

Conference Paper

An Analysis of Contractor Satisfaction on Owner Team Performance in Construction Projects (Case Study: Construction Projects in ITS)

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Abstract

Subjective performance measurements have been developed on construction projects of various key stakeholders such as contractors, designers and consultants. These approaches are usually related to owner satisfaction, customer satisfaction, occupant satisfaction but very rarely consider contractor satisfaction. The performance of the contractor and owner are interdependent, and their interactions fundamentally determine the overall project performance. This research aims to analyze the level of contractor satisfaction with the team owner's performance which in the end to improve the improvement (Continuous Improvement) where there are indicators of team' owner performance that needs attention to be improved and improved and those that need to be maintained. Owner performance indicators include the owner's understanding of project needs, finances, decision-making, management, adequate support for contractors, client attitudes, clarity of client/owner commitment goals, and the working relationship of the owner and contractor. These indicators were obtained from literature and interviews with practitioners. These indicators are then developed to improve the existing conceptual framework. The satisfaction is measured using the Customer Satisfaction Index (CSI) and priority variables that need to be improved are analyzed by the Importance Performance Analysis (IPA) method. The results of this study indicate the level of contractor satisfaction with the performance of the team owner from CSI calculations at the level of satisfaction. Meanwhile the results of the IPA show that financial indicators, one sub-indicator of support for contractors and one sub-indicator of the attitude of the owner must be improved.

Keywords: Contractor satisfaction, Owner performance, Customer Satisfaction Index (CSI), Importance Performance Analysis (IPA).

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1. Introduction

Construction is often a long-term project that is described as a dynamic and complex entity (Karna, 2004). But in the work of construction projects there is a poor record of

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the successful implementation of the project in terms of cost, time, quality and others. [23]. Therefore it is necessary to measure the performance of the main stakeholders (Owner, contractor and consultant) on the construction project work.

Traditionally the main stakeholders of a construction project coalition are owners, consultants and contractors. These interactions and relationships between stakeholders largely determine the overall performance of construction projects [7, 14]. The performance of these stakeholders is also interdependent [9, 14]. Although there are interdependencies, the performance of each stakeholder remains important because overall project performance is a function of the performance of each stakeholder. [10].

In addition to the role of contractors and consultants, the role of the owner in construction work is believed to be important in the management of construction projects. In addition to paying bills related to the project, the owner has duties and responsibilities such as making decisions in every issue. In carrying out their duties and responsibilities, the owner can make a positive and negative contribution to the value of the facilities built. [2]. Because the owner has the most authority in making decisions, then the satisfaction of the contractor will be the owner's performance related to decision making and related to the performance of other owners is important to consider. [19].

There are various measurements of satisfaction in the context of the construction industry. This consists of studies of owner satisfaction levels related to the performance of contractors and consultants [5], customer satisfaction and home buyers with industrial products and services [11, 24]; and occupant satisfaction in terms of comfort [13, 18]. These approaches are clearly related to owner satisfaction, customer satisfaction, buyer satisfaction and house occupants but very rarely consider contractor satisfaction. This means that a lot of research on previous satisfaction in the field of construction is more concerned with owner and customer satisfaction compared to measuring contractor satisfaction. [15]. The few studies that discuss contractor satisfaction with owner performance.

A good working relationship between the owner and the contractor can bring an increase in project success [16]. Interaction and relationships between related parties in the organization of a project that has different backgrounds and interests determine the overall performance of a construction project. Each party needs another party to carry out this level of performance. Many problems that arise in the field are caused by the client. Problems caused by poor communication, final design changes, late payment, and so on. To improve construction performance, all parties must work in harmony, including the owner. [8] In short, satisfaction with the owner's performance is very

important if the contractor professionally carries out his duties effectively. Therefore there is a need to place performance standards for owners [15].

There is a relationship between performance and satisfaction in the context of performance appraisal [12, 15]. Performance results are inputs and satisfaction levels are outputs. Close coordination and good working relationships among project stakeholders have been found to be the most important factors that contribute to perceived project success. In addition, project performance can be improved by a high level of collaboration between project stakeholders. [7, 14]

The contractor and owner work in partnership during the construction phase. They communicate and interact with each other to complete a project. Thus, it can be said that the performance of the contractor and the owner are essentially interdependent, and their interactions fundamentally determine the overall project performance. When late payment from the owner occurs, for example, the contractor may perform poorly, slowing the progress of the project. Because project performance is not only determined by the performance of the contractor, but also by the performance of the owner, the performance evaluation of the owner then becomes very important. Basically, increasing owner performance will have an impact on contractor performance, and ultimately will also improve project performance. [8]

One of the best ways to assess owner performance is through contractor satisfaction with owner performance because both work closely in partnership. The purpose of this satisfaction measurement is to analyze the level of contractor satisfaction with the owner's performance. The aim is to determine the contractor's satisfaction index to the owner's performance, and to evaluate the owner's performance indicators through the importance of performance analysis.

The owner working in team on a construction management has a very important role in the success of a project. If the owner works with a construction management consultant, the duties and roles of the owner are divided into one unit as a team owner. The owner works in a team partly because of factors that affect the construction project that makes the owner unable to work alone or rely on his own human resources. These factors include: the scale and characteristics of the project, the contract model, human resource owner and others. The importance of the owner building teamwork for example teamwork with construction management consultants means that the owner believes that teamwork or teamwork is easier to achieve success and the owner believes that construction management consultants play an important role in the success of a project. For example the task of a construction management consultant is to oversee the owner at the initial stage of the project (the planning and design stage) to prepare

for the next stage, as well as during the construction period (implementation of physical development). Job consultant's description in general is to translate the wishes and needs of the owner by accompanying the planning consultant in the design process as outlined in the drawing documents, calculations and other supporting documents. Then supervise and assist the contractor in the implementation phase. Good planning at the beginning of the project will produce a product of accurate implementation guidelines which in turn will greatly determine the success of a project.

The parties involved in the team owner be it the project owner, consultant planners or construction management consultants or other parties who are representatives of the owner work as a team. Team work is one of the keys to the success of a project. So the success of the team owner in completing the work does not only depend on one party but on the cooperation of all parties involved in the management of the team owner.

2. Literature Review

2.1. Concepts of Performance Measurement

The evolution of performance measurement has seen a shift in focus from ways of objective measurement to subjective [4], as illustrated in Figure 1. It should be noted that the objective approach uses mathematical calculations based on construction time, construction speed, cost, and accident rate, when the subjective approach uses participant's opinions and personal judgment.

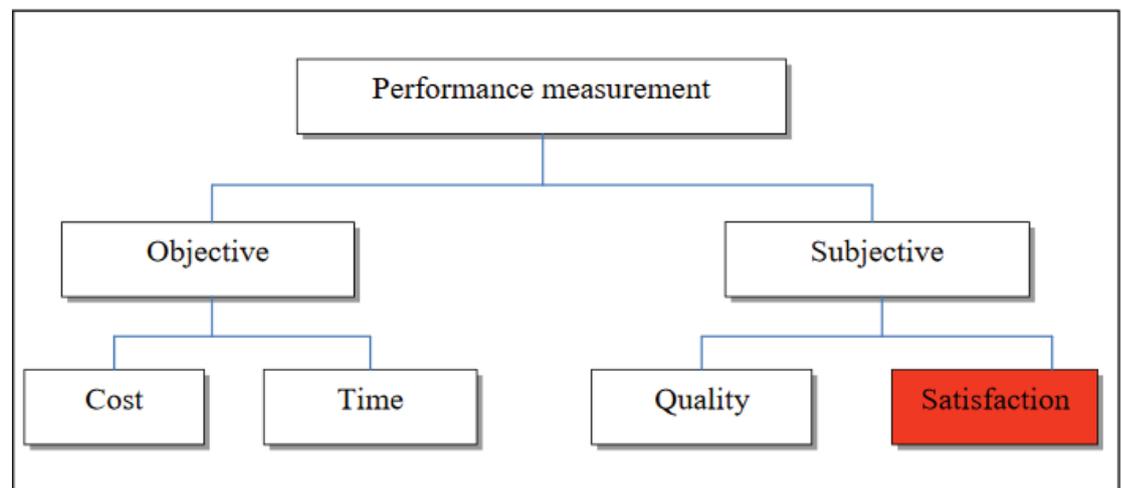


Figure 1: Approach to measuring performance [4]

2.2. Theory of Satisfaction

According to Oliver [12], the word “satisfaction” is a combination of Latin words, *satis* (enough) and *facere* (to do or make). But differences in satisfaction levels can also be defined as feelings, which can be influenced by a number of factors [21]. According to this definition satisfaction can be defined as the result of an assessment made between individual expectations and performance expectations.

Contractor satisfaction on construction projects is usually related to working relationships with owners, consultants and other stakeholders. This satisfaction is influenced by performance or work relations between stakeholders. For example the contractor’s satisfaction with the owner’s performance, the contractor’s satisfaction with the consultant’s performance and satisfaction with other stakeholders in the construction project.

2.3. Methods and Determinants of the Owner

Organization The owner organization is the main organization in project management. The owner’s organizational structure is determined by several factors explained in Figure 2 below.

1. The owner management model in a project is usually divided into three models: 1). Owners rely on their own human resources; 2). The owner sends to one or more management consulting companies; 3). The owner sends to one or more management consulting companies and the owner is also involved in management.
2. Project characteristics and scale;
3. The structure of the work details of the project is closely related to the owner’s organization, the structure of the work details are different according to different organizations;
4. The contract model and project contract structure greatly affect the owner’s organization;
5. Human Resources Owner.

It can be said of team performance because the owner works in a team that is the owner sends to one or more management consulting companies and the owner is also involved in management.

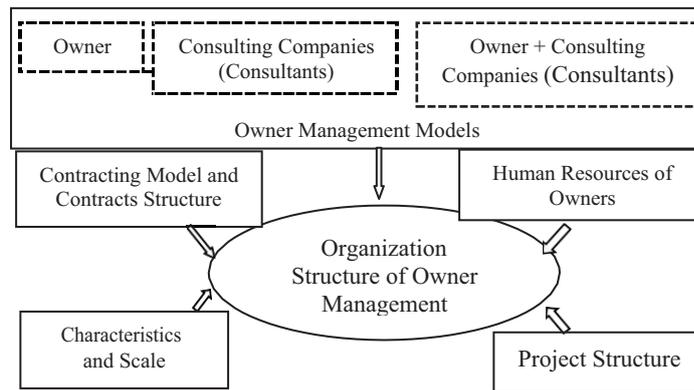


Figure 2: Determinants of the owner management organization structure. [17]

2.4. Owner Performance Variables Determine Contractor Satisfaction

From the literature study results we will get owner performance variables. The variables are then grouped into eight parts. These variables are the performance variables of the team owner including the consultant who is authorized to carry out the owner’s duties.

TABLE 1: Owner Performance Variables Determine Contractor Satisfaction

No	Variable	Source
Decisions Making		
1	Owner decisions are in line with the contractor (in choosing decisions, the owner always considers the ability of the contractor)	[3, 8, 15]
2	The owner is able to make decisions / solutions quickly and precisely to the problem.	[8, 15, 19]
3	Unity of opinion from the team owner (between owner, planner consultant, and MK)	[8, 15]

No	Variable	Source
Management Skill		
4	Delegation (owner gives sufficient authority to the Constitutional Court and planning consultant)	[2, 8, 20]
Owner Commitment		
5	The owner clearly monitors the productivity of the contractors.	[3, 23]
6	Owners can explain clearly their needs to contractors	[2, 19]
Understand Project Needs		
7	Owners understand the process of building construction projects in	[2, 19]
8	The owner has a clear thought set forth in the design so that there is no change in work.	[8, 10]
9	The owner is able to explain the limits of work, scope and specifications to avoid misunderstandings.	[8, 15]
Work Relations of Owners and Contractors		
10	Mutual trust in the team between owner and contractors	[1, 16, 24]
11	Capability and structure of joint work (Clarity of roles and responsibilities in the contract will be very helpful to clarify the project governance structure)	[16]
12	The owner builds team responsibilities with the contractor.	[3, 16]
Financial		
13	Conformity / reasonableness of the owner estimate value to the project cost.	[8, 15]
14	The accuracy of payment by the owner in accordance with the contract.	[2, 23]
15	Ease of payment approval for projects that do not complicate contractors.	[8, 15]
Support for Contractors		
16	Owner supports when necessary addendum	[8, 20]
17	Sufficient duration of project implementation (allocation of realistic duration of implementation)	[8, 15]
18	Land readiness to start the development process	[3, 8]
19	The owner routinely monitors progress / performance	[3, 8, 15]
20	Sufficient and timely support for information from owner	[8, 15]
21	Owner involvement in construction site safety	[3, 7, 8]
22	The owner does not interfere too much in the affairs of the contractor	[8, 15, 21]
Attitude		
23	The owner implements an agreement that has been arranged agree with the contractor if there are problems during project implementation.	[8, 15, 22]
24	The owner empathizes with the contractor's difficulties by providing alternatives, suggestions / solutions to problems that arise.	[8, 15]
25	Owners rely on integrity and honesty	[1, 15]
26	Owners are able to activate the proactive attitudes (making contractors comfortable in proposing)	[1, 15]
27	The owner respects the advice of the contractor (the owner accepts and considers the advice given by the contractor in accordance with the experience and expertise of the contractor)	[8, 15, 22]

3. Methods

For the technical data processing the Customer Satisfaction Index (method) is used CSI) and Importance Performance Analysis (IPA).

4. Customer Satisfaction Index:

There are four steps to calculating CSI:

1. Determine *Mean Importance Score (MIS)* and *Mean Satisfaction Score (MSS)*. This value is derived from the average level of importance and performance of each respondent.
2. Making *weight factor (WF)*, this weight is the percentage of MIS values per attribute to the total MIS of all attributes.
3. Make a *weighting score*. This weight is the multiplication of *Weighting Factor (WF)* with the average level of satisfaction (*Mean Satisfaction Score= MSS*)

Determine CSI. The consumer satisfaction scale that is commonly used in the interpretation of the index is a scale of zero to one or zero to one hundred.

$$CSI = \frac{\sum_{i=1}^n WSI}{5} \times 100\%$$

From the overall level of satisfaction of respondents can be seen from the criteria for the level of customer or consumer satisfaction in table 2

TABLE 2: Consumer Satisfaction Index

No	ValueIndex Value	Remarks
1	81% - 100%	Very Satisfied
2	66% - 80.99%	Satisfied
3	51% - 65.99%	Quite
4	35% - 50.99%	Less Satisfied
5	0% - 34.99%	Not Satisfied

Source: [8]

5. Importance Performance Analysis (IPA)

The stages in the method *Importance Performance Analysis* are as follows (Supranto, 2006):

1. Based on the results of the assessment of the level of importance and the results of the performance evaluation then determined the level of conformity between the level of importance and the level of client performance. The level of conformity is the result of comparing the performance / implementation score with the importance score. This level of appropriateness will determine the order in which the factors that influence client satisfaction are increased. X is the level of performance of the owner while Y is the level of importance.
2. The horizontal axis (X) will be filled by the score of the implementation level while the vertical axis will be filled by the importance level score.
3. Mapping into a Cartesian diagram.

The Cartesian diagram is a structure divided into four sections that are bounded by two lines that intersect perpendicular to the points (\bar{X}, \bar{Y}) , where \bar{X} is the average of the average score of the client's performance level and \bar{Y} is the average of the average importance level scores that affect contractor satisfaction. Furthermore, the level of these elements will be elaborated and divided into four parts into a Cartesian diagram as shown in Figure 3 below.

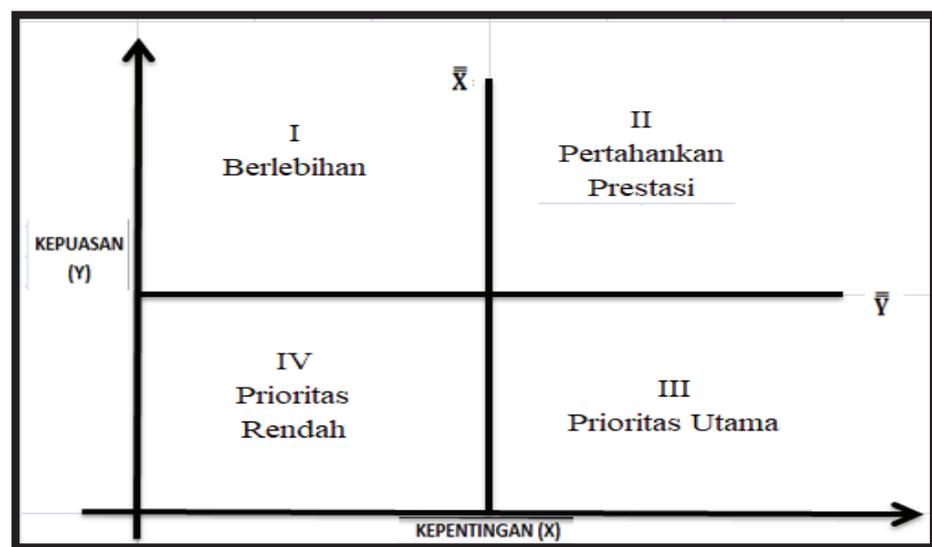


Figure 3: Concepts of a Cartesian Diagram Importance Performance Analysis (IPA) [8]

6. Results and Discussion

The index obtained using the CSI method shows that respondents (contractors) fall into the second category that is satisfied with the owner's performance and is stated in 79.94%.

While the results of the IPA show that owner performance indicators are important and also less important indicators, and there are also indicators whose implementation can satisfy the contractor, some are unsatisfactory. There are indicators that need to be improved and maintained.

The owner performance variable that is included in quadrant A is the variable that becomes the main priority to improve its implementation. Performance variables included in quadrant B are variables that have good achievements to maintain because they have high implementation and importance values. The variables included in quadrant C are variables that are included in the low priority because they are considered to be the contractor not so important and the level of implementation is also not high. While the variable in quadrant D needs to be suppressed because the level of importance is low but the implementation is excessive.

The following is a diagram of the IPA Cartesian assessment results of the contractor on the level of importance and satisfaction of the owner’s performance.

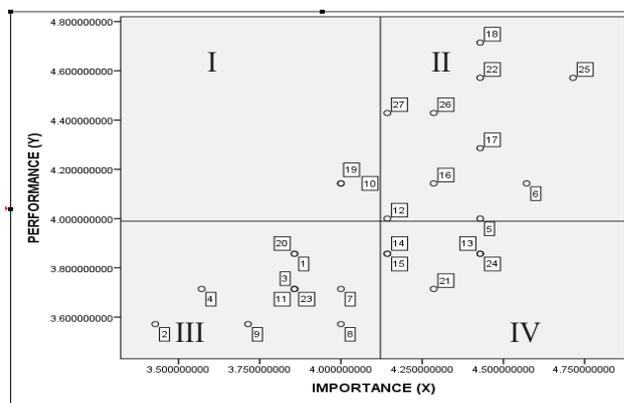


Figure 4: Cartesian Diagram Importance Performance Analysis (IPA)

Below is the description and analysis results in quadrant position Importance Performance Analysis (IPA) Cartesian diagram:

1. Quadrant I shows these variables are considered to affect contractor satisfaction with the owner’s performance, including performance elements that are considered less important by the contractor, but are not widely implemented by the owner. These variables include: Owner is able to explain the limits of work, scope and specifications well to avoid misunderstandings and mutual trust in the team between the owner and contractor.
2. Showing the variables in this awareness position, it is important to influence the satisfaction of the contractor on the owner’s performance and successfully

implemented by the owner. These variables include: Owner clearly monitors contractor productivity, Owner can clearly explain their needs to the contractor, Owner supports if necessary addendum, Adequate duration of project implementation (realistic allocation of implementation duration), Land readiness to start the development process (eg: no dispute), Owner is not too interfering in the affairs of the contracting area, Integrity and honesty of the owner, Owner is able to activate a proactive attitude (making the contractor comfortable in giving proposals) and Owner respects the advice of the contractor (the owner accepts and considers the advice given the contractor in accordance with the experience and expertise of the contractor).

3. Indicating the variables in this quadrant position is considered less important effect on the contractor, and is carried out by the owner in a normal way. These variables include: The owner's decision is in line with the contractor (in choosing decisions, the owner always considers the ability of the contractor), the Owner is able to make decisions / solutions quickly and accurately to the problem, the Unity of opinion from the team owner (between the owner, consultant planner, and MK), Delegation (owner gives sufficient authority to the Constitutional Court and planning consultant), Owner understands the construction process of construction projects, Owner has clear thoughts set forth in the design so that work changes do not occur, Owner is able to explain the limits of work, scope and specifications with both to avoid misunderstanding, ability and structure of joint work (clarity of roles and responsibilities in the contract will greatly help to clarify the project governance structure), Support sufficient and timely information from the owner, and the Owner carries out an agreement agreed with the contractor if it occurs permasal during the project implementation.
4. Showing the variables in this awareness position is considered very important while the implementation is still less or less satisfying. There are six variables included in this quadrant, namely: Owner clearly monitors contractor productivity, Conformity / reasonableness of the owner estimate value of the project cost, Accuracy of payment by the owner in accordance with the contract, Ease of payment approval on government projects (ITS) or ITS regulatory flow that is not complicate contractors, Owner Involvement in Construction Site Safety (eg Participating and promoting safety awareness through the contracting team) and Owner empathizing with contractor difficulties by providing alternatives, suggestions / solutions to problems that arise.

Yong et al (2012) in their study in which the financial ability of the owner ranks first out of the 37 important factors for the success of the project in Malaysia. Then find that lack of finances and delays in payments are very important to note because they are related to the performance of the contractor later on government projects. The accuracy of payment is marked by the ease and speed of completion of the final account and the accuracy of the payment process carried out by the owner. [24]

In a study conducted by Bubshait (1992), decision making was carried out in a participatory way. Whether the participatory mechanism is effective or not depends largely on the owner. Measurement of satisfaction is done by systematically evaluating the effectiveness of the implementation of the whole project. But this satisfaction measurement related to decision making does not map in one diagram to determine the position of each research variable. [3]

7. Conclusion

The index obtained using the CSI method shows that as much as 79.94 % of building contractors feel **Satisfied** with the performance of the ITS owner. While the results of the IPA show that all sub-indicators of financial indicators (Conformity / fairness of the owner estimate value to the project cost, Accuracy of payment by the owner in accordance with the contract, Ease of payment approval on the project that does not

complicate the contractor) and one indicator of support for the contractor (Owner involvement Construction Site Safety) and one attitude sub-indicator that must be improved (Owner empathizes with the contractor's difficulties by providing alternatives, suggestions / solutions to problems that arise). The assessment of the performance of the ITS owner showed satisfactory results, this is also evidenced by the ten sub-indicators that need to be maintained in quadrant II, but in some indicators still need to be improved.

Compared with what was stated by Hatmoko et al (2016) who positioned the variable to understand the needs of the project in the quadrant that was considered important but the implementation was not satisfactory. In the sense of the study revealed that the variables related to the owner understood that the project needs to be improved or improved.

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