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Hybrid Analysis of Road Service Level Determination Decision Support System

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Abstract: Traffic congestion on the highway is one of the problems often faced by road users, as on the highway traffic in the city of Padang often experiences congestion due to the growth of several highways that are relatively smaller than the growth of traffic volume, causing a decrease in road service levels. This study aimed to determine the level of road services in several traffic lanes in the city of Padang. Information examination utilizing a Mixture Choice Emotionally supportive network (HDSS) displayed by joining the Logical Progressive system Cycle (AHP) strategy with the Weighted Amassed Aggregate Item Appraisal (WASPAS), This technique is remembered for the Multi-Rules Navigation (MCDM) bunch. The AHP technique can reliably decide the weight worth of every measure, and the WASPAS strategy can investigate elective information to get choice outcomes by positioning with the Weighted Aggregate Model (WSM) and Weighted Item Model (WPM) processes. The ranking results show that there are three types of road services in the city of Padang, namely B, C, and D with an accuracy rate of 0.6947%, thus the results of this study using HDSS modeling can provide a better analysis process.

Keywords: Service level highway; HDSS; AHP method; WASPAS method; MCDM

INTRODUCTION

Padang City Highway is a causeway widely traversed by various city transportation both local and inter-province. In addition, community activities also mostly use this road section in various daily activities, such as work, school, shopping, and others. The effect of a higher population has an impact on vehicle use which continues to increase. The increasing level of vehicle ownership is the main problem that triggers unstable traffic flows and low public awareness in obeying traffic rules which are prone to causing traffic conflicts and congestion. The existence of industrial activities that are directly adjacent to the road section in question also indirectly affects the flow of traffic on the road. Therefore, an analysis of the capacity and level of road services in the area is needed to review road conditions and handling needed in the future to create comfortable and decent roads for road users.

The advancement of data innovation today is progressively fast, making it simpler for people to beat different confounded issues in pursuing choices both organized and unstructured issues, this framework was first presented by Michael Hurry Morton during the 1970s with the term The executives Choice Framework (MDS) (Marbun & Sinaga, 2019). This MDS framework formed into a Choice Emotionally supportive network (DSS) is a versatile, adaptable, and intuitive PC-based framework used to tackle semi-organized issues to build the worth of choices taken (Darmawan et al., 2021), (Dodi Guswandi et al., 2022). DSS helps a director settle on organized and half-organized choices to be more compelling by utilizing logical models and accessible information (Ardi et al., 2019). The idea of choosing emotionally supportive networks has been one of the fascinating examination subjects since its commencement in the mid-1970s and confronted various difficulties because of the quick turn of events and development in the field of data innovation (Kasie et al., 2017). The use of the field of Choice Emotionally supportive network science is exceptionally fitting to work with the connected Padang City Office in beating the issue of Padang City street gridlock because DSS has numerous techniques that keep on developing today.

This exploration fosters the idea of DSS as a Mixture Choice Emotionally supportive network (HDSS) by joining the Scientific Order Cycle (AHP) strategy, and the Weighted Collected Total Item Evaluation (WASPAS) technique, which is remembered for the Multi-Models navigation (MCDM) (Waluyo et al., 2021). The MCDM approach has characteristics that have many criteria/attributes and alternatives, where these alternatives are given explicitly (Maratullatifah et al., 2022). The AHP strategy enjoys the benefit of having the option to work out need weight values among measures and limit the event of abstract weighting (Hanif et al., 2022). The presentation of

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the WASPAS strategy utilizes a mixed approach of the Weighted Total Model (WSM) and the Weighted Item Model (WPM) (Rahayu et al., 2020).

In previous research, Analysis of Factors Causing Traffic Congestion on Road Collectors, a Case Study of Gajah Mada Gunung Pangilun road, Padang City using Saturation Degrees that compare total traffic volume and road capacity (Chairi et al., 2020). The past examination then, at that point, knows the degree of administration at the Ruwet convergence in Jepara city so it can assess to decide the strategy bearing. Information was obtained from field overviews covering mathematical circumstances and normal day-to-day traffic. Information is handled in light of the 1997 Indonesian Street Limit Manual with the goal that the limit of every street and the degree of street administration are acquired (Saputro, 2022).

Based on previous research literature, the HDSS concept can be used in determining road service levels. This research applies AHP and WASPAS methods to facilitate related parties in decision-making. The mix of DSS techniques can refine the past model by utilizing steady rules weighting examination and improving in assessment for the determination of the greatest and least qualities (Pagan & Syahrizal, 2020), and measurement of the validity of the method used to determine the accuracy of the method (Praba et al., 2020).

The novelty in this study lies in the data analysis process by adopting the DSS method which can be integrated to complement the performance of each method so that the results of decisions produced in determining the level of road services in the city of Padang can be done accurately.

LITERATURE REVIEW

Decision Support System

A choice emotionally supportive network is a framework that can give critical thinking and relational abilities for semi-organized issues (Pransiska et al., 2023). Decision Support Systems address structured, unstructured, and semi-structured problems (Firdonsyah et al., 2022). DSS is intended to help all phases of navigation, beginning from the phases of recognizing issues, choosing important information, deciding the methodology utilized in the dynamic cycle to assessing elective determination. There are three basic components of a decision support system (DSS) (Sari & Oktavia, 2023):

a. Data set administration framework (DBMS). The DBMS fills in as an information bank for the DSS.
b. Model base administration framework (MBMS). The job of the MBMS is undifferentiated from the job of the DBMS, its fundamental capability is to give autonomy among the particular models utilized in the DSS of the applications that utilize it.
c. Exchange age and the board framework (DGMS). The primary result of collaboration with DSS is knowledge. Since its clients are much of the time individuals who are not prepared with PCs, DSS should be furnished with a natural and simple to-utilize interface.

Analytical Process Hierarchy (AHP) Method

The means of the AHP technique are as per the following (Rosiska, 2018), (Ayağ & Samanlioglu, 2021):

1. Characterize the issue, and decide the targets, models, sub-rules, and elective arrangements.
2. Make a various leveled structure from start to finish, in particular targets, measures, sub-standards, and elective arrangements.
3. Make a pairwise examination framework of rules. The examination is completed given the "judgment" of chiefs by surveying the significance of one component contrasted with different components.
4. The worth of the correlation measures depends on Table 2.

Table. 2 Matched Correlation Rating Scale Values

Intensity of importance	Information	Explanation
1	The two components are similarly significant.	Two components have a similar impact on the objective.
3	One component is somewhat more significant than the other.	One element is preferred over another by experience and judgment.
5	One component is a higher priority than the other.	One component is preferred over another by experience and judgment.
7	One component is more totally significant than another.	One component that is emphatically upheld and prevailing is found by and by.
9	One component is a higher priority than another	Proof for one component against another has the most elevated conceivable level of assertion.
2,3,4,6,8	Values between two contiguous thought values.	This worth is given when there are two trade-offs between the two choices.

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Opposite	If for movement I get one number contrasted with action j, j has the contrary worth contrasted with I.

5. Works out a lattice of significant worth loads among rules and needs.
6. Work out the total lattice of each line or Compute the eigenvector of any matched examination grid.
7. Calculate the value of the criteria consistency ratio. If the consistency ratio (CR) value ≤ 0.1, then the assessment carried out is consistent. The equation used is as follows:

$$\lambda \max = \frac{Total\ Value}{n} \quad (1)$$

$$CI = \frac{(\lambda\ max - n)}{(n-1)} \quad (2)$$

$$CR = \frac{CI}{IR} \quad (3)$$

Weighted Aggregated Sum Product Assessment (WASPAS) Method

The stages of solving cases in the WASPAS method are as follows (Baykasoğlu & Gölcük, 2020):

1. Define the decision matrix
2. Determining the normalization matrix
   Equation used:
   $$X_{ij} = \frac{xij}{Max_i\ X_i} \quad (Benefit) \quad (4)$$
   $$X_{ij} = \frac{Min_i\ X_i}{X_{ij}} \quad (Cost) \quad (5)$$
3. Determining Qi values
   Equation used:
   $$Q_i = 0{,}5 \sum_{j=1}^{n} x_{ij} w + 0{,}5 \prod_{j=1}^{n} (x_{ij})^{wj}$$
4. Ranking of Alternative value calculation results

The aftereffects of the choice through positioning are arranged by the most noteworthy worth still up in the air by the kind of street administration level given Table 3 (Novitasari & Sudibyo, 2020).

Table. 3 Types of Road Service Levels

Type	Description of Road Conditions	% Free Flow Speed
Type A	Free traffic stream without prevention. traffic volume and thickness. Vehicle speed is the driver's decision.	≥ 90
Type B	The traffic stream is steady. The speed starts to be impacted by traffic conditions, however it can in any case be chosen by the driver's desires.	≥ 70
Type C	The cross-current is as yet steady. Travel speed and opportunity of development have been impacted by the huge volume of traffic so the driver can never again pick the speed he needs.	≥ 50
Type D	The traffic flow has begun to become unstable. Changes in traffic volume greatly affect the magnitude of travel speed.	≥ 40
Type E	The traffic flow is already unstable. Volume is approximately equal to capacity. Frequent traffic jams.	≥ 3,3
Type F	Traffic flow is restrained at low speeds. There are frequent traffic jams. Traffic flow.	≥ 3,3

METHOD

This exploration utilizes a subjective technique approach, where the strategy underlines more on noticing peculiarities and inspecting the substance of the significance of the peculiarity (Abdussamad, 2021). The subjective examination is more centered around human components, articles, and foundations, as well as connections or communications between these components, to grasp an occasion, conduct, or peculiarity (Kusumastuti, 2019).

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Information in subjective examination is abstract since it is handled by the scientist himself. What's more, data in subjective examination depends on suspicions, convictions, and assessments and is affected by private feelings and sentiments (Adlini et al., 2022).

The idea of Mixture DSS utilizing the AHP and WASPAS techniques can be displayed in the phases of examination completed. The phases of examination are contained in Fig.1.

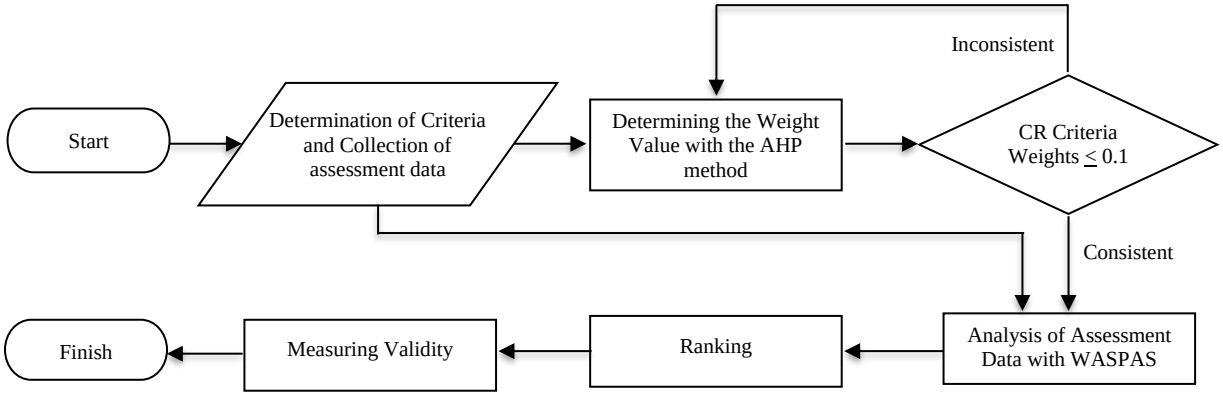

Fig. 1. AHP-WASPAS method framework flowchart

Figure 1 portrays the times of appraisal beginning with closing standards and social event evaluation information, trailed by finishing up the weight respect utilizing the AHP framework which can close the consistency of the weight respect, expressly expecting the consistency degree (CR) respect is < 0.1 if it isn't strong, it is repeated to pick the pairwise relationship worth of every single reason. The resulting stage The weight worth of each destined rule is used by the WASPAS procedure to deal with elective assessment data by deciding situating (Ayağ & Samanlioglu, 2020). The last step checks genuineness to close the level of accuracy of the technique utilized. The models utilized in this study should be clear in Table 1.

Table 1. Road Service Level Criteria

No	Code	Criteria
1	C1	Road Type
2	C2	Road Width
3	C3	vehicle volume
4	C4	Vehicle Speed
5	C5	Road Shoulder Width
6	C6	Median
7	C7	Sidewalk
8	C8	Green Lane
9	C9	Drainage

RESULT

The most common way of deciding the degree of street administration utilizing a choice emotionally supportive network with the AHP and WASPAS techniques is made sense of beneath:

AHP Method Analysis

The AHP technique does a course of contrasting matched models given the degree of significance, the AHP strategy is utilized to decide the worth of loads to figure out their consistency, the stages completed in breaking down information in the AHP strategy are :

1. Hierarchical Structure of AHP method

The AHP technique directs various leveled course of evaluating choices, beginning through and through. This construction plans to find elective arrangements in light of the measures markers contained in Tabe.1. The type of the portrayal of the various leveled design of the AHP strategy should be visible in Figure 2.

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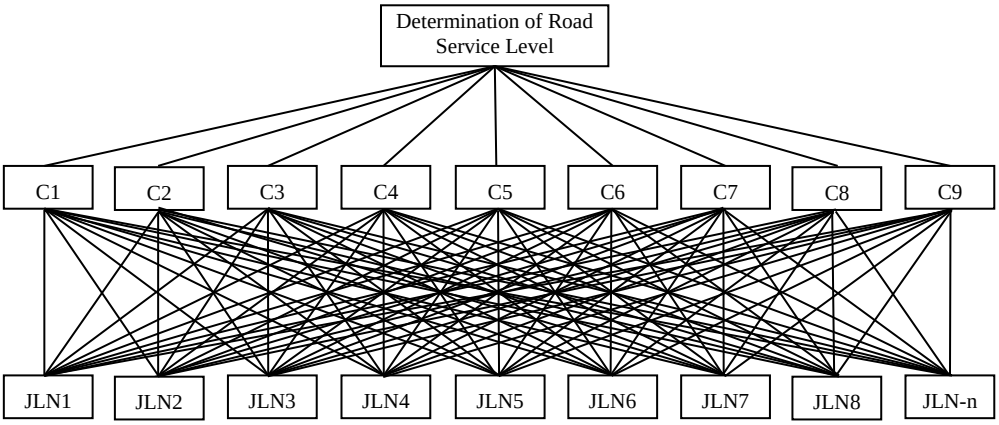

Fig. 2. Hierarchical structure of AHP-WASPAS method

2. Define a pairwise comparison matrix.

The value of the paired comparison matrix is derived from the value of Thomas Saaty's paired comparison scale table, the paired comparison matrix is presented in table 4.

Table 4. Pairwise comparison matrix

K	C1	C2	C3	C4	C5	C6	C7	C8	C9
C1	1	2	3	5	5	6	7	8	9
C2	0,5	1	2	3	5	6	7	7	8
C3	0,333	0,5	1	2	4	5	7	8	9
C4	0,2	0,333	0,5	1	3	5	6	7	8
C5	0,2	0,2	0,25	0,333	1	2	3	5	7
C6	0,167	0,167	0,2	0,2	0,5	1	3	5	7
C7	0,143	0,143	0,143	0,167	0,333	0,333	1	2	4
C8	0,125	0,143	0,125	0,143	0,2	0,2	0,5	1	3
C9	0,111	0,125	0,111	0,125	0,143	0,143	0,25	0,333	1
∑	2,779	4,611	7,33	11,96	19,18	25,68	34,75	43,33	56

The worth of the pairwise examination is not entirely settled by dynamic administration in light of the significance of the rules two by two. The cycle is finished by separating the standards in line with the measures in the section.

3. Determine the priority matrix.

The priority matrix is a weight value that will be used in the next process, the calculation of this matrix goes through the process of division and addition as in Table 5.

Table 5. Priority matrix of each criterion

K	C1	C2	C3	C4	C5	C6	C7	C8	C9	∑	P
C1	0,359	0,434	0,409	0,418	0,261	0,234	0,201	0,186	0,161	2,662	0,296
C2	0,179	0,217	0,273	0,251	0,261	0,234	0,201	0,162	0,143	1,921	0,213
C3	0,119	0,108	0,136	0,167	0,209	0,195	0,201	0,185	0,161	1,482	0,165
C4	0,072	0,072	0,068	0,084	0,156	0,195	0,173	0,162	0,143	1,124	0,125
C5	0.072	0,043	0,034	0,028	0,052	0,078	0,086	0,115	0,125	0,634	0,070
C6	0,059	0,036	0,027	0,017	0,026	0,039	0,086	0,115	0,125	0,532	0,059
C7	0,051	0,031	0,019	0,014	0,017	0,013	0,029	0,046	0,071	0,293	0,033
C8	0,044	0,031	0,017	0,012	0,01	0,008	0,014	0,023	0,054	0,214	0,024
C9	0,039	0,027	0,015	0,01	0,007	0,006	0,007	0,008	0,018	0,138	0,015

The need worth of every standard will constantly be 1, the consistency of this need still up in the air by the Proportion Consistency (CR) equation in the subsequent stage.

4. Calculating the Eigen Vector value

Eigen Vector values should be possible after deciding the needed lattice of every basis, the Eigen Vector values are introduced in Table 6.

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Table 6. Eigen Vector Value

K	C1	C2	C3	C4	C5	C6	C7	C8	C9	∑
C1	0,296	0,427	0,494	0,625	0,352	0,355	0,228	0,190	0,138	3,104
C2	0,148	0,213	0,329	0,375	0,352	0,355	0,228	0,167	0,123	2,289
C3	0,099	0,107	0,165	0,250	0,282	0,295	0,228	0,190	0,138	1,753
C4	0,059	0,071	0,082	0,125	0,211	0,295	0,195	0,167	0,123	1,329
C5	0,059	0,043	0,041	0,042	0,070	0,118	0,098	0,119	0,108	0,697
C6	0,049	0,036	0,033	0,025	0,035	0,059	0,098	0,119	0,108	0,561
C7	0,042	0,030	0,024	0,021	0,023	0,020	0,033	0,048	0,062	0,302
C8	0,037	0,030	0,021	0,018	0,014	0,012	0,016	0,024	0,046	0,218
C9	0,033	0,027	0,018	0,016	0,010	0,008	0,008	0,008	0,015	0,143

The calculation process to obtain the Eigen Vector value uses multiplication between the priority value in Table 5 and the pairwise comparison matrix value in Table 4.

5. Calculate the value of the criteria consistency ratio.

To get the worth of the Consistency Proportion, the all-out esteem is resolved first by partitioning the aggregate worth in Table 3 by the need esteem in Table 2, then the outcome is added up to with a worth of 89.68 and gone on with the means beneath.

a. Determine the Lamda Max value

Determine the Lamda Max value using equation 1.

$$\lambda\, max = \frac{89{,}68}{9} = 9{,}96$$

b. Determining the Consistency Index (CI)

In calculating the value of CI using Equation 2.

$$CI = \frac{(9{,}96 - 9)}{(9 - 1)} = 0{,}121$$

c. Determining Ratio Consistency (CR)

To determine the value of CR using equation 3.

$$CR = \frac{0{,}121}{1{,}45} = 0{,}083$$

Given the aftereffects of the estimation of the CR esteem < 0.1, the computation cycle with the AHP technique is predictable, so the need esteem (weight esteem) can be utilized for the following system.

WASPAS Method Analysis

The WASPAS strategy is one of the DSS techniques used to settle choices by consolidating weighted amounts and weighted items. This technique is utilized to proceed with the estimation of the AHP strategy to get choice outcomes through positioning. The computation steps of the WASPAS technique are as per the following:

1. Choose the value of the choice grid (X).

The decision matrix X refers to m alternatives to be evaluated based on n criteria. The decision matrix X can be seen in Table 7.

Table 7. Value weighting between criteria and Priority

Alternatives	Criteria								
	C1	C2	C3	C4	C5	C6	C7	C8	C9
JLN1	8	4	5	5	4	3	3	4	1
JLN2	8	4	7	5	2	3	2	1	1
JLN3	8	4	3	5	4	3	3	1	1
JLN4	8	5	6	7	3	5	4	1	3
JLN5	3	4	7	7	3	1	1	1	1
JLN6	7	5	5	6	3	3	5	1	3
JLN7	5	8	4	7	2	3	4	1	3
JLN8	8	4	5	7	3	5	4	1	3
JLN9	3	5	6	6	1	1	4	4	2
JLN10	8	4	4	6	2	4	1	5	1

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JLN11	8	4	4	7	1	3	1	1	2
JLN12	8	4	4	6	1	3	1	1	3

This table displays the converted values from road assessment data in the city of Padang using 9 assessment indicators.

2. Determining the normalization matrix ($\bar{X}$)
   Calculates the normalization matrix using pressings 4 and 5. The calculation process is presented below.

   1. Criteria C1 (Benefit) :
      Max{8;8;8;8;3;7;5;8;3;8;8;8}=8
      $\bar{X}11 = \left(\frac{8}{8}\right) = 1$
      $\bar{X}21$ until $\bar{X}91$ (criteria C1) calculated in the same way.
   2. Criteria C2 (Benefit) :
      Max{4;4;4;5;4;5;8;4;5;4;4;4}=8
      $\bar{X}12 = \left(\frac{4}{8}\right) = 0{,}5$
      $\bar{X}22$ until $\bar{X}92$ (criteria C2) calculated in the same way.
   3. Criteria C2 (Cost) :
      Min{5;7;3;6;7;5;4;5;6;4;4;4}=3
      $\bar{X}13 = \left(\frac{3}{5}\right) = 0{,}6$
      $\bar{X}23$ until $\bar{X}93$ (criteria C3) calculated in the same way.
   4. Criteria C4 (Benefit) :
      Max{5;5;5;7;7;6;7;7;6;6;7;6}=7
      $\bar{X}14 = \left(\frac{5}{7}\right) = 0{,}714$
      $\bar{X}24$ until $\bar{X}94$ (criteria C4) calculated in the same way.
   5. Criteria C5 (Benefit) :
      Max{4;2;4;3;3;3;2;3;1;2;1;1}=4
      $\bar{X}15 = \left(\frac{4}{4}\right) = 1$
      X25 until X95 (criteria C5) is calculated in the same way.
   6. Criteria C6 (Benefit) :
      Max{3;3;3;5;1;3;3;5;1;4;3;3}=5
      $\bar{X}16 = \left(\frac{3}{5}\right) = 0{,}6$
      $\bar{X}26$ until $\bar{X}96$ (criteria C6) calculated in the same way.
   7. Criteria C7 (Benefit) :
      Max{3;2;3;4;1;5;4;4;4;1;1;1}=5
      $\bar{X}17 = \left(\frac{3}{5}\right) = 0{,}6$
      $\bar{X}27$ until $\bar{X}97$ (criteria C7) calculated in the same way.
   8. Criteria C8 (Benefit) :
      Max{4;1;1;1;1;1;1;1;4;5;1;1}=5
      $\bar{X}18 = \left(\frac{4}{5}\right) = 0{,}8$
      $\bar{X}28$ until $\bar{X}98$ (criteria C8) calculated in the same way.
   9. Criteria C9 (Benefit) :
      Max{1;1;1;3;1;3;3;3;2;1;2;3}=3
      $\bar{X}19 = \left(\frac{1}{3}\right) = 0{,}333$
      $\bar{X}29$ until $\bar{X}99$ (criteria C9) calculated in the same way.

   The consequences of the estimation cycle above are shown in the standardization lattice as follows:

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$$\bar{X} = \begin{bmatrix} 1 & 0,5 & 0,6 & 0,714 & 1 & 0,6 & 0,6 & 0,8 & 0,333 \\ 1 & 0,5 & 0,428 & 0,714 & 0,5 & 0,6 & 0,4 & 0,2 & 0,333 \\ 1 & 0,5 & 1 & 0,714 & 1 & 0,6 & 0,6 & 0,2 & 0,333 \\ 1 & 0,625 & 0,5 & 1 & 0,75 & 1 & 0,8 & 0,2 & 1 \\ 0,375 & 0,5 & 0,428 & 1 & 0,75 & 0,2 & 0,2 & 0,2 & 0,333 \\ 0,875 & 0,625 & 0,6 & 0,857 & 0,75 & 0,6 & 1 & 0,2 & 1 \\ 0,625 & 1 & 0,75 & 1 & 0,5 & 0,6 & 0,8 & 0,2 & 1 \\ 1 & 0,5 & 0,6 & 1 & 0,75 & 1 & 0,8 & 0,2 & 1 \\ 0,375 & 0,625 & 0,5 & 0,857 & 0,25 & 0,2 & 0,8 & 0,8 & 0,666 \\ 1 & 0,5 & 0,75 & 0,857 & 0,5 & 0,8 & 0,2 & 1 & 0,333 \\ 1 & 0,5 & 0,75 & 1 & 0,25 & 0,6 & 0,2 & 0,2 & 0,666 \\ 1 & 0,5 & 0,75 & 0,857 & 0,25 & 0,6 & 0,2 & 0,2 & 1 \end{bmatrix}$$

3. Determine the total value of relative importance (Qi)

Determining the value of Qi using the priority value (weight value) obtained from the AHP method, in the WASPAS method called Weight (W), the calculation process determines the value of Qi using equation 6.

Q1=(0,5) ∑((1x0,296) + (0,5x0,213) + (0,6x0,165) + (0,714x0,125)+
(1x0,070)+(0,6x0,059)+(0,6x0,033)+(0,8x0,024)+(0,333x0,015))
=0,370041

Q1=(0,5) ∏((1^0,296) x (0,5^0,213) x (0,6^0,165) x (0,714^0,125) x
(1^0,070)x(0,6^0,059)x(0,6^0,033)x(0,8^0,024)x(0,333^0,015))
=0,354793

Q1=0,370041 + 0,354793 = 0,72483

Determining the values of Q2 through Q12 is done in the same way as in Q1, the calculation results determining the overall Qi values are shown in table 8.

Table 8. Value Qi

Alternative	Value Qi
JLN1	0,72483
JLN2	0,63317
JLN-3	0,76924
JLN4	0,77503
JLN5	0,47164
JLN6	0,72827
JLN7	0,74813
JLN8	0,76334
JLN9	0,49888
JLN10	0,72932
JLN11	0,69126
JLN12	0,68065

In light of the consequences of deciding the Qi esteem, the positioning system displayed in Table 9 can be completed.

Table 9. Ranking value

No	Alternative	Value sum	Information
1	JLN4	0,77503	Type B
2	JLN3	0,76924	Type B
3	JLN8	0,76334	Type B
4	JLN7	0,74813	Type B
5	JLN10	0,72932	Type B
6	JLN6	0,72827	Type B
7	JLN1	0,72483	Type B
8	JLN11	0,69126	Type C
9	JLN12	0,68065	Type C
10	JLN2	0,63317	Type C
11	JLN9	0,49888	Type D
12	JLN5	047164	Type D

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The aftereffects of the choice through positioning in Table 9 comprise 3 kinds of street administration levels in the city of Padang, in particular, sort B there are 7 options which are expressed as Steady traffic stream, speed starts to be impacted by traffic conditions, however can in any case be chosen by the driver's desires. Type C there are 2 options where the cross current is as yet steady. Travel speed and opportunity of development have been impacted by the huge volume of traffic so the driver can never again pick the speed he needs. Then type D there are 2 other options, A particular Rush hour gridlock stream has started to be unsound, and changes in rush hour gridlock volume significantly influence how much travel speed.

Measuring Validity Value

After obtaining the results of the decision in the form of ranking, it is continued with the process of measuring the performance of the HDSS analysis process. This process uses an external validity test formula based on actual alternate values with alternate ranking values. The calculation process using Equation 7 (Cholil et al., 2021).

$$r_{xy} = \frac{n\sum XY - (\sum X)(\sum Y)}{\sqrt{(n\sum X^2 - (\sum X)^2)(n\sum Y^2 - (\sum Y)^2)}} \quad (7)$$

The data to be processed using the formula above comes from the actual value and value of the ranking results, as in Table 10.

Table 10. Validity measurement data

No	X	Y	X^2	Y^2	XY
1	37	0,7248	1369	0,5254	26,8189
2	33	0,6332	1089	0,4009	20,8946
3	32	0,7692	1024	0,5917	24,6156
4	42	0,7750	1764	0,6007	32,5513
5	28	0,4716	784	0,2224	13,2060
6	38	0,7283	1444	0,5304	27,6741
7	37	0,7481	1369	0,5597	27,6806
8	40	0,7633	1600	0,5827	30,5335
9	32	0,4989	1024	0,2489	15,9641
10	35	0,7293	1225	0,5319	25,5263
11	31	0,6913	961	0,4778	21,4291
12	31	0,6807	961	0,4633	21,1003
∑	416	8,2138	14614	5,7358	287,9946

The data processing process using the formula of equation 7 is presented as follows:

$$r_{xy} = \frac{(12)(287{,}9946) - (416)(8{,}2138)}{\sqrt{\left((12)(416) - 416^2\right)\left((12)(5{,}7358) - 8{,}2138^2\right)}}$$

$$= \frac{39{,}0084}{56{,}1527} = 0{,}6947$$

Using equation 7 to measure the validity of determining the level of road service in the city of Padang, the percentage result is 0.6947%. These results illustrate that the HDSS concept provides quite good precision.

DISCUSSIONS

The choice of an emotionally supportive network planned in this study helps related parties in deciding the street administrations of the city of Padang to conquer the issue of street use rapidly and precisely. The mix of choice emotionally supportive network strategies in this study utilizes the AHP and WASPAS techniques, the mix of DSS strategies can build the exactness of the consequences of information examination, for example, the AHP strategy can decide the consistency of the worth of the heaviness of models to be utilized by the WASPAS strategy to decide the aftereffects of choices through positioning.

The system that has been designed needs to be developed using a combination of other DSS methods so that the accuracy value can be increased again because the higher the level of accuracy value, the more precise and accurate the resulting decision results. Further development of data analysis is still carried out manually so that users can easily use it and can be implemented into applications using high-level programming languages such as Java, PHP, Python, and others.

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CONCLUSION

In light of the outcomes and conversations that have been done, the examination of deciding the degree of street administration can be resolved utilizing the HDSS technique. This strategy can give refreshed ideas and models by consolidating the AHP and WASPAS techniques to give yields that can be utilized as a source of perspective in navigation. The consequences of the AHP examination process give a predictable weighting worth to every rule utilized. The WASPAS strategy is additionally ready to deliver choice outcomes through positioning in light of weighted amount models and weighted item models. Given the general result results, it tends to be presumed that HDSS execution gives a precision pace of 0.6947%. With these results, the HDSS method can be used as a reference in overcoming problems in determining the level of road service.

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