



Optimizing The Role Of Technologi In Improving The Quality Of Life Of Village Communities Using Anp Method

Yanti Yusman

Faculty of Science and Technology Computer Systems study Program, university pembangunan Panca Budi, Indonesia.

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ABSTRACT

This Research aims to investigate and Analyze the rore of technology in improving the quality of life of people in rural environments The Analytical Network Process (ANP) method will be used to Analyze various dimensions of techonology that have a positive impact on aspects of village society. This research will involve surveys, intevIEWS and data analysis to identify priorities, impacts and relationships between variables relevant to the role of technology in the context of the quality of life of village communities. It is hoped that the results of this research will provide in-depth insight and strategy recommendations to increase the effectiveness of the use of technology in improving the quality of life of village communities.

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Corresponding Author:

Yanti Yusman ,

Faculty of Science and Technology Computer System Study Program,
University Pembangunan Panca Budi, Indonesia.

Email: yantiyusman@gmail.com

1. INTRODUCTION

Technological development have great potential to influence the quality of life of people at various levels, including rural commonities.[1] The use of technology , if optimezel well, can have a significant positive impact in improving the walfare an daily live of rural communities,[2] but the use of technology is effective in the rural context. Requires a deep understanding of thr preferences, priorities and implications of the technological solutions implemented.[3]

In many countries, including Indonesia, Indonesia people play an important role in the social and economic structure,[4] but technological progress tends to be uneven, often creating gaps between villages and urban areas. Technology has great potential to be acatalyst in improving the quality of life in villages, but its role is often not optimal.[5]

Villager often face several challeges including limited knowledge an technological skills among the village population. This can hinder the application of technology to improve the quality of life of village communities.[6]

The use of technology such e-commerce, smart agricultural technology, long- distance health services and telecommunications infrastructure can be a solution to improve accessibility and quality of village communities. [7]However, choosing the right technology and in- depth understanding of the needs of village communities are key factors in successful technology implementation.[8]

The ANP method is an approach method that can be used to measure and analyze the complexity of relationship between criteria between decision makers in this context. ANP can be uses to evaluate varios alternative technologies that can be applied in vilages.[9] This method help in determining the priority of technology implementation the priority of technology implementation the best suit the needs of the conditons. Specific to each village.[10]

As varios technological innovations continue to develop, there is a need for a systematic and structured approach to evaluate the role and impact of technology in improving the quality of life of rural communities.[11] The analytical Network Process (ANP) method is an analytical approach that makes it possible to understand the complexity of interaction between variables involved in the use of technology.[12]

ANP (Anlytical Network Process) is an analytical method that allws structuted decision making by considering the relationship between various complex and diverse factors in this context.[13] [14]ANP is used to identify technological development priorities that will have the greatest impact on the quality of life of village communities.[15]

In many cases, technology development in villages in often less than optimal due to a lack of in- depth understanding of community needs, priority aspects, and the expected impact of the technological solutions implemented.[8] Therefore, research using the ANP method is relevant for inverstigating the relationship between variables related to technology and the quality of life of village communities.[9]

It is hoped that optimizing the role of technology by using ANP will not only improve the quality of life of village communities in areas such as education,[16] health, agriculture and the economy. [17]But also provides a sustainable positive impact in reducing the gap between rural and urban areas.[18]

Thus, this research aims to gain in-depth insight regarding the pontential of technology to improve the quality of life of village communities, as well as providing strategy recommendations based on the results of structured analysis using the ANP method.[18] This research can provide a holistic and sustainable view to guide the development of appropriate and effective technology in improving the quality of life of rural communities.[14]

2. RESEARCH METHOD

Data is processed using a certain process through an information model. The recipient will receive this information to make a decision and take action which will result in the appearance of more data. The data will be captures as input, processed again through a model and so on, forming a cycle. [19]This cycle is called the information Cycle. To make the information Cycle clearer, see figure.[20]

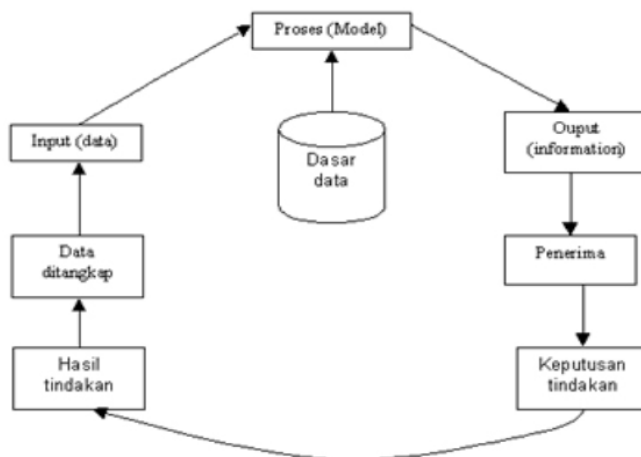


Figure 1. Information Cycle

In this research, the ANP (Analytical Network Proses) method is used, where this method makes decision making easier so that we can understand the role of technology in the quality of life of the community.[7]

The ANP method was developed by Thomas L.Saaty, a mathematician. This method is a framework for making effective decisions on complex problems by simplifying and speeding up the decision- making process by breaking the problem into its parts, arranging these parts or variables in a hierarchical order,[9] assigning numerical values to subjective judgments about the importance of each variable.[21] And synthesize these considerations to determine which variables have the highest priority and act to influence the outcome in the situation.[22] This ANP method helps solve complex problems by structuring a hierarchy of criteria, interested parties, results and by drawing on various considerations to develop weights or priorities.[23] This method also combines the power of feelings and logic related to various problems, then synthesizes various diverse considerations into results that match our intuitive estimates as presented by the consideration that have been made. (Saaty, 1993).[13]

To solve problems using the ANP method there are several principles that must be understood :

1. Create a hierarchy.
hierarchy is used to make understanding easier, namely by breaking it down into supporting elements, arranging the elements hierarchically and combining them.
2. Selection of criteria and alternatives
criteria and alternatives are carried out by carrying out pairwise comparisons. According to Saaty (1998) in his book, for various issues, a scale of 1 to 9 is the best scale for expressing opinions. The value and definition of qualitative opinions comparative scales.
3. Determine priorities
for each criterion and alternative , pairwise comparisons need to be carried out. The relative comparative values of all alternative criteria can be adjusted to the judgment that has been determined to produce weights and priorities. Weights and priorities are calculated by manipulating matrices or through solving mathematical equations.
4. Logical Consistency
the meaning of consistency :
 - a. Similar objects can be grouped according to uniformity and relevance
 - b. Concerns the level of relationship between objects based on certain criteria.

Table 2.1 Pairwise Comparison Rating Scale

Level of Importance	Definition
1	Both elements are very important
3	One element is slightly more important than the others
5	One element is essential or very important compared to other elements
7	One element is really more important than the others
9	One element is absolutely more important than the other elements
2,4,6,8	The middle value between two consecutive assessments
The opposite	If activity I gets one point compared to activity j, then j has the opposite value compared to i

5. Define the problem and determine the desired solution, then arrange a hierarchy of the problems faced. Arranging a hierarchy is by setting goals which are system targets at the top level.
6. Determine element priority.
 - a. Make pairwise comparisons, that is, compare element in pairs according to the given criteria.
 - b. The pairwise comparison matrix is filled in using numbers to represent the relative importance of one element to another element.
7. Synthesis

Considerations from pairwise comparisons are synthesized to obtain overall priorities. The things done in this step are :

 - a. Add up the value from each matrix column.
 - b. Divide each value of the column by the total of the column in question to obtain the normalization matrix.
 - c. Add up the values from each row and divide by the number of elements to get the average value.
8. Measure Consistency

in making decisions, it is necessary to know how good the consistency will be, because it is undesirable to make decisions based on interests with low consistency several things that must be done in this step are :

 - a. Multiply the value in the first column by the relative priority of the first element, the value in the second column by the relative priority of the second element, and so on.
 - b. Add up each row
 - c. The result of adding rows is divided by the number of elements present, and the result is called lambda max (λ max).
9. Calculate the Consistency Index (CI) with the formula :

$$CI = \frac{\lambda_{maksimum} - n}{n - 1} \dots\dots\dots(1)$$

Where n = number of elements.

10. Calculate the Consistency Ratio (CR) with the formula :

$$CR = \frac{CI}{RI} \dots\dots\dots(2)$$

11. Checking Hierarchy Consistency.
 if the value is more than 10 %, then the judgment data assessment must be corrected. However, if the consistency ratio (less or equal to 0.1) then the calculation results can be seen in the table :

Table 2.2 : Table of Consistency Random Index (IR) value

n	1	2	3	4	5	6	7	8	9	10	11	12
RI	0.00	0.00	0.58	0.90	1.12	1.24	1.32	1.41	1.45	1.49	1.51	1.58

3. RESULTS AND DISCUSSIONS

Matrix Calculation Results

From the results of research and data collectin based on questionnaire in Sicanggan Village Langkar Rregency, North Sumatra. [24]In processing this data, there are several criteria that will be used to find out information about ortimizing the role of technology to improve the quality of life of village communities.[25]

Table 3.1 Matrix Calculation Table

1	3	4
3/1	1	2
4/1	2/1	1

In order to assess and analyze based on the results of the questionnaire processing obtained number of assessment components such as :

1. Health (Max 50 %)
2. Education (Max 30 %)
3. Economu (Max 20%)

In this assessment, there are criteria for the assessment components after the application is used, which can be seen in the image below :

1. Initial Application Apperance

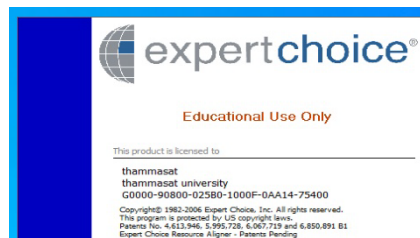


Figure 3.1 Initial View of ExpertChoice

2. From the main menu the application will appear

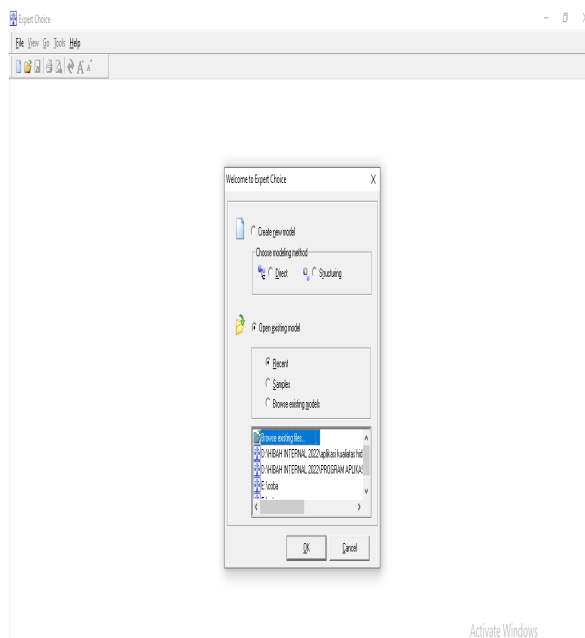


Figure 3.2. Home Display Menu

In this initial display, save the first so that we can go the next stage, after saving, a display will appear.

3. Input Display

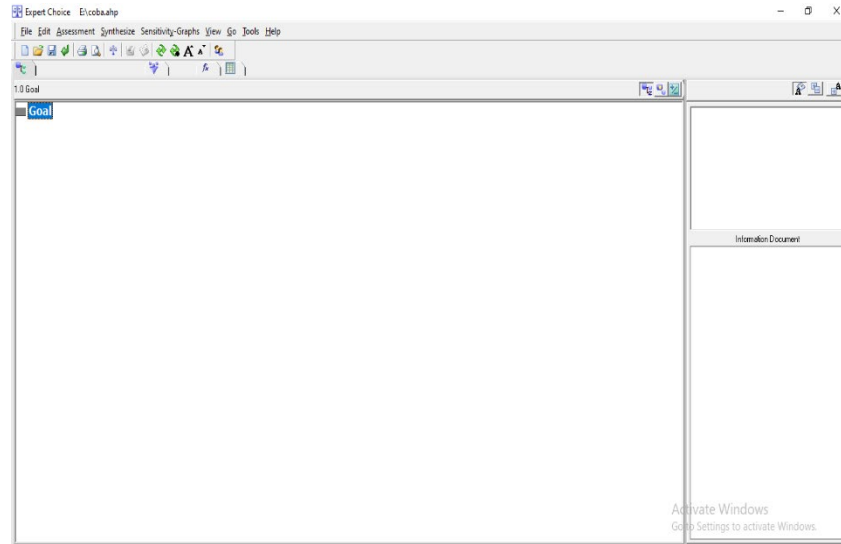


figure 3.3 input Display

In this display we input the main objective of the problem by inputting the Goal as well as criteria and alternatives from the data which makes it easier to determine the role of technology in improving peoples quality of life using the ANP method.

4. After we input the criteria dat and alternatives from the selection data

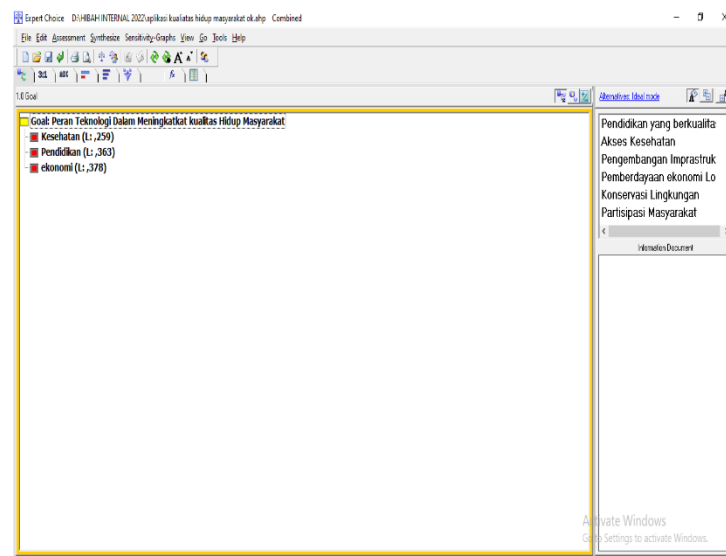


figure 3.4 Data that has been entered

5. For the data that is input, we input the data manually into the application by secting and clicking the icon on the application screen display and we can input the criteria and alternative data that have been filled in by the respondent into the application.

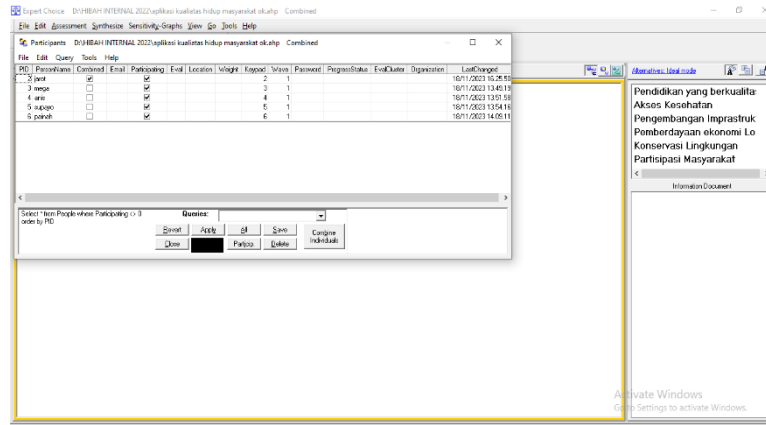


Figure 3.5 Data Input

- After inputting the data, we return to the initial display menu and we input all the criteria data that we want which will later be calculated between the criteria and the selected alternative.

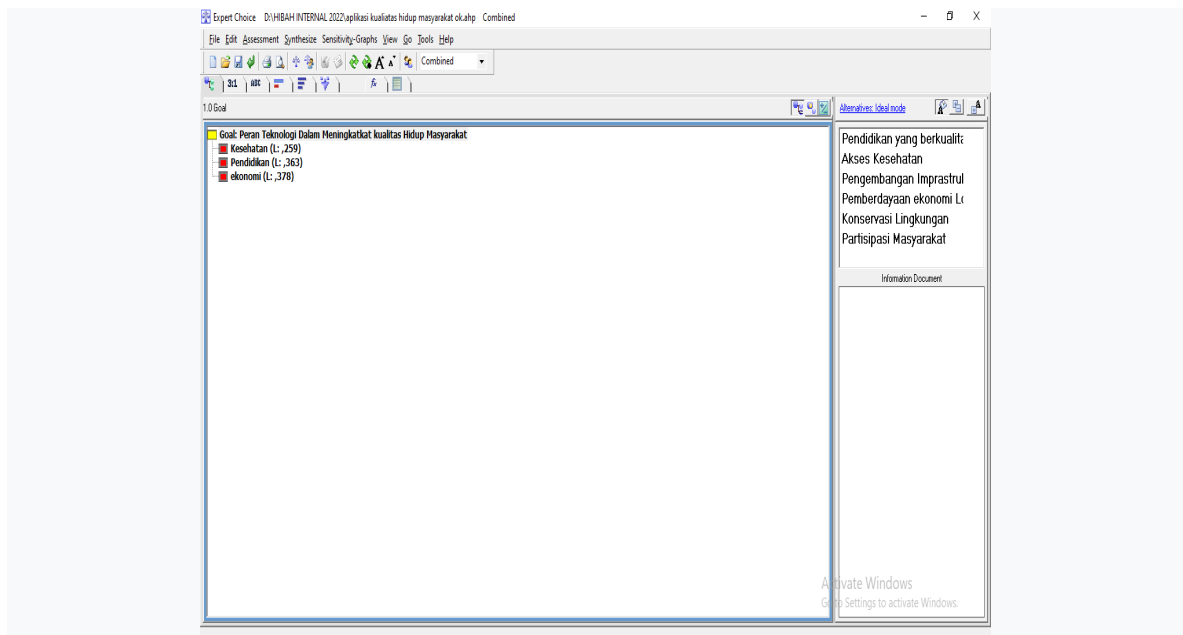


figure 3.6 input image based on respondent

- After we input all the data we do a combination and the respondent criteria will aper later, where we just need to input the respondent data so that we can find out the opinions of the respondents.

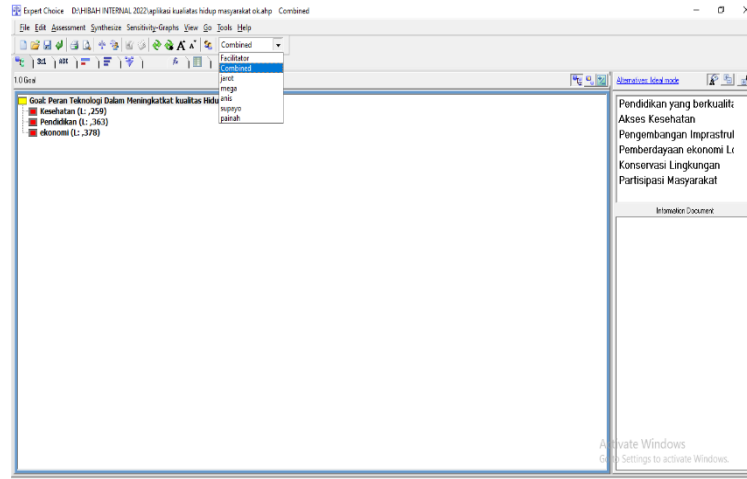


figure.3.7 Data Combination

- After combining the data from all respondents, we click 3.1 in the initial display, a display will appear where we enter data based on the opinions of the respondents

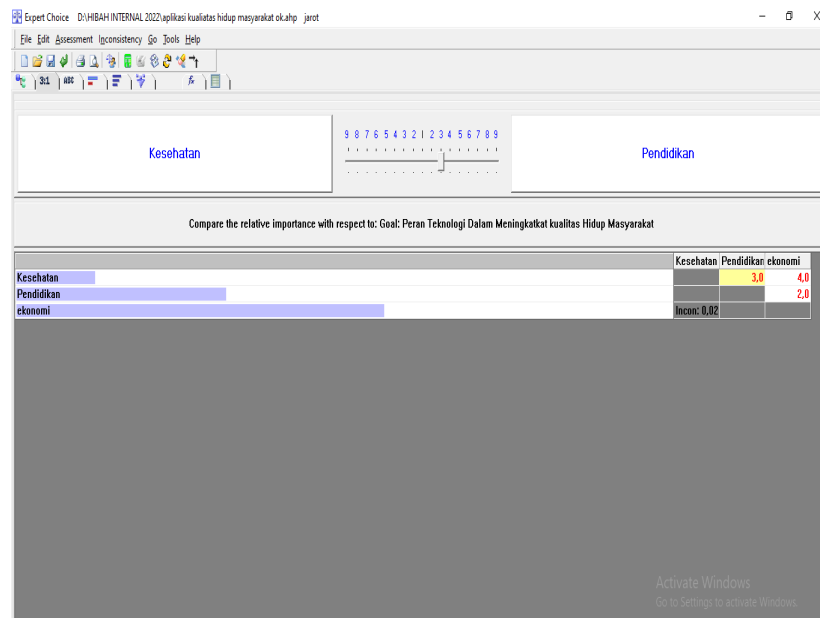


figure 3.8 Respondent data input

9. After we input the data, we can see which result is more intensi based on the respondents opinion after we press the blue button at the beginning of the application screen so that we can find out the final result of the combination of respondents from health, education and economics.

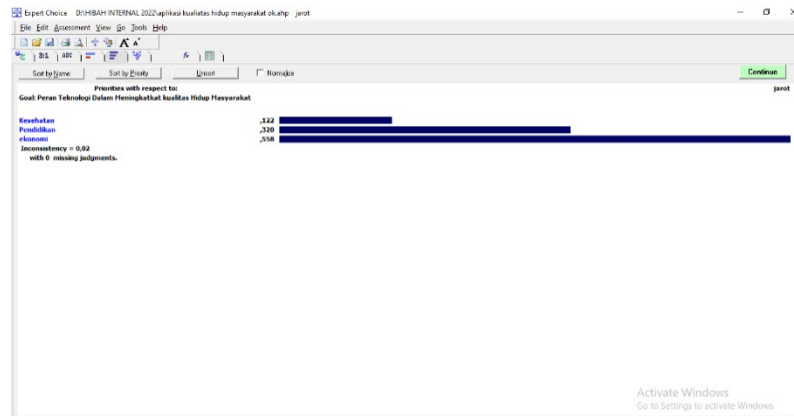


Figure 3.9 final results based on consistency

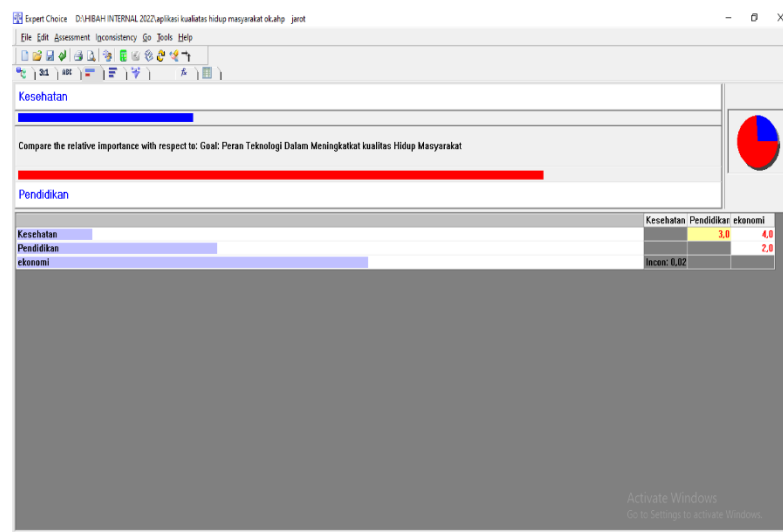


Figure 3.10 Final result Graph

4. CONCLUSION

Based on the results of the analysis carried out by the author so that he knows the role of technology in improving the quality of peoples lives, it can be concluded as follows :

1. The process is more ptimal by using the Analytical Network Process (ANP) method because it can make it easier using the Analytical Network Process (ANP) method .
2. By testing the application, it provides a benchmark in determining the intensity of varios different interesys and needs so that it can provide solutions ot results that are more in line with desires.

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