

## EVALUATION OF PARAMETRIC COST ESTIMATES FOR THE BUDGET CEILING FOR THE CONSTRUCTION OF THE BEKASI DISTRICT ATTORNEY'S OFFICE BUILDING

By

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### ABSTRACT

*Lack of data, as well as the estimator's experience and expertise in estimating prices, can lead to inaccurate estimates. Differences between the contract value and the budget ceiling indicate the need to evaluate the accuracy of a building's cost estimate. Cost estimation evaluations are conducted to determine the results of cost estimates and improve their accuracy. Cost estimation accuracy evaluations are conducted by collecting primary data through interviews and questionnaires, as well as secondary data in the form of the budget ceiling, contractor contract value, building area and height, SHST, and related coefficients. The data obtained are analyzed using parametric methods. The parameters evaluated include: building area, cost, building classification, building type, floor height, and space program. The analysis in this study includes: analyzing the accuracy of parametric cost estimation methods against the budget ceiling value and analyzing parameters that influence cost estimation accuracy.*

**Keywords:** Evaluation, Cost Estimation, Parametric, Budget Ceiling

### EVALUASI PERKIRAAN BIAYA PARAMETRIS UNTUK BATAS ANGGARAN PEMBANGUNAN GEDUNG KANTOR KEJAKSAAN DAERAH KABUPATEN BEKASI

#### ABSTRAK

*Kekurangan data, serta pengalaman dan keahlian perencana dalam memperkirakan harga, dapat menyebabkan perkiraan yang tidak akurat. Perbedaan antara nilai kontrak dan batas anggaran menunjukkan perlunya mengevaluasi akurasi perkiraan biaya bangunan. Evaluasi perkiraan biaya dilakukan untuk menentukan hasil perkiraan biaya dan meningkatkan akurasi. Evaluasi akurasi perkiraan biaya dilakukan dengan mengumpulkan data primer melalui wawancara dan kuesioner, serta data sekunder berupa batas anggaran, nilai kontrak kontraktor, luas dan tinggi bangunan, SHST, dan koefisien terkait. Data yang diperoleh dianalisis menggunakan metode parametrik. Parameter yang dievaluasi meliputi: luas bangunan, biaya, klasifikasi bangunan, jenis bangunan, tinggi lantai, dan program ruang. Analisis dalam studi ini meliputi: menganalisis akurasi metode perkiraan biaya parametrik*

*terhadap nilai batas anggaran dan menganalisis parameter yang mempengaruhi akurasi perkiraan biaya.*

**Kata kunci:** *Evaluasi, Perkiraan Biaya, Parametrik, Batas Anggaran*

## INTRODUCTION

Every construction project has a maximum expenditure limit set to fund the activity, and this limit is called the budget ceiling. Each project has a different budget ceiling value according to its cost estimate. To obtain an accurate cost estimate, the estimation is carried out at an early stage before the project begins. Hence S. D. Doring (2014), conceptual stage cost estimation is a project cost estimate conducted before sufficient information on design details has been gathered and the scope of work is still incomplete.

In the Bekasi District Attorney's Office building construction project, data was obtained on a land area of approximately 3,980 m<sup>2</sup> and a building area of approximately 4,576 m<sup>2</sup>. This project is a building construction project managed by the Bekasi Regional Government's Housing, Settlement and Land Agency, with funding coming from the 2019 Regional Revenue and Expenditure Budget (APBD). In addition, there are other obstacles in estimating project costs, namely incomplete data, resulting in inaccurate estimates, especially in calculating building sizes. Another factor that can affect the accuracy of cost estimates is the classification of buildings that is not appropriate according to their level of complexity. All these obstacles cause cost estimates at the initial planning stage to be considered less accurate than the conditions in the field.

This approach is very useful for projects that do not have detailed data at the initial planning stage. Based on the problems described above, this study aims to evaluate the parametric estimation method for the budget ceiling for the construction of the Bekasi District Attorney's Office building. The hope of this study is to identify the variables that affect the accuracy of cost estimates, so that the accuracy of estimates at the conceptual stage for future construction projects can be improved.

## Research Methods

### 1. Data Analysis Methods

Analysis of Cost Estimation Accuracy Using

## Parametric Methods for Physical

### Construction Budget Ceilings

#### 1) Tabulation Analysis

This was conducted to determine the percentage of cost estimation accuracy against the budget ceiling. The first step was to calculate the total physical cost of the building using the following formula:

$$\text{Physical Cost} = \text{HSBGN} \times \text{Building Area}$$

$$\text{HSBGN} = \text{HPSNS} \times \text{KKB}$$

$$\text{HPSNS} = \text{Standard Cost} + \text{Non - standard Cost}$$

$$\text{Non - standard Cost} = \text{Standard Cost} \times \% \text{ Non - standard}$$

Explanation:

- HSBGN = State Building Unit Price
- HPSNS = Standard and Non-standard Work Price
- KKB = Building Height Coefficient

The calculation results can be summarized in a table, as shown in Table 2.1 below.

Table 2.1 Total Physical Cost of the Building

|                                                     |                                                              |
|-----------------------------------------------------|--------------------------------------------------------------|
| <b>Contractor Contract Value (NKK)</b>              | <b>Rp.</b>                                                   |
| <b>HSBGN</b>                                        | Rp.                                                          |
| <b>State Building Unit Price (HSBGN) /m2</b>        | NKK / Building Area (minus 10% VAT)<br>Rp.                   |
| <b>Standard Price (SHST)</b>                        | Rp.                                                          |
| <b>Non-Standard Price</b>                           | Rp.                                                          |
| <b>Non-Standard Work Percentage</b>                 | %                                                            |
| <b>Non-Standard Price (Maximum percentage 150%)</b> | (% Non-Standard Work / (SHST X Building Area)) x 100%<br>Rp. |
| <b>Standard and Non-Standard Work Price (HPSNS)</b> | Rp.                                                          |

|                                          |                              |
|------------------------------------------|------------------------------|
| <b>Building Height Coefficient (KKB)</b> |                              |
| <b>Total Physical Cost of Building</b>   | HSPNS x KKB Rp.              |
| <b>Total Physical Cost of Building</b>   | HSBGN x Building Area<br>Rp. |

Source: PUPR Regulation No. 22/2018

To determine the percentage cost of non-standard work used in calculating the percentage accuracy of cost estimates, an analysis of the non-standard percentage within the specified range is carried out. The list of non-standard work percentages is shown in Table 2.2 below:

Table 2.2 Non-Standard Work Percentages

| NO. | TYPE OF WORK                                            | PERCENTAGE INTERVAL | PERCENTAGE OF WORK |
|-----|---------------------------------------------------------|---------------------|--------------------|
| 1   | Air Conditioning Equipment                              | 7 - 15 %            | ...                |
| 2   | Elevator/Escalator                                      | 8 - 14 %            | ...                |
| 3   | <i>Solar System</i>                                     | 2 - 4 %             | ...                |
| 4   | Telephone and PABX                                      | 1 - 3 %             | ...                |
| 5   | IT (Information & Technology) Installation              | 6 - 11 %            | ...                |
| 6   | Electrical (Including Generator)                        | 7 - 12 %            | ...                |
| 7   | Fire Protection System                                  | 7 - 12 %            | ...                |
| 8   | Special Lightning Protection System                     | 1 - 2 %             | ...                |
| 9   | Wastewater Treatment Plant (WWTP)                       | 1 - 2 %             | ...                |
| 10  | Interior (including Furniture)                          | 15 - 25 %           | ...                |
| 11  | Combustion Gas                                          | 1 - 2 %             | ...                |
| 12  | Medical Gas                                             | 2 - 4 %             | ...                |
| 13  | Termite Prevention                                      | 1 - 3 %             | ...                |
| 14  | Deep Foundation                                         | 7 - 12 %            | ...                |
| 15  | Facilities for People with Disabilities & Special Needs | 3 - 5 %             | ...                |
| 16  | Environmental Infrastructure                            | 3 - 8 %             | ...                |
|     | <b>TOTAL % NON-STANDARD (AGAINST X)</b>                 |                     | ...                |
| 17  | <i>Basement/m<sup>2</sup></i>                           | 120%                | ...                |
|     | <b>TOTAL % BASEMENT (AGAINST Y)</b>                     |                     | ...                |
| 18  | Quality Improvement                                     | 0 - 30 %            | ...                |

Total % Quality Improvement (Relative To Z) ...

Source: Ministry of Public Works and Public Housing Regulation No. 18 of 2022

Explanation:

X = total physical construction cost of standard work

Y = Highest standard unit price/m<sup>2</sup>

Z = Total cost of quality improvement work components

After completing the Willermark and Isind percentages and calculating the physical cost of the building, the next step is to add the quality improvement costs. Quality improvement costs are calculated by multiplying the physical cost of the building by the quality improvement percentage. After that, analyze or calculate the total physical construction cost by adding up all physical building costs and quality improvement costs. The result is then added to 10% VAT. After adding VAT, the calculation result is rounded. The table format can be seen in Table 2.3 below:

Table 2.3 Physical Construction Costs

|                               |     |
|-------------------------------|-----|
| Total Physical Building Costs | IDR |
| Quality Improvement Costs     | IDR |
| Total Costs                   | IDR |
| 10% VAT                       | IDR |
| Total Cost + 10% VAT          | IDR |
| Rounding                      | IDR |

Source: PUPR Regulation No. 18 of 2022

The final step to determine the accuracy percentage of the budget ceiling is to calculate the difference between the budget ceiling value (HPS Owner) and the results of the revised budget ceiling analysis from the previous step. The difference is then converted into a percentage of the calculated budget ceiling value, using the following formula:

*Difference in ceiling value*

$$\% \text{ Accuracy} = \frac{\text{Difference in ceiling value}}{\text{corrected ceiling value}} \times 100\%$$

*corrected ceiling value*

The details of the data table are as shown in Table 2.4 below.

Table 2.4 Budget Ceiling Accuracy

|                                 |  |     |
|---------------------------------|--|-----|
| Budget Ceiling/HPS Owner        |  | IDR |
| Budget Ceiling Analysis Results |  | IDR |
| Budget Ceiling Difference       |  | IDR |
| Budget Ceiling Accuracy Value   |  | %   |

Source: Research Processing, 2025

## 2) Multi-Criteria Analysis

In several previous studies, various levels of accuracy were described using different measures. The author compared three levels of accuracy from previous studies, then selected one level or created a new level as a reference to determine the range of cost estimation accuracy in this study.

Table 2.5 Comparison of Cost Estimation Accuracy Ranges

| No | Author & Year                   | Title                                                                              | Range                     | Difference (%) |
|----|---------------------------------|------------------------------------------------------------------------------------|---------------------------|----------------|
| 1  | Jieh Haur Chen (2018)           | Improving Preliminary Cost Estimation in Indonesia using Support Vector Regression | -12,97%<br>s/d<br>+26,80% | ...            |
| 2  | Pingkan Syalomei Tangkau (2022) | Estimating Building Construction Costs in Manado using the Cost Significant Model  | -23,71%<br>s/d<br>+23,17% | ...            |
| 3  | M. Rizky F. Fahri (2023)        | Cost Estimation Model for School Projects using the Cost Significant Model         | -27,43%<br>s/d<br>+56,52% | ...            |

Sources: Jieh Haur (2018)<sup>17</sup>, Pingkan S. (2022)<sup>18</sup>, M. Rizky (2023)

Jieh Haur Chen (2018) states that the accuracy level of cost estimates ranges from -12.97% to +26.80%. According to Pingkan S. Tangkau (2022), the range of cost estimation accuracy is between -23.71% and +23.17%, while according to M. Rizky F. (2023), the accuracy range is between -27.43% and +56.52%.

## 3) Cost Estimate Accuracy Analysis

After obtaining the percentage of cost estimate accuracy in the data tabulation stage and selecting the accuracy range in the multi-criteria analysis stage, the next step is to determine the cost estimate accuracy category in order to find out how accurate the cost estimate evaluation results are based on the calculated percentage.

## 2. Discussion Method for Analysis Results

Discussion of the Results of the Evaluation of Cost Estimation Accuracy Using the Parametric Method Against the Physical Construction Budget Ceiling Value

1) Discussion of Data Tabulation Results

After conducting the analysis, data tabulation, and calculations, the results obtained were the percentage of accuracy of the conceptual stage cost estimates against the budget ceiling value in the construction of the Bekasi District Attorney's Office building.

2) Discussion of Multicriteria Analysis Results

After obtaining the range used in the study, the next step was to divide the range of cost estimation accuracy assessments into five categories, namely Very Inaccurate (STA), Inaccurate (TA), Accurate (A), Less Accurate (KA), and Very Less Accurate (SKA), with specific value divisions, as shown in Figure 2.1 below:

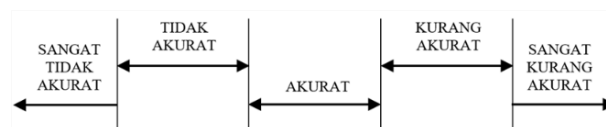


Figure 2.1 Cost Estimate Accuracy Range

Source: Budiaji, 2013

An explanation of the cost estimate accuracy category range can also be presented in tabular form, as shown in Table 2.6 below.

Table 2.6 Cost Estimate Accuracy Range

| No. | Category                 | Value |
|-----|--------------------------|-------|
| 1   | Very Inaccurate (STA)    | ...   |
| 2   | Inaccurate (TA)          | ...   |
| 3   | Accurate (A)             | ...   |
| 4   | Less Accurate (KA)       | ...   |
| 5   | Very Less Accurate (SKA) | ...   |

Source: Budiaji, 2013

3) Discussion of Cost Estimate Accuracy Analysis Results

We will discuss the grouping of cost estimate accuracy levels at the conceptual stage based on the percentage of cost estimate accuracy calculated in the previous data table. This grouping is carried out in accordance with the accuracy range selected in the study.

## Results and Discussion Results

### 1.Data Analysis Analysis of Cost Estimate Accuracy Using the Parametric Method on Construction Budget Ceiling Values

The results of the cost estimate evaluation on the construction budget ceiling values at the Bekasi District Attorney's Office building with tabulation and multi-criteria analysis are as follows: a. Data Tabulation Results To determine the percentage of budget ceiling accuracy, calculations were performed and presented in tabular form. The first step was to calculate the total physical cost of the building, then analyze the percentage of non-standard work, followed by calculating the physical construction cost, then calculating the quality improvement cost, and finally calculating the budget ceiling accuracy value. The results of the tabulation are shown in Table 3.1 below.

Table 3.1 Data Tabulation Results

|                |                                   |                                                                                                          |                                                         |
|----------------|-----------------------------------|----------------------------------------------------------------------------------------------------------|---------------------------------------------------------|
| 1.1            |                                   | Project Description                                                                                      |                                                         |
| -              | Owner                             | Housing, Settlement and Defense Agency                                                                   |                                                         |
| -              | Budget                            | 2019 Regional Budget                                                                                     |                                                         |
| -              | Building                          | Office Building                                                                                          |                                                         |
| Function       |                                   |                                                                                                          |                                                         |
| -              | Building                          | Non-Simple                                                                                               |                                                         |
| Classification |                                   |                                                                                                          |                                                         |
| -              | Work Contract                     | <i>Design-and-Build (DnB)</i>                                                                            |                                                         |
| -              | Work Period                       | 1 Fiscal Year                                                                                            |                                                         |
| 1.2            |                                   | Project Info                                                                                             |                                                         |
| -              | Project Location                  | Jl. Veteran No. 1 RT.002/RW.002, Marga Jaya, kasi<br>South Be<br>District, Bekasi City, West Java, 17141 |                                                         |
| -              | Land Area                         | ±                                                                                                        | 3.980,00 m <sup>2</sup>                                 |
| -              | Building Area                     | ±                                                                                                        | 4.576,00 m <sup>2</sup>                                 |
| -              | Floor Area Ratio (FAR)**          | 50%                                                                                                      | 762,67 m <sup>2</sup> (<FAR) 1.990,00 m <sup>2</sup>    |
| -              | Building Height**                 | 5,00                                                                                                     | 4.576,00 m <sup>2</sup> (<FAR) 19.900,00 m <sup>2</sup> |
| -              | Building Height**                 | 6,00                                                                                                     | lt. (<JLB) 10,00 Fl.                                    |
| -              | Building Height Coefficient (KKB) | 1.197,00                                                                                                 |                                                         |
| -              | Ceiling (HPS)* Owner              | 44.201.825.280,00 IDR                                                                                    |                                                         |
| -              | HPS minus 10% VAT                 | 39.781.642.752,00 IDR                                                                                    |                                                         |

| -                                                   | Highest Unit Price Standard (SHST)          | 5.000.000,00                                 | IDR                 |
|-----------------------------------------------------|---------------------------------------------|----------------------------------------------|---------------------|
| -                                                   | Contractor Contract Value (NKK)*            | 33.336.416.000,00                            | IDR                 |
| -                                                   | NKK <sup>1</sup> 10% VAT                    | 30.002.774.400,00                            | IDR                 |
| -                                                   | NKK/HPS Percentage                          | 75,42                                        | %                   |
| <b>1.3 Budget Ceiling Evaluation</b>                |                                             |                                              |                     |
| -                                                   | Building Unit Price (HSBGN) /m <sup>2</sup> | NKK / Building Area (minus 1<br>6.556.550,35 | 0% VAT)<br>IDR      |
| -                                                   | Standard Price (HST)                        | 5.000.000,00                                 | IDR                 |
| -                                                   | Non-Standard Price                          | 1.556.550,35                                 | IDR                 |
| -                                                   | Non-Standard Price Percentage (max. 150%)   | 31,13 %                                      | (> 150 %)           |
| <b>1.4 Budget Ceiling Analysis</b>                  |                                             |                                              |                     |
| <b>a. Physical Building Cost Analysis</b>           |                                             |                                              |                     |
| -                                                   | Standard Price (HST)                        | 5.000.000,00                                 |                     |
| IDR                                                 |                                             |                                              |                     |
| -                                                   | Non-Standard Price                          | % Non-Standard Work                          |                     |
| -                                                   | % Non-Standard Work                         | 92%                                          | IDR x SHST          |
|                                                     |                                             | 4.600.000,00                                 |                     |
| -                                                   | HPSNS                                       | 9.600.000,00                                 | IDR                 |
| -                                                   | KKB                                         | 1,197                                        |                     |
| -                                                   | Total HSBGN                                 | HPSNS<br>11.491.200,00                       | IDR x KKB           |
| -                                                   | Total Physical Building Costs               | HSBGN<br>52.583.731.200,00                   | IDR x Building Area |
| <b>b. Analysis of Non-Standard Price Percentage</b> |                                             |                                              |                     |
| NO.                                                 | TYPE OF WORK INTERVAL                       | PERCENTAGE                                   | PERCENTAGE OF WORK  |
| 1                                                   | Air Conditioning Equipment                  | 7 - 15 %                                     | 11%                 |
| 2                                                   | Elevator/Eskalator                          | 8 - 14 %                                     | 10%                 |
| 3                                                   | <i>Solar System</i>                         | 2 - 4 %                                      | 3%                  |
| 4                                                   | Telephone and PABX                          | 1 - 3 %                                      | 2%                  |
| 5                                                   | IT Installation (Information & Technology)  | 6 - 11 %                                     | 8%                  |
| 6                                                   | Electrical (including Generator)            | 7 - 12 %                                     | 8%                  |
| 7                                                   | Fire Protection System                      | 7 - 12 %                                     | 8%                  |

<sup>1</sup>Percentage (max. 150%)

$HST \times \text{Building Area} \times 100\%$

|                                               |                                                         |                    |            |
|-----------------------------------------------|---------------------------------------------------------|--------------------|------------|
| 8                                             | Special Lightning Protection System                     | 1 - 2 %            | 2%         |
| 9                                             | Wastewater Treatment Installation (IPAL)                | 1 - 2 %            | 2%         |
| 10                                            | Interior (including Furniture)                          | 15 - 25 %          | 15%        |
| 11                                            | Combustion Gas                                          | 1 - 2 %            | 0%         |
| 12                                            | Medical Gas                                             | 2 - 4 %            | 0%         |
| 13                                            | Termite Prevention                                      | 1 - 3 %            | 3%         |
| 14                                            | Deep Foundations                                        | 7 - 12 %           | 8%         |
| 15                                            | Facilities for People with Disabilities & Special Needs | 3 - 5 %            | 4%         |
| 16                                            | Environmental Infrastructure                            | 3 - 8 %            | 8%         |
|                                               | <b>TOTAL % NON-STANDARD (AGAINST X)</b>                 |                    | <b>92%</b> |
| 17                                            | <i>Basement</i> 120%                                    |                    | 0%         |
|                                               | <b>TOTAL % WORK (AGAINST Y)</b>                         |                    | <b>0%</b>  |
| 18                                            | Quality Improvement 0 - 30 %                            |                    | 15%        |
|                                               | <b>% QUALITY IMPROVEMENT (TO Z)</b>                     |                    | <b>15%</b> |
| <b>c. Physical Construction Cost Analysis</b> |                                                         |                    |            |
| -                                             | Total Physical Building Cost                            | 52.583.731.200,00  | IDR        |
| -                                             | Total Quality Improvement Cost                          | 7.887.559.680,00   | IDR        |
| -                                             | Total Cost                                              | 60.471.290.880,00  | IDR        |
| -                                             | VAT 10%                                                 | 6.047.129.088,00   | IDR        |
| -                                             | Total Physical Construction                             | 66.518.419.968,00  | IDR        |
|                                               | Cost + VAT 10%                                          |                    |            |
| -                                             | Rounding*                                               | 66.518.420.000,00  | IDR        |
| <b>1.5 Budget Ceiling Accuracy Analysis</b>   |                                                         |                    |            |
| -                                             | Budget Ceiling/Owner HPS                                | 44.201.825.280,00  | IDR        |
| -                                             | Budget Ceiling Analysis                                 | 66.518.420.000,00  | IDR        |
| <b>Results</b>                                |                                                         |                    |            |
| -                                             | Budget Ceiling Difference                               | -22.316.594.720,00 | IDR        |
| -                                             | Ceiling Accuracy %                                      | -33,55             | %          |

Source: Research Compilation, 2025 Description:

(\*) = Includes 10% VAT

(\*\*) = Data from Bekasi City Spatial Planning Agency

X = Total Physical Construction Costs for Standard Work

Y = Highest standard unit price/m<sup>2</sup>

Z = Total costs for quality improvement work components

Section 1.1 of the data table contains explanations about the project, such as the project name, classification type, and project year. Section 1.2 explains information about the physical building, including the location, land area, building area, and building height, along with the coefficients. There are also the highest unit price, maximum budget, and contract value given to the contractor. Section 1.3 explains the calculation of the State Building Unit Price (HSBGN) per square meter, which can be used as the basis for calculating standard building costs.

For buildings with a height of 6 floors, a building height coefficient (KKB) of 1.197 is used. The result of the total physical building cost calculation in section 1.4.a in the table is IDR 52,583,731,200.00.

Furthermore, the results of the analysis of the percentage of non-standard work with indicators referring to Minister of Public Works and Public Housing Regulation No. 22 of 2018 are shown in section 1.4.b. The total percentage of non-standard costs is 92% with a 15% increase in quality.

The details of the physical construction costs are shown in section 1.4.c of the table, with a total cost of IDR 66,518,420,000.00. Section 1.5 shows the budget accuracy value. The accuracy level is -33.55%.

#### a. Multi-Criteria Results

A comparison of the three previous studies shows that there are differences in the range of cost estimation errors, as shown in Table 3.2 below. Table 3.2 Comparison of Cost Estimation Accuracy Ranges

| No | Author & Year                   | Title                                                                                  | Range                     |
|----|---------------------------------|----------------------------------------------------------------------------------------|---------------------------|
| 1  | Jieh Haur Chen (2018)           | Improving Preliminary Cost Estimation in Indonesia using Support Vector Regression     | -12,97%<br>s/d<br>+26,80% |
| 2  | Pingkan Syalomei Tangkau (2022) | Estimating Construction Costs for Buildings in Manado using the Cost Significant Model | -23,71%<br>s/d<br>+23,17% |

|   |                          |                                                                       |                           |
|---|--------------------------|-----------------------------------------------------------------------|---------------------------|
| 3 | M. Rizky F. Fahri (2023) | School Project Cost Estimation Model Using the Cost Significant Model | -27,43%<br>s/d<br>+56,52% |
|---|--------------------------|-----------------------------------------------------------------------|---------------------------|

Source: Research Compilation, 2025

Research conducted by Jieh Haur Chen in 2018 showed a difference in range of 39.77%. In Pingkan S. Tangkou's 2022 journal, the difference in range reached 46.88%, while M. Rizky F.'s 2023 research showed a difference in range of 83.95%.

This research report uses the accuracy percentage range reference from Jieh Haur Chen in 2018, which ranges from -12.97% to +26.80%.

This range was chosen because the accuracy value given was considered by the author to be the highest, with the smallest range difference compared to the ranges from other comparative journals.

#### b. Results of Cost Estimation Accuracy Analysis

After selecting the range used in the study, the range was then divided into 5 (five) accuracy categories based on the percentage. The division into these categories will be explained in the results of the cost estimation accuracy analysis.

## 2. Discussion of Analysis Results Discussion of Cost Estimate Accuracy Evaluation Using Parametric Methods Against Construction Budget Ceiling Values a. Discussion of Data Tabulation Results

After calculating the percentage accuracy of the construction budget ceiling for the Bekasi District Attorney's Office building project, the results show that there is an inaccuracy in the cost estimate of -33.55%, with a total budget evaluation value of IDR 66,518,420,000.00 and a difference of Rp. 22,316,594,720.00 from the budget ceiling value.

#### b. Discussion of Multicriteria Analysis Results

This research report uses the accuracy percentage range reference from Jieh Haur Chen (2018)<sup>17</sup>, which ranges from -12.97% to +26.80%, with a difference of 39.77%. The range is further divided into 5 (five) accuracy categories, as shown in Figure 3.1 and Table 3.3.

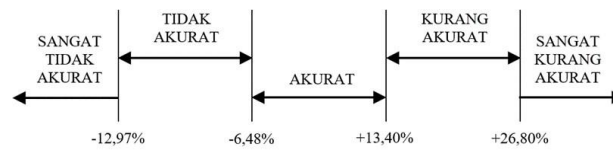


Figure 3.1 Cost Estimate Accuracy Range  
 Source: Research Processing, 2025

Table 3.3 Budget Ceiling Accuracy Range

| No. | Category              | Value               |
|-----|-----------------------|---------------------|
| 1   | Very Inaccurate (STA) | < -12,97%           |
| 2   | Inaccurate (I)        | -12,97% s/d -6,48%  |
| 3   | Accurate (A)          | -6,48% s/d +13,40%  |
| 4   | Less Accurate (LA)    | +13,40% s/d +26,80% |
| 5   | Very Inaccurate (SKA) | > +26,80%           |

Source: Research Compilation, 2025

c. Discussion of Cost Estimate Accuracy Analysis Results

The accuracy of the budget ceiling is -33.55%. Within the range of cost estimation accuracy in this study, the accuracy of the conceptual stage cost estimation for the construction budget ceiling of the Bekasi District Attorney's Office building falls into the Very Inaccurate (STA) category, as shown in Table 3.4 below.

Table 3.4 Budget Ceiling Accuracy Range

| No. | Category                 | Value               |
|-----|--------------------------|---------------------|
| 1   | Very Inaccurate (STA)    | < -12,97%           |
| 2   | Inaccurate (TA)          | -12,97% s/d -6,48%  |
| 3   | Accurate (A)             | -6,48% s/d +13,40%  |
| 4   | Less Accurate (KA)       | +13,40% s/d +26,80% |
| 5   | Very Less Accurate (SKA) | > +26,80%           |

Source: Research Processing, 2025

**CONCLUSION**

From the research conducted on the Bekasi District Attorney's Office building project, the following conclusions can be drawn:

In the evaluation and analysis of the Bekasi District Attorney's Office building project costs, using the data tabulation and multi-criteria analysis methods, the physical construction costs were calculated to be IDR 66,518,420,000.00. Meanwhile, the budget ceiling set for the

project is IDR 44,201,825,280.00. There is a difference between the budget ceiling and the physical cost evaluation results, amounting to IDR 22,316,594,720.00. The percentage of inaccuracy reaches -33.55%. In the accuracy category used in this report, which is between -12.97% and +26.80%, the cost estimate falls into the Very Inaccurate (STA) category.

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