Development of Passenger Preference Model In Selecting Sea Transportation Mode: Case On Kendari - Raha Route in Southeast Sulawesi Province

Usman Rianse[1], La Ode Muh. Magribi[2], Hado Hasina[3], Bayu P. Adiputra[4], Adris A. Putra[5]
[1]Lecturer of Postgraduate Program, Halu Oleo University, Kendari, Southeast Sulawesi, email: usman.rianse@gmail.com; Telp. (+62)811402399
[2]Lecturer of Postgraduate Program, Halu Oleo University, Kendari, Southeast Sulawesi, email: obi_magribi@yahoo.com; Telp. (+62)81284229970
[3]Head of Transportation Office of Southeast Sulawesi Province, email: hado.hasina@gmail.com; Telp. (+62)8114033444
[4]Students of Post Graduate Program, Planning and Regional Development of Halu Oleo University, email: bayupurna76@gmail.com, Telp. (+62)85394578001
[5]Lecturer of Postgraduate Program, Halu Oleo University, Kendari, Southeast Sulawesi, email: putra_adris@yahoo.com; Telp. (+62)82136043403

Abstract

The rapid development of commercial activity center in Kendari City caused the high level of travel that occurred between Kendari City with several regencies in Muna Island, especially Muna Regency and West Muna Regency. Where in the nodal region system the relation of nucleus and hinterland regions is an uncoordinated entity so that the role of the core and hinterland regions is an important element of the regional system.
The purpose of this study was to identify the characteristics of users of the speedboat modes and night vessels. Another goal is to model the selection of modes between the two, identify the factors that influence the mode selection and test the sensitivity of the traveler when a change is made to one of its attributes, and compare the sensitivity between the binary binary curve model and the binary probit. From these two models can be known the probability of choosing the mode of transportation of Fast Ship and Night Ship.
The result of the analysis of the selection of modes obtained by the equation of the function of the difference of the Quick Ship and Ship Utility as follows: UKC - KM = -1,468 - 0,0000579 X1 - 0,609 X2 + 0,435 X3 + 0,439 X4, with X1 (attribute cost), X2 (time attribute) , X3 (frequency attribute), X4 (service attribute).

Keywords:
stated preference, binary logit, binary probit, attribute, modal selection

I. Introduction

Transportation and regional development is a two-way interaction. Transport services provide encouragement and service to various activities to enhance regional development. While the development of the region requires the availability of effective and efficient transportation services throughout the region (Adisasmita, 2011).
Along with the increase and development of the population and the increasingly tight competition tendency in economic and other aspects of social causes the high level of activity/ movement that occurs and the variety of travel behavior in choosing a mode to achieve a goal of meeting the needs. Fulfillment of the various needs where the need is not met where he is located but fulfilled elsewhere. For that reason moves between two places, where the goods/

services are needed to the place where the goods / services are available. This means that inter-regional or inter-island interconnection is very instrumental in creating travel.

The model of selection of sea transportation modes and characteristics of inter-island passengers is a very decisive variable in understanding and developing the concept of the relationship model between demand and supply of transportation within a region. If in the planning of transportation of a region is not known the characteristics of travelers and the model of the choice of travel modes of the community, it will have a disruptive impact on the transportation system in an area due to the mismatch of community needs with the availability of existing transportation facilities in a planning (Adiputra, B, P, 2013) .

Southeast Sulawesi Province is one of the areas in Indonesia which has several urban centers and some are buffer areas. The trend in Southeast Sulawesi Province is the existence of a centralized travel pattern, especially the trip from several districts in the archipelago to the capital of Southeast Sulawesi province namely Kendari. This is due to the rapid development of commercial centers in the capital while at the same time newly developed residential areas in some of the districts of the archipelago or new regions are not receiving adequate services. In the nodal region system the relationship between the center and hinterland is an uncoordinated entity so that the role of some core and hinterland regions in Southeast Sulawesi Province is an important element of the regional system.

Muna Island is one of the largest islands in Southeast Sulawesi Province whose territory consists of several districts. Muna Regency and West Muna Regency is a district in Muna island that has a considerable amount of movement to the city of Kendari through the archipelago Raha vice versa. The means of transportation connecting the two zones is a means of sea transportation where the dominance of social, economic and political activities in the region of Muna and West Muna is influenced by the activities in Kendari City.

Increased travel between island routes Raha and Kendari City is marked by the average movement in the last 4 (four) years of departure of 71,187 inhabitants/ year and the arrival of 90.300 inhabitants/ year (Raha Port Management Unit Office, 2009-2015), the figure is certainly larger, because some passengers are not buying tickets so they are not listed in the ship's manifest data. Based on data from the Central Bureau of Statistics of Muna Regency and West Muna Regency in 2016, the population in Muna Regency is 211,622 people and West Muna Regency as many as 77,084 people. Muna Regency and West Muna Regency have different characteristics of the community, both in terms of social, cultural, occupation, and income level, can make this District as the origin of the largest inter-island travel to get to the center of activity in the Capital of Southeast Sulawesi Province.

II. LITERATURE REVIEW

A. Transport Planning And Modeling

Transport planning can be defined as a process whose purpose is to develop a transportation system that allows people and goods to move or move safely and cheaply (Pignataro, 1973) and according to (Tamin 1997) Transport planning is a systematic systematic transportation planning activity that aims to provide transportation services both facilities and infrastructures tailored to the needs of transportation for the community in a region and other community objectives.

Transport planning is intended to determine the factors that affect the needs of people will travel people or goods. These factors may include land use, economic, socio-cultural, transportation technology and other factors that may be related. Recent developments led to the planning of a sustainable transport system that combines transport efficiency, economic growth and resource sustainability.

B. Modeling Concepts

The activity of summarizing and simplifying the realistic (real) condition is the modeling activity. Thus we can define the model as follows:

1) The model is a concise representation of the real condition and the form of a design which may describe or represent the real condition for a particular purpose (Black, 1981, Miro 2004).
2) A model is a representation or formulation in a particular language agreed from a real condition (Simatupang, 1995, Miro 2004)
3) The model is a main framework or formulation of information / data about the actual conditions collected to study/ analyze the real system (Gordon, 1978, Miro 2004).

C. Concept of Mode Selection

The selection of modes enters in the third stage of transport planning after the stage to obtain travel awakening and movement distribution. In this third stage it aims to know how travelers travel divided into (or choose) different modes of transport. In other words, the mode selection stage is a transportation planning process aimed at assigning to impose

travel expenses or knowing the number (in terms of proportion) of persons and or goods that will use or select the various modes of transportation available to serve a particular point of origin, for some specific travel purposes (Miro, 2002).

D. Stated Preference Technique

According to (Permain, 1991), Stated Preference is one approach to the respondents in choosing the best alternative by making an alternative. The questionnaire contains questions about what options they want or how they make a rating or ranking in one or more alleged situations.

Stated Preference is an approach by conveying a choice statement in the form of a hypothesis to be assessed by the respondent. With this method, we can exercise real-life experimental controls in the transport system (Ortuzar and Willumsen, 1994).

The Stated Preference technique offers a technique for providing information about travel demand and behavior well for a particular expenditure for some reason. The technique stated preference refers to an approach that uses statements about how respondents respond to different situations or change.

III. RESEARCH METHODS

A. Location and Time of Study

This research will be conducted at two places, namely at Raha City Port and Kendari City Port by distributing questionnaires to sea vessel passengers in port and aboard either fast vessel or night vessel.

This research survey was conducted for 1 month in November to 160 respondents and the process of preparation / processing of data approximately 3 (three) months starting from December to February 2017.

B. Research Variables

In the primary data collection, the variables that influence the making of the Characteristics of Travel Actors and the Model of Inter-island Passenger Passenger Mode are:

1) Respondent Characteristic Variables
   (Name, gender, age, education, occupation, origin-purpose, mode used, reason using mode, travel intent, total travel, and income).
2) Variables Attribute Stated Preference mode selection are Cost, Time, Frequency and Service)

C. Data Analysis Technique

The analysis technique used in this research is done in three stages, namely;

1) The first data processing involves the compilation of data on social / economic characteristics of fast vessel users or night ships, which is the respondent's answer on sheet one questionnaire. This data presentation is completed with Excel Program.
2) The second data processing concerning data compilation of result of Stated Preference selection of modes, which is answer from result of second sheet questionnaire. The presentation of this data was completed with the SPSS 23 Program.
3) The third data processing is the test of binary logitity sensitivity and binary probit, with Excel program, Sensitivity test is done to understand the change of probability value of Fast Ship selection and night vessel in case of change of service attribute value.

The variable attributes used in assessing the user preferences of the mode of sea transport to the type of modes used consist of service attributes namely:

Table 3.1 Comparison of Fast Ship Travel Attributes and Existing Night Vessels

Travel Attribute	Fast Ship	Night Ship
Cost	Rp.125.000	Rp.115.000
Time Travel	+/- 3 hours	+/- 6 hours
Frequency	2 times a day	1 time a day
Service	TV, AC, Canteen, WC	Fan, AC, Cafetaria/Canteen, Karaoke, Bed, WC, (Wide Space)

Source: Research Results 2017

Figure 1. Competing Sea Transport Modes (Fast Ships and Night Ship)

The data stated preference is processed in order to be used as input data in the analysis process, where the qualitative data analysis of field survey results presented in the semantic scale is transformed into a numerical scale (a value expressing the individual response to the choice statement). Numeric scale values are used as non-free variables and as independent variables are the difference in the value of fast ship attributes and night ships.

Table 3.2 Numerical scale values

Rating Point	Scale Standard	
	Pr (Quick Ship)	Numeric Scale $R = Ln\left[\frac{Pr_{Kapal\ Cepat}}{1 - Pr_{Kapal\ Cepat}}\right]$
1. Definitely Choose QS	0,9	R1 = 2,1972
2. Maybe choose QS	0,7	R2 = 0,8473
3. Balanced Choose	0,5	R3 = 0,0000
4. Maybe choose NS	0,3	R4 = -0,8473
5. Definitely Choose NS	0,1	R5 = -2,1972

Source: Permain et al (1991) in Rudi Aziz, et al

IV. RESULTS AND DISCUSSION

A. Descriptive Analysis of Characteristics of Sea Transport Travel Agents Route Raha-Kendari and Kendari-Raha

Characteristics of selection of sea transport routes Raha-Kendari and Kendari-Raha route describes the passengers of fast boats and night ships as respondents in this study. The number of respondents who qualify in this study as many as 150 people.

1. Age

Age is one of the important factors that affect one's mobility. Where the younger a person/ diusia productive will be the greater the movement in comparison with the age of someone who is not productive.

Although this does not happen automatically and apply in absolute terms but can represent real conditions. Based on the age of respondents who travel, it can be seen that the characteristics of fast boat users and night ships are more dominant in the productive age of traveling ie between the ages of 21-35 years by 53% for fast boats and 54% for night ships. The percentage of respondent age users of fast ships and night ships can be seen in Figure 2.

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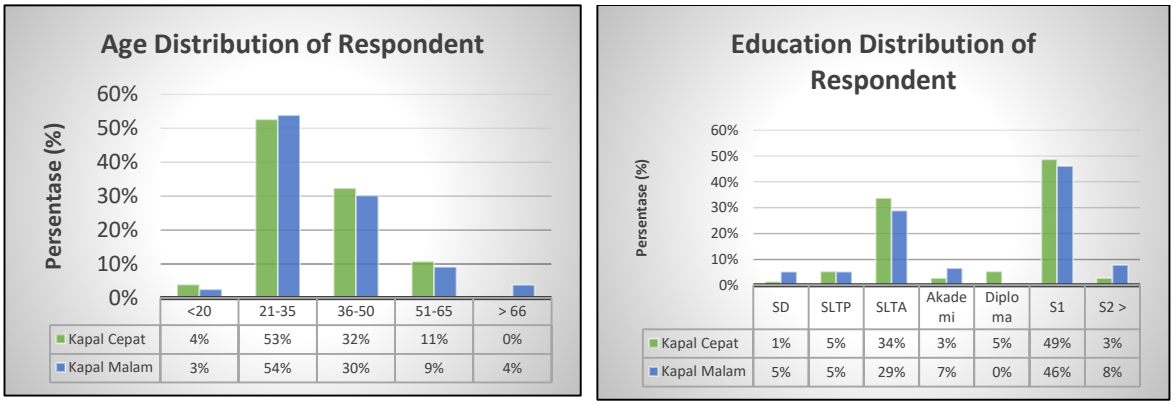

Figure 2.Graph of User Respondents Age and Education Distribution Fast Ship Modes (Kapal Cepat) And Night Vessels (Kapal Malam) Routes Raha-Kendari And Kendari-Raha
Source: Data Anlasis Result, 2017
Where:

SD	= elementary School	Akademi	= Academy
SLTP	= Junior High School	S1	= Graduate
SLTA	= Senior Hihg Scholl	S2	= Post Graduate

2. Education

Education is one index of socioeconomic status. In some studies found a significant relationship between education and mobility of a person, although generally not directly meaning, education is more closely related to income with work. The higher a person's education will have an impact on the increase of position (occupation) and income. Although this does not take place automatically and in absolute terms it can be considered to represent real conditions. Based on the education of the respondents who travel, it can be seen that the characteristics of fast boat users and larger night ships with S1 education background is 49% for fast vessels and 46% for night ships. Further followed by high school education background with percentage of 34% for fast boat and 29% for night ships. The percentage of educational background of respondent users of fast ship mode or night boat can be seen in Figure 2.

3. Job

Job is one of the socioeconomic status index where due to the varying status of one's work will affect the higher mobility of a person in the activity or travel. Although this does not take place automatically and in absolute terms it can be considered to represent real conditions.
Based on the work of respondents who travel can be seen that the characteristics of fast ship users dominant with civil servant background is with a percentage of 31% while for the larger vessel users with a background of self-employment with a percentage of 32%. The percentage of educational background of respondents of fast ship mode users or night ships can be seen in Figure 3.

4. Revenue/ Earnings/ Income

Revenue is one of the variables that affect the rate of movement of a person, where the greater the income a person will be the greater the need and mobility of a person to cause a greater movement as well. Although this does not take place automatically and in absolute terms it can be considered to represent real conditions. Based on the income of respondents who travel can be seen that the characteristics of fast boat users with revenue above Rp.2.000.000 with a percentage of 58% as well as users of night vessels with revenue above Rp.2.000.000 with percentage of 57%. The percentage of respondents' income of fast vessel and overnight vessel users can be seen in Figure 3.

5. Purpose of Travel

Measurement of respondent intent variable in this study, intended to get a picture of how the movement conditions that occur in people who travel with fast boat modes and night vessels.

Based on the intentions of the respondents can be seen that the characteristics of fast ship users more dominant with the intention of travel affairs family and and official affairs with a percentage of 34% and 18%. While the user of the night boat mode with the intention of the biggest trip is with the intention of family affairs and business / work trip intent with a percentage of 29% and 20%. The percentage of travel intentions of respondents of users of fast ships or night ships can be seen in Figure 4.

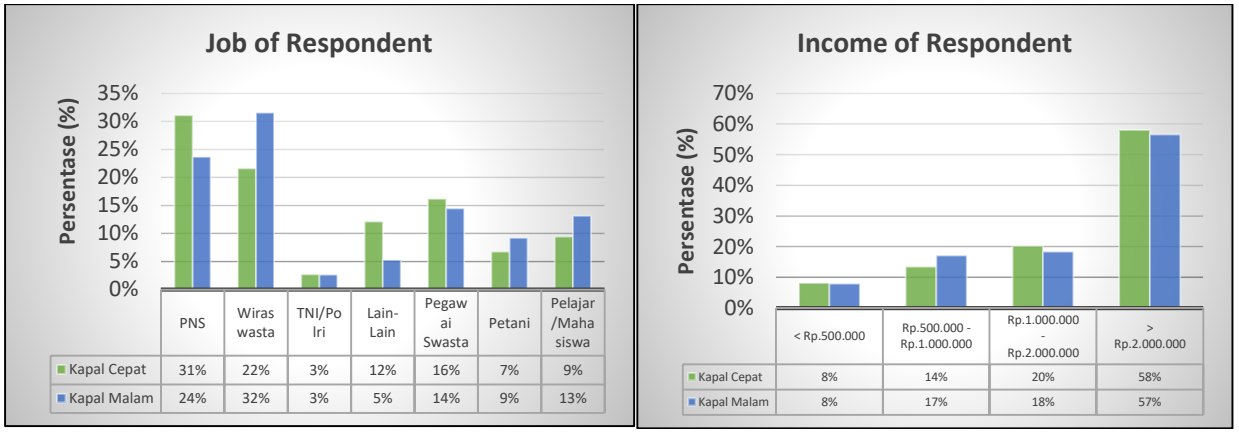

Figure 3. Distribution Chart Job and Income of Respondents User Fast Ship Modes (Kapal Cepat) And Night Vessels (Kapal Malam) Routes Raha-Kendari And Kendari-Raha
Source: Data Anlasis Result, 2017

Where:

PNS	= Government Employee	Pegawai Swasta	= Private employee
Wiraswasta	= Entrepreneur	Petani	= Farmers
TNI/Polri	= National Army and State Police	Pelajar/Mahasiswa	= Students/College Students
Lain-Lain	= the other jobs		

6. Reasons to Use Mode

Measurement of the respondent's variables in choosing frequently used modes is intended to get an idea of the reasons for using the fastest sea transport vessels or night ships that are most often used by people traveling.

Based on the reason for choosing the mode that is often used by the respondent, it can be seen that the reason for the use of fast boat with the biggest speed / time is with percentage of 61% and the night vessel with the reason of comfort that is with the percentage of 38%. The percentage of reason in using the fast ship mode or night boat can be seen in Figure 4.

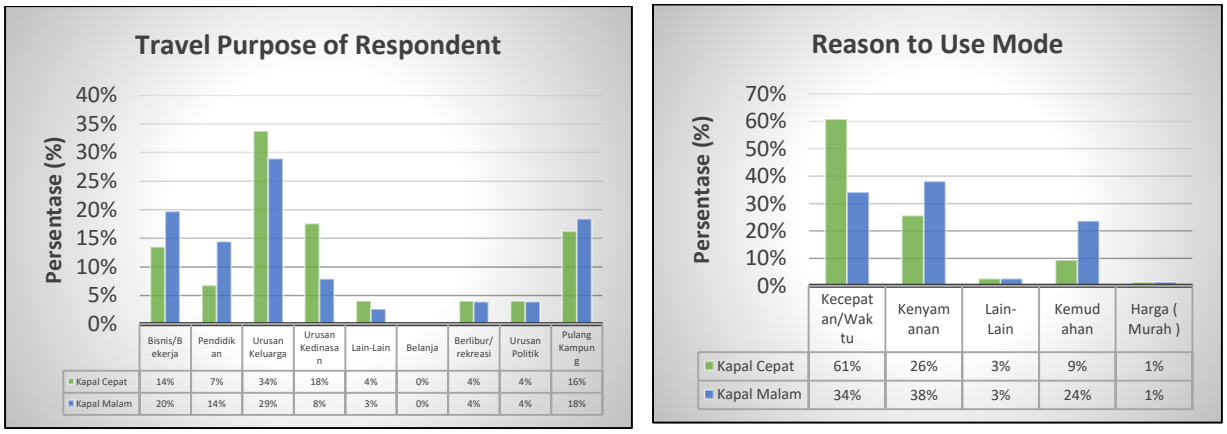

Figure 4. Distribution Charts The Purpose and Reason to Use Mode of Travel User Respondents Fast Ship Modes (Kapal Cepat) And Night Vessels (Kapal Malam) Routes Raha-Kendari And Kendari-Raha
Source: Data Anlasis Result, 2017

Where:
Travel Purpose

Bisnis/Bekerja	= Business	Lain-lain	= the Others Purpose
Pendidikan	= Education	Belanja	= Shoping
Urusan Keluarga	= Family Affairs	Berlibur/Rekreasi	= On Holiday/Recreation
Urusan Dinas	= Official Affair	Urusan Politic	= Political Affair
Pulang Kampung	= Back to Hometown		

Reason to Use The Mode

Kecepatan/Waktu	= Fast/Time	Kemudahan	= convenience
Kenyamanan	= Comfort	Harga Tiket Murah	= cheap ticket price
Lain-lain	= other reason		

7. The Origin and Destination Movement

Measurement of the respondent's origin variable in this study is intended to get an idea of what sub-district people travel by fast boat mode and night boat route Raha-Kendari and kendari-Raha route.
The percentage of origin and destination of respondents of users of sea transport mode Raha-Kendari route can be seen in Figure 5.

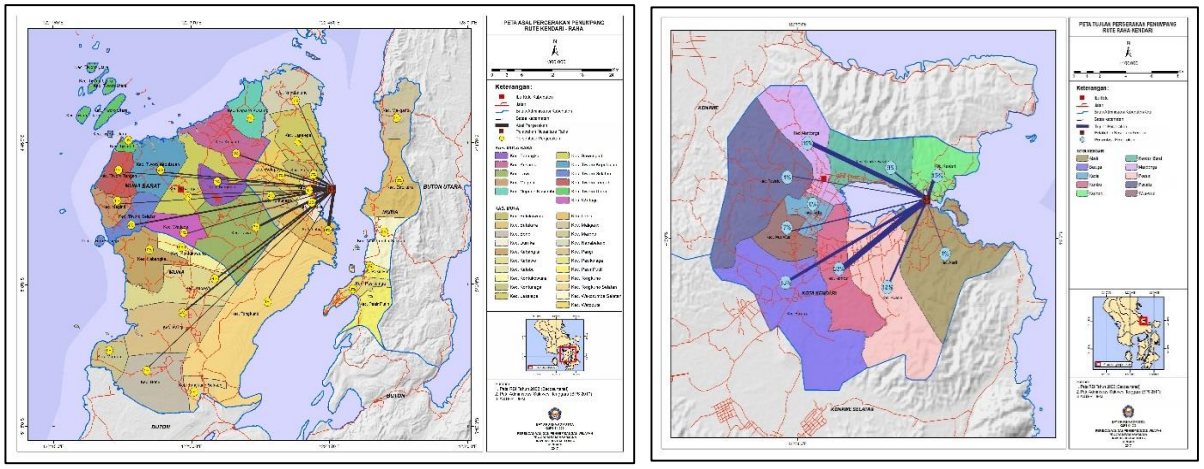

Figure 5. Map of the Origin of the Raha and Kendari Route Movement
Source: Data Anlasis Result, 2017

B. Inferential Analysis Characteristics of Sea Transport Travel Actors Routes Raha-Kendari and Kendari-Raha

The analysis used to see how much the linkage between the characteristics of travelers, which consists of age, education, employment, and income to the choice of mode of transportation.
To measure whether age, education, occupation, and income have correlation with the level of selection of modes of transportation, the chi square test method is used. Before doing the test, first formulated statistical hypothesis, namely:
H0: There is no frequency difference in choosing a mode of transportation.
Ha: There is a frequency difference in choosing a mode of transportation.
Table 4.1 Chi-Square Test Results Using SPSS

Variables Charateristic	DF	*Asymptotic significance*	*Chi Square*		Ket.
			Conting	Table	
Age	4	0,388	4,139	9,48	H_0 accepted
Education	6	0,740	3,529	12,59	H_0 accepted
Job	6	0,100	10,644	12,59	H_0 accepted
Income	3	0,509	2,316	7,81	H_0 accepted

Source: Data Analysis Result, 2017

Based on the output of Table 4.1 above, it is known that the chi-square value of the four characteristic variables Xcount <Xtable it can be concluded that H0 is accepted, which means there is no difference in the frequency of age, education, employment and income in choosing the mode of transportation.

C. Utility Function Equations Analysis

The equation of the utility velocity functions of fast vessels and night liners used in the mode selection model in this study is linear equations. The general form of the linear equation is:

U_ (KC-KM) = a + b_1.X_1 + b_2.X_2 + b_3.X_3 + b_4.X_4

Where:

UKC-KM = Utility Selection Difference Mode

X1 = difference of cost attribute (cost)

X2 = difference of time attribute (time)

X3 = frequency attribute difference

X4 = difference of convenience attribute

Next will be made some alternative equations that can be formed from the equation, to then selected one equation which is the best utility difference function.

Table 4.2 Alternative equations of Utility Functions

No.	Alternatif Persamaan	F_{hitung}	R^2
1.	UKC - KM = 0,671 - 0,0000579 X1	960,509	0,235
2.	UKC - KM = - 1,737 - 0,609 X2	117,044	0,036
3.	UKC - KM = - 0,257 + 0,406 X3	84,516	0,026
4.	UKC - KM = 0,153 + 0,429 X4	283,445	0,083
5.	UKC - KM = - 1,158 - 0,0000579 X1 - 0,609 X2	581,227	0,271
6.	UKC - KM = 0,323 - 0,0000579 X1 + 0,406 X3	552,888	0,261
7.	UKC - KM = 0,732 - 0,0000579 X1 + 0,429 X4	729,116	0,318
8.	UKC - KM = - 2,085 - 0,609 X2 + 0,406 X3	104,015	0,062
9.	UKC - KM = - 1,676 - 0,609 X2 + 0,429 X4	211,504	0,119
10.	UKC - KM = - 0,218 + 0,435 X3 + 0,439X4	199,570	0,113
11.	UKC - KM = -1,506 - 0,0000579 X1 - 0,609 X2 + 0,406 X3	440,885	0,297
12.	UKC - KM = -1,096 - 0,0000579 X1 - 0,609 X2 + 0,429 X4	571,262	0,354
13.	UKC - KM = 0,361 - 0,0000579 X1 + 0,435 X3 + 0,439 X4	556,504	0,348
14.	UKC - KM = -2,047 - 0,609 X2 + 0,435 X3 + 0,439 X4	182,824	0,149
15.	UKC - KM = -1,468 - 0,0000579 X1 -0,609 X2 +0,435 X3+0,439 X4	487,460	0,384

Source: Data Anlasis Result, 2017

Considering the lowest constant value, F Count, and R2 is the largest one is chosen equality utility binominal function logit the best difference is the equation 15, with the largest R^2 value, in addition has the largest R2 value of the equation also has a large F-hitung value of 487.460. The equations are:

UKC - KM = -1,468 - 0,0000579 X1 - 0,609 X2 + 0,435 X3 + 0,439 X4

The equation has the highest coefficient of determination or R2 that is 0.384 or 38.4%. This shows that 38.4% of utility variation (Y) is variable cost (X1), time variable (X2), variable frequency (X3), and service variable (X4).

D. Sensitivity of Binary Logit Model

1. Sensitivity to the cost attribute (Cost)

Based on the sensitivity analysis to the cost attribute change as shown in Figure below, it can be concluded several things as follows:

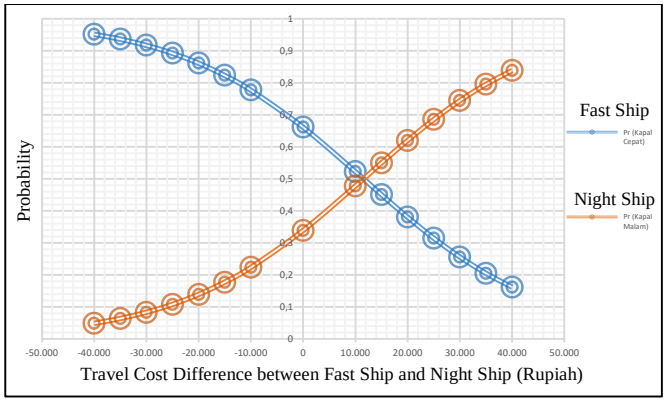

Figure 6. Graph of Binomial Logit Sensitivity Model on Travel Costs.
Source: Data Anlasis Result, 2017

a) Shows the direction of the slope of the ship Fast Probability line, indicating the direction of the negative slope, ie the greater the difference in cost difference (Cost) fast ship, the more decrease the probability of choosing a fast ship.
b) Considering only the difference in cost difference, for the mode selection competition between speedboats and night ships, it can be seen that the probability of selection of modes will be balanced when the probability is at 0.5. So the probability of choosing a speedboat will be greater than the probability of choosing a night liner if the difference or change is less than Rp.12.000, -.

2. Sensitivity to time attribute (Time)

Based on the analysis of the sensitivity to the change of time attribute as shown in Figure below, it can be concluded several things as follows:

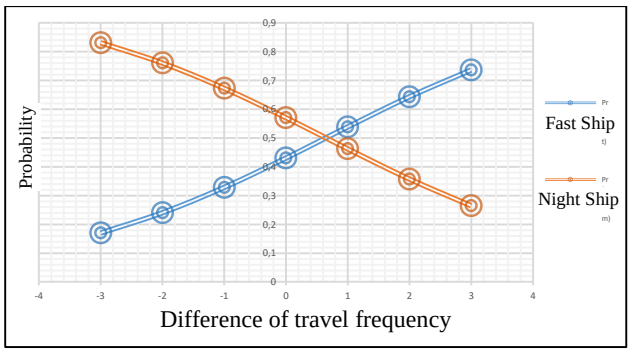

Figure 7. Graph of Binomial Logit Sensitivity Model on Frequency of Travel.
Source: Data Anlasis Result, 2017

a) Shows the direction of the slope of the ship's Fast Probability line, indicating the direction of the positive slope, ie the smaller the difference in the frequency of the speed of the speedboat, the less the probability of choosing a speedboat.
b) From the above graph it can be seen that the probability of selection of modes will be balanced when the probability is at the number 0.5. So the probability of choosing a speedboat will be greater than the probability of choosing a night liner if the travel frequency difference is greater than 0.65 times or 1 times.

3. Sensitivity to service level attributes (service)

Based on the analysis of sensitivity to service level attribute change as shown in Table and Picture below, it can be concluded several things as follows:

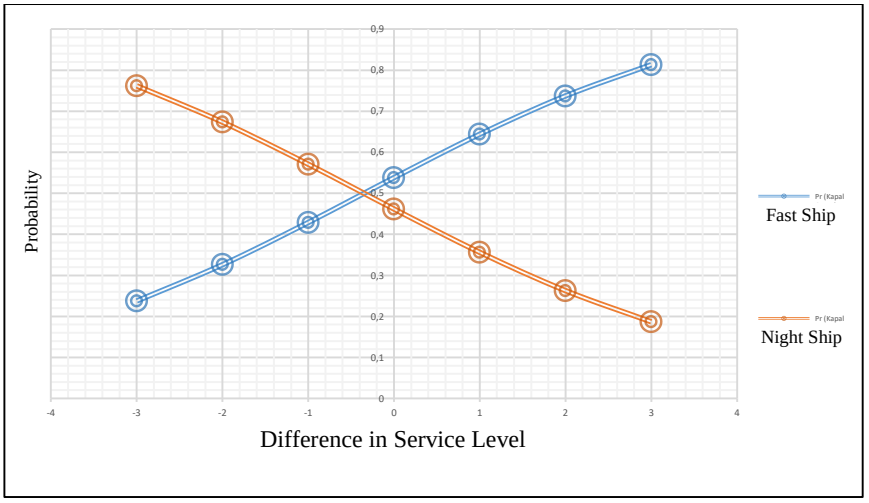

Figure 8. Graph of Binary Logit Sensitivity Model on Service Level.
Source: Data Anlasis Result, 2017

a) Shows the direction of the slope of the ship Probability line Fast, indicating the direction of the positive slope, i.e. the greater the difference between the service level between the fast boat and the vessel night will further increase the probability of choosing a fast ship.
b) From the above graph it can be seen that the probability of selection of modes will be balanced when the probability is at the number 0.5. So the probability of choosing a speedboat will be greater than the probability of choosing a night vessel if the service difference is greater than - 4%.

E. Sensitivity of Probit Binary Model

1. Sensitivity to the cost attribute (Cost)

Based on the sensitivity analysis to the cost attribute change as shown in Figure below, it can be concluded several things as follows:

a) Shows the direction of the slope of the ship Fast Probability line, indicating the direction of the negative slope, ie the greater the difference in cost difference (Cost) fast ship, the more decrease the probability of choosing a fast ship.
b) Considering only the difference in cost difference, for the mode selection competition between speedboats and night ships, it can be seen that the probability of selection of modes will be balanced when the probability is at 0.5. So the probability of choosing a speedboat will be greater than the probability of choosing a night liner if the difference or change is less than Rp.12.000, -.

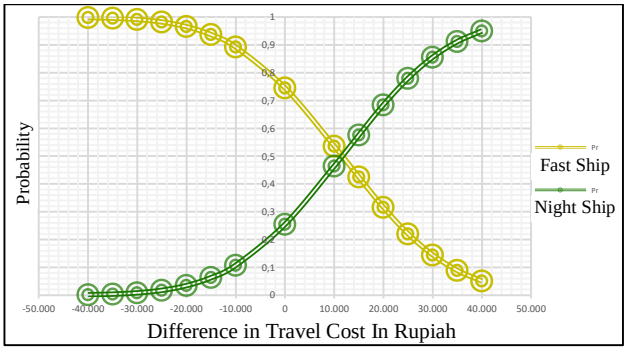

Figure 4.11 Graph of Probit Binary Model Sensitivity to Travel Expenses
Source: Data Anlasis Result, 2017

2. Sensitivity to time attribute (Time)

Based on the analysis of the sensitivity to the change of time attribute as shown in Figure below, it can be concluded several things as follows:

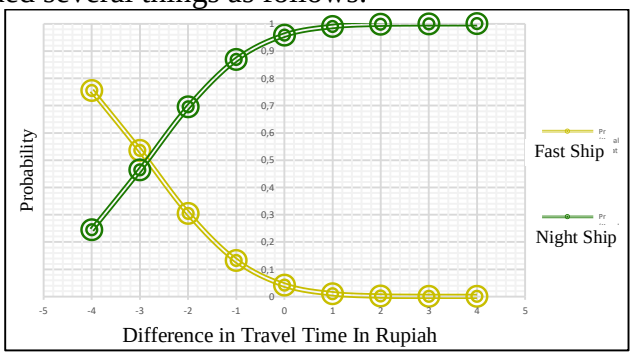

Figure 4.12 Graph of Probit Binary Model Sensitivity To Travel Time
Source: Data Anlasis Result, 2017

a) Shows the direction of the slope of the ship Fast Probability line, indicating the direction of the negative slope, ie the greater the difference in the time difference of time of the fast vessel, the less the probability of choosing a speedboat.
b) From the above graph it can be seen that the probability of selection of modes will be balanced when the probability is at the number 0.5. So the probability of choosing a speedboat will be greater than the probability of choosing a night liner if the travel time difference is less than -2 hours 50 minutes.

3. Sensitivity to frequency attributes (Frequency)

Based on the analysis of sensitivity to the change of frequency attributes as shown in Figure below, it can be concluded several things as follows:

a) Shows the direction of the slope of the ship's Fast Probability line, indicating the direction of the positive slope, ie the smaller the difference in the frequency of the speed of the speedboat, the less the probability of choosing a speedboat.
b) From the above graph it can be seen that the probability of selection of modes will be balanced when the probability is at the number 0.5. So the probability of choosing a speedboat will be greater than the probability of choosing a night liner if the travel frequency difference is greater than 0.65 times or 1 times.

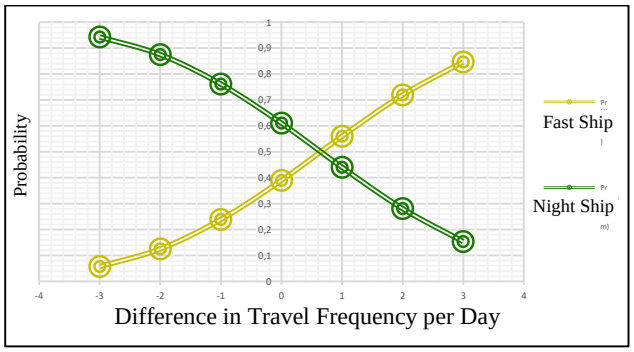

Figure 4.13 Graph of Probit Binary Model Sensitivity to Travel Frequency
Source: Data Anlasis Result, 2017

4. Sensitivity to service level attributes (service)

Based on the analysis of sensitivity to service level attribute change as shown in Table and Picture below, it can be concluded several things as follows:

Figure 4.14 Graph of Sensitivity Probit Binary Model on Service Level
Source: Data Anlasis Result, 2017

a) Shows the direction of the slope of the ship Probability line Fast, indicating the direction of the positive slope, ie the greater the difference between the service level between fast boats and night ships will further increase the probability of choosing a fast ship.
b) From the above graph it can be seen that the probability of selection of modes will be balanced when the probability is at the number 0.5. So the probability of choosing a speedboat will be greater than the probability of choosing a night vessel if the service difference is greater than -4%.

V. CLOSING

A. Conclusions

1) From the results of descriptive and inferential analysis, the characteristics of fast vessel and overnight boat users are:
   a) The result of descriptive analysis of user characteristics of inter-island sea transport modes; Based on age of 21-35 year old traveler with fast ship percentage of 53% and night vessel 54%; Based on the education of travelers is S1, with the percentage of fast vessels by 49% and night vessels 46%; Based on the work of travelers for fast vessels are civil servants with a percentage of 31% while the night ships are 32% self-employed; Based on the dominant traveling traveler's income is> Rp.2.000.000 with the percentage of fast vessels of 58% and night vessels of 57%; Based on the intention of travel is a family affair with the percentage of fast ships by 34% and vessels 29%.
   b) Characteristics of age, education, employment and income there are no difference in frequency in choosing the mode of sea transportation between fast ship and night ships.
2) The probability of mode choice utility model between fast ship and night ship route Raha-Kendari and Kendari-Raha which reviewed in this research are:
   UKC - KM = -1,468 - 0,0000579 X1 - 0,609 X2 + 0,435 X3 + 0,439 X4
   The model has a value of R^2 of 0.384 or 38.4%. The most influential variable in this mode selection model is time/ time. Time has the greatest coefficient value among other variables. Time has a negative coefficient value, this means the longer the journey time the lower the utility value. The most significant factor in influencing the selection of modes by travelers with Raha-Kendari and Kendari-Raha routes is the time factor of travel.
3) The results of model application analysis indicate that departure frequency and service level are the most significant factor in influencing probability of choice of modes due to changes in departure frequency and service level giving the largest percentage value in the change of probability of mode selection.
4) The results obtained from the analysis of the sensitivity of the utility function of binary logit model and binary probit that of the four attributes analyzed the result is the cost (Cost) and time (Time) attribute shows the direction of the negative slope of the line. Which means if the difference between time and cost attributes is getting bigger, then the probability of fast ship mode selection will decrease, and vice versa the probability of choosing the night mode vessel will be bigger. While the attributes of frequency and service level show the direction of the positive line slope, which means that if difference attribute of frequency and service level is bigger, then the probability of choosing fast ship mode will be bigger, and vice versa the probability of night vessel mode selection will the smaller.

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Biographies
Usman Rianse is a former Rector of Haluoleo University for two periods. He is a professor at the Faculty of Agriculture at Halu Oleo University. He was born in a suburban village of Teak Moraa, Kafofo, east of Kontu Dui Village, Muna District. Currently, he actively teaches undergraduate, post-graduate and doctoral programs and holds several courses.

La Ode Muhammad Magribi is a lecturer in Undergraduate Program, Post Graduate and Doctoral Program at Halu Oleo University. Undergraduate education completed at Makassar Hasanuddin University, Post-Graduate Education completed at Gadjah Mada University, Yogyakarta, on Master of Transportation System and Engineering, while doctoral education completed in Faculty of Geography University of gadjah Mada.

Hado Hasina currently serves as Head of Department of Transportation in Southeast Sulawesi Province. In addition to serving as head of Dinas, he is also currently handed over as a trustee of Baubau Mayor.

Bayu Purnama Adiputra is a student who studied at Postgraduate Program of Halu Oleo University for Regional Planning and Development Program. His thesis program was completed under the guidance of Prof. Dr. Usman Rianse and Dr. Ir. La Ode Muhammad Magribi.

Adris Ade Putra is a lecturer who teaches at Undergraduate Program, Post Graduate Program and Doctoral Program at Halu Oleo University. His bachelor's education was completed at Halu Oleo University, graduate education was completed at Hasanuddin University, while his doctoral education was completed at Halu Oleo University.

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