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Evaluating Inclusive Public Services In Medan City Using CoCoSo Method

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Abstract− Ensuring the inclusiveness of public services remains a critical challenge in urban governance, particularly in decentralized regions characterized by unequal access and service quality. This study evaluates the level of public service inclusivity across sub-districts in Medan City using the Multi-Criteria Decision Making (MCDM) approach, specifically the Combined Compromise Solution (CoCoSo) method. The evaluation is based on ten inclusivity criteria covering physical and digital accessibility, service availability for vulnerable groups, service quality, transparency, community participation, and service innovation. The study employs primary data obtained through direct observations and semi-structured interviews with service users and stakeholders, as well as secondary data derived from official statistics and government documents. CoCoSo integrates the Weighted Sum Model (WSM) and Weighted Product Model (WPM) to generate stable and objective rankings of 21 sub-districts. The final CoCoSo scores range from 0.7262 to 10.7427. The results indicate that Medan Maimun and Medan Petisah achieved the highest and identical scores of 10.7427, reflecting strong performance in accessibility, service quality, and supporting infrastructure. In contrast, several sub-districts exhibit relatively low inclusivity scores, highlighting persistent disparities in service distribution and limited community participation. These findings underscore the need for targeted infrastructure development, expansion of inclusive digital services, and strengthening participatory feedback mechanisms to enhance equitable public service delivery. This study contributes a structured evaluation framework that can support evidence-based policymaking and regular monitoring of public service inclusivity at the local government level.

Keywords: Inclusive Public Services; Inequality Of Access; Vulnerable Groups; Medan City Government; Cocoso Method.

1. INTRODUCTION

Inclusive public service delivery is a cornerstone of good governance, aligning with the principles of equity and the Sustainable Development Goals (SDGs), particularly ensuring that no one is left behind in accessing essential services [1], [2]. In the context of decentralized governance, local governments, like those in Medan City, bear the responsibility of not only providing public services but also ensuring they are equitably accessible to all segments of the population, particularly vulnerable and marginalized groups.

While much progress has been made in increasing the availability of basic services, the challenge has shifted from mere accessibility to addressing the quality and equity of service delivery across different community segments. Previous studies on urban public services have primarily focused on indicators like quantity, speed, and user satisfaction. However, these studies often fail to capture the structural gaps in service distribution, especially across sub-districts with varying socio-economic conditions and infrastructure capabilities [3]-[5]. This limitation highlights the need for a comprehensive evaluation approach that can integrate various dimensions of inclusivity, from physical and digital accessibility to service innovation and staff quality [6]-[7].

This research addresses this gap by applying the Multi-Criteria Decision Making (MCDM) approach, specifically the Combined Compromise Solution (CoCoSo) method, which integrates both the Weighted Sum Model (WSM) and Weighted Product Model (WPM) to objectively assess and rank the inclusiveness of public services across Medan City's 21 sub-districts [8]-[10]. The study evaluates ten critical criteria, including accessibility, service availability for vulnerable groups, service quality, and innovation in service delivery, which are grounded in established theories of good governance and public service equity [11-[20]. Conceptually, this research is built upon a theoretical map that links specific service indicators to broader governance principles. Central to this map is the dimension of Accessibility, both physical and digital, which reflects the principle of equal access to services for all in diverse urban settings. This is closely linked to Service Availability for Vulnerable Groups, evaluating whether marginalized populations' needs are met in alignment with SDG 10's goal of reducing inequalities.

Furthermore, Service Quality, measured by staff professionalism and responsiveness, connects the evaluation to the theory of responsive governance, ensuring public services effectively meet community needs. To ensure future-proofing of service delivery, Service Innovation is examined to see how digital advancements improve overall reach and quality. Additionally, the inclusion of Community Participation highlights the importance of citizen involvement, aligning with the theory of open governance which advocates for transparency in decision-making processes. The integration of these theoretical criteria within the CoCoSo method provides a robust and comprehensive framework for assessing inclusiveness. By offering a structured and balanced solution, this study identifies the specific strengths and weaknesses across Medan City's sub-districts, serving as a definitive reference for policymakers to implement targeted.

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2. RESEARCH METHODOLOGY

This section outlines the research design, sources and methods of data collection, and the technical procedure for implementing the Combined Compromise Solution (CoCoSo) method to evaluate the inclusivity performance of public services in the 21 sub-districts of Medan City.

2.1 Research Design and Study Location

This research utilizes a quantitative evaluative research design with a Multi-Criteria Decision Making (MCDM) approach. This approach is selected because the problem of evaluating public service inclusivity performance involves ten interacting multidimensional criteria that necessitate systematic weighting and ranking. The unit of analysis (alternatives) in this study consists of the 21 sub-districts in Medan City, and the data collection period was conducted in 2025.

2.2 Place and Time

The place and time of the research are as follows.

1. Place
   The study was conducted across all sub-district offices in Medan City.
2. Time
   The activity was carried out over a period of one year. Initial mapping and completion of protocols and instruments were carried out in months 1–5. Primary and secondary data collection across all subdistricts was carried out in months 3–6, followed by data cleaning and preliminary analysis in months 4–7. CoCoSo normalization, weighing, and calculation procedures were carried out in months 6–7. System design, development, and testing were carried out in months 7–9, with system implementation in months 8–9. Synthesis of results and conclusions were prepared in months 9–10, mandatory outputs (e.g., articles/patent applications) in months 10–11, and final reporting and dissemination in months 10–12.

2.3 Research Conceptual Framework

To facilitate understanding of the procedures and research framework, Figure 1 below is provided.

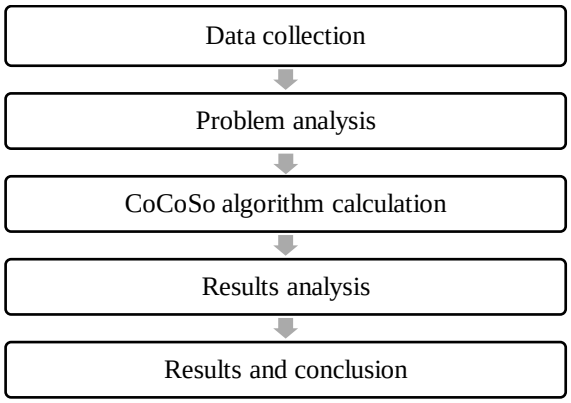

Figure 1. Research stages

1. Data Collection
   The next stage was collecting the necessary data to support problem-solving based on the research focus. This stage involves collecting all the necessary data. The results of the Holistic Evaluation of Inclusive Public Services in all Districts of Medan City will be analyzed using the CoCoSo method. The necessary data was obtained using three methods: literature review, direct observation and interviews with the community, limited interviews with stakeholders, secondary data from relevant agencies, and experts in the Holistic Evaluation of Inclusive Public Services.
   a. Literature Review
      A literature review is conducted to broaden insight and knowledge regarding the problem under study and determine appropriate methods for solving the problem. Literature review can be conducted through literature in the form of guidebooks, journals, other people's research, and information searches via the internet.
   b. Observation
      This involves research in all districts of Medan City and direct observation of each Holistic Evaluation of Inclusive Public Services. Ten assessment criteria were obtained, namely:

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Table 1. Criteria Table

No	Description
1	Physical and Digital Accessibility
2	Availability of Services for Vulnerable Groups
3	Quality of Service Provided by Officers
4	Transparency and Accountability of Services
5	Community Participation and Feedback
6	Speed and Accuracy of Service
7	Availability of Supporting Facilities and Infrastructure
8	Distribution and Equalization of Services Between Subdistricts
9	Inclusive Public Service Innovation
10	Sustainability and Commitment to Service Improvement

And for the assessment of each criterion, a 1-5 Likert scale was applied, as shown in the following table:

Table 2. Likert Scale

No	Criterion	Score 1	Score 2	Score 3	Score 4	Score 5
1	Physical and Digital Accessibility	Very difficult to access, both physically and digitally.	Quite difficult to access; facilities are limited.	Fairly easy to access with some obstacles.	Easy to access, both physically and online.	Very easy to access for all population groups.
2	Availability of Services for Vulnerable Groups	No facilities are available for vulnerable groups.	Facilities are very minimal and inadequate.	Some facilities exist but are not evenly available.	Facilities are fairly complete and function well.	Facilities are comprehensive and designed to be friendly to vulnerable groups.
3	Quality of Service Provided by Officers	Staff are unfriendly and unhelpful.	Staff are unprofessional and slow.	Service is fairly good but inconsistent.	Service is friendly and reasonably fast.	Staff are highly professional, fast, and fair.
4	Transparency and Accountability of Services	Information is unclear and unavailable.	Information is available but incomplete.	Information is fairly complete but not easily accessible.	Information is available and sufficiently clear.	Information is highly transparent and easy to understand.
5	Community Participation and Feedback	There is no mechanism for feedback.	A mechanism exists but is not used.	Community participation is limited.	The community is adequately involved in evaluation.	The community participates actively and its voice is heard.
6	Speed and Accuracy of Service	Very slow and often erroneous.	Slow and inaccurate.	Fair speed but inconsistent.	Relatively fast and accurate.	Very fast with rare errors.
7	Availability of Supporting Facilities and Infrastructure	No supporting facilities/infrastructure are available.	Available but in poor condition.	Sufficiently available and usable.	Facilities support the service and are fairly adequate.	Facilities are very complete, proper, and inclusionâ€‘friendly.
8	Distribution and Equalization of Services Between Subdistricts	Highly unequal across urban villages.	Quite unequal, with clear disparities.	Some urban villages have good services.	Relatively equal across most urban villages.	Services are highly equal and fair across urban villages.
9	Inclusive Public Service Innovation	No innovation is carried out.	Innovation is very limited and has not had an impact.	Some innovations exist but are not yet optimal.	Several innovations exist and help service delivery.	Innovations are highly effective and support inclusion.

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No	Criterion	Score 1	Score 2	Score 3	Score 4	Score 5
10	Sustainability and Commitment to Service Improvement	No effort to improve services.	Improvements are rarely carried out.	Improvements are performed occasionally.	There is a routine program for evaluation and improvement.	The commitment to continuous improvement is very strong.

c. Interviews
This involves gathering information by directly asking the community, limited interviews with stakeholders, secondary data from relevant agencies, and consulting experts to determine the Holistic Evaluation of Inclusive Public Services in all Districts of Medan City.

2. Problem Analysis
Problem analysis was conducted through direct field observations related to each Holistic Evaluation of Inclusive Public Services in all districts of Medan City, community interviews, limited interviews with stakeholders, secondary data from relevant agencies, and several experts in determining the assessment of the Holistic Evaluation of Inclusive Public Services. This resulted in the identification of the identified problems, which were then analyzed and formulated to identify their causes and possible solutions.

3. CoCoSo algorithm calculation

a. The first step is to create a decision matrix (x). The decision matrix consists of m existing alternatives (rows) and n criteria (columns). The xij matrix can be seen in Equation 1.

$$X_{ij} = \begin{bmatrix} X11 & X12 & \dots & X1n \\ X21 & X22 & \dots & X2n \\ \vdots & \vdots & \vdots & \vdots \\ xm1 & xm2 & \dots & xmn \end{bmatrix} \quad (1)$$

i=1,2,…,m; j=1,2,…,n. (2)

b. Creating a Normalization Matrix (rij) The normalization of criterion values is completed based on the compromise normalization equation developed by Zeleny in 1973. The normalized X matrix can be seen in equations 2 and 3.

$$r_{ij} = \frac{x_{ij} - min\, x_{ij}}{max\, x_{ij} - min\, x_{ij}} \; kriteria\ Benefit \quad (3)$$

$$r_{ij} = \frac{max\, x_{ij} - x_{ij}}{max\, x_{ij} - min\, x_{ij}} \; kriteria\ Cos \quad (4)$$

c. Determine the total of the weight comparison sequence with the overall weight, for each alternative number of weight comparison sequences and also a number of comparison sequence weights for each alternative as Si and Pi, calculated using Equations 4 and 5. The Si value is based on the following approach:

$$S_i = \sum_{j=1}^{n} (W_j r_{ij}) \quad (5)$$

$$P_i = \sum_{j=1}^{n} (r_{ij})^{w_j} \quad (6)$$

The value of Pi is also stored in accordance with the Waspas multiplicative attitude.

d. The relative weight of alternatives uses a calculation aggregation strategy. In this step, three scoring strategies are used to generate the relative weight of other options, which are calculated using Equations 6, 7, and 8.

$$K_{ia} = \frac{P_i + S_i}{\sum_{i=1}^{m} (P_i + S_i)} \quad (7)$$

$$K_{ib} = \frac{S_i}{min\, S_i} + \frac{P_i}{min\, P_i} \quad (8)$$

$$K_{ic} = \frac{\lambda(S_i) + (1-\lambda)(P_i)}{(\lambda\, max\, S_i + (1-\lambda) max\, P_i)} \quad (9)$$

expresses the arithmetic mean of the total WSM and WPM scores, while equation 7 expresses the relative total of WSM and WPM compared to the best. Equation 8 releases a balanced compromise of the WSM and WPM score models. In equation 8, ƛ (usually ƛ = 0.5) is chosen by the decision maker. However, the flexibility and stability of CoCoSo can rely on other values.

e. The final ranking value of the alternatives is determined based on the ki value, which can be seen in Equation 9.

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$$K_i = (k_{ia}k_{ib}k_{ic})^{\frac{1}{3}} + \frac{1}{3}(k_{ia} + k_{ib} + k_{ic}) \quad (10)$$

4. Results analysis
   Result analysis was conducted to validate the accuracy of the CoCoSo algorithm results, ensuring that the CoCoSo algorithm successfully solves the problem of determining a Holistic Evaluation of Inclusive Public Services across all districts of Medan City in a transparent manner to the public.
5. Results and Conclusions
   The Results and Conclusions explain the results and conclusions of the validity of the CoCoSo algorithm application in determining the level of accuracy applied and display the ranking results that form the final output of the Holistic Evaluation of Inclusive Public Services.

3. RESULT AND DISCUSSION

This section presents the results of the Combined Compromise Solution (CoCoSo) method implementation used to evaluate and rank the 21 sub-districts of Medan City based on their public service inclusivity performance. It is followed by an in-depth discussion, comparison with relevant studies, and crucial policy implications.

3.1 Implementation of the CoCoSo Method

In determining the Holistic Evaluation of Inclusive Public Services in All Districts of Medan City using the CoCoSo method, the following steps are required to complete the calculation:

1. Describe the criteria and weights.
2. Determine the normalization of the decision matrix.
3. Determine the total of the weight comparison values with the overall weights, namely the Si and Pi values.
4. Calculate the relative weights of the alternatives using the calculations, namely the Kia, Kib, and Kic values.
5. Perform the calculations and ranking of the final values, namely the Ki values.

3.2 Framework

A framework is a basic conceptual structure used to solve or address complex problems. This term is often used, among other things, in the field of reusable software, as well as in the field of management to describe a concept that allows for the homogeneous handling of various types of business entities. This framework is the steps that will be taken in solving the problem to be discussed.

The research framework can be illustrated in the following figure:

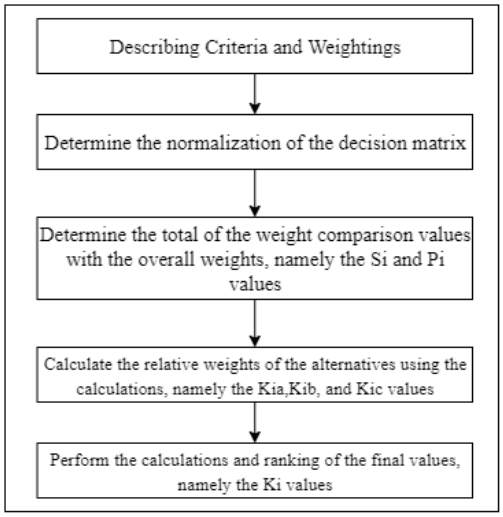

Figure 2. CoCoSo Method Framework

3.3 Determination of Assessment Criteria

Some factors that need to be assessed are as shown in the table below:

Table 3. Criteria Weight Table

No	Criteria	Description	Type	Weight
1	C1	Physical and Digital Accessibility	Benefit	0.10
2	C2	Availability of Services for Vulnerable Groups	Benefit	0.10
3	C3	Quality of Service Provided by Officers	Benefit	0.10
4	C4	Transparency and Accountability of Services	Benefit	0.10

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5	C5	Community Participation and Feedback	Benefit	0.10
6	C6	Speed and Accuracy of Service	Benefit	0.10
7	C7	Availability of Supporting Facilities and Infrastructure	Benefit	0.10
8	C8	Distribution and Equalization of Services Between Subdistricts	Benefit	0.10
9	C9	Inclusive Public Service Innovation	Benefit	0.10
10	C10	Sustainability and Commitment to Service Improvement	Benefit	0.10

3.4 Problem solving using the CoCoSo method

In discussing the CoCoSo calculation, 21 samples will be taken from alternatives that have 10 criteria. The CoCoSo calculation in the system, if calculated manually, can be seen in the solution where Case Data: There are 21 sub-districts that will be selected for Holistic Evaluation of Inclusive Public Services, with the following data:

Table 4. Alternative Data

Code	Name	Criteria									
		C1	C2	C3	C4	C5	C6	C7	C8	C9	C10
A01	Medan Amplas	4	4	3	4	3	4	3	3	3	4
A02	Medan Area	4	4	4	4	4	5	4	4	4	4
A03	Medan Barat	3	3	3	3	3	3	3	3	2	3
A04	Medan Baru	5	5	4	5	5	5	5	4	5	5
A05	Medan Belawan	2	2	2	3	2	2	2	2	2	2
A06	Medan Deli	3	3	3	3	3	3	3	3	3	3
A07	Medan Denai	4	4	4	4	4	4	4	3	4	4
A08	Medan Helvetia	4	4	4	4	4	4	4	4	4	4
A09	Medan Johor	4	4	4	4	3	4	4	4	4	4
A10	Medan Kota	4	4	4	5	4	4	4	4	4	5
…	…	…	…	…	…	…	…	…	…	…	…
A21	Medan Tuntungan	4	4	4	4	4	4	4	4	4	4

After that, the feasibility of these supporting factors will be calculated to determine whether they are acceptable or not. The steps are as follows:

1. Establishing Assessment Criteria
   The establishment of assessment criteria here involves converting alternative data into numerical values in accordance with the criteria normalization table.

Table 5. Independent Research Criteria Scores After Weighting

Code	Criteria											
	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	Total	Average
A01	4	4	3	4	3	4	3	3	3	4	**35**	**3.5**
A02	4	4	4	4	4	5	4	4	4	4	**41**	**4.1**
A03	3	3	3	3	3	3	3	3	2	3	**29**	**2.9**
A04	5	5	4	5	5	5	5	4	5	5	**48**	**4.8**
A05	2	2	2	3	2	2	2	2	2	2	**21**	**2.1**
A06	3	3	3	3	3	3	3	3	3	3	**30**	**3**
A07	4	4	4	4	4	4	4	3	4	4	**39**	**3.9**
A08	4	4	4	4	4	4	4	4	4	4	**40**	**4**
A09	4	4	4	4	3	4	4	4	4	4	**39**	**3.9**
A10	4	4	4	5	4	4	4	4	4	5	**42**	**4.2**
…	…	…	…	…	…	…	…	…	…	…	…	…
A21	4	4	4	4	4	4	4	4	4	4	**40**	**4**

From the results in table 5, it can be seen below that figure 2 is a visualization of the average results.

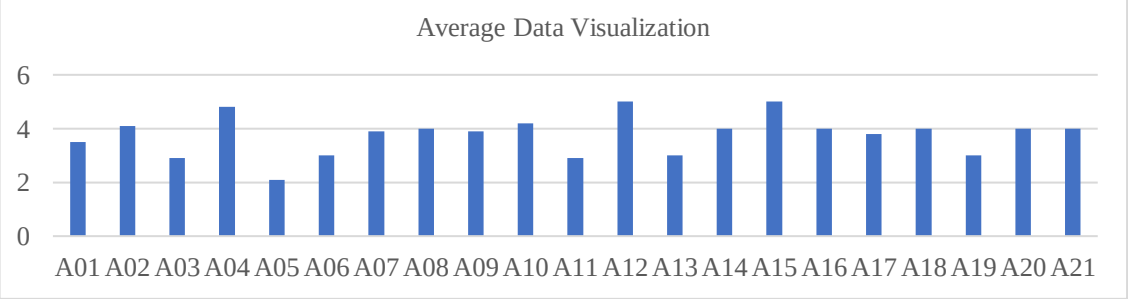

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Figure 3. Average Data Visualization

From the image above, it can be seen that the highest average was obtained by A12, namely Medan Maimun, and A15, namely Medan Petisah.

3.5 CoCoSo algorithm calculation

From the results of the Assessment Criteria determination, calculations will then be carried out using the CoCoSo algorithm which will be applied to the data.

1. Forming a decision matrix
   Forming a decision-making matrix here means reforming the normalized data matrix in accordance with the criteria normalization table.

Table 6. Decision Matrix

Code	Criteria									
	C1	**C2**	**C3**	**C4**	**C5**	**C6**	**C7**	**C8**	**C9**	**C10**
A01	4	4	3	4	3	4	3	3	3	4
A02	4	4	4	4	4	5	4	4	4	4
A03	3	3	3	3	3	3	3	3	2	3
A04	5	5	4	5	5	5	5	4	5	5
A05	2	2	2	3	2	2	2	2	2	2
A06	3	3	3	3	3	3	3	3	3	3
A07	4	4	4	4	4	4	4	3	4	4
A08	4	4	4	4	4	4	4	4	4	4
A09	4	4	4	4	3	4	4	4	4	4
A10	4	4	4	5	4	4	4	4	4	5
…	..	..	..	..	..	..	..	..	..	..
A21	4	4	4	4	4	4	4	4	4	4
Minimum Value	**3**	**2**	**2**	**3**	**2**	**2**	**2**	**2**	**2**	**2**
Maximum Value	**5**	**5**	**5**	**5**	**5**	**5**	**5**	**5**	**5**	**5**

$$\begin{pmatrix}
4 & 4 & 3 & 4 & 3 & 4 & 3 & 3 & 3 & 4 \\
4 & 4 & 4 & 4 & 4 & 5 & 4 & 4 & 4 & 4 \\
3 & 3 & 3 & 3 & 3 & 3 & 3 & 3 & 2 & 3 \\
5 & 5 & 4 & 5 & 5 & 5 & 5 & 4 & 5 & 5 \\
2 & 2 & 2 & 3 & 2 & 2 & 2 & 2 & 2 & 2 \\
3 & 3 & 3 & 3 & 3 & 3 & 3 & 3 & 3 & 3 \\
4 & 4 & 4 & 4 & 4 & 4 & 4 & 3 & 4 & 4 \\
4 & 4 & 4 & 4 & 4 & 4 & 4 & 4 & 4 & 4 \\
4 & 4 & 4 & 4 & 3 & 4 & 4 & 4 & 4 & 4 \\
4 & 4 & 4 & 5 & 4 & 4 & 4 & 4 & 4 & 5 \\
\dots & \dots & \dots & \dots & \dots & \dots & \dots & \dots & \dots & \dots \\
4 & 4 & 4 & 4 & 4 & 4 & 4 & 4 & 4 & 4 \\
\mathbf{3} & \mathbf{2} & \mathbf{2} & \mathbf{3} & \mathbf{2} & \mathbf{2} & \mathbf{2} & \mathbf{2} & \mathbf{2} & \mathbf{2} \\
\mathbf{5} & \mathbf{5} & \mathbf{5} & \mathbf{5} & \mathbf{5} & \mathbf{5} & \mathbf{5} & \mathbf{5} & \mathbf{5} & \mathbf{5}
\end{pmatrix}$$

2. Matrix normalization in the CoCoSo method
   If the criterion is Profitable (Maximum), normalization is performed as follows:

$$rij = \frac{X_{ij} - \min X_{ij}}{maxX_{ij} - \min X_{ij}}$$

   If the criteria are unfavorable (Minimum), normalization is performed as follows:

$$rij = \frac{Max_{Xij} - X_{ij}}{maxX_{ij} - \min X_{ij}}$$

   The results of decision matrix normalization can be seen as follows:
   Criteria normalization C1 (*Benefit*)

$$A11 = \frac{4-3}{5-3} = 0.5$$

$$A21 = \frac{4-3}{5-3} = 0.5$$

$$A31 = \frac{3-3}{5-3} = 0$$

$$A211 = \frac{4-3}{5-3} = 0.5$$

   Criteria normalization C2 (*Benefit*)

$$A12 = \frac{4-2}{5-2} = 0.6667$$

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A22 $= \frac{4-2}{5-2} = 0.6667$
A32 $= \frac{3-2}{5-2} = 0.3333$
A212$= \frac{4-2}{5-2} = 0.6667$

Criteria normalization C3 (*Benefit*)

A13 $= \frac{3-2}{5-2} = 0.333$
A23 $= \frac{4-2}{5-2} = 0.6667$
A33 $= \frac{3-2}{5-2} = 0.3333$
A213$= \frac{4-2}{5-2} = 0.6667$

Criteria normalization C4 (*Benefit*)

A14 $= \frac{4-3}{5-3} = 0.5$
A24 $= \frac{4-3}{5-3} = 0.5$
A34 $= \frac{3-3}{5-3} = 0$
A214$= \frac{4-3}{5-3} = 0.5$

Criteria normalization C5 (*Benefit*)

A15 $= \frac{3-2}{5-2} = 0.3333$
A25 $= \frac{4-2}{5-2} = 0.6667$
A35 $= \frac{3-2}{5-2} = 0.3333$
A215$= \frac{4-2}{5-2} = 0.6667$

Criteria normalization C6 (*Benefit*)

A16 $= \frac{4-2}{5-2} = 0.6667$
A26 $= \frac{5-2}{5-2} = 1$
A36 $= \frac{3-2}{5-2} = 0.3333$
A216$= \frac{4-2}{5-2} = 0.6667$

Criteria normalization C7 (*Benefit*)

A17 $= \frac{3-2}{5-2} = 0.3333$
A27 $= \frac{4-2}{5-2} = 0.6667$
A37 $= \frac{3-2}{5-2} = 0.3333$
A217$= \frac{4-2}{5-2} = 0.6667$

Criteria normalization P8 (*Benefit*)

A18 $= \frac{3-2}{5-2} = 0.3333$
A28 $= \frac{4-2}{5-2} = 0.6667$
A38 $= \frac{3-2}{5-2} = 0.3333$
A218$= \frac{4-2}{5-2} = 0.6667$

Criteria normalization C9 (*Benefit*)

A19 $= \frac{3-2}{5-2} = 0.3333$
A29 $= \frac{4-2}{5-2} = 0.6667$
A39 $= \frac{2-2}{5-2} = 0$
A219$= \frac{4-2}{5-2} = 0.6667$

Criteria normalization C10 (*Benefit*)

A110 $= \frac{4-2}{5-2} = 0.6667$
A210 $= \frac{4-2}{5-2} = 0.3333$
A310 $= \frac{3-2}{5-2} = 0$
A2110$= \frac{4-2}{5-2} = 0.6667$

Then, from the decision matrix above, the normalized decision matrix can be obtained as follows:

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0.5	0.6667	0.3333	0.5	0.3333	0.6667	0.33333	0.33333	0.33333	0.66667
0.5	0.6667	0.6667	0.5	0.6667	1	0.66667	0.66667	0.66667	0.66667
0	0.3333	0.3333	0	0.3333	0.3333	0.33333	0.33333	0	0.33333
1	1	0.6667	1	1	1	1	0.66667	1	1
0.5	0	0	0	0	0	0	0	0	0
0	0.3333	0.3333	0	0.3333	0.3333	0.33333	0.33333	0.33333	0.33333
0.5	0.6667	0.6667	0.5	0.6667	0.6667	0.66667	0.33333	0.66667	0.66667
0.5	0.6667	0.6667	0.5	0.6667	0.6667	0.66667	0.66667	0.66667	0.66667
0.5	0.6667	0.6667	0.5	0.3333	0.6667	0.66667	0.66667	0.66667	0.66667
0.5	0.6667	0.6667	1	0.6667	0.6667	0.66667	0.66667	0.66667	1
0	0.3333	0.3333	0	0.3333	0.3333	0.33333	0	0.33333	0.33333
1	1	1	1	1	1	1	1	1	1
0	0.3333	0.3333	0	0.3333	0.3333	0.33333	0.33333	0.33333	0.33333
0.5	0.6667	0.6667	0.5	0.6667	0.6667	0.66667	0.66667	0.66667	0.66667
1	1	1	1	1	1	1	1	1	1
0.5	0.6667	0.6667	0.5	0.6667	0.6667	0.66667	0.66667	0.66667	0.66667
0.5	0.6667	0.3333	0.5	0.6667	0.6667	0.66667	0.66667	0.33333	0.66667
0.5	0.6667	0.6667	0.5	0.6667	0.6667	0.66667	0.66667	0.66667	0.66667
0	0.3333	0.3333	0	0.3333	0.3333	0.33333	0.33333	0.33333	0.33333
0.5	0.6667	0.6667	0.5	0.6667	0.6667	0.66667	0.66667	0.66667	0.66667
0.5	0.6667	0.6667	0.5	0.6667	0.6667	0.66667	0.66667	0.66667	0.66667

3. Determining the Value of Si and the Value of Pi
   The formulas for calculating Si and Pi are as follows:
   $S_i = \Sigma_{j=1}^{n}(W_j\ r_{ij})$
   $P_i = \Sigma_{j=1}^{n}(rij)^{wj}$

Si =

(0.05000*0.10) + (0.06667*0.10) + (0.3333*0.10) + (0.05000*0.10) + (0.06667*0.10) + (0.03333*0.10) + (0.03333*0.10) + (0.03333*0.10) + (0.03333*0.10) + (0.06667*0.10) = **0.4467**

Table 7. Si Value

C1	C2	C3	C4	C5	C6	C7	C8	C9	C10
0.05	0.06667	0.03333	0.05	0.03333	0.06667	0.03333	0.03333	0.03333	0.06667
0.05	0.06667	0.06667	0.05	0.06667	0.1	0.06667	0.06667	0.06667	0.06667
0	0.03333	0.03333	0	0.03333	0.03333	0.03333	0.03333	0	0.03333
0.1	0.1	0.06667	0.1	0.1	0.1	0.1	0.06667	0.1	0.1
0.05	0	0	0	0	0	0	0	0	0
0	0.03333	0.03333	0	0.03333	0.03333	0.03333	0.03333	0.03333	0.03333
0.05	0.06667	0.06667	0.05	0.06667	0.06667	0.06667	0.03333	0.06667	0.06667
0.05	0.06667	0.06667	0.05	0.06667	0.06667	0.06667	0.06667	0.06667	0.06667
0.05	0.06667	0.06667	0.05	0.03333	0.06667	0.06667	0.06667	0.06667	0.06667
0.05	0.06667	0.06667	0.1	0.06667	0.06667	0.06667	0.06667	0.06667	0.1
0	0.03333	0.03333	0	0.03333	0.03333	0.03333	0	0.03333	0.03333
0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
0	0.03333	0.03333	0	0.03333	0.03333	0.03333	0.03333	0.03333	0.03333
0.05	0.06667	0.06667	0.05	0.06667	0.06667	0.06667	0.06667	0.06667	0.06667
0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
0.05	0.06667	0.06667	0.05	0.06667	0.06667	0.06667	0.06667	0.06667	0.06667
0.05	0.06667	0.03333	0.05	0.06667	0.06667	0.06667	0.06667	0.03333	0.06667
0.05	0.06667	0.06667	0.05	0.06667	0.06667	0.06667	0.06667	0.06667	0.06667

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C1	C2	C3	C4	C5	C6	C7	C8	C9	C10
0	0.03333	0.03333	0	0.03333	0.03333	0.03333	0.03333	0.03333	0.03333
0.05	0.06667	0.06667	0.05	0.06667	0.06667	0.06667	0.06667	0.06667	0.06667
0.05	0.06667	0.06667	0.05	0.06667	0.06667	0.06667	0.06667	0.06667	0.06667

Total Si Value =
0.4667 + 0.6667 + 0.2333 + 0.9333 + 0.0500 + 0.2666 + 0.6000 + 0.6334 + 0.6000 + 0.7167 + 0.2333 + 1.0000 + 0.2666 + 0.6334 + 1.0000 + 0.6334 + 0.5667 + 0.6344 + 0.2666 + 0.6334 + 0.6344
Total Value Si of the Overall = 11.6669
Value Min Si = 0.0500
Value Max Si = 1.0000

Pi =
(0.9330^0.10) + (0.9603^0.10) + (0.8960^0.10) + (0.9330^0.10) + (0.8960^0.10) + (0.9603^0.10) + (0.8960^0.10) + (0.8960^0.10) + (0.8960^0.10) + (0.9603^0.10) = **9.2269**

4. Determining the values of Kia, Kib, and Kic

$K_{ia} = \frac{P_i+S_i}{\sum_{i=1}^{m}(P_i+S_i)} = \frac{0.4667 + 9.2269}{190.7170} = 0.0508$

$K_{ib} = \frac{S_i}{min\ S_i} + \frac{P_i}{min\ P_i} = \frac{0.4667}{0.0500} + \frac{9.2269}{0.9330} = 19.2235$

$K_{ic} = \frac{\lambda(S_i)+(1-\lambda)(P_i)}{(\lambda\ max\ S_i+(1-\lambda) max\ P_i)} = \frac{(0.5*0.4667)+((1-0.5)*9.2269)}{(0.5*\ 0.1000)+((1-0.5)*10.000)} = 0.8812$

Table 8. Decision Results

Kia	Kib	Kic (Numerator)	Kic (Denominator)	Results Kic
0.0508	19.2235	4.8468	5.5	0.8812
0.0538	23.6106	5.1274	5.5	0.9323
0.0341	11.3884	3.2527	5.5	0.5914
0.0569	29.299	5.427	5.5	0.9867
0.0052	2	0.4915	5.5	0.0894
0.039	13.0147	3.7173	5.5	0.6759
0.0529	22.1652	5.0421	5.5	0.9167
0.0534	22.9021	5.0909	5.5	0.9256
0.0529	22.1652	5.0421	5.5	0.9167
0.0544	24.6824	5.1859	5.5	0.9429
0.0341	11.3884	3.2527	5.5	0.5914
0.0577	30.7181	5.5	5.5	1
0.039	13.0147	3.7173	5.5	0.6759
0.0534	22.9021	5.0909	5.5	0.9256
0.0577	30.7181	5.5	5.5	1
0.0534	22.9021	5.0909	5.5	0.9256
0.0524	21.4302	4.9933	5.5	0.9079
0.0534	22.9021	5.0909	5.5	0.9256
0.039	13.0147	3.7173	5.5	0.6759
0.0534	22.9021	5.0909	5.5	0.9256
0.0534	22.9021	5.0909	5.5	0.9256

5. Determining Ki Value and Ranking Results
The formula for calculating the Ki value is as follows:
$K_i = (K_{ia}K_{ib}K_{ic})\frac{1}{3} + \frac{1}{3}(K_{ia} + K_{ib} + k_{ic})$

1. Alternative Value A1 (Ki)
Ki = (0.0508*19.2235*0.8812)$^{1/3}$ + $\frac{1}{3}$ (0.0508*19.2235*0.8812) = 6.9979

Table 9. Ranking

Code	Name	Final score	Ranking
A01	Medan Amplas	**6.9979**	15
A02	Medan Area	**8.4369**	5
A03	Medan Barat	**4.2169**	19

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Code	Name	Final score	Ranking
A04	Medan Baru	**10.2831**	3
A05	Medan Belawan	**0.7262**	21
A06	Medan Deli	**4.8192**	16
A07	Medan Denai	**7.9647**	12
A08	Medan Helvetia	**8.2064**	6
A09	Medan Johor	**7.9647**	13
A10	Medan Kota	**8.7856**	4
A11	Medan Labuhan	**4.2169**	20
A12	Medan Maimun	**10.7427**	1
A13	Medan Marelan	**4.8192**	17
A14	Medan Perjuangan	**8.2064**	7
A15	Medan Petisah	**10.7427**	2
A16	Medan Polonia	**8.2064**	8
A17	Medan Selayang	**7.7237**	14
A18	Medan Sunggal	**8.2064**	9
A19	Medan Tembung	**4.8192**	18
A20	Medan Timur	**8.2064**	10
A21	Medan Tuntungan	**8.2064**	11

From the results of table 7, it can be seen below that figure 4 is a visualization of the results of the ranking data.

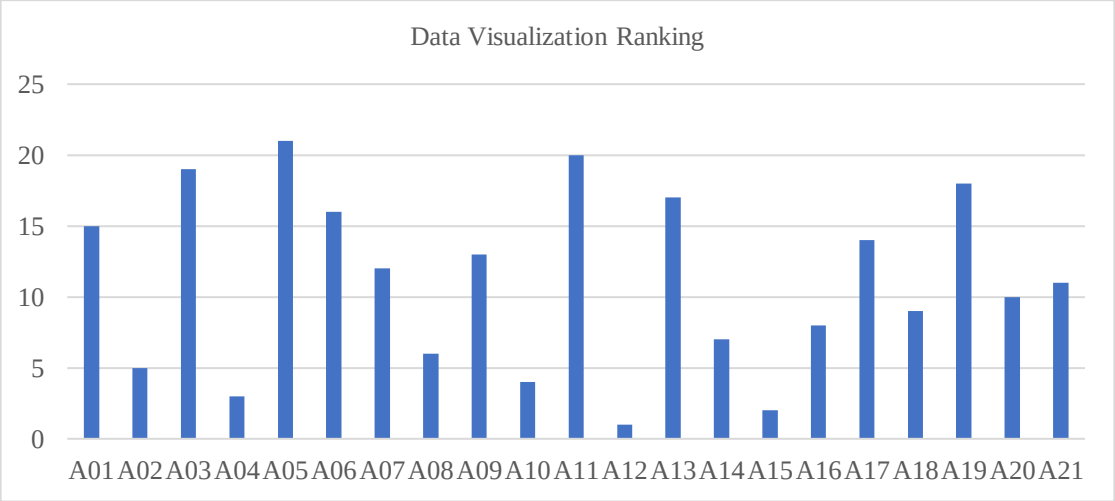

Figure 4. Data Visualization Ranking

Based on the final analysis results presented, the validation of the accuracy of the CoCoSo Algorithm was successfully achieved. This finding strengthens the initial data showing that Sub-districts A12 (Medan Maimun) and A15 (Medan Petisah) consistently ranked highest on average, which are now confirmed as the first and second rankings based on the highest compromise score (*Ki*) from the CoCoSo Method. The CoCoSo Method provides valid validation because the ranking result *Ki* is a balanced compromise solution, combining the average performance (*Si*) and the weakest performance (*Pi*) of each alternative. This result eliminates bias and establishes a definite benchmark. The implications of this analysis are very important: This final ranking can be used as a definite strategic reference for the Medan City Government to focus on service improvement efforts. The highest-ranking districts can be used as benchmarks, while low-ranking districts require targeted interventions on the criteria that cause their low *Ki* scores, in order to realize Inclusive Public Services that are evenly distributed throughout Medan City in a transparent manner to the public.

4. CONCLUSION

This study evaluates the inclusiveness of public services in Medan City using the Combined Compromise Solution (CoCoSo) method, based on ten key criteria such as physical and digital accessibility, service quality, and the distribution of services across sub-districts. The results show that Medan Maimun and Medan Petisah ranked first with the same score (10.7427), excelling in physical-digital accessibility, service quality, and infrastructure. However, significant disparities were found in the distribution of services between sub-districts and low community participation, especially among vulnerable groups. The main recommendations from this study are to improve infrastructure in underdeveloped areas, strengthen more inclusive community feedback mechanisms, and optimize digital innovations to expand service reach. This study also notes the

limitation of using equal weights for all criteria and Likert-type data, which could introduce subjectivity into the results. The theoretical contribution of this research is providing a more comprehensive approach to evaluating the inclusiveness of public services, while its practical contribution offers a policy foundation for enhancing more inclusive and sustainable public services. Future research is suggested to focus on a deeper evaluation of the effectiveness of digital transformation in improving accessibility for vulnerable groups and the sustainability of inclusive service development in the future.

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