Ferry Transport Of Trans Maluku Interislands Cluster In Indonesia

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Abstract-- Geography with a dominance of marine areas are scattered in small islands (island group), resulting in high transportation costs, the level of isolation, poor accessibility, lack of infrastructure and transportation affect to economic growth in the region Province of Maluku. These study are policy and case study, using the method of gap analysis, descriptive qualitative to find out how people's satisfaction with the performance, characteristics of transportation development priorities and strategies. In general, transport services is still far from adequate, although subsidies from the government, especially in the islands group in the East and South. Required system integration between modes of air transport services and water transport (pioneering sea transport, cruise people, and Ferry transportation).

Index Term-- Service Performance, Inter-islands Cluster, Regional Transport, Ferry Ship

INTRODUCTION

Maluku province in Geograffis lies between 2° 30' - 9° south latitude and 124° - 136° east longitude, with administrative boundaries as follows:  
- North side adjacent to the North Maluku Province  
- Southern border with East Timor and Australia  
- To the East to West Papua Province  
- Next to the western border with the Province of Southeast Sulawesi and Central Sulawesi

The total area of the whole is 712,479.69 km2, an area of 92.40% and 7.60% is water the land area. Maluku province is a region of islands, has 1340 islands, so the role of water transportation is very important as the infrastructure and facilities supporting community activities and development of the region.

Distance of the small islands in the archipelago province vary widely, from nearest to farthest or outermost so that air and sea transportation accessibility is necessary even though the frequency of service to the tiny island-pulau very limited, requiring a relatively long travel time and cost. The role of local government in an effort to facilitate transport between the districts of small islands is not maximized. The lack of transportation infrastructure, leading to high transport costs and slow economic growth in communities in Maluku province, so we need a concept of how the development of infrastructure and facilities between modes of transportation combined sea / ferry and land. This study classified cases and policy research that is studying the transportation system Trans Maluku island group as a product of public service policies to find out how people's satisfaction with the performance and characteristics of transportation.

OBSERVATION OF THEORY

1. Islands Regional Development Model

Development areas on the islands or island group basically aims to:
- Equal distribution of growth rates between regions  
- Enhance the public welfare  
- Reduce the level of inequality (economic and social) between regions  
- Efforts to balance national and regional economic structure.

Islands can be developed with models of regional development in areas that have not been or are being developed, states that there are several models of the development of the islands [1] are as follows:

a. Growth Center Model  
b. Model Transito  
c. Sea Border Region Model
Development area or areas is closely associated with the transportation system. There are 3 (three) main elements of regional development are:

1). Nodal Center
2). Effect of region or service area
3). Transport network.

These elements are the same as the nodal center where transportation nodes, or the influence of the service area associated with the movement of the flow of people and goods from origin node to destination node of transportation or transportation networks. Thus, the activity is in line with regional development and transportation activities are the building blocks of economic growth.

1. Transport and Regional Economy

In the process of regional development, transport is one element forming region of space structures directly supporting the functional relationship between the distribution and orientation of service nodes, both internal and external areas can affect economic growth directly, as in figure 1.

![Fig. 1. Transportation development and economic growth](http://www.irishspatialsstrategy.ie/docs/pdf)

Furthermore, according to its role as the lifeblood of economic, social, cultural, political, security and defense, transportation modes has a multiplier function as a supporting element (servicing sector) and as the driving element (promoting sector).

As a supporting element, serves to provide transportation service effective and efficient transportation to meet the needs of other sectors as well as anticipated, they serve to move the dynamics of development. As the driving element, mode of transportation to work provide effective transportation services to open up isolated areas, serving areas or remote islands, stimulate the growth of the back area, behind the village and is able to suppress poverty in remote areas [2,3,4].

Explaining that there are 4 (four) main benefits of transport infrastructure for the community, namely:

1) Opening the isolation region and the region.
2) Increasing economic activity and support the smooth region.
3) Facilitate access to technology and utilization of social facilities,
4) Increased mobility and social contact between residents.

The transport sector is one sector of the economy is very skelter in supporting the economy of a region or country. One of the main functions of this sector is to distribute the production of goods-producing sectors, like agriculture, mining and quarrying, industrial, to the end consumer is using. Another function is to carry out the mobility of people from place to place, also suggested that the presence of transport cost reduction is the movement of goods, production of a region will give usability point (place utility) and time utility so that it becomes a large value of the goods with lower transport costs [5,6,7].

Efficient and effective transport defined by the chain of connectivity or node that serves as composition, conection, interchange and Decomposition, particularly in intermodal transport [8,9,10]

**RESEARCH METHODS**

Research location in the province of Maluku, as in Figure 2. Scop research includes the combined transport between road and ferry transport. However in this discussion is limited to the transport system include the movement Ferry, Transportation Network, and Service performance.

![Fig. 2. Research Location Map](http://www.irishspatialsstrategy.ie/docs/pdf)

Maluku provincial spatial structure consists of twelve groups of islands, each island group has development centers that serve the region or city orientation for other cities are less stratified hierarchy. Though not entirely, generally these service centers are the district capital. Based on the analysis of patterns of population movements, and goods, internal transportation service network Maluku
Province can be done based on the orientation of the island group is divided into 12 groups Island.

The approach used is a combination of quantitative and kualitativ. Pedestrian transportation service performance measurement using the GAP Analysis, IPA (Importance Performance Analysis). The weight of opinion and analysis are summarized offender transportation practitioners, stakeholders and providers, users and decision makers.

Framework of the concept of developing customized transportation geography, space utilization and considered superior region in supporting the economy of society, consideration of external factors of opportunities and threats, internal strengths and weaknesses and areas of Maluku province [11].

RESULTS AND DISCUSSION
1. Movement of passengers and goods

Entanglement interactions in the islands of Maluku province following the pattern of movement of goods and passengers, economic and social activity. Levels of public accessibility in the utilization of economic resources, physical and non physical looks of the amount of movement of goods and passenger traffic. Links between the provinces of Maluku island group, internally embodied in the form of patterns of interaction among the growth centers berhirarki, forming a pattern of regional transportation network in the region as a whole transport network.

This is expected to grow, integrated between road transport and ferry in an integrated system called the Trans Maluku, to support the development of the Maluku Province. Based on the origin and destination survey of the National Transportation ATTN 2011, desire line movement of passenger and goods contained in the internal movement of inter-island group in the north of the island group I to VII. Island groups in the eastern and southern low relative interactions. Neither of the interaction between island groups VIII to XII underdeveloped.

1. Ferry transport operational characteristics

Distribution of number of vessels operating in Maluku Provinces is based on the capacity of the ship, more is shown in the following table;
TABLE I
Fleet of Ferry Transport Trans Maluku

<table>
<thead>
<tr>
<th>Route and Distance</th>
<th>Name of Ship</th>
<th>Ship Capacity</th>
<th>Speed (knot)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Poka – Galala (0.5 mil)</td>
<td>Gabus</td>
<td>100</td>
<td>7</td>
</tr>
<tr>
<td></td>
<td>Tenggiri</td>
<td>340</td>
<td>9</td>
</tr>
<tr>
<td>Galala – Namlea (85 mil)</td>
<td>Temi</td>
<td>214</td>
<td>9</td>
</tr>
<tr>
<td>Hunimua – Waipirit (12 mil)</td>
<td>Gurita</td>
<td>300</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>Iniloko</td>
<td>400</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>Terubuk</td>
<td>350</td>
<td>9</td>
</tr>
<tr>
<td>Tual-Kur-Larat-Tayandu (295 mil)</td>
<td>Karmo-Malin</td>
<td>450</td>
<td>12</td>
</tr>
</tbody>
</table>

Sources: Department of Transportation Maluku Province, 2012

TABLE II
Productivity of Ferry Transport

<table>
<thead>
<tr>
<th>The Ferry Line</th>
<th>Trip per day</th>
<th>Passengers Per Day</th>
<th>Vehicles Per Day</th>
<th>Goods (tons) /day</th>
<th>Passenger Vehicle Unit (PVU)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Galala–Poka</td>
<td>77</td>
<td>3077</td>
<td>1969</td>
<td>338</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>660-700</td>
</tr>
<tr>
<td>Hunimua–Waipirit</td>
<td>14</td>
<td>1181</td>
<td>351</td>
<td>168</td>
<td>115</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>260-300</td>
</tr>
<tr>
<td>Galala–Namlea</td>
<td>1</td>
<td>241</td>
<td>26</td>
<td>10</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>18-25</td>
</tr>
<tr>
<td>Tulehu – Kailolo - Umeh Putih – Wailey</td>
<td>4</td>
<td>52</td>
<td>20</td>
<td>3</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>15-20</td>
</tr>
<tr>
<td>Tulehu – Umeputih – Nahalia – Amahai</td>
<td>2</td>
<td>30</td>
<td>7</td>
<td>2</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>10-15</td>
</tr>
<tr>
<td>Galala–Ambalauw - Wamsisi - Namrole – Leksula</td>
<td>2</td>
<td>101</td>
<td>6</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>10-15</td>
</tr>
</tbody>
</table>

Source: Analysis results 2012

a. Distance Line Ferry

Line ferry is very distance varies, the line of the most widely served ferry is less than 30 nautical miles by 44% and nationally this track as much as 39%.

b. Boat speed and capacity

Characteristics of speed ferry nationally ranked five clusters, namely, less than 7 knots speed is very low, the speed of 8 to 9 knots speed, 10 to 13 knots have high speed, between 13 to 16 knots boat speed and in above 16 knots in the grade is very high speed, as shown in the following grafikl.

Fig. 6. Distance Line Ferry
TABLE III
Distribution of Ship Speed

<table>
<thead>
<tr>
<th>Cluster</th>
<th>Knot</th>
<th>Speed (km/hour)</th>
<th>Number of Ship</th>
<th>Distribution (%)</th>
<th>Cluster Distribution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very low</td>
<td>&lt; 7</td>
<td>12.97</td>
<td>7</td>
<td>3.27</td>
<td>3.27</td>
</tr>
<tr>
<td>Low</td>
<td>8</td>
<td>14.82</td>
<td>10</td>
<td>4.67</td>
<td>12.15</td>
</tr>
<tr>
<td></td>
<td>9</td>
<td>16.68</td>
<td>16</td>
<td>7.48</td>
<td></td>
</tr>
<tr>
<td>Fair</td>
<td>10</td>
<td>18.53</td>
<td>56</td>
<td>26.17</td>
<td>64.02</td>
</tr>
<tr>
<td></td>
<td>11</td>
<td>20.38</td>
<td>50</td>
<td>23.36</td>
<td></td>
</tr>
<tr>
<td></td>
<td>12</td>
<td>22.24</td>
<td>31</td>
<td>14.49</td>
<td></td>
</tr>
<tr>
<td>High</td>
<td>13</td>
<td>24.09</td>
<td>13</td>
<td>6.07</td>
<td>13.55</td>
</tr>
<tr>
<td></td>
<td>14</td>
<td>25.94</td>
<td>11</td>
<td>5.14</td>
<td></td>
</tr>
<tr>
<td></td>
<td>15</td>
<td>27.80</td>
<td>5</td>
<td>2.34</td>
<td></td>
</tr>
<tr>
<td>Very High</td>
<td>&lt; 16</td>
<td>29.65</td>
<td>15</td>
<td>7.01</td>
<td>7.01</td>
</tr>
<tr>
<td>Amount</td>
<td>214</td>
<td>100</td>
<td>100.00</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The line of the ship's speed between 10 to 12 knots, or about 18 to 22 kilometers per hour as many as 137 units (64%), speed over 16 knots, there are around 7%. For cruise crossing trans Maluku island group there are two low-speed boats (6 to 7 knots), a low-speed boats and speed boats were 9 (10 to 12 knots).

Fig. 7. Characteristics Ship Capacity

Tonnage (GT) which operate nationwide ferry is very diverse. However, almost 50% of the vessel with a capacity between 251-500 GT.

b. Ferry Transport Tariff

Line within a short ferry of less than 12 miles are already commercialized and semi-commercial are within up to 30 miles. Line within the upper 40 miles are heavily subsidized or pionir transport, except for the track-Namele Galala within 85 miles is a commercial status. Trails are generally more commercial prospect in the northern cluster of transport ferry appeal claster operating in East and South. It is associated with economic growth and population density.

Fig. 8. Ferry Transport Tariff

4. Performance of Ferry Transport Services

Some of the indicators that need attention is the regularity of transport services and water pollution in the harbor. Neither of the aspects of safety and security as well as aspects of the port hinterland to region access Ferry transport. In general, the indicators related to economic rather than social and environmental aspect performance.
1. The movement of goods between inter island groups to follow the movement of passengers, movement of the density of movement share a triangular connection between Ambon, Piru and Bula. Masohi is a major node of the three. Interaction cluster north towards the east and south is still very weak, nor the interaction between the island groups in the east and south region.

2. Transportation network of the ferry transport has a commercial statute is in line of Poka – Gala and Gala – Namlea, Hunimua – Wapiirit. Trajectory of the ferry at East Cluster and South are majority still subsidized. There was 42% trajectory of the ferry had distance about 30 mi and 28% distance amount 31-60 mi. Capacity of the ship Ro-Ro was operating about 250-500 GRT and the speed between 7 to 12 knot.

3. Service performance of ferry transportation is still unsatisfactory the consumer/adequacy. Performance indicator is rated low and the effect on social and environmental aspects are convenience, pollution, safety, accessibility, and frequency order. The island group with a development center Ambon, Tual, Dobo and Saumlaki relatively good transport services, although it still needs improvement.

4. This research can be developed to study the Transport Integration modeling between road and Ferry Transport as a whole to join intermodal transportation. Further research could also be developed for the prediction of ship capacities related to variables Average Daily Traffic (ADT), Distance of Ferry Lines, and Speed of Ferry Ship.

**BIBLIOGRAPHY**


