Journal of Mathematics and Technology (MATECH) E-ISSN: 2829-3940
Volume 3, Nomor 2, November 2024

DECISION SUPPORT SYSTEM DETERMINES THE FEASIBILITY OF GRANTING A GENERAL PRACTITIONER LICENSE USING THE ANALYTIC NETWORK PROCESS METHOD (ANP)

[1]Sindy Silvia, [2] Yani Maulita, [3] Siswan Syahputra

[1,2,3]Information System, STMIK Kaputama Binjai
Jl. Veteran No.4A, Binjai, North Sumatra, Indonesia

e-mail : *sindysilvia98@gmail.com, yanimaulita26@gmail.com , siswansyahputra@gmail.com

Received: 2023-08-24
Revised: 2024-03-15
Accepted: 2024-04-02

Page : 180-188

Abstract : There are differences in general practitioner practice licensing services because they have special attention that is directly related to the health and public health sectors. The Langkat Regency Investment and One-Stop Integrated Licensing Services Service (DPMPPTSP) has also experienced the development of the system, but it still has a weakness, namely if the applicant who wants to make a permit must come to the office to validate the permit that the customer wants to make without knowing whether whether the files brought by the customer will be valid or not. So we need a decision support system that can help decision makers to use data and solve existing problems. The Analytic Network Process (ANP) method is a method that is able to represent the level of interest of various parties by considering the interrelationships between existing criteria and sub-criteria. From the results of the trials carried out, it was found that the highest score was 2.4625, namely Dr. Frimaneti Z, Old Village Health Center Upt, and Dr. Setiadi Abdillah Pratama, UPT Puskesmas Tanjung Selamat.

Keywords: Analytic Network Process (ANP), Permits, Services, Practices, Decision Support Systems.

Abstract:*There are differences in the licensing services for practicing general practitioners because they have special attention that is directly related to the health sector and public health. The Langkat Regency Investment and One-Stop Integrated Licensing Service (DPMPPTSP) has also experienced the development of the system, but this still has a weakness, namely if an applicant who wants to make a permit, the applicant must come to the office to validate the permit that the customer wants to make without knowing whether the file brought by the customer will be valid or not. So we need a decision support system that can help decision makers to use data and solve existing problems. The Analytic Network Process (ANP) method is a method that is able to represent the level of interest of various parties by considering the interrelationships between existing criteria and sub-criteria. From the results of the trials*

Journal of Mathematics and Technology (MATECH) E-ISSN: 2829-3940
Volume 3, Nomor 2, November 2024

conducted, it was found that the highest score was the one with a value of 2.4625, namely Dr. Frimaneti Z, Old Village Health Center Upt, and Dr. Setiadi Abdillah Pratama, UPT Tanjung Selamat Health Center.

Keywords: *Analytic Network Process (ANP), Permits, Services, Practices, Decision Support Systems.*

1 Introduction

Public services are all service activities carried out by service providers as an effort to fulfill the needs of service recipients. Public services can take the form of licensing in health facilities where service providers must provide easy requirements for obtaining general practitioner practice permits, providing services that are fast, fair, precise and transparent and providing satisfaction to the public is the hope and goal for every institutional institution of public administration.

General practitioner practice licensing services have special attention because they are directly related to the health and public health sectors. Licensing services are considered to require improvements to the public service system, including improvements to methods and procedures in the public service itself. General practitioner practice permit services are an important service when starting a business. The granting of General Practitioner Practice Permits is carried out at the One Stop Investment and Integrated Services Service (DPMPPTSP) in Langkat Regency, North Sumatra. Currently, the number of general practitioner practices applying for permits is showing an increase day by day, this indicates that the policy at the Capital Investment Service and One Stop Integrated Services (DPMPPTSP) have not been successful because they still use conventional methods.

The Langkat Regency Investment and One-Stop Integrated Licensing Services Service (DPMPPTSP) has also experienced the development of the current technological system. The Langkat Regency Investment and One-Stop Integrated Licensing Services Service (DPMPPTSP) has used a web-based online doctor's practice permit creation system. The meaning of a doctor's practice permit is a document or written permission that is used to control certain work that has the potential to endanger workers or other people. The system that makes this work permit is called the Licensing and Investment Management Information System (SIMENDAI).

So to solve the above problems can apply the methods in the decision support system. A decision support system is defined as an interactive computer-based system that helps decision makers to use data and various models to solve semi-structured or unstructured problems. In making this decision support system it is integrated with the Analytical Network Process (ANP) method.

2 Literature Review

Research conducted in 2019 with the title "Decision Support System for Prospective Recipients of the Family Hope Program (Pkh) Using the Analytical Hierarchy Process (AHP) Method" is the result of research where 9 criteria, each criterion has 3 sub-criteria, namely: Ownership of a Cell Phone, Occupation, Income, Residence Status, Floor Type, House Condition, Toilet Facilities, Education, Neighbor Interview. It is hoped that the results of this research will help and facilitate PKH assistants in the process of selecting recipients of family program assistance [1].

Other related research in 2021 regarding Supplier Selection Proposals for Cimahi Manufacturing Company Contractors Using the Analytic Network Process (ANP) Method. The purpose of the

Journal of Mathematics and Technology (MATECH) E-ISSN: 2829-3940
Volume 3, Nomor 2, November 2024

research conducted is to get the results of the selection of suppliers or suppliers in the company. One method that helps in making decisions that involve many criteria and sub-criteria is using the Analytical Network Process (ANP) method. Based on 10 criteria and 29 sub-criteria, the selected steels supplier with the largest weight value is the supplier PT A [2].

Other related research in 2018 was regarding the Application of the Android-Based Analytic Network Process (ANP) Method as a Decision Support System in Selecting Boarding Houses. From the results of the questionnaire to 30

students calculated the geometric average and used as a fixed weight in the study. This research uses initial coordinates, namely the UNTAN computer system building with the aim of coordinating each boarding house using Google Maps Api to obtain the distance value for each boarding house. Based on the selected criteria values, calculation results were obtained using the ANP method with the first highest value of 3.714%, namely Kos Putri (1) and the second highest value of 3.702%, namely Kos Asenkar [3].

3 Research Method (or Research Method)

Research methods are the stages carried out in research which aim to achieve maximum and accurate results. The framework uses the waterfall model. The stages are as follows:

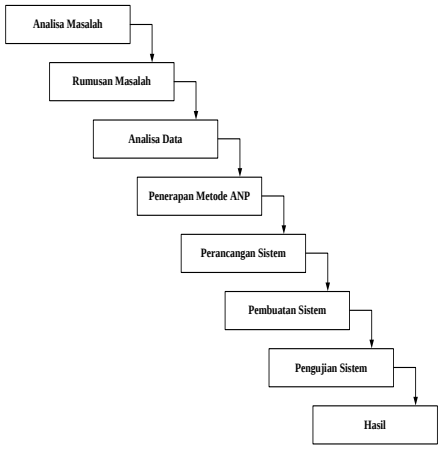

Figure 1 Research Framework

After determining the criteria in determining the feasibility of granting a General Practitioner License by applying the ANP method. There are several stages in the solution, first creating a pairwise comparison matrix which describes the relative contribution or influence of each element on each criterion with other criteria as in the table below.

Table 1 Paired Comparison Rating Scale

Intensity of Interest	Information
1	Both elements are equally important
3	One element is slightly more important than the other
5	One element is more important than the others
7	One element is clearly more important than the other
9	One element is absolutely more important than the others
2,4,6,8	Values between two values of adjacent considerations

Once the comparative assessment scale is known, a comparison matrix is created based on the criteria to determine the feasibility of granting a General Practitioner Permit by applying the ANP

Journal of Mathematics and Technology (MATECH) E-ISSN: 2829-3940
Volume 3, Nomor 2, November 2024

method at the Langkat Regency Investment and One-Stop Integrated Licensing Services Service (DPMPPTSP) as in the table below.

Table 2 ANP Comparison Matrix

Criteria	Last education	Experience	Facility	Total population
Last education	1	3	1	3
Experience	3	1	1	3
Facility	1	1	1	3
Total population	3	3	3	1

The next step is to add up the comparison values for each column (∑ column) to get the results as shown in the table below.

Table 3 Number of Comparison Values with Number of Columns

Criteria	Last education	Experience	Facility	Total population
Last education	1	3	1	3
Experience	3	1	1	3
Facility	1	1	1	3
Total population	3	3	3	1
∑ column	**8**	**8**	**6**	**10**

After calculating the number of comparison values by the number of columns, the next step is to divide the comparison values by the number of columns as in the table below.

Table 4 Distribution of Comparison Values by Number of Columns

Criteria	Last education	Experience	Facility	Total population
Last education	1/8	3/8	1/6	3/10
Experience	3/8	1/8	1/6	3/10
Facility	1/8	1/8	1/6	3/10
Total population	3/8	3/8	3/6	1/10

After dividing the criteria value by the number of columns (criterion value/∑ column). After that, the results of the division are added up per row (∑rows) then after adding the rows, the results of the number of rows are divided by the number of criteria, of which there are 4 criteria, the division is carried out by the number of rows (∑rows/n) to get the TPV value (Total Priority Value) Criteria. Can be seen in the table below:

Table 5 Addition and division of rows to obtain TPC Criteria

Criteria	Last education	Experience	Facility	Total population	∑row	∑ row/n
Last education	0.125	0.375	0.17	0.3	0.97	0.2425
Experience	0.375	0.125	0.17	0.3	0.97	0.2425
Facility	0.125	0.125	0.17	0.3	0.72	0.18
Total population	0.375	0.375	0.5	0.1	1.35	0.3375

Journal of Mathematics and Technology (MATECH) E-ISSN: 2829-3940
Volume 3, Nomor 2, November 2024

The next step is to add up the results from dividing the comparison values by the number of columns (∑ columns) and after that divide by the number of matrices, this will produce the total priority value (TPV). The results for the number of rows can be seen in column ∑ rows with and for the total Priority values can be seen in column ∑ rows/n.

Then the total priority value (TPV) is used to get the Criteria weight as shown in the table belowi.

Table 6 Total Priority Value (TPV) Criteria

Criteria	Priority Value
Last education	0.2425
Experience	0.2425
Facility	0.18
Total population	0.3375

4 Results and Discussion (or Results and Analysis)

The results of the calculations in the ANP method process above are then poured into the results matrix. The values 0.2425, 0.2425, 0.18 and 0.3375 are taken from table 3.6, namely the priority value results, while the values 0.39, 0.32 and 0.29 are taken from table 3.11 TPV priority sub-criteria as in the table below.

Table 7 ANP Decision Result Matrix

Last education	Experience	Facility	Total population
0.2425	0.2425	0.18	0.3375
Good	Good	Good	Good
0.39	0.39	0.39	0.39
Enough	Enough	Enough	Enough
0.32	0.32	0.32	0.32
Not enough	Not enough	Not enough	Not enough
0.29	0.29	0.29	0.29

Several candidates applying for a General Practitioner License submitted to the Langkat Regency Investment and One-Stop Integrated Licensing Service (DPMPPTSP) Service can be seen in the table below.

Table 8 Scores of Candidates for Applying for a Health Facilities Permit

Applicant Name General Practitioner Practice License	Last education	Experience	Facility	Total population
Dr. Circle Lilies Eternal Love Facility Clinic 3 New Old Village, Sei Lepan District	Good	Good	Enough	Enough
Dr. Armon Boy Rs Pertamina Pangkalan Brandan Jln. Wahidin No. 01 Pangkalan Brandan	Enough	Good	Enough	Good
Dr. Frimaneti Z Upt Old Village	Not enough	Good	Good	Good

Journal of Mathematics and Technology (MATECH) E-ISSN: 2829-3940
Volume 3, Nomor 2, November 2024

Applicant Name General Practitioner Practice License	Last education	Experience	Facility	Total population
Health Center Jln. Besitang Tangkahan Lagan, Sei Lepan District				
Dr. Jim Cheril Sulanda Siregar Pratama Cinta Fitri Clinic Jln. T Amir Hamzah Dusun IV, Sambirejo Village, Binjai District	Enough	Enough	Good	Not enough
Dr. Indra Bambang Siswoyo Pangkalan Brandan Community Health Center UPT Jln. Sutomo No. 65 Pangkalan Brandan, Babalan District	Good	Enough	Enough	Good
Dr. Cahya Nurhadi Wardhana Crown Angel Hospital Jln. Sisingamangaraja No 146 Paluh Manis Village, Gebang District	Good	Enough	Good	Enough
Dr. Joseph Manor Silitonga Cermin Beach Community Health Center UPT Jln. Canal No. 106, Tanjung Pura District	Enough	Good	Not enough	Good
Dr. Limenta Eternal Love Facility Clinic 3 Jln, Lama Baru Village, Sei Lepan District	Not enough	Enough	Good	Enough
Dr. Laurent Elfriede Hutagalung Crown Angel Hospital Jln, Sisingamangaraja No 146 Paluh Manis Village, Gebang District	Good	Enough	Good	Enough
Drg. Setiadi Abdillah	Good	Good	Not	Good

Journal of Mathematics and Technology (MATECH) E-ISSN: 2829-3940
Volume 3, Nomor 2, November 2024

Applicant Name General Practitioner Practice License	Last education	Experience	Facility	Total population
Pratama UPT Tanjung Selamat Health Center Jln. Batang Serangan-Tanjung Pura, Padang Tualang District			enough	

So, from the results of determining the feasibility of granting a general practitioner practice permit carried out by the Langkat Regency Investment and One-Stop Integrated Licensing Services Service (DPMPPTSP), a selection was carried out based on criteria and implemented a decision support system by applying the ANP method as in the table below:

Table 9 Final Results of the ANP Method

Applicant Name General Practitioner Practice License	Last education	Experience	Facility	Total population	Total
Dr. Circle Lilies Eternal Love Facility Clinic 3 New Old Village, Sei Lepan District	0.6325	0.6325	0.5	0.6575	2.4225
Dr. Armon Boy Rs Pertamina Pangkalan Brandan Jln. Wahidin No. 01 Pangkalan Brandan	0.5625	0.6325	0.5	0.7275	2.4225
Dr. Frimaneti Z Upt Old Village Health Center Jln. Besitang Tangkahan Lagan, Sei Lepan District	0.5325	0.6325	0.57	0.7275	2.4625
Dr. Jim Cheril Sulanda Siregar Pratama Cinta Fitri Clinic Jln. T Amir Hamzah IV Hamlet, Sambirejo Village, Bincai District	0.5625	0.5625	0.57	0.6275	2.3225
Dr. Indra Bambang Siswoyo Pangkalan Brandan Community Health Center UPT Jln. Sutomo No. 65 Pangkalan Brandan, Babalan District	0.6325	0.5625	0.5	0.7275	2.4225
Dr. Cahya Nurhadi Wardhana Crown Angel Hospital Jln. Sisingamangaraja No 146 Paluh Manis Village, Gebang District	0.6325	0.5625	0.57	0.6575	2.4225
Dr. Joseph Manor Silitonga Cermin Beach Community Health Center UPT Jln. Canal No. 106, Tanjung Pura District	0.5625	0.6325	0.47	0.7275	2.3925
Dr. Limenta Eternal Love Facility Clinic 3	0.5325	0.5625	0.57	0.6575	2.3225

Applicant Name General Practitioner Practice License	Last education	Experience	Facility	Total population	Total
Jln, Lama Baru Village, Sei Lepan District					
Dr. Laurent Elfriede Hutagalung Crown Angel Hospital Jln, Sisingamangaraja No 146 Paluh Manis Village, Gebang District	0.6325	0.5625	0.57	0.6575	2.4225
Drg. Setiadi Abdillah Pratama UPT Tanjung Selamat Health Center Jln. Batang Serangan-Tanjung Pura, Padang Tualang District	0.6325	0.6325	0.47	0.7275	2.4625

Therefore, it can be concluded that the one who got the highest score was the one with a score of 2.4625, namely Dr. Frimaneti Z, Old Village Health Center Upt, and Dr. Setiadi Abdillah Pratama, UPT Puskesmas Tanjung Selamat.

Table 10 Ranking Results

No	Name of General Practitioner License Applicant	Rating Value	Rating
1.	Dr. Frimaneti Z Upt Old Village Health Center	2.4625	1
2.	Dr. Setiadi Abdillah Pratama UPT Tanjung Selamat Health Center.	2.4625	2
3.	Dr. Circle Lilies Eternal Love Facility Clinic 3	2.4225	3
4.	Dr. Armon Boy Pertamina Pangkalan Brandan Hospital	2.4225	4
5.	Dr. Indra Bambang Siswoyo Pangkalan Brandan Community Health Center UPT	2.4225	5
6.	Dr. Cahya Nurhadi Wardahana Crown Angel Hospital	2.4225	6
7.	Dr. Laurent Elfriede Hutagalung Crown Angel Hospital	2.4225	7
8.	Dr. Joseph Manor Silitonga Cermin Beach Community Health Center UPT	2.3925	8
9.	Drg. Limenta Eternal Facilities Clinic 3	2.3225	9
10.	Dr. Jim Cheril Sulanda Siregar Pratama Cinta Fitri Clinic	2.3225	10

5 Conclusion

Based on the research that has been carried out above, several conclusions have been obtained, namely that the existence of a decision support system for determining the feasibility of granting a health facility permit using the analytic network process (ANP) method can make it easier for those granting General Practitioner Permits to determine the suitability of applicants by applying the ANP method. This system can help or simplify the process of determining which General Practitioner

License applicants are eligible to be issued. And based on the results of the trials carried out, it was found that the highest score was 2.4625, namely Dr. Frimaneti Z, Old Village Health Center Upt, and Dr. Setiadi Abdillah Pratama, UPT Puskesmas Tanjung Selamat.

Reference

[1] Sujoni, BS (2019). The decision support system for prospective recipients of the Family Hope Program (PKH) assistance uses the analytical hierarchy process (AHP) method. Journal of Information and Computers, Vol: 7, No: 2, 97

[2] Rispianda, MA (2021). Proposed Supplier Selection for Cimahi Manufacturing Company Contractors Using the Analytic Network Process (ANP) Method.

[3] Bangkit Tri Pramesti, Rini Oktavera, and Viktor Yuardi Risonarta. (2018). Selection of the Decision to Use Caustic Soda (NaOH) as an Alternative to Replace Paint Cleaning Liquid Thinner on Metal Using the Analytic Network Process (ANP) Method. OPSI Journal Vol 11 No. 2, December, 112.

[4] Fiqh Apriandi and Muhammad Findi A. (2013). Solutions for Improving Human Resources at Baytul Maal wat Tamwil (BMT) in Indonesia through the Analytic Network Process (ANP) Approach. Journal of al-Muzara'ah, Vol 1, No. 2, 108.

[5] Pelawi, D. (2013). Intelligence Phase as a Basis for the Decision Making Process for Building DSS Application Models in SMEs. ComTech Vol. 4 No. December 2, 2013, 567.

[6] Prind Triajeng Pungkasanti, TH (2017). Application of Analytic Network Process (ANP) in Decision Support Systems. Vol. 14, no. 2.

[7] Putra, RR (n.yr.). Mangrove Forest Tourism Web Information System in Belawan Sicanang Village, Medan Belawan District as Promotional Media. Core IT Scientific Journal.