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VARIABLES AND INDICATORS TO MEASURE THE PERFORMANCE OF SUSTAINABLE CONSTRUCTION PROJECT MANAGEMENT OF CITY PARK

Silia Yuslim[1], Manlian R. A. Simanjuntak[2], Fermanto Lianto[3]

[1]*School Student Doctoral Program of Civil Engineering*
UNIVERSITAS TARUMANAGARA, INDONESIA *and lecture at*
UNIVERSITAS TRISAKTI, INDONESIA
[2]*Professor Construction Management*,
UNIVERSITAS PELITA HARAPAN, INDONESIA
[3]*Lecturer at Architecture and Planning Department,*
UNIVERSITAS TARUMANAGARA, INDONESIA

Abstract

City people need a quality city park. It makes the city park development project anticipate the needs of the community and the environment. Currently, city parks in Jakarta aren't qualified, because the gaps in the management of city park construction projects. The research aim is to provide a set of variables and indicators that influence the pre-construction stage of managing a sustainable City Park construction project to measurement city park project cost performance and quality, as a reference for increasing the achievement of city park functions. This study applies a combination of Soft System Methodology (SSM) and Hard System Methodology (HSM) with Focus Group Discussion (FGD) and questionnaires. This research is consultant's point of view pilot project. The research results are a set of variables and indicators for performance measurement as a basis for developing a model of sustainable city park construction projects management in future research.

Keywords: city park; construction project management performance; sustainable

[1] Corresponding Author, Email: siliayuslim@trisakti.ac.id

INTRODUCTION

The increase in population and the magnitude of the flow of urbanization causes many changes in green land in urban areas to change functions to meet the population's needs. The City Park is one of the green areas needed by a city to improve the quality of life of its people. In comparison, City Parks is one of the green areas required by a city to improve the quality of life of its people. City parks are also public goods (public goods) used as a forum for the public to engage in outdoor activities without paying, providing services for the public interest. In addition, the City Park provides a forum for community interaction, a healthy environment and can improve community welfare (Pakzad & Osmond, 2016; Firmansyah, Soeriaatmadja, & Wulanningsih, 2017). City Parks in Jakarta are also expected to play an optimal role as public goods. Minister of Public Works Regulation No. 5/PRT/M/2008 concerning Guidelines for Provision and Utilization of Green Open Space in Urban Areas outlines that the functions of city parks are ecologically, economically, socio-culturally, aesthetically and mitigating.

City parks in Jakarta have not yet fully functioned according to the functions stated in the Minister of Public Works Regulation No. 5/PRT/M/2008. Many City Parks are not maintained. Damaged play facilities and lack of shelter in several parks are Kalijodo Park (Filani, 2017). The misuse of several parks as places of sexual intercourse can be seen from the discovery of condom waste in the park, plus vandalism and damage to pedestrian paths (Anugrahadi, 2019). Finally, it causes people to be reluctant to visit the park. Misuse of park functions, damage, and vandalism are caused by a lack of community ownership and sub-optimal maintenance. All of this shows that there are problems in the management of the City Park construction project implementation. This situation further causes the sustainability of the City Park to be unattainable. As a result, City Parks become inaccessible and inclusive and have not played a role according to the expected function.

This research is a continuation of previous research that examines the condition of the management system of city park construction project management and is part of a more extensive series of research, namely "Management Model for Sustainable City Park Construction Project Implementation in Jakarta. The results of previous studies indicate that the weakness of the city park construction management system lies in the management of the pre-construction stage, and the involvement of stakeholders is not optimal. Therefore, this paper aims to provide a set of variables and indicators that can measure the performance of urban park construction project management that can be used as a reference for increasing its success.

Research relevant to this research has discussed: 1) measuring the green open space success performance for its functions achievement (Firmansyah,

Soeriaatmadja, & Wulanningsih, 2017; Hui, Lim, Lee, Zakaria, & Keng, 2017); 2) elaboration of green open space management criteria that combine criteria from previous research (based on literature studies) (Pakzad & Osmond, 2016); 3) the need for collaborative management and interdisciplinary approaches to achieve the sustainability of a landscape (Opdam, 2018). The visible gap is that no research has revealed the quality performance measurement and cost performance of the management of urban park construction project implementation, which is more focused on the pre-construction stage. Therefore, the research aims to provide a set of variables and indicators to measure the performance of city park construction project management, especially at the pre-construction stage, which has gone through validity and reliability tests based on the results of a limited questionnaire distribution (Pilot Project). These variables and indicators can build a management model for implementing a sustainable urban park construction project in Jakarta.

THEORETICAL REVIEW

A city park construction project is a series of activities to achieve predetermined targets in a limited period and use specific resource allocations. Each project has a specific pattern as the main characteristic of the project and is known as the Project life cycle. A cycle projects activities series that begins with an initial idea until the project is declared complete and grouped into stages of project development activities so that suitable control can be carried out (Sanchez, 2017). Each stage of development must pay attention to management actions, project procedures, stakeholder competencies, project internals, and project externals (Alias, Zawawi, Yusof, & NM, 2014). The stages in the project cycle are grouped into four stages, namely the Conception Stage, Planning Stage, Execution Stage, and Operation Stage.

Each stage of development must pay attention to management actions, project procedures, stakeholder competencies, project internals, and project externals (Faisal, 2019) which is in line with the needs of an Eco-city, it is necessary to determine the definition and target of budget, management, supervision, and regulatory/ policy support (Liu, Lau, & Lin, 2018), related to the sustainable management of a City Park. This is described in two essential documents produced at this stage (Sanchez, 2017). The first documents are Project Charter (project requirements), Goal Project (agreements from stakeholders), Product Description, Risk, Stakeholder Responsibility, Project Budget, and Duration Prediction. The second document, the Stakeholder List, defines who is involved in a project so that coordination can be carried out to provide direction for the design of the City Park (Opdam, 2018). Stakeholder involvement is beneficial for enhancing the project's character (City Park).

Community involvement from the planning stage (Geberemariam, 2016; Yuslim, 2019) can provide input on design considerations and build a strong sense of affection and ownership for City Parks and solutions for achieving sustainability (Kumar, Lodha, Mahalingam, Prasad, & Sahasranaman, 2016). This effort can indirectly save maintenance costs. These savings are necessary considering that these costs are continuous (Herman, Sbarcea, & Panagopoulos, 2018). City Park construction projects must also consider maintenance costs keeping in mind. The government can facilitate the community's involvement and other stakeholders so that development outcomes positively improve the neighbourhood's quality of life (Stefano, Endayani, & Sadono, 2021; Hersperger, Burgi, Wende, Bacau, & Gradinaru, 2021). Stakeholder involvement can also take the form of support from the private sector. In this regard, two essential factors out of five must be considered for its success: effective project management and a complete and profitable legal and regulatory framework (Nguyen, Likhitruangsilp, & Onishi, 2020).

The planning Phase is a Project Management Plan that describes the Project Scope and activities to complete a project. Its activities include the preparation of the Term of Reference (TOR) as a guide for the success of a design; details of work units, work sequences, resource estimates, duration estimates, and project schedule finalization as the basis for determining the estimated cost of each activity; preparation of quality management plans with product conformity inspection devices against General and Technical Specifications (Sanchez, 2017); various planning (human resources, communication between stakeholders and risk management). At this stage, design guidelines and operational principles are also needed to refer to the three pillars of sustainability. Guidelines must be applied in the design process, understood by the designer, and implemented according to their respective scale levels (Klemm, Lenzholzer, & Brink, 2017). This is necessary considering that construction activities significantly impact three pillars of sustainability: ecology/ environment, economy, and socio-culture (Wirahadikusumah, Abduh, Messah, & Aulia, 2021).

The project execution/implementation stage is the stage for controlling the schedule, budget, and quality control as the main tasks. This step is carried out to monitor the implementation of the project so that it can be completed according to the planning document. This is intended to achieve the quality and cost performance of the City Park construction project in improving the quality of health and the surrounding environment (Sugiyama, 2013; Grunewald & Behnisch, 2019). The last stage is the operation stage, which are the operational and maintenance activities of the project's products. Project performance illustrates how the project works by comparing the actual work results with the estimated workings of the work contract agreed by the parties who signed the

contract. Construction project performance indicators can be divided into (Ling, Low, Wang, & Lim, 2009; Sufa, 2010):

1) Objective construction project performance indicators, including time, cost, occupational health, and safety, as well as possible project benefits.
2) Subjective construction project performance indicators, including quality, technical performance, functions achievement, productivity, stakeholder satisfaction, and sustainability.

Determination of variables and performance indicators of urban park construction project management in this study focuses on the process at the Preconstruction stage related to the completeness and quality of its implementation with benchmarks from one subjective indicator, namely the achievement of functions, as well as one of the objective factors, namely cost. Based on the previous research, literature review result, and the design criteria of the 2019 RTH Development and Development Guidebook in DKI Jakarta, the variables of urban park construction project management to measure cost performance are Pre-construction Stage Management, Completeness of Planning Documents, Cost Estimated, Technical Standards for Sustainable Landscape Design Criteria, and Stakeholder Engagement.

In this study, performance measurement of sustainable urban park construction management was carried out on quality performance and cost performance. The benchmark for City Park quality performance achievement is carried out on three pillars of sustainability, such as ecological function (environmental), economic function, and socio-cultural. The cost performance benchmark increases the actual project cost of < 10% of the initial contract cost based on Presidential Regulation No. 16/2018 concerning Government Procurement of Goods and Services.

METHODOLOGY

Research Method

By looking at the management of the City Park construction project as a system, this research method will also use a combination of Soft System Methodology (SSM) and Hard System Methodology (HSM). SSM uses a holistic approach to solving complex and unstructured problems (Eriyatno, 2013). In contrast to other methods included in HSM, SSM is used for build systems to resolve ambiguous problems. SSM uses a seven-step approach.

Researchers have widely used SSM as a method or approach. The utilization of SSM as a method or approach is applied in multiple areas, including the field of education management and administration, management and organizational studies (Wang, Liu, & Mingers, 2015), human resource

development (Fadhil, Maari, Bantacut, & Hermawan, 2017) organizational performance improvement, organizational policies (Henggeler, Dias, Dantas, Mathias, & Zamboni, 2016). SSM is also used in dealing with environmental problems. However, SSM should be equipped with a quantitative systemic methodology and a numerical database with HSM to make the decision-making objectives more structured and measurable. HSM is a critical thinking methodology that utilizes various numerical techniques and operational research. The methodological phase in this study is described in Fig. 1.

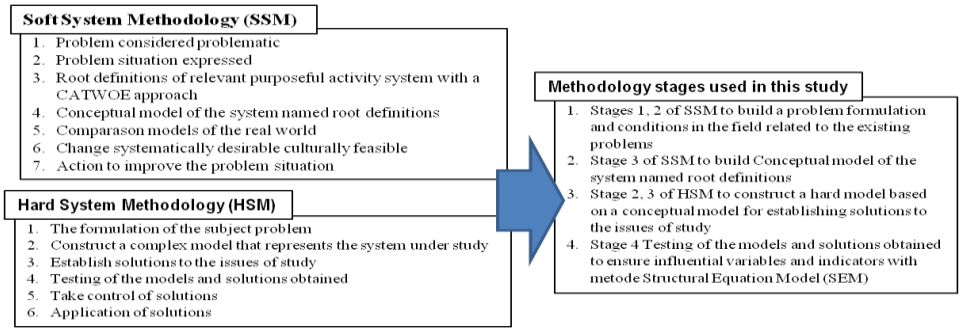


Figure 1. Research Phase
Source: Researcher Document (Authors, 2021)

SSM is used to conduct social studies on a group or situational organization. A systems approach is needed to examine the relationship between problem situations and the real world (Checkland & Poulter, 2010). SSM helps understand the field problems, formulate them and present them through rich pictures. Relate the issue to the existing system to find a root definition that can explain the problem's process. It would test with CATWOE analysis. This step serves as the basis for building a conceptual system model for each system described. In this study is the management system for implementing the City Park construction project. Conceptual models can help understand problems in the field and provide steps for solving them (Zuniawan & Sriwana, 2019). Based on the conceptual model, a questionnaire was compiled, and then a Focus FGD was conducted to validate it. After that, using the Structural Equation Model (SEM) method, a hard system model was built to predict it through the Pilot Project. SEM with Smart PLS is two analytical tools taken from econometrics, namely simultaneous equations that focus on latent variables (variables that cannot be measured directly) measured through the indicators (Ghozali & Latan, 2015).

Sampling Technique

Sampling techniques are based on specific criteria or considerations related to population characteristics, needs, and research objectives, called purposive

sampling. The City Park sample in this study was determined based on the following criteria:

1) Environmental parks and regional parks with an area of 0.5 – 5 Ha have been upgraded to City Parks based on the scale of service and ease of visitor accessibility
2) City Parks that the developer does not manage
3) Newly renovated City Parks (less than five years) and City Parks that are planned to be renovated

Based on these criteria, there are 10 City Parks in Jakarta, which are sampled in this study, namely 2 City Parks in Central Jakarta (Menteng Park and Suropati Park); 2 City Parks in East Jakarta (Salix Park, Picnic Park, and Bamboo Park); 2 City Parks in South Jakarta (Langsat Park, and Casuarina Park); 2 City Parks in North Jakarta (Kalijodo Park dan Bintaro Park); and 2 City Parks in West Jakarta (Cattleya Park and Wijayakusumah Park). This research was conducted as a pilot project involving 30 respondents (Creswell, 2014) to answer the questionnaire about the management system for implementing the City Park construction project, especially the pre-construction stage to measure the performance of urban park construction project management. The selected respondents are expert consultants with the following criteria:

1) Work experience in garden green open space construction projects > 5 years
2) Has handled a city park construction project

Research Instruments

The research measuring instruments used in this study are Focus Group Discussions (FGD), which is an in-depth interview conducted by researchers with a group of people (3-12 people) together in a meeting at the same time to validate the questionnaire. Validity testing is done by testing construct validity by asking whether the questions in the questionnaire are in accordance with the scientific concept in question, called expert judgment, total 3 people, through the FGD process, with the following criteria: government representatives (Head of the Park Planning Section of the Parks Division of the City Park and Forest Service) as a client and manager, with minimum 10 years work experience; consultant representatives (Director of Urban Plus Landscape Architecture and Secretary-General of the Indonesian Association of Landscape Architects), with minimum 10 years work experience, have handled at least 5 City Parks and have a certificate of expertise in Main Landscape Architects; and academic representatives (permanent Lecturer of the Landscape Architecture Study Program at Trisakti

University), with minimum 10 years work experience and certified as Intermediate Landscape Architect.

Questionnaire is a data collection technique conducted on respondents by using a set of questions or statements with a benchmark answer set in the category of strongly agree with a value of 5; category agrees with a value of 4; undecided/neutral category with a value of 3; the category does not agree with a value of 2, and the category strongly disagrees with a value of 1.

The Research Data Analysis

Analysis was carried out after the hard system model had been built to test the validity and reliability of the data obtained. The validity test is carried out to see how far the determination and accuracy of a measuring instrument in carrying out its measuring function are. Test reliability (reliability) is an index that shows the extent to which a measuring instrument can be trusted or relied on. Reliability testing is carried out to see whether the instrument can measure something measured consistently from time to time and to see how far a measuring instrument can be trusted or reliable in measuring what will be measured (Nurgiyantoro, 2012). In this study, the distribution of the questionnaire was carried out in a limited manner as a Pilot Project to be then tested for its feasibility related to the suitability of the model with field conditions as well as the validity and reliability of the questionnaire conducted with the Smart PLS (Partial Least Square) software as well Convergent Validity, Discriminated Validity, Composite reliability, and Cronbach's Alpha.

RESULTS

SSM phase on Unstructured Problems (Reality of City Park Project Construction Management in Jakarta) to Arranging Identified Problems Identified in Rich Picture

Results In the SSM-based action, the research provided an overview of the management of the City Park construction project implementation in Jakarta. Based on the results of discussions with the actors involved, it can be seen that implementing the City Park construction project, stakeholder involvement, and general guidelines related to the elaboration of sustainable landscape design has been carried out. Still, as a result, City Parks have not functioned optimally and are not sustainable. The interrelationship of roles between actors, the existing regulatory roles, and the implementation process in the field is reflected in the Rich Picture in Figure 2.

The number of activities that are not carried out optimally at the planning preparation stage, including the absence of a study for determining the direction of City Parks design, clarity regarding the scope of the project, the time allocation provided for the City Park construction project, as well as optimal

stakeholder involvement caused activities at the planning stage to not be carried out correctly. As a further consequence, the construction phase also did not go well. Another problem revealed from the interviews and in-depth discussions with the supervisory consultant were the mismatch between stakeholder expectations for green space and the available budget. This causes the necessary design adjustments that affect the quality of the City Park. In the end, the existing City Park cannot function optimally and operate correctly.

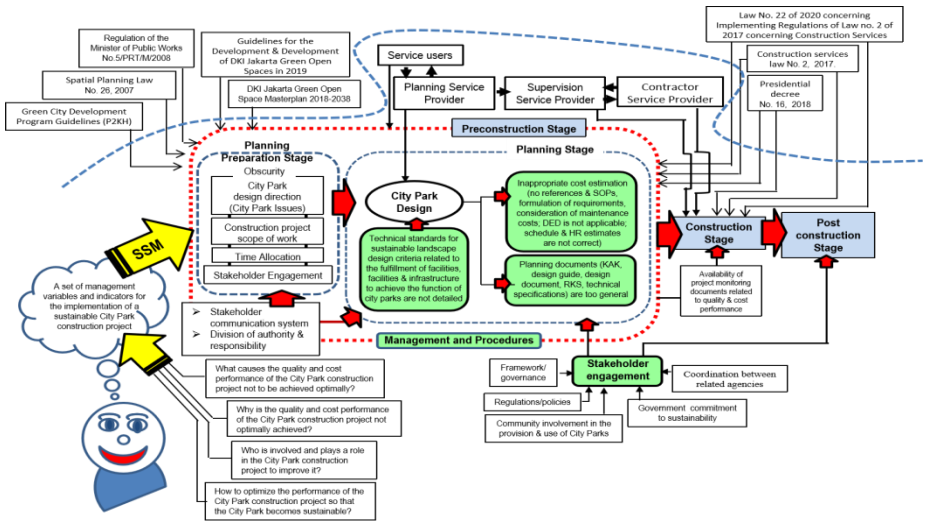


Figure 2. Rich Picture of City Park Project Construction Management in Jakarta
Source: Researcher Document (Authors, 2021)

SSM phase on Formulation Root Defining: Sustainable Urban Park Construction Project Management in Jakarta

At this phase, a Root Definition is carried out, focusing on Jakarta's City Park construction project management, especially the pre-construction stage. Management of the pre-construction stage that was not carried out correctly and the unavailability of a guide to the description of sustainable landscape design resulted in inadequate planning documents, and cost estimates could not be carried out correctly. This ineffectiveness is further complicated because stakeholder involvement cannot be carried out optimally. This needs to be improved to improve the quality performance and cost performance of the City Park construction project, which ultimately can achieve a sustainable City Park. In SSM, Root Definitions are checked for accuracy through CATWOE Analysis as shown in Table 1, which consists of Customers, Actors, Transformation Process, World View, Owner, and Environmental Constraint.

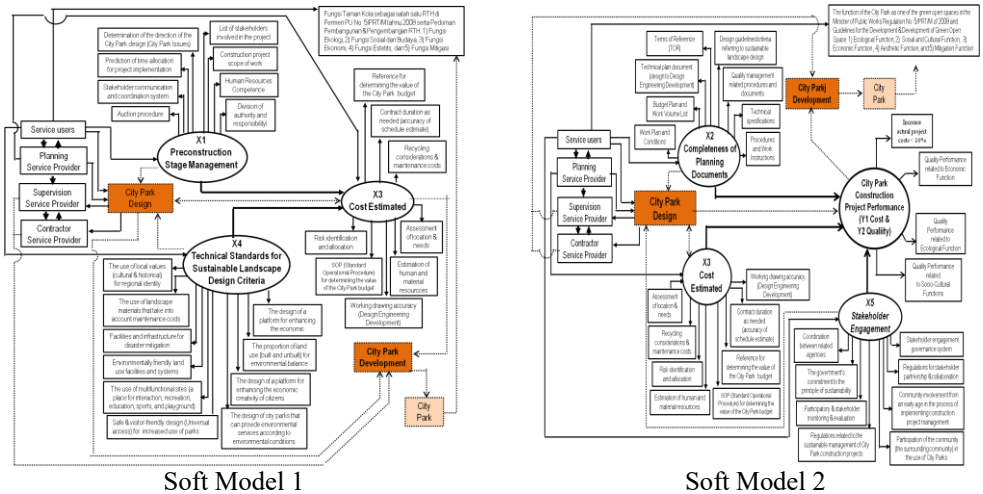
Table 1: CATWOE Analysis

Customer Actors	Community, Department of Parks and Urban Forests, Sub-Department of Urban Parks and Forests, Ministry of Public Works and Public Housing (Service Users); Consultant, Contractor (Service Provider)
Transformati-on	Ineffective management of the implementation of the City Park construction project in Jakarta
Welt (Worldview)	A set of variables and indicators for the management of a sustainable City Park development project to improve the performance of a City Park development project in Jakarta
Owner	Jakarta City Parks and Forests Service; Sub-dept. of City Parks and Forests; and the Ministry of Public Works and Public Housing
Environment	Regulations, availability of funds, time, stakeholder needs, Green City Construction and Development Program, and the environment

Source: Researcher Document (Authors, 2021)

SSM phase on Formulating a Conceptual Model

In formulating a conceptual model, three phases of research are needed. The first soft model phase describes and explains implementing a City Park construction project in Jakarta regarding the variables and indicators. The second soft model phase describes and explains the quality and cost performance of the City Park construction project in Jakarta to the variables and indicators that become the benchmarks. The third soft model phase describes a comprehensive model, which combines the two soft models, namely the model produced in the soft model phase 1 and soft model phase 2 (Fig. 3).



Soft Model 1 Soft Model 2

Figure 3. SSM Research Phase of Implementation Management City Park Construction Projects in Jakarta

Source: Researcher Document (Authors, 2021)

The soft model phase 1 was built to explain implementing the City Park construction project, especially the pre-construction stage. At this stage, a reasonable cost estimation variable is measured by indicators of completeness of activities and available documents. These variables are also influenced by pre-construction stage management variables and technical standard variables for sustainable landscape design criteria, with their respective indicators as the basis for City Park design needs.

The soft model phase 2 was built to describe the variables and indicators that affect the Pre-Construction stage. Cost estimation variables, completeness of planning documents, stakeholder involvement and their respective indicators affect the cost performance and quality of the City Park construction project. The soft model phase 3 (Fig.4) aims to build a new model as a comprehensive soft model by combining the phase 1 and 2 models into a unified model so that the influence between one variable and another can be seen. There are 5 variables of urban park construction project management to measure cost and quality performance, such as Pre-construction Stage Management (X1) with 8 indicators, Completeness of Planning Documents (X2) with 8 indicators, Cost Estimated (X3) with 8 indicators, Technical Standards for Sustainable Landscape Design Criteria (X4) with 10 indicators, and Stakeholder Engagement (X5) with 8 indicators. This model is built as the basis for building the hard model in the next phase.

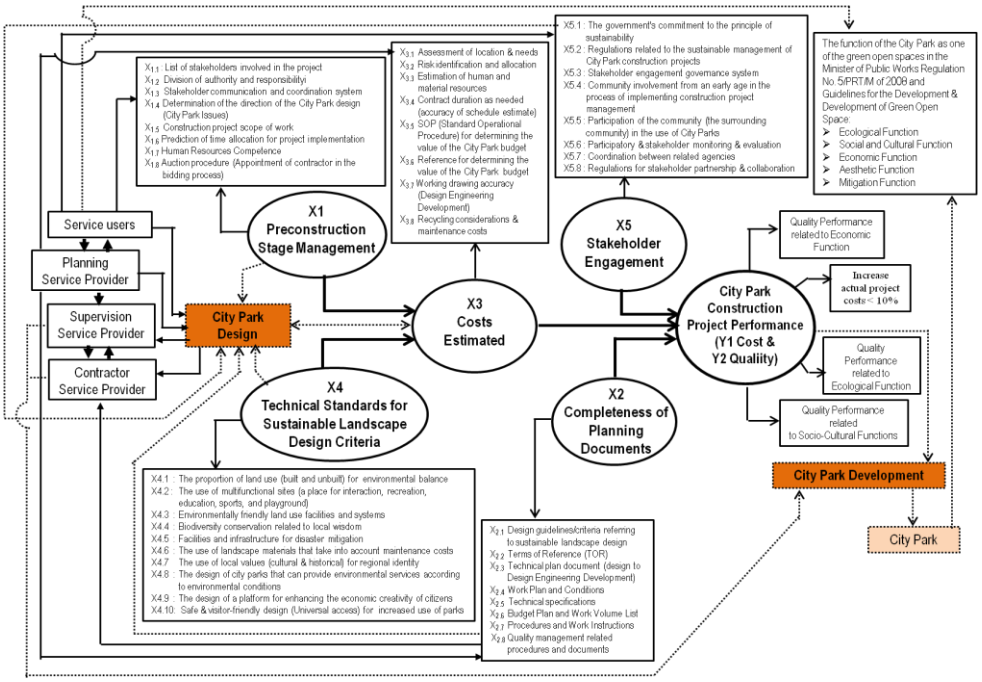


Figure 4. The Soft Model 3 of the Conceptual Model of Management for the Implementation of a Sustainable City Park Construction Project in Jakarta
Source: Researcher Document (Authors, 2021)

In Figure 4, it can be seen that there are variable of pre-construction stage management, guidelines for the elaboration of sustainable landscape design, cost estimates, completeness of planning documents, and stakeholder involvement in the management of the implementation of a sustainable City Park construction project; as well as the cost performance variables and the quality of the City Park construction project. These variables are influenced by their respective indicators.

HSM to construct a hard model by Structure Equation Model (SEM) based on a conceptual model for establishing solutions to the issues of study based on Conceptual Model

The hard model was built by looking at the relationship between the City Park construction project (Fig. 5) on the quality performance and cost performance of the City Park construction project. Then it is used to analyze the influence of the indicators of each of these variables. Data analysis used Smart PLS.

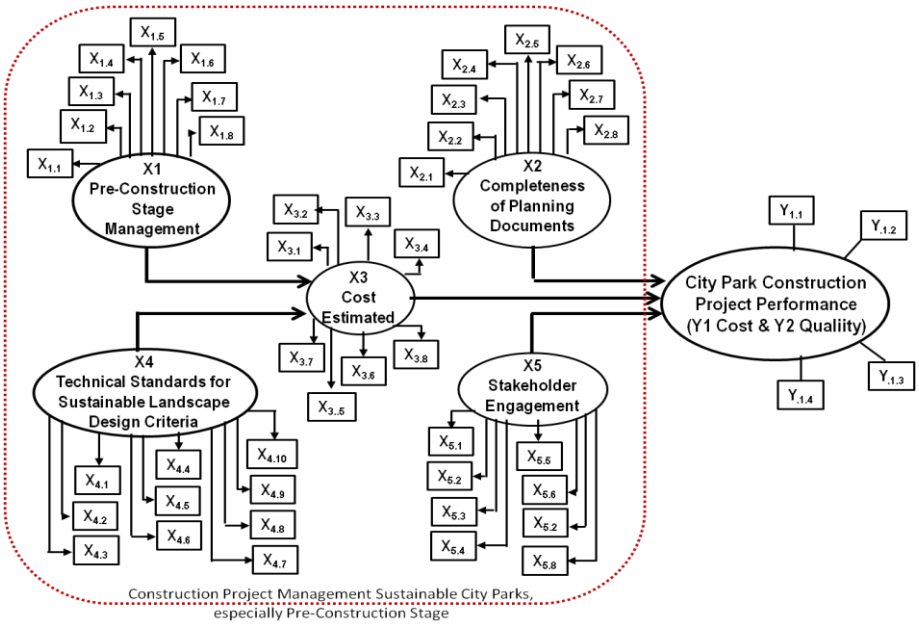


Figure 5. Hard Model Based on Conceptual Model
Source: Researcher Document (Authors, 2021)

DISCUSSIONS

The data obtained from the Pilot Project is tested in a hard model simulation (Fig. 5) that has been built to test whether the model results. Variables and Indicators Management Model for the Implementation of a Sustainable City Park Construction Project in Jakarta has the power to answer the actual phenomenon. Smart PLS will analyze the data validity and reliability.

Convergent validity from initial research studies with reflexive indicators is seen from the correlation between indicator scores and construct scores. With a correlation value > 0.70, individual indicators are considered reliable. Loading 0.50 - 0.60 at the research of the scale development stage is still acceptable (Ghozali & Latan, 2015). In this research, all indicators have a loading above 0.60. The Smart PLS output for the loading factor shows that the outer loading value of all indicators of the Preconstruction Stage Management variable (X1) ranges from 0.827 to 0.951; 0.780 to 0.950 for all indicators of the Completeness of Planning Documents variable (X2); 0.801 to 0.928 for all indicators of the Cost Estimated variable (X3); 0.780 to 0.932 for all indicators of the Technical Standards for Sustainable Landscape Design Criteria variable (X4); 0.805 to 0.928 for all indicators of the value of the outer loading of all indicators of the Stakeholder Engagement variable (X5); and 0.816 to 0.960 for all indicators of the City Park Construction Project Performance variable (Y).

Based on that, it is known that all research indicators have an outer loading value > 0.7. Initial data processing shows that all variables' indicators are valid for research and for further analysis.

Discriminant validity can be assessed based on the square root of the Average Variance Extracted (AVE) with a recommended value > 0.5 (Ghozali & Latan, 2015). Based on the data processing, the Preconstruction Stage Management variable (X1) has an AVE value of 0.800; 0,756 for the Completeness of Planning Documents variable (X2); 0,786 for the Cost Estimated variable (X3); 0,769 for the Technical Standards for Sustainable Landscape Design Criteria variable (X4); 0,760 for the Stakeholder Engagement variable (X5); and 0,785 for the City Park Construction Project Performance variable (Y). Thus, each variable has good discriminated validity because all research variables have met the recommended value. It means each variable in this research has a good constituent indicator.

The next test is the composite reliability of the indicator block that measures the construct. The construct will reliable if the composite reliability value > 0.60 (Ghozali & Latan, 2015). The data processing results show satisfactory composite reliability results. The Preconstruction Stage Management variable (X1) has a composite reliability value of 0.970; 0,961 for the Completeness of Planning Documents variable (X2); 0,967 for the Cost Estimated variable (X3); 0,971 for the Technical Standards for Sustainable Landscape Design Criteria variable (X4); 0,962 for the Stakeholder Engagement variable (X5), and 0,936 for the City Park Construction Project Performance variable (Y). Composite reliability value of all constructs > 0.60. This means that each variable has a high level of reliability.

Cronbach's alpha value can strengthen the reliability test with composite reliability. A variable can be declared reliable or fulfilled if the value of Cronbach's alpha > 0.7 (Ghozali & Latan, 2015). The result of processed data show that the Cronbach's alpha value of the Preconstruction Stage Management variable (X1) is 0.964; 0,954 for the Completeness of Planning Documents variable (X2); 0,961 for Cost Estimated variable (X3); 0,968 for the Technical Standards for Sustainable Landscape Design Criteria variable (X4); 0,956 for the Stakeholder Engagement variable (X5); and 0,908 for the City Park Construction Project Performance variable (Y). This shows that each research variable has a high level of reliability.

The questionnaire's validity and reliability tests, variables, and indicators have high validity and reliability. That is, the variables and indicators can be trusted under the conditions in the field. Thus, this study has 5 variables that influence the management of the City Park construction project in Jakarta, namely Preconstruction Stage Management (X1), Completeness of Planning Documents (X2), Cost Estimated (X3), Technical Standards for Sustainable

Landscape Design Criteria (X4), and Stakeholder Engagement (X5). Each variable has 8-10 indicators that support its construct. In addition, this study also has a variable City Park Construction Project Performance (Quality and Cost) as a benchmark for achieving management implementation.

CONCLUSIONS

Based on the Smart PLS analysis results, five variables influence the management of a sustainable City Park construction project, namely Preconstruction Stage Management, Completeness of Planning Documents, Cost Estimated, Technical Standards for Sustainable Landscape Design Criteria, and Stakeholder Engagement. Of these five variables, 42 indicators can be used as a reference in measuring the quality and cost performance of the City Park construction project. The research results can be used as a basis for developing a management model for implementing a Sustainable City Park construction project in Jakarta in future research.

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