The Analysis of Willingness to Pay for Operations and Financing Road Maintenance at Tengku Hasan Street Aceh Besar District

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Abstract. Infrastructure components are generally divided into two major parts, namely cost-back and no-cost return. Infrastructure financing is not returned by involving the community financially by using a system that is often referred as connection fees are charges imposed by the company or government services to individuals. This study was carried out to investigate the willingness to pay (WTP) by civilian for operations and financing road maintenance in Tengku Hasan Street, Aceh Besar. The study was conducted by distributing questionnaires to 140 respondents who are villagers Bakoy and employees of Tirta Mountala Company. The value of the average WTP community is IDR 1.800 per month. With the amount of WTP values of IDR 2.4642 million per month, or approximately IDR 29.5704 million per year. The values indicate that a very small amount of people is willing to pay for the operations and maintenances in Tengku Hasan street but it can be concluded that there is awareness of the public to get a decent quality infrastructure despite having to pay a fee. The majority of respondents chose to agree to be involved financially in the operation and maintenance of Tengku Hasan street Bakoy village, Aceh Besar district with citations per year, as many as 41 people or 56.9%.

Keywords: infrastructure components, willingness to pay, descriptive analysis

1. Introduction
Infrastructure can be defined as a physical element (urban) to support community activities systems. The main functions of the infrastructure are to serve the needs of the community in the activities of both economic and social [1]. Generally, Infrastructure financing components are divided into two major parts, namely cost and the cost is not returned back.

Financing infrastructure is not returned by involving the community financially by using a system that is often referred to as connection fees are fees charged by the company or government services to individuals. Associated with this system, the researcher conducted research about society participation toward operations financing and maintenances of roads on Tengku Hasan street Bakoy village which is a local road in the district of Aceh Besar.

Infrastructure of transportation that include all parts of the road, including complementary buildings and equipment intended for traffic, which is at ground level, above ground, below ground or water, as well as above the water surface, except railways and lorries roads. The road has so many roles
not only as a transportation strip, serves as a support in various mayors such as social, economic, cultural, and environmental as well as supporting the growth and distribution region [2].

In general, the role of the road be seen in two main dimension of the road as providers of access to land parcels (micro scale) and road as service providers of movement of people and goods. In a broader perspective the road is able to deliver a significant contribution in encouraging the growth of the region both physically as well as economically [3].

Limited sources of financing to support the operation and maintenance of roads is a classic problem faced by almost all developing countries. This is reflected in the amount of funds allocated for road maintenance needs of only about less than 20% of the funding requirements for operations and maintenance of roads that in fairly good condition. This matter arises because of the tendency to spend the budget for the construction and repair [4].

There are several factors that affect people's participation in development. These factors can be grouped into two categories, internal factors and external factors. Internal factors are factors of the affected communities in the public participation program. While external factors are factors that come from outside the community [5]. Hence, this study was conducted to determine the how far these factors can build the consciousness in the civilian by investigate the WTP for operations and financing road maintenance in Tengku Hasan Street, Aceh Besar.

2. Method
2.1 Willingness to Pay
The willingness to pay is defined as the amount of money willing to pay by individuals to obtain a good or service [6]. Conception of willingness to pay (WTP) of society closely related to aspect public welfare. [7] that the concept of WTP is closely related to the concept of welfare economy (welfare economics). Welfare Economics uses a cost benefit analysis approach as an attempt to explore whether there is a potential change to usability an item due to changes in economic variables, such as price changes.

According [8] WTP is a method for measuring how much the price of loss resulting from damage to the road but we do not directly know the market price. Several approaches are used in the calculation WTP to calculate raising or deterioration of environmental conditions are:

i. Calculate the costs incurred by an individual who is willing to reduce the negative impact on the environment due to development activity

ii. Calculate the reduction in the value or price of the goods due to the declining quality of the environment.

iii. Through a survey to determine the level of people's willingness to pay in order to reduce negative impacts on the environment better.

2.2 Data Collection
Tengku Hasan Street, Village Bakoy connect between Lambaro and Blang Bintang area with Limpok and Ulee Kareng. Where, ± 3.3 km road length and width ± 5 m. The required data in this study of primary and secondary data. The samples were taken approximately 10% of the total population [1] Total population is 1369 and this study has 140 respondents. Flowchart of experimental design for this study were shown in the Figure 1.
3. Results and Discussion

3.1 Respondent Characteristic

The characteristic of the gender shows that most of the respondent are male which are 75 respondents (53.6%), and for female are 65 respondents (46.4%). The distribution of the respondents based on the gender were shown in the Figure 2.
Figure 2. Characteristic of the gender

The characteristic of the age shows that most of the respondents are 30-40 years old which are 55 respondents (39.3%), some are < 30 years old which are 45 respondents (32.1%). The respondents are 41-50 years old which are 30 respondents (21.4%). Only few respondents are > 50 years old which are 10 respondents (7.1%). The distribution of the respondents based on the age can be seen in the Figure 3.

Figure 3. Characteristic of the age

The characteristics of the educational background shows that almost the respondents are bachelor degrees which are 81 respondents (57.9%), some are senior high school which are 44 respondents (31.4%). The respondents are junior high school which are 11 respondents (7.9%). Only few have master degrees which are 3 respondents (2.1%) and the rest ones are doctor degrees which is 1 respondent (0.7%). The distribution of the respondents based on the educational background were shown in the figure 4.
Figure 4. Characteristic of the educational background

The characteristics of the monthly income shows that almost the respondents are IDR 2,100,000 – IDR 3,000,000 which are 38 respondents (27.2%), some are IDR 1,100,000 - IDR 2,000,000 which are 37 respondents (26.4%). The respondent with IDR 3,100,000 - IDR 4,000,000 are 35 respondents (25.0%). Only few have IDR < 1,000,000 which are 16 respondent (11.4%) and the rest ones are IDR > 4,000,000 which are 14 respondents (10.0%). The distribution of the respondents based on the monthly were depicted in the figure 5.

Figure 5. Characteristic of the monthly income

The characteristic of the type vehicle ownership shows that most of the respondent have motorcycle which are 107 respondents (76.4%), some are having a car which are 20 respondents (14.3%). Only few have car and motorcycle which are 11 respondents (7.9%) and the rest have truck which are 2 respondents (1.4%). The distribution of the respondents based on the type vehicle ownership were illustrated in the figure 6 below.
3.2 Analysis Willingness to Pay for Operations and Financing Road Maintenance

Based on the results of 140 respondents who responded to questionnaires distributed, it turns out the respondents who expressed a willingness to pay for operations and maintenance funding Tengku Hasan street Bakoy village, Aceh Besar district is as much as 72 people or 51.4%.

In this study, the respondents are divided into 4 groups. Group 1 are the respondents who refuse to be involved financially in the operation and maintenance in Tengku Hasan street which amount up to 68 people or equal to 48.6%. Group 2 are the respondents who are willing to be financially involved in operations and maintenance in Tengku Hasan street paid IDR 1,000 – IDR 2,000 per month is 57 people or 40.7%. While, Group 3 are the respondents who are willing to be financially involved in operations and maintenance in Tengku Hasan street paid IDR 2,100 - IDR 3,000 per month is 11 people or 7.9% and Group 4 are the respondents who are willing to be financially involved in operations and maintenance in Tengku Hasan street paid IDR 3,100 – IDR 4,000 per month is 1 person or 0.7%. And the last group, Group 5 are the respondents who are willing to be financially involved in operations and maintenance Tengku Hasan street who paid for > IDR 4,000 per month is 3 people or 2.1%. From all respondents who agreed to be financially involved in the operation and maintenance of the road, the average value of the WTP is IDR 1797.22 or rounded up to IDR 1,800 per month. With the magnitude of the average value of WTP IDR. 1,800 monthly x 1369 (number of local community) = IDR 2.4642 million monthly, or approximately IDR 29.5704 million per year. This value is very small to fund operations and maintenance Tengku Hasan street but it can be concluded that there is awareness of the public to get a decent quality infrastructure despite having to pay a fee. Distribution WTP on user respondents Tengku Hasan street can be seen in Table 1.

| No | Group | Number of Respondents (People) | %  |
|----|-------|---------------------------------|----|
| 1  | Group 1 | 68                              | 48.6 |
| 2  | Group 2 | 57                              | 40.7 |
| 3  | Group 3 | 11                              | 7.9 |
| 4  | Group 4 | 1                               | 0.7 |
| 5  | Group 5 | 3                               | 2.1 |
|    | Total   | 140                             | 100 |

Table 1. Percentage of willingness to pay on the User Respondents Tengku Hasan Street.
In this section will describes about the response of respondents to the operations and maintenance funding mechanism Tengku Hasan street Bakoy village, Aceh Besar district. Based on the table above, the majority of respondents chose to agree to be involved financially in the operation and maintenance of Tengku Hasan street Bakoy village, Aceh Besar district with citations per year, as many as 41 people or 56.9%. The distribution of the operations and maintenance funding mechanism Tengku Hasan street Bakoy village, Aceh Besar district can be referred in the Figure 7.

![Figure 7. Method of Payment](image)

4. Conclusion
Based on the results of 140 respondents who responded to questionnaires distributed, it has been revealed that the respondents who expressed a willingness to pay for operations and maintenance funding in Tengku Hasan Street Bakoy village, Aceh Besar district is as much as 72 people or 51.4% of respondents and those who are not willing as many as 68 people or 48.6%. The average value of WTP is IDR 1793.22 or rounded IDR 1800 monthly. With the amount of WTP values of IDR 2.4642 million per month, or approximately IDR 29.5704 million per year, this value was considered to be very small to pay the operations and maintenances in Tengku Hasan street but it can be concluded that there is still some awareness from the people to get a decent quality infrastructure despite having to pay a fee. The majority of respondents chose to agree to be involved financially in the operation and maintenance of Tengku Hasan street Bakoy village, Aceh Besar district with citations per year, as many as 41 people or 56.9%.

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