Sea Transportation Route Engineering of Tourism Develoment in South East Sulawesi, Indonesia

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Abstract— The purpose of this study was to identify the condition of tourism and the implementation of sea transportation, in support of tourism in the Southeast Sulawesi province in terms of facilities and infrastructure, costs, tourist locations, origin and destination of tourists, tourist characteristics, quality of port services and tourist destination attractions. This research uses a quantitative approach with quantitative descriptive analysis and employed Structural Equational Model (SEM) analysis. This research was conducted in Southeast Sulawesi Province by specifying the locations of Kendari City, Muna Regency, West Muna Regency, Baubau City, Buton Regency, South Buton Regency, Central Buton Regency, South Buton Regency, North Buton Regency and Wakatobi Regency. This results of this study indicate that, the conditions of tourism and sea transportation in Kendari City, Muna Regency, West Muna Regency, Baubau City, Buton Regency, South Buton Regency, Central Buton Regency, South Buton Regency, North Buton Regency and Wakatobi Regency still show conditions which is not good to bad, regarding facilities and infrastructure, routes, and the quality of services is still very poor. Appropriate steps, need to be taken by the manager or local stakeholders, so that the conditions of the implementation of tourism and sea transportation become good or even very good so that it can give effect to the region.

Index Terms— Tourism conditions, Sea transportation, Quality of service

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1 INTRODUCTION

Areas in Southeast Sulawesi Province are known as tourist destinations by domestic and foreign tourists, but it must be recognized that tourism facilities and infrastructure are inadequate. New routes or routes in terms of smooth transportation, especially sea transportation, become one of the strategic roles to advance the tourism [1]

Sea transportation is the activity of transporting and / or moving passengers and / or goods using water vehicles that have a certain shape and type, and can be driven by mechanical, wind power or other forms of energy [2].

Sitti Astija & Ardiana Yuli Puspitasari [3], in their study of the influence of the port as a plant node on the development of the case study area: the Paelangkuta port, found that the plant node of the Paelangkuta Nusantara Raha Port affected the Muna Regency. Ronen [4]who examined some of the differences between route problems and ship and vehicle scheduling, Christiansen and Fagerholt [5], then reviewed these problems which were divided into four studies, namely about ship planning strategies, scheduling strategy arrangements ships on industrial and tramper shipping, scheduled shipping arrangements, and other studies related to ship route issues.

Ishak, et al [6], on their research concerning the logistical transportation network system and the accessibility of goods transportation in the Kabaena and Bombana districts, found that, the largest commodity in the Kabaena Islands for estate crops and breeders was produced by Kabaena District and Kabaena Setatan District. Internal movement at the entrance of Sikeli Port, Dongkala Port, Bopinang Port and Kasipute Port. While the external movement of logistical transport exits on the islands of Morowali, B, Kassi, M. Bajji, Toli-Toli and Biringkasi. The transportation development strategy is carried out with a road transportation network system that is adjusted to the needs of regional development.

Another study by La Ode Muhamad Magribi, &. Suhardjo

[7] in their study studied about Accessibility and Its Influence on Development in Rural Areas, is associated between the characteristics of accessibility in rural areas with development variables, per capita income, mobility, population density, and activity density, where the results obtained from this research are: the increase that occurred in the accessibility variable resulted in a significant increase in other in-dependent variables such as development, income, mobility, population density, and activity density.

Ships and ports are means and means of sea transportation that have interdependent relationships in supporting trade and passenger traffic and cargo. The main function of sea transportation facilities and infrastructure is to shorten the travel space, to move production results and to smooth relations between regions [8].

Potentials that can be developed in the Southeast Sulawesi region, include the huge potential maritime tourism, but there are various kinds of constraints in the travel process including: Tourism management that is not professional and not in accordance with minimum service standards on tourist attraction objects (ODTW); Maritime tourism potential is still localistic; There is no regional integrated maritime tourism planning; Support facilities and infrastructures for transportation that have not been optimal, to support the potential development of maritime tourism; Connectivity between regions that have the potential for maritime tourism has not been planned optimally; and Integration between modes of transportation in areas that have the potential for maritime tourism is not optimal;

This research aims to: 1) Identify the condition of tourism, and the implementation of sea transportation in supporting tourism in Southeast Sulawesi Province in terms of facilities and infrastructure, costs, tourist sites, origin and destination, tourist characteristics, quality of port services and tourist destination objects, 2) Analyzing the connectivity system of sea

transport routes in connecting between tourist destination ports in Southeast Sulawesi Province, 3) Analyzing the distribution model of the movement of sea transport passengers to support tourism in Southeast Sulawesi Province, 4) Analyzing transportation policy development strategies in supporting marine tourism in the Province of Southeast Sulawesi.

2. RESEARCH METHODS

This research uses a quantitative approach with quantitative descriptive analysis and employed Structural Equational Model (SEM) analysis. This research was conducted in Southeast Sulawesi Province by specifying the locations of Kendari City, Muna Regency, West Muna Regency, Baubau City, Buton Regency, South Buton Regency, Central Buton Regency, South Buton Regency, North Buton Regency and Wakatobi Regency. As for the stages of this research the following steps were carried out: Observation Techniques, Interview Techniques / Interviews, Questionnaires, Documentation Techniques [9].

The first research subjects used were visitors (users) tourist destination objects. Because the unknown number of visitors so that is infinite population (unknown population). The minimum sample size in the study can be shown in the following equation:

$$n \geq ((Z\alpha/2)^2 pq)/d^2$$

The sample size using a confidence level of 95% and an error rate of 5%, the sufficiency of the data for this study as follows :

$$n \geq (1,96^2 \times 0,5 \times 0,5)/0,05^2 = 384,16$$

The calculation results above obtained a minimum sample is 384, so the number of respondents to be used in this study were 384 respondents.

The sample size used in the tourism development strategy in Southeast Sulawesi Province is based on modal probability, as a basis for determining the policy direction of the concept of developing an effective and efficient transportation system, in the islands of Southeast Sulawesi. There are 30 experts consisting of: Transportation Agency with 5 people, Community Leaders with 5 people, NGOs with 5 people, Bappeda with 5 people, Sahabandar with 5 people and Akade-mission with 5 people who are chosen purposively.

Quantitative Descriptive Data Analysis was to Analyze the first research objectives with quantitative descriptive method approach, constructivist-vitism which is the starting point for qualitative research.

To test instrument validation, the Product Moment Co-relation technique is used as follows (Supranto, 2001):

$$r - calculate = \frac{N(\sum XY) - (\sum X \sum Y)}{\sqrt{[(N \sum N^2) - (\sum X)^2][(\sum Y^2) - (\sum Y)^2]}}$$

Validity test is done to calculate the correlation between each question with a total score using SPSS 20 software. The results of validity testing for each of the results of the measurement of the level of satisfaction to the whole question, is

greater than r table at the 95% confidence interval and 99%. While reliability testing was analyzed using Cronbach's Alpha technique. The formula to find out the range of importance (Likert scale) is :

$$Scale \ range \ \frac{(Xib - Xik)}{number \ of \ measurement \ scales}$$

Keterangan :

Xib = Biggest score possible, with the assumption that all respondents gave very important answers.

Xik = The smallest score possible, assuming that all respondents gave unimportant answersMaka besarnya rentang untuk setiap kelas yang di teliti adalah :

$$((5 \times 100) - (1 \times 100))/5 = 80$$

The classification for the level of importance in this study are as follows:

1) 100 - 179 = Not important
2) 180 - 259 = Not too important
3) 260 - 339 = Quite important
4) 340 - 41 9 = Important
5) 420 - 500 = Very Important

While the division of classes for the level of performance in this study are:

1) 100 - 179 = Not Good
2) 180 - 259 = Not Good
3) 260 - 339 = Good Enough
4) 340 - 419 = Good
5) 420-500 = Very Good

The generation model used in this study has a regression form, namely Multiple Linear Regression Analysis. For Structural Equation Modeling using a full SEM model or latent variable model consists of two parts, namely: measurement model and structural model. The measurement model links measured variables with latent variables through the Confirmatory Factor Analysis (CFA) model, whereas the structural model links latent variables with each other, also called causal modeling or path analysis.

4 RESULT AND DISCUSSION

4.1 Analysis of Importance and Performance Levels of ODWT

According to Table 1, showed that the results of the analysis of the average level of interest and the level of performance of the attributes of the quality of tourism services at the study site.

TABLE 1

CALCULATION RESULTS OF PERFORMANCE LEVEL
AND IMPORTANCE

Num	Service Quality Dimensions	Average	
		Importance Level ($\overline{Y}$)	Performance Level ($\overline{X}$)
1	The suitability of the tourist display with advertising and promotions	15.82	11.54
2	The quality of the vehicle is in accordance with the entrance ticket provided	15.95	11.34
3	The condition and cleanliness of the tourist sites is maintained	15.76	11.34
4	Restaurant facilities	15.76	11.5
5	Bathroom / toilet facilities	16.86	12.11
6	Adequate parking and rest areas	15.72	11.22
7	Strategic location	16.86	12
8	Entrance fee	16.8	11.94
9	ease of payment	17.08	12.34
10	Ease of reaching location	17.36	12.46
11	Proper service and satisfying by the officers	17.12	11.16
12	Alertness of employees in serving visitors	16.76	11.06
13	Officers understands the difficulties and complaints of visitors	17.06	11.36
14	Clarity of officers in providing information about attractions	16.9	11.22
15	The officers 'skills in serving visitors' difficulties	16.92	11.26
16	Security facilities at tourist sites	17.22	11.36
17	The officers are friendly and polite in dealing with visitors	17.56	11.36
18	Image of tourism in the visitors	17.06	11.02
19	Sensitivity of officers in paying attention to visitors' complaints	17.26	11.36
20	Providing service to all visitors without favoritism	17.46	11.46
21	Public facilities (canteen / restaurant, public telephone, ATM, souvenir shop, mosque)	16.70	11.06
	Average	**16.76**	**11.5**

Furthermore, from the mean value of table 1, it can be plotted in the Cartesian diagram of the relationship pattern in Figure 1, as follows:
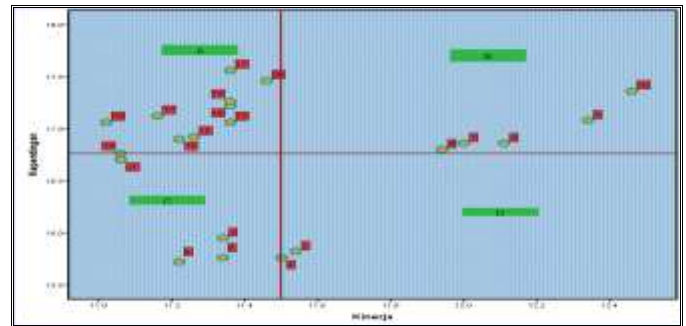

Fig 1. Cartesian Diagram

The interpretation of the Cartesian diagram can be explained as follows:

Quadrant A (Top Priority)
The attributes that are in quadrant A indicate the service quality attributes that have a high level of importance or above the average value, but have a level of performance that is considered low. Service quality attributes that are in this quadrant are:
1) The officers are friendly and polite in dealing with the end complaints
2) Providing services to all visitors without favoritism
3) Official sensitivity in paying attention to visitor complaints
4) There are security facilities in ODWT
5) Appropriate service and satisfying its value by officers
6) Officers understand the difficulties and complaints of visitors
7) ODWT image in the eyes of visitors
8) The officers 'skills in serving visitors' difficulties
9) Clarity of officers in providing information about ODWT

Quadrant B (Maintain Performance)
This quadrant shows the attributes of the tourism service that needs to be maintained or enhanced, because the level of performance that has been implemented is generally in accordance with the level of interest or expectations of visitors. The service quality attributes that are in this quadrant are :
1) Ease of reaching locations
2) Ease of payment methods
3) Bathroom toilet facilities
4) Strategic location
5) ODWT entrance fee

Quadrant C (Low Priority)
This quadrant shows service quality attributes that have a low level of importance and performance. The attributes included in this quadrant are
1) The alertness of employees in serving visitors
2) Restaurant facilities
3) The quality of the vehicle is in accordance with the price of admission given

4) The condition and cleanliness of the vehicle is always maintained

Quadrant D (Excessive)

This quadrant shows service quality attributes that have a low level of importance, but high implementation. The attributes included in this quadrant include:
1) Match the appearance of ODWT with advertisements and promotions
2) Restaurant facilities

4.2 Test of Validity and Reliability of ODWT Service Quality

One of the testing techniques obtained is used SPSS 20.0 Software. The test mechanism is carried out by correlating each variable score with the total score which is the sum of all variables. This test uses a one-tailed test with a significance level of 0.05,

The results of the validity test in Table 2 show that all questions for the service quality variable have a correlation value greater than 0.113 so that it is considered valid and can be included in the subsequent analysis process.

TABLE 2

RELIABILITY TEST OF PERFORMANCE LEVEL AND IMPORTANCE

Performance(X)		Importance(Y)	
Cronbach's Alpha	N of Items	Cronbach's Alpha	N of Items
.980	21	.909	21

Source : Reseacrh Data Analysis

For the results of the reliability level of the performance test and the level of importance if processed with SPSS 20.0 software. According to Wiratna Sujermeni (2014), the questionnaire is seem to be reliable if the Cronbach value> 0.6 then it is found that all values of the variable Performance Level (.980) and Level importance (.909) produces a Cronbach alpha value> 0.6, so that it can be concluded that all instruments are reliable.

TABLE 3

VALIDITY TEST RESULTS LEVEL OF PERFORMANCE AND INTEREST OF TOURISM OBJECTS

Num	Variabel	r Tabel	Perfor-for-mance	Im-portance	Exp.
1	The suitability of the tourist display with advertising and promotions	0.113	.947**	.862**	Valid
2	The quality of the vehicle is in accordance with the entrance ticket provided	0.113	.948**	.327**	Valid
3	The condition and cleanliness of the tourist sites is maintained	0.113	.950**	.284**	Valid
4	Restaurant facilities	0.113	.948**	.511**	Valid
5	Bathroom / toilet facilities	0.113	.194**	.862**	Valid
6	Adequate parking and rest areas	0.113	.936**	.841**	Valid
7	Strategic location	0.113	.940**	.517**	Valid
8	Entrance fee	0.113	.924**	.614**	Valid
9	ease of payment	0.113	.939**	.823**	Valid
10	Ease of reaching location	0.113	.926**	.490**	Valid
11	Proper service and satisfying by the officers	0.113	.936**	.154**	Valid
12	Alertness of employees in serving visitors	0.113	.162**	.284**	Valid
13	Officers understands the difficulties and complaints of visitors	0.113	.898**	.511**	Valid
14	Clarity of officers in providing information about attractions	0.113	.905**	.327**	Valid
15	The officers 'skills in serving visitors' difficulties	0.113	.883**	.862**	Valid
16	Security facilities at tourist sites	0.113	.905**	.511**	Valid
17	The officers are friendly and polite in dealing with visitors	0.113	.911**	.856**	Valid
18	Image of tourism in the visitors	0.113	.897**	.862**	Valid
19	Sensitivity of officers in paying attention to visitors' complaints	0.113	.874**	.862**	Valid
20	Providing service to all visitors without favoritism	0.113	.942**	.327**	Valid
21	Public facilities (canteen / restaurant, public telephone, ATM, souvenir shop, mosque)	0.113	.926**	.862**	Valid

4.3 Analysis of Service Quality Level of Interest and Performance

The results of the analysis of service quality will be pre-

sented in table 5.20 which represents the average value of service levels at ports and ships as follows.

TABLE 4

ANALYSIS RESULTS OF AVERAGE VALUES OF
PORT AND SHIP SERVICE LEVELS

Num	Service Quality Dimensions	Average	
		Importance Level	Performance Level
		(y)	(x)
1	The Attitude of port officer	16.71	7.88
2	Ship schedule information	16.11	7.36
3	Port area security	16.42	8.91
4	Port lighting system	17.02	9.23
5	Port supporting facilities	16.27	8.48
6	Port cleanliness	16.16	7.91
7	Ticket purchasing system	16.95	6.68
8	Parking area availability	16.39	8.00
9	The attitude of the crew	16.69	9.88
10	Guarantee to get a place	16.70	9.06
11	Baggage security	16.38	7.86
12	Arrival time, depart ship	16.02	8.84
13	Safety facilities on Ship	16.25	8.62
14	Supporting facilities on Ship	16.54	10.67
15	Cleanliness on Ship	16.52	10.39
16	Comfortness on Ship	16.05	10.76
	Average	12.53	6.69

Furthermore, from the table 4, can be plotted in the form of a Cartesian diagram of the relationship pattern as below:
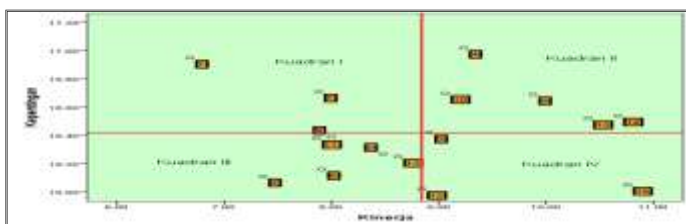

Fig 2. Cartesian Diagram Relationship of Quality of Performance and Interests of ports and ships

The results of the plot of the average value of respondents' responses in the Cartesian diagram in Figure 2, give an overview of the quality of services provided by the manager of the Southeast Sulawesi Regional Port and ships, especially the research area as follows :

1) Quadrant I (top priority) There are two factors that are located in this quadrant, namely the attitude of the port officer and the ticket purchasing system. This means that port service users are not satisfied with the service quality of the two factors, thus demanding an effort to improve the quality of service.

2) Quadrant II (maintain performance) there are five factors located in this quadrant, namely the port lighting system, guarantee of getting a place, the attitude of subordinates, vessel cleanliness, ship supporting facilities

3) Quadrant III (low periorits) there are six factors in this quadrant, namely the availability of parking areas, luggage baggage security, supporting facilities, safety facilities on board, port cleanliness, ship schedule information

4) Quadrant IV (excessive) there are three namely the security of the port area, the time of departure of the ship, the convenience of the ship.

Several previous concepts, have supported the findings of researchers about tourist transportation routes. In Adisasmita [10], it illustrates that land and sea and air transportation facilities and infrastructure development plans must be made comprehensive and integrated according to the National Strategic Plan.

4.4. Test of Validity and Reliability of Port and Ship Service Quality

The results of the validity and reliability test of the quality of port and ship services use the SPSS 20.0 program with 384 respondents as shown as follows in table 5 :

TABLE 5

VALIDITY TEST RESULTS OF ASSESSMENT
OF PORT AND SHIP SERVICE QUALITY

No	Variabel	r Tabel	Performance	Importance	Ket
1	Sikap petugas pelabuhan	0.113	.871**	.890**	Valid
2	Informasi jadwal kapal	0.113	.882**	.180**	Valid
3	Keamanan area pelabuhan	0.113	.853**	.195**	Valid
4	Sistem penerangan pelabuhan	0.113	.918**	.384**	Valid
5	Fasiltas pendukung Pelabuhan	0.113	.847**	.890**	Valid
6	Kebersihan pelabuhan	0.113	.883**	.873**	Valid
7	Sistem pembeliaan tiket	0.113	.625**	.395**	Valid
8	Ketersediaan area parkiran	0.113	.888**	.609**	Valid

| 9	Sikap anak buah kapal	0.113	.883**	.867**	Valid
10	Jaminan mendapatkan tempat	0.113	.800**	.544**	Valid
11	Keamanan barang bagasi	0.113	.847**	.227**	Valid
12	Waktu tiba, berangkat kapal	0.113	.517**	.885**	Valid
13	Fasilitas keselamatan di Kapal	0.113	.846**	.193**	Valid
14	Fasilitas pendukung di kapal	0.113	.909**	.890**	Valid
15	Kebersihan di kapal	0.113	.658**	.180**	Valid
16	Kenyamanan di kapal	0.113	.573**	.890**	Valid
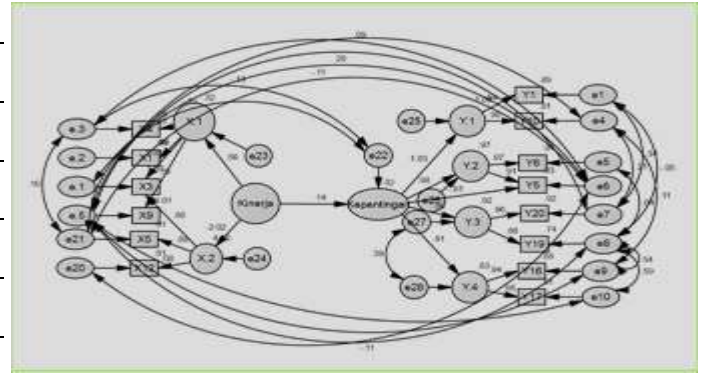
Fig 3. Fit Modeling Structure

The results of the validity test in the table 5 show that all questions for the service quality variable, have a correlation value greater than r table = 0.113 so it is considered valid and can be included in the subsequent analysis process.

Reability test results Performance level and importance level are processed with SPSS 20.0 software, then according to Wiratna Sujermeni (2014), the questionnaire is said to be reliable if the Cronbach value> 0.6 is found that all values of the variable Performance Level (.980) and Level of importance (.980) .869) produces Cronbach's alpha value> 0.6 so that it can be concluded that all instruments are reliable.

Regarding port security, Talley [11]provides several indicators, namely: a). The average expectation of the possibility of damage to the ship when it is in the port, b) The average expectation of the possibility of loss of ship equipment while in the port, c) The average expectation of possible damage to the cargo while in the port and d) the average average expectations of possible loss of cargo while at the port.

Discussing about the ability to provide guarantees for port users is not only done through a communication system with port users but must also be accompanied by evidence of field performance that can ensure that port users can feel secure in receiving services from the port.

The development of sea transportation services can also be done by utilizing the Intelligent Transportation System (ITS) which must be accompanied by other efforts to overcome traffic congestion, such as the application of a mass public transportation system, increased transportation network capacity and other supporting policies [12].

4.5. Confirmatory Factor Analysis
4.5.1. CFA Analysis of Feasibility Model of Performance and Importance

The results of the model have been made and a number of assumptions have been met, then the final stage is to test the AMOS model or measurement model. The results of the tests are shown in Figure 3.

CFA Analysis Output Results Performance level variables are shown in the table 6 as follows:

TABLE 6

RESULTS OF GoF MODEL

No	Goodness-of-fit indeks	cut off value	Hasil	Con-clusion
1	X^2 Chi square	≤α.df (≤ X^2 tabel)...		
2	significance probability	≥ 0,05	0.350	Fit
3	GFI	≥ 0,90	0.981	Fit
4	AGFI	≥ 0,90	0.960	Fit
5	CFI	≥ 0,95	0.999	Fit
6	TLI atau NNFI	≥ 0,95	0.999	Fit
7	NFI	≥ 0,90	0.991	Fit
8	CMIN/DF	≤ 2,00	1.065	Fit
9	RMSEA	≤ 0,08	0.013	Fit
10	RMR	≤ 0,05	0.004	Fit

From table 6, the entire estimation or loading factor is ≥ 0.5. The resulting regression model is Performance = 0.144 importance + error 1.00 - 0.21 = 0.79.

In the standard regression weight the following regression models are generated: Y = 1.44X + 0.79 (1-0.968), the coefficient of determination (R Sguare) = 0.968. Then test the hypothesis :
Accept HO if t(C.R) ≤ 1.96 OR P value ≤ 0.05
Reject HO if t(C.R) ≤ 1.96 OR P value ≤ 0.05

Then t value (C.R) 3.343 ≥ 1.96 and P value with the sign *** then 0.000) ≤ 0.05, then HO is rejected and the consequences are accepting H1 namely Performance has a positive effect on Interest.

Acknowledgment

CONCLUSION

The conditions of tourism and sea transportation in the research location are still showing an unfavorable condition or not, even for all variables asked by researchers to the respondents, on the average answer that facilities and infrastructure, routes, service quality in the research area are still very concern and need Appropriate steps are taken by the local management or stakeholders so that the conditions of the implementation of tourism and sea transportation become good and even very good so that it can give effect to the region.

Recommendations for the study of the Development of Sea Transportation Services in Supporting Tourism Development in Southeast Sulawesi include :

1) This study was carried out in a national scope by taking several cities as samples. The recommendations given in the form of policies, strategies and programs, which are derived from the identification of conditions, as well as the analysis conducted.

2) Indepth studies are needed to detail policies, strategies and programs in the scope of provinces / districts / cities, so that each will have specific characteristics depending on the conditions of each region.

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