PERFORMANCE INDEX MODEL OF MAIN STRUCTURE (CASE STUDY IN IPDMIP)

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ABSTRACT

Purpose: This research intends to build a performance index model of main structure by case study in IPDMIP.

Theoretical reference: It is important to evaluate the percentage weights of 6 (six) variables in the Irrigation System Performance Index (ISPI) assessment so that irrigation managers get assessment results close to actual conditions in the field, improving the quality of irrigation system management.

Method: The methodology or the main structure model in this study was analyzed by using SEM-PLS software and GRG analysis. The selection of a research location in the Central Authority Irrigation Area was by considering the same data availability as previous research. In this research, the author used the Smart-PLS (Partial Least Squared) application to analyze and reduce variables, which were then analyzed again using the GRG (Generalized Reduced Gradient) method to calculate non-linear equations.

Result and Conclusion: The result shows that in this equation, there is only 1 (one) variable, 3 (three) dimensions, and 13 (thirteen) indicators analyzed. After analyzing with SEM PLs, followed by GRG (Generalized Reduced Gradient) analysis with the solver in Microsoft Excel, changes in variable weights occur, so the new model equation for the main structure performance index (Y) is 0.348, with structure body dimensions of + 0.492 and door & gear to operate of +0.160. Mud Bags and drain doors apply to the Central Authority.

Implication of research: Based on the results of previous research, where the assessment weight of the variable of the main irrigation network (with a weight of 0.744) is greater than the tertiary irrigation network (with a weight of 0.256).

Originality/ value: the role of the main irrigation network is more dominant in channeling water from the intake to the tertiary irrigation network. However, previous research has not been completed since the main structure still has a level below it and has not been included in the scope of previous research.

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MODELO DE ÍNDICE DE DESEMPENHO DA ESTRUTURA PRINCIPAL (ESTUDO DE CASO EM IPDMIP)

RESUMO

Objetivo: Esta pesquisa pretende construir um modelo de índice de desempenho da estrutura principal por estudo de caso em IPDMIP.

Referência teórica: É importante avaliar os pesos percentuais de 6 (seis) variáveis na avaliação do Índice de Desempenho do Sistema de Irrigação (ISPI) para que os gestores de irrigação obtenham resultados de avaliação próximos das condições reais no campo, melhorando a qualidade da gestão do sistema de irrigação.

Método: A metodologia ou o modelo de estrutura principal deste estudo foi analisado utilizando o software SEM-PLS e a análise GRG. A seleção de um local de pesquisa na Área de Irrigação da Autoridade Central foi feita considerando a mesma disponibilidade de dados de pesquisas anteriores. Nesta pesquisa, o autor usou o aplicativo Smart-PLS (Parcial Least Square) para analisar e reduzir variáveis, que foram então analisadas novamente usando o método GRG (Generalized Reduced Gradient) para calcular equações não-lineares.

Resultado e Conclusão: O resultado mostra que nessa equação há apenas 1 (uma) variável, 3 (três) dimensões e 13 (treze) indicadores analisados. Depois de analisar com SEM PLS, seguido pela análise GRG (Generalized Reduced Gradient) com o solver no Microsoft Excel, ocorrem alterações nos pesos variáveis, de modo que a nova equação do modelo para o índice de desempenho da estrutura principal (Y) é 0,348, com dimensões do corpo da estrutura de + 0,492 e porta & engrenagem para operar de +0,160. Sacos de lama e portas de drenagem aplicam-se à autoridade central.

Implicação da pesquisa: Com base nos resultados de pesquisas anteriores, onde o peso de avaliação da variável da rede de irrigação principal (com peso de 0,744) é maior que a rede de irrigação terciária (com peso de 0,256).

Originalidade/valor: o papel da rede de irrigação principal é mais dominante no encaminhamento de água da entrada para a rede de irrigação terciária. No entanto, a pesquisa anterior não foi concluída, uma vez que a estrutura principal ainda tem um nível abaixo dela e não foi incluída no escopo da pesquisa anterior.

Palavras-chave: estrutura principal, PLS, GRG.

INTRODUCTION

The Irrigation System Performance Index, or ISPI, is an instrument for assessing the performance of irrigation systems. The irrigation system comprises water, infrastructure, institutions, human resources, and management. These five elements are interconnected with each other to form an irrigation system. Good irrigation management
is very important to achieve national food security. Irrigation systems are closely related to agricultural activities, especially in increasing plant productivity.

It is important to evaluate the percentage weight of 6 (six) variables in the ISPI assessment to help irrigation managers obtain assessment results close to actual conditions in the field and improve the quality of irrigation system management. Evaluation data can be used as consideration in decision-making, where the accuracy of the decision is based on ISPI recommendations. Irrigation system performance and irrigation asset management activities are evaluated using e-PAKSI. Based on Ministerial Regulation Number 12/PRT/M/2015, the weight of physical aspects is 45%, the weight of cultivation and management productivity is 15%, the weight of supporting facilities and farmer associations is 10%, and the weight of documentation is 5%.

ISPI activities aim to evaluate the irrigation system in an Irrigation Area every year. The ISPI assessment variables are related to each other; if there are problems, they are reflected in the ISPI score. Evaluation of Irrigation Areas needs to consider unique characteristics that differ from other irrigation areas due to geographical location, topography, population, climate, soil, and other factors. This problem can affect agricultural planting productivity, which has not been optimal. One of the causes is the decline in the condition and function of existing physical infrastructure in the Irrigation Area (Dwiyantama, 2020). An increase in the ISPI value of an Irrigation Area indicates an increase in irrigation system services and vice versa. The decrease in the ISPI value means that the efficiency and effectiveness of irrigation system management need review and improvement. The ISPI evaluation process uses 6 (six) variables to determine the quality of irrigation system management.

Currently, several studies on the assessment of the technical and non-technical weight of infrastructure have been conducted. Previous research shows that physical or technical aspects tend to have the highest weight compared to non-technical or non-infrastructure aspects. Research conducted by Suprayogi et.al. (2018) showed a drainage index with a technical aspect weight of 0.73 and a non-technical aspect weight of 0.27. Furthermore, there is research on the polder system performance index showing that the final weight results are 0.53 for technical aspects and 0.47 for non-technical aspects (Noviadriana et.al., 2020 and Purwantoro, 2021) also conducted similar research with a weight of 0.63 for physical aspects, 0.27 for social aspects, and 0.10 for regulatory aspects (Susilo et.al., 2021) carried out similar research on groundwater irrigation networks, with
a weight of 66.86% for physical aspects, 8.56% for social aspects, and 24.58% for management aspects (Kurniawan et al., 2021) completed research on four variables that influence river performance and infrastructure, namely technical (0.338), spatial (0.026), social (0.176), and regulatory variables (0.460). In previous research, the impact of ISPI patterns/trends could be seen due to rehabilitation interventions; even though the weight of physical infrastructure was 45%, it turned out that rehabilitation was not a determinant of the increase in ISPI, as evidenced by the results of the ISPI survey after rehabilitation. Moreover, each of two dominant patterns/trends in the movement of ISPI values due to rehabilitation occurred in 8 (eight) Irrigation Areas, where some of the values increased and decreased after construction. It shows that the other 5 (five) ISPI variables (planting productivity, supporting facilities, documentation, personnel, and WUA) must also receive the same attention so irrigation performance remains good and sustainable. Based on the results of previous research, where the assessment weight of the variable of the main irrigation network (with a weight of 0.744) is greater than the tertiary irrigation network (with a weight of 0.256), it is indicated that the role of the main irrigation network is more dominant in channeling water from the intake to the tertiary irrigation network (Bakti et al., 2021). However, previous research has not been completed since the main structure still has a level below it and has not been included in the scope of previous research. Therefore, the main structure model in this study was analyzed using SEM-PLS software and GRG analysis.

2 THEORETICAL FRAMEWORKS

This was a descriptive-quantitative research with primary and secondary data obtained from e-PAKSI results in 2019-2021. The same data were used for previous research in number 2 above.

a. Data Collection

This research used quantitative data collection methods. Meanwhile, the arrangement of dimensions and indicators for the main structure variables was grouped below:

i. Dimensions of the structure body consist of the following indicators:

1. Tower
2. Wings
3. Weir Floor
4. Upstream and Downstream Closing Embankments
5. Bridge (above tower/service bridge)
6. Operation Board
7. Measuring Ruler
8. Safety Fence

ii. Dimensions of the operable doors and gears consist of the following indicators:
   1. Intake Door
   2. Weir Drainage Door

iii. Dimensions of mud bag & drain doors consist of the following indicators:
   1. Mud bag structure
   2. Cleaned mud bag
   3. Operable drain door and mud bag gear

b. Research Concept Framework

3 METHODOLOGY

In this research, the author has several limitations as follows:

1. The research location was in the Central Authority Irrigation Area in the main and tertiary irrigation networks. The research location was chosen by considering the availability of data, and research on irrigation performance index models using SEM-PLS had been conducted previously.

2. This research was a continuation of previous research entitled *Performance Index Model of Irrigation (Case Study in IPDMIP)* with different variables, dimensions, and indicators. Previous research was conducted with these three levels, although the main structure indicators still have two more levels.
3. Main structure indicators were used as variables in this research, and then the two levels below were used as dimensions and indicators.

4 RESULTS AND DISCUSSION

Determination of performance index of the Main Structure was determined based on dimensions and indicators.

a. Dimensions and Indicators of Research

The dimensions and indicators in this research are:

i. Dimensions of Structure Body

Research indicators on the dimensions of the structure body (X1) are:
1. Tower (x1.1)
2. Wings (x1.2)
3. Weir Floor (x1.3)
4. Upstream and Downstream Closing Embankments (x1.4)
5. Bridge (above tower/service bridge) (x1.5)
6. Operation Board (x1.6)
7. Measuring Ruler (x1.7)
8. Safety Fence (x1.8)

ii. Dimensions of the Doors and Gears

Research indicators on the dimensions of the doors and gears (X2) are:
1. Intake Door (x2.1)
2. Weir Drainage Door (x2.2)

iii. Dimensions of Mud Bag & Drain Doors

Research indicators on the dimensions of mud bag & drain doors (X3) are:
1. Mud bag structure (x3.1)
2. Cleaned mud bag (x3.2)
3. Operable drain door and mud bag gear (x3.3)

Table 1. Data Requirements

<table>
<thead>
<tr>
<th>Data Requirements</th>
<th>Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dimensions of Structure Body</td>
<td>Data from the e-PAKSI website 2019 – 2021,</td>
</tr>
<tr>
<td>Dimensions of the Doors and Gears</td>
<td>Data from the e-PAKSI website 2019 – 2021,</td>
</tr>
<tr>
<td>i) Intake door, ii) Weir drainage door</td>
<td><a href="https://103.211.51.198">https://103.211.51.198</a></td>
</tr>
</tbody>
</table>
b. Performance Index Model of Main Structure

The condition of the irrigation performance is a unified system in which the value of function and usefulness became the reference parameter of evaluation. The value of functions and benefits become very important since the percentage of each variable – dimension – indicators need to be recalculated to get the actual conditions of the irrigation system; for example, the percentage dimension of infrastructure is the largest of other dimensions. The data that have been obtained was secondary data from all irrigation areas under a central authority. Filtering of variables is done with the smart PLS-Partial Least Squares tool. Then, an analysis is carried out using the GRG-Generalized Reduced Gradient method to solve the non-linear equation with objective-objective assumptions and constraint assumptions.

i. Statistical Analysis Using SEM PLS

This research aims to examine the variables of the main and tertiary irrigation networks on the irrigation performance index. Therefore, the analysis was carried out using the Partial Least Square (PLS) model with the SmartPLS 3 program. This research uses Partial Least Square (PLS) since this analysis method is powerful and often referred to as soft modeling because it eliminates the assumptions of the Ordinary Least Square (OLS) technique, such as the distribution of residuals that does not have to be a multivariate normal distribution. Furthermore, the sample in PLS does not have to be large and can use categorical, interval, and ordinal measurement scales in the same model (Kurniawan et.al., 2021). The model developed in this research is in accordance with Figure 1. Research Concept Chart.

The PLS results will be explained in detail as follows

1. Evaluation of the Outer Model (Measurement Model)
   a. Convergent Validity

   The first evaluation of the outer model is convergent validity. An indicator is considered to meet convergent validity if it has an outer loading value of > 0.7 (4).
Based on Figure 2, it can be seen that all remaining indicators have an outer loading value greater than 0.7. Thus, each indicator in this research has met convergent validity, and the indicators on the main structure variable can be used for further analysis.

b. Discriminant Validity

The second evaluation of the outer model is discriminant validity. To measure discriminant validity, cross-loading values can be used. An indicator is said to meet discriminant validity if the indicator’s cross-loading value for its construct is the largest compared to other constructs.

The following are the cross-loading values for each indicator on dimensions and variables:

<table>
<thead>
<tr>
<th>Table 3. Results of Cross-Loading Values on Dimensions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Structure Body</td>
</tr>
<tr>
<td>----------------</td>
</tr>
<tr>
<td>xl</td>
</tr>
<tr>
<td>xl.1.1</td>
</tr>
<tr>
<td>xl.1.2</td>
</tr>
<tr>
<td>xl.1.3</td>
</tr>
<tr>
<td>xl.1.4</td>
</tr>
<tr>
<td>xl.1.5</td>
</tr>
<tr>
<td>xl.1.6</td>
</tr>
<tr>
<td>xl.1.7</td>
</tr>
<tr>
<td>xl.1.8</td>
</tr>
<tr>
<td>xl.1.1.1</td>
</tr>
<tr>
<td>xl.1.1.2</td>
</tr>
<tr>
<td>xl.1.3.1</td>
</tr>
<tr>
<td>xl.1.3.2</td>
</tr>
<tr>
<td>xl.1.3.3</td>
</tr>
</tbody>
</table>

Source: Analysis Results, 2023
Based on Tables 3 and 4, it is known that the cross-loading value of each indicator for its construct is the largest compared to other constructs. Thus, it can be said that the indicators used in this research have good discriminant validity in compiling their respective variables.

c. Composite Reliability

The final evaluation of the outer model is composite reliability. Composite reliability tests the reliability value of indicators on a construct. A construct or variable is said to meet composite reliability if it has a composite reliability value > 0.7.

The following are the composite reliability values for each construct:

<table>
<thead>
<tr>
<th>Constructs</th>
<th>Composite Reliability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mud Bag &amp; Drain Door</td>
<td>0.995</td>
</tr>
<tr>
<td>Operable Doors and Gears</td>
<td>0.995</td>
</tr>
<tr>
<td>Structure Body</td>
<td>0.977</td>
</tr>
</tbody>
</table>

Table 5 shows that the composite reliability value is more than 0.7. In this way, the research model can be concluded that each variable and dimension has met composite reliability.

c. Evaluation of the Inner Model (Structural Model)

Evaluation of the Inner Model is not carried out since the test results for the first Outer Model are all fulfilled. The next stage is a causality test to determine the significance level of dimensions and indicators for variables. The influence between variables is said to be statistically significant if the p-value < 0.05. The following are the path coefficient values (original sample estimates) and p-values in the inner model:
Based on Table 6, the following mathematical equation can be created:

\[
\text{Main Structure (Y)} = 0.263 \times X_1 + 0.651 \times X_2 + 0.173 \times X_3
\]

Where:

\[
Y = \text{Main Structure Index}
\]

\[
X_1 = \text{Structure Body Dimensions}
\]

\[
X_2 = \text{Operable Doors and Gears}
\]

\[
X_3 = \text{Dimensions of Mud Bag & Drain Door}
\]

\[\text{ii. Generalized Reduced Gradient (GRG)}\]

The Generalized Reduced Gradient (GRG) method with the Solver tool in Microsoft Excel is used to find the respective weights (Kurniawan et.al., 2021)). In order to make iterative modeling of these aspects, dimensions, indicators, and boundary conditions are required, as mentioned:

\[
0 \leq X_1 \leq 100; 0 \leq X_2 \leq 100; 0 \leq X_3 \leq 100; 0 \leq Y \leq 100; X_1 + X_2 + X_3 = 1
\]

\[
x_{1,1} + x_{1,2} + x_{1,3} + x_{1,4} + x_{1,5} + x_{1,6} + x_{1,7} + x_{1,8} = I; x_{2,1} + x_{2,2} = I; x_{3,1} + x_{3,2} + x_{3,3} = I;
\]

\[
0 \leq \text{Performance Index of Main Structure} \leq 100
\]

\[\text{iii. Model of Performance Index of Main Structure}\]

\[\text{Value of Dimensions of Structure Body:}\]

\[
X_1 = 0.261 \times x_{1,1} + 0.140 \times x_{1,2} + 0.177 \times x_{1,3} + 0.158 \times x_{1,4} + 0.054 \times x_{1,5} + 0.094 \times x_{1,6} + 0.048 \times x_{1,7} + 0.068 \times x_{1,8}
\]

\[\text{Value of Dimensions of Operable Doors and Gears:}\]

\[
X_2 = 0.497 \times x_{2,1} + 0.503 \times x_{2,2}
\]

\[\text{Value of Dimensions of Mud Bag & Drain Door:}\]
The Performance of the Main Structure is as follows:

Performance Index (PI) of Main Structure \( Y = 0.348 \times X_1 + 0.492 \times X_2 + 0.160 \times X_3 \)  

iv. Value of Performance Index Model of Main Structure

The Performance Index Model of the Main Structure is obtained by calculating the average index of dimensions of the structure body, operable doors and gears, and mud bag & drain door.

Value of Dimensions of Structure Body:

\[
X_1 = 0.261 \times x_{1,1} + 0.140 \times x_{1,2} + 0.177 \times x_{1,3} + 0.158 \times x_{1,4} + 0.054 \times x_{1,5} + 0.094 \times x_{1,6} + 0.048 \times x_{1,7} + 0.068 \times x_{1,8}
\]

\[
X_1 = 0.261 \times 58.543 + 0.140 \times 57.704 + 0.177 \times 55.718 + 0.158 \times 57.446 + 0.054 \times 48.754 + 0.094 \times 39.928 + 0.048 \times 44.081 + 0.068 \times 49.370
\]

\[
X_1 = 54.158
\]  

Value of Dimensions of Operable Doors and Gears:

\[
X_2 = 0.497 \times x_{2,1} + 0.503 \times x_{2,2}
\]

\[
X_2 = 0.497 \times 57.635 + 0.503 \times 56.981
\]

\[
X_2 = 57.306
\]  

Value of Dimensions of Mud Bag & Drain Door:

\[
X_3 = 0.342 \times x_{3,1} + 0.322 \times x_{3,2} + 0.337 \times x_{3,3}
\]

\[
X_3 = 0.342 \times 28.514 + 0.322 \times 27.127 + 0.337 \times 26.910
\]

\[
X_3 = 27.528
\]  

Value of the Main Structure Index:
PI of the Main Structure \((Y) = 0.348 \times x_1 + 0.492 \times x_2 + 0.160 \times x_3 \)

Therefore, the Performance Index Model of the Main Structure has a performance index of 51.446, or moderate performance.

vi. Index Weights and Values

The magnitude of the influence of each dimension and indicator is described by the coefficient.

<table>
<thead>
<tr>
<th>No</th>
<th>Dimensions of Structure Body ((0.348))</th>
<th>Variable of Main Structure</th>
<th>Dimensions of Operable Doors and Gears ((0.492))</th>
<th>Dimensions of Mud Bag &amp; Drain Door ((0.160))</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>(x_{1.1})</td>
<td>0.261</td>
<td>(x_{2.1})</td>
<td>0.497</td>
</tr>
<tr>
<td>2</td>
<td>(x_{1.2})</td>
<td>0.140</td>
<td>(x_{2.2})</td>
<td>0.503</td>
</tr>
<tr>
<td>3</td>
<td>(x_{1.3})</td>
<td>0.177</td>
<td>(x_{3.1})</td>
<td>0.342</td>
</tr>
<tr>
<td>4</td>
<td>(x_{1.4})</td>
<td>0.158</td>
<td>(x_{3.2})</td>
<td>0.322</td>
</tr>
<tr>
<td>5</td>
<td>(x_{1.5})</td>
<td>0.054</td>
<td>(x_{3.3})</td>
<td>0.337</td>
</tr>
<tr>
<td>6</td>
<td>(x_{1.6})</td>
<td>0.094</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>(x_{1.7})</td>
<td>0.048</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>(x_{1.8})</td>
<td>0.068</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: Analysis Results, 2023

Calibration

Calibration is done by calculating the math equation of the index value through calculations with the field index value (Juwono et.al., 2019 and Ahyadi et.al., 2018). The difference between the two shows the relative error value; if the value is not greater than the specified error rate, then the model can be accepted with compliance with the calibration requirements not exceeding the specified error magnitude. After twice recalculating the solver, the Math Model of Irrigation is done, with the biggest error value of 0.004 and the smallest error value of 0.0000000%.

vii. Validation

Index values will be validated by testing the index model formula that has been produced. This validation must produce statistically qualified values (Rudyanto et.al., 2018; Sulianto et.al., 2018; Tama et.al., 2023). This test uses the t-test by comparing the t-statistics with the t-table. The calculation results show the t-count value \((-0.00137) < t\)-
table (1.645). The $H_0$ hypothesis is accepted, where the value of the average main structure has a performance index of 51.446.

c. Interpretation of the Use of the Index of Main Structure

It is essential to review the evaluation of the percentage weights of 3 (three) dimensions in assessing the main structure variables so that irrigation managers get assessment results that are close to actual conditions in the field and a form of improving the quality of irrigation system management.

Table 9 displays a comparison between operational guidelines and research results with the following description:

1. The weight of the main structure variable, which is 13, is the sum of the three dimensions below it, or equal to $4 + 7 + 2$. The weight of the main structure variable is corrected to equal 1 (one), which is the sum of the three dimensions below it, with details: the structure body, which was initially 4, becomes 0.341; the doors and gears can be operated, which were initially 7, become 0.501; and the mud bag & drain door, which were initially 2, become 0.158.

2. Changes in indicators for each dimension can be seen in Table 9.

<table>
<thead>
<tr>
<th>Operational Guidelines or Juklak (%)</th>
<th>Assessment based on Operational Guidelines (Juklak)</th>
<th>Research Results (%)</th>
<th>% Change</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Physical Infrastructure</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>45</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Main Structure</strong> (variable)</td>
<td>1000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>13</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Structure Body (dimension)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Weight</td>
<td>Indicators (%)</td>
<td>(%)</td>
<td>(%)</td>
</tr>
<tr>
<td>0.800</td>
<td>Tower</td>
<td>0.200</td>
<td>0.234</td>
</tr>
<tr>
<td>0.600</td>
<td>Wings</td>
<td>0.150</td>
<td>0.154</td>
</tr>
<tr>
<td>0.800</td>
<td>Weir Floor</td>
<td>0.200</td>
<td>0.173</td>
</tr>
<tr>
<td>0.800</td>
<td>Upstream and Downstream Closing Embankments</td>
<td>0.200</td>
<td>0.170</td>
</tr>
<tr>
<td>0.200</td>
<td>Bridge (above the tower/service bridge)</td>
<td>0.050</td>
<td>0.048</td>
</tr>
<tr>
<td>0.400</td>
<td>Operation Board</td>
<td>0.100</td>
<td>0.091</td>
</tr>
<tr>
<td>0.200</td>
<td>Measuring Ruler</td>
<td>0.050</td>
<td>0.053</td>
</tr>
<tr>
<td>0.200</td>
<td>Safety Fence</td>
<td>0.050</td>
<td>0.077</td>
</tr>
<tr>
<td>4.000</td>
<td>Total</td>
<td>1.000</td>
<td>1.000</td>
</tr>
<tr>
<td><strong>Operable doors and gears (dimensions)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Weight</td>
<td>Indicators (%)</td>
<td>(%)</td>
<td>(%)</td>
</tr>
<tr>
<td>3.500</td>
<td>Intake Door</td>
<td>0.500</td>
<td>0.500</td>
</tr>
<tr>
<td>3.500</td>
<td>Weir Drainage Door</td>
<td>0.500</td>
<td>0.500</td>
</tr>
<tr>
<td>7.000</td>
<td>Total</td>
<td>1.000</td>
<td>1.000</td>
</tr>
<tr>
<td><strong>Mud bag &amp; Drain Door</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Weight</td>
<td>Indicators (%)</td>
<td>(%)</td>
<td>(%)</td>
</tr>
<tr>
<td>0.7</td>
<td>Good Mud Bag Structure</td>
<td>0.350</td>
<td>0.338</td>
</tr>
<tr>
<td>0.6</td>
<td>Cleaned Mud Bag</td>
<td>0.300</td>
<td>0.321</td>
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</table>
5 CONCLUSIONS

This study uses SEM PLS software and GRG analysis to evaluate the ISPI equation for the main structure indicators with mathematical equations. The analysis results show that the dimension and indicator coefficients are not significantly different. Figure 1 shows that the main structure variable in this subchapter study is a derivative of physical infrastructure, which was previously an indicator. The weight value in the operational guidelines is the sum of the indicator weights, not their percentage, as seen in the arrow lines at points A, B, and C. This subchapter displays the analysis results in the rightmost column, titled Hasil Penelitian (%). The weight percentage figures are a revision of the operational weight percentages, which are not much different and only have a comma difference.

RECOMMENDATION

Based on this research, it is recommended to carry out further research to examine the correlation between the combined ISPI value and the Actual Needs for Operation and Maintenance (AKNOP) value in Central Authority Irrigation Areas.
REFERENCES


