4,30	19,93
2.	4,95	21,93	12.	4,66	21,43
3.	4,30	19,21	13.	4,66	21,12
4.	5,05	22,07	14.	4,95	22,92
5.	4,48	19,56	15.	4,91	22,75
6.	4,98	22,51	16.	4,98	22,25
7.	3,30	14,18	17.	5,38	23,48
8.	4,91	22,26	18.	4,95	22,42

9.	4,91	22,26	19.	4,30	19,93
10.	4,62	21,11	20	5,02	22,92
			21	5,02	23,75
WAT					453,08

c. To calculate Weighted Average Score (WAT)

WAT score is obtained by summing up all weighted score of item performance of road maintenance contractors. Then it is found out that WAT score for road maintenance contractors using self-management mechanism is 448,25 and the WAT score for road maintenance contractors using contractual mechanism is 453,08.

d. To Calculate CSI score.

CSI score is obtained by dividing WAT score by High Scale (maximum scale used for item responses). The HS is 5 because Likert scale of 1-5 is used.

1) Calculation of CSI score for performance of road maintenance project using self-management mechanism

$$CSI = \frac{WAT}{HS} \times 100$$

$$CSI = \frac{448,25}{5} \times 100\%$$

$$CSI = 89,65 \%$$

CSI score of 89, 65% shows that respondents are highly satisfied with performance of road maintenance project using self-management mechanism

2) Calculation of CSI score for performance of road maintenance project using contractual mechanism

$$CSI = \frac{WAT}{HS} \times 100$$

$$CSI = \frac{453,08}{5} \times 100\%$$

$$CSI = 90,69 \%$$

CSI score of 90, 69% shows that respondents are highly satisfied with performance of road maintenance project using contractual mechanism

4.3. Importance Performance Analysis

The followings are steps for Importance Performance Analysis

a. To calculate score of Conformity level

This score is the result from comparison between score of performance satisfaction and score of performance significance. Those scores are presented in the following table

Table 4.5. Score of Conformity Level (TK) for Contractor using self-management and contractual mechanism

Item No	Performance Variables	TK	
		Self-management	Contractual
1	Performance to make project plan.	105,51	93,33
2	Performance to manage stages and division of projects.	106,98	96,38
3	Performance to supervise and control projects	96,09	111,67
4	Performance to make documents for project closing	108,73	92,91
5	Performance to plan for scope of project based on work order.	103,88	104,80
6	Performance to control scope of project	115,65	94,24
7	Performance to make project schedule	106,45	140,22
8	Performance to control the project deadline.	103,03	99,27
9	Performance to make plan for project budget.	100,00	99,27
10	Performance to control project spending	104,72	106,20
11	Performance to make project quality plan.	108,59	115,83
12	Performance to ensure project quality	108,20	106,15
13	Performance to manage teams of project	104,69	104,62
14	Performance to control team and other resources of project	103,05	100,72
15	Performance to manage internal and external communication.	102,99	101,46
16	Performance to make plan for risk management of project	103,13	96,40
17	Performance to give response for work risks.	106,87	87,33
18	Performance to make purchasing plan for project equipment and material.	112,82	98,55

19	Performance to purchase project equipment and material	110,66	115,83
20	Performance to control purchasing process of project equipment and material.	105,47	97,86
21	Performance to communicate progress of project to stakeholders.	102,24	101,43

b. To calculate Average Score of Performance Satisfaction Level (X) and Score of Performance Significance Level (Y)

3) For Contractor using self-management mechanism

$$X = 2823$$

$$Y = 2675$$

4) For contractor using contractual mechanism

$$X = 2848$$

$$Y = 2790$$

c. To Calculate Total Score of Performance Satisfaction level (X) and total score of Performance Significance Level (Y)

It is conducted by dividing X score by Y score and multiplying it by 100.

5) Total Score for Contractor using self-management mechanism is 105,57

6) Total score for contractor using contractual is 102,08

d. To determine axis point for X and Y to compose Cartesian Diagram

The following formula is used for determining axis point

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

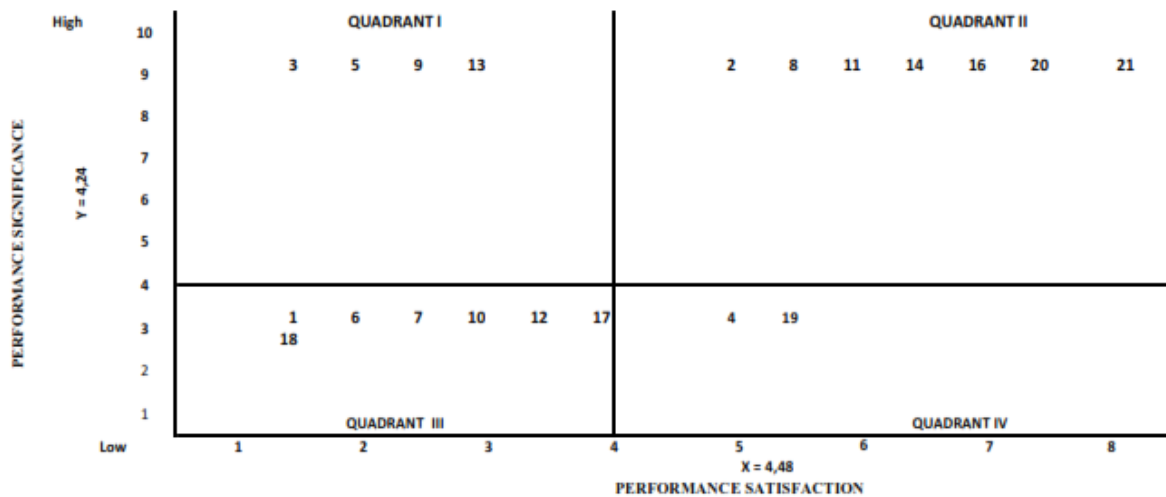
$$\bar{X}_1 = \frac{\sum_{i=1}^k \bar{X}_i}{n}$$

1) The score of axis point for Contractor using self-management mechanism is

$$X = 4,48$$

$$Y = 4,24$$

Cartesian Diagram for IPA of Contractor using self-management mechanism is as follows



Based on the Cartesian Diagram for contractor using self-management mechanism above, we found out that

a. Quadrant I

There are four performance variables having high priority to be improved by contractors. They are

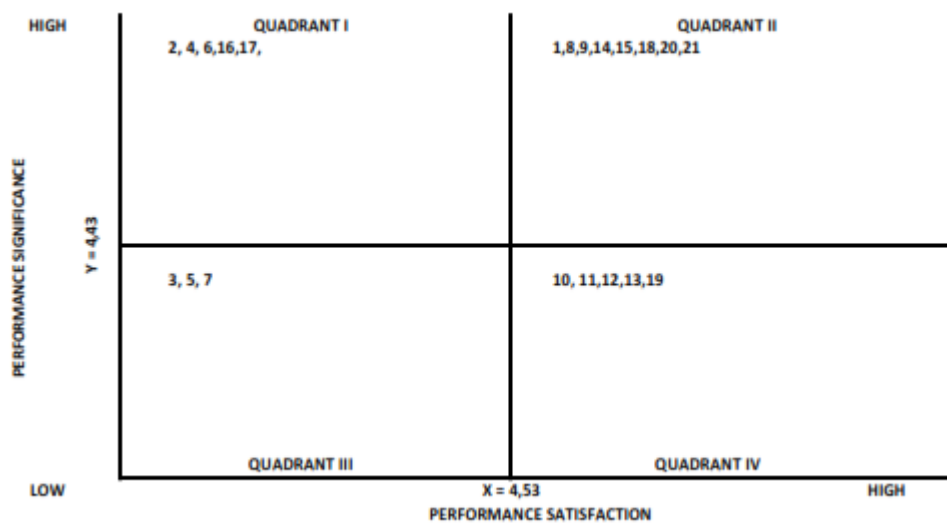
- Performance to supervise and control projects
- Performance to plan for scope of project based on work order
- Performance to make plan for project budget
- Performance to manage teams of project

b. Quadrant II

Seven performance variables fall into quadrant II. Those performances should be maintained. They are

- Performance to manage stages and division of projects
- Performance to control the project deadline

- Performance to make project quality plan
 - Performance to control team and other resources of project
 - Performance to make plan for risk management of project
 - Performance to control purchasing process of project equipment and material.
 - Performance to communicate progress of project to stakeholders
- c. Quadrant III
Performance variables in this quadrant have low priority to be improved. They are
- Performance to make project plan
 - Performance to control scope of project
 - Performance to make project schedule
 - Performance to control project spending
 - Performance to ensure project quality
 - Performance to give response for work risks
 - Performance to make purchasing plan for project equipment and material
- d. Quadrant IV
Two performance variables in this quadrant are those which are not significant but for stakeholders they are satisfying. They are
- Performance to make documents for project closing
 - Performance to purchase project equipment and material
- 2) The score of Axis point for Contractor using self-management mechanism is
 $X = 4,53$
 $Y = 4,43$
- Cartesian Diagram for IPA of Contractor using self-management mechanism is as follows



Based on the Cartesian Diagram for contractor using self-management mechanism above, we found out that

- a. Quadrant I
There are five performance variables having high priority to be improved by contractors. They are
- Performance to manage stages and division of projects
 - Performance to make documents for project closing
 - Performance to control scope of project
 - Performance to make plan for risk management of project
 - Performance to give response for work risks
- b. Quadrant II
Eight performance variables fall into quadrant II. Those performances should be maintained. They are
- Performance to make project plan
 - Performance to control the project deadline

- Performance to make plan for project budget
 - Performance to control team and other resources of project
 - Performance to manage internal and external communication
 - Performance to make purchasing plan for project equipment and material.
 - Performance to control purchasing process of project equipment and material
 - Performance to communicate progress of project to stakeholders.
- c. Quadrant III
Performance variables in this quadrant have low priority to be improved. They are
- Performance to supervise and control projects
 - Performance to plan for scope of project based on work order
 - Performance to make project schedule
- d. Quadrant IV
Five performance variables in this quadrant are those which are not significant but for stakeholders they are satisfying. They are
- Performance to control project spending
 - Performance to make project quality plan
 - Performance to ensure project quality
 - Performance to manage teams of project
 - Performance to purchase project equipment and material

4.4. T test

The objective of conducting T test is to find out whether or not there is significance difference between stakeholders' satisfaction for performance of road maintenance project using self-management mechanism and those using contractual mechanism of 2002 in Malang Regency. If significance score of t test is $<0,05$ then there is significant difference between the two satisfaction levels. In addition, if significance score is $>0,05$ then there is no significant difference between the two score of satisfaction levels.

The result t test shows that the score of significance is 0,321. It shows that there is no significance difference in terms of stakeholders' satisfaction for road maintenance contractor using self-management mechanism and those using contractual mechanism of 2022 in Malang Regency.

V. CONCLUSION

In this study, there are 21 performance variables that can be identified based on the result of literature review and field observation. Those performance variables are then put in questionnaires used to gather data. The respondents gives responses on level of performance significance and performance satisfaction for contractors' performance of road maintenance project using self-management and those using contractual mechanism of 2022 in Malang Regency.

The results show that stakeholders are highly satisfied with contractors' performance of road maintenance project using self-management and those using contractual mechanism. It is shown by CSI score of 89,65 for contractors' performance using self-management mechanism and 90,62 for contractors' performance using contractual mechanism.

The analysis results also show that there are several performance variables that should be improve both contractors using self-management mechanism and those using contractual mechanism. Contractors using self-management mechanism should improve their performance to supervise and control projects, plan for scope of project based on work order, make plan for project budget, and to manage teams of project. Performance to manage stages and division of projects, make documents for project closing, control scope of project, make plan for risk management of project, and to give response for work risks are those that should be improved by contractors using contractual mechanism.

In addition, the result of t-test analysis shows that there is no significant difference in terms of stakeholders' satisfaction or contractors' performance of road maintenance project using self-management mechanism and contractual mechanism of 2022 in Malang Regency.

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