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SELECTION OF PILOT PORTS AND EFFECT OF LONG DOCK INVESTMENTS TO ECONOMIC GROWTH AN ISLANDS

Marcus Tukan
Technical Faculty,
University Of Pattimura,
INDONESIA.
macstukan_amq@yahoo.co.id

Tri Achmadi
Institute of Technology,
Sepuluh November,
INDONESIA.
triachmadi@na.its.ac.id

Sjarief Wijaja
Institute of Technology,
Sepuluh November,
INDONESIA.
sjarief.widjaya@yahoo.co.uk

ABSTRACT

The economic development of a region cannot be separated from the role of the port and investment. Performance, effectiveness and efficiency of ports facilitate supply chain needs of the region. This research resulted in the modeling or the influence of the long dock investment to economic growth. This research uses quantitative analysis and econometric modeling in statistical testing. The result was an increase in the loading of 1% could increase economic growth by 0,413%, and the loading capacity of the vessel followed by an increase of 0,842%. The increase in length of vessel 1% will increase the load capacity of each ship visits (call) of 0,018% and can reduce ship visits by 0005% and a long dock that it takes about 0,350%. It can be concluded that the increase in loading and unloading at the port and the long dock of investment is also affect of economic growth

Keywords: Ports, econometrics, investment, economics

INTRODUCTION

Policy on the development of the transportation sector aimed at providing transport facilities and infrastructure necessary to support the smooth flow of goods and people from point of origin to the destination, this condition gives an overview of the development of different approaches for each region but the transport infrastructure especially maritime transport as a major supporter of the development of the region should be developed in synergy to deliver optimal service. The vessel/ship service time is the dominant factor that directly affects the performance of the port and can be fully controlled by the port authority (Tukan, 1998). Port infrastructure investment is believed to encourage the economic growth of a region. And the positive effects of investment in transport and communication to economic growth (Canning & Pedroni, 1999) which has a transport infrastructure investment levels of productivity compared with an average of 0.134 (Canning, 1999). Economic contribution of public investment is part of transportation capital for the G7 countries, demonstrating the importance of public investment in productivity and growth (Aschauer, 1989). Availability of infrastructure must be such that it has a significant effect on the performance of the transport network and changes in economic behavior. Public Infrastructure and Growth: New Channels and Policy Implications measuring the impact of infrastructure investment on the development of a country concluded that the infrastructure can affect economic growth (Agénor *et al.,* 2006).

Similarly, the achievement of certain economic level is believed to promote the development of the transport system more effective and efficient (Harlan, 2008). The process of implementation of sustainable development policies and infrastructure development is one important dimension in strategic planning will ensure the development of the region and the socio-economic development of a country (Grundey & Managing, 2008). The infrastructure of the port area where the focus of the supply chain is to find the most effective and efficient in implementing value-added, in order to obtain solutions to complex problems related to consumer demand. Various inventory policy research on multi-echelon supply chain system, as developed by Weng, and has not been integrated with transport policy (Easthan *et al.,* 2001, Routroy & Kodali, 2005).

Then developed a model that integrates inventory policy with transport policy (Abdul-Jalbar *et al.,* 2003, Gaur & Fisher, 2004) in these studies, model development inventory policies and transportation policies are assigned sequentially, not simultaneously. The extent of causality between investment in port infrastructure ensure a smooth supply chain and the need for economic growth and national islands remains to be seen. Public Infrastructure and Economic Productivity A Transportation-Focused Review said that it's strong relationship between infrastructure and productivity (Chan *at al.,* 1998)

Weisbrod and Treyz introduced the concept of a global prospective bridge to measure the impact of transportation investment on both the micro and macro level, where the economic model was developed to analyze the effect of transportation planning (Brian, 1998). Button explained that transportation has a positive impact on development and economic growth, in turn increasing the production of goods and services can be attributed directly to the improvement of transport (Weisbroad & Treyz, 1998). Transport Infrastructure and Economic Growth: Evidence from Africa Using Dynamic Panel Estimates, the empirical method to prove the importance of development as a key mode of transport productivity and a contributor to the advancement of economic development especially for African countries and island states case (Button, 1982).

Theoretical approach to port development investment relationship to economic growth of the islands can be attributed to the modified neoclassical growth theory with endogenous development theory. Neoclassical growth theory pioneered by Bort, (Sjafrizal, 2008), considers that the number of outputs (goods and services) produced by an economy is determined by the availability and number of factors used. In the macro-scale (regional) output is the sum of all goods and services made within a certain period of time and if the price level multiplied by the number into the value of all goods and services produced in a period. While that is a factor of production Neoclassical classified into two major groups, namely capital and labor. The above statement raises the question of how much further investment in port infrastructure required to achievement a certain level of economic growth. This question needs to be answered so that the pattern of investment allocation of quay length can be done efficiently and effectively, or at least a minimum investment requirement can be estimated rate of economic growth to be achieved, then the relevance of this study to be an important study.

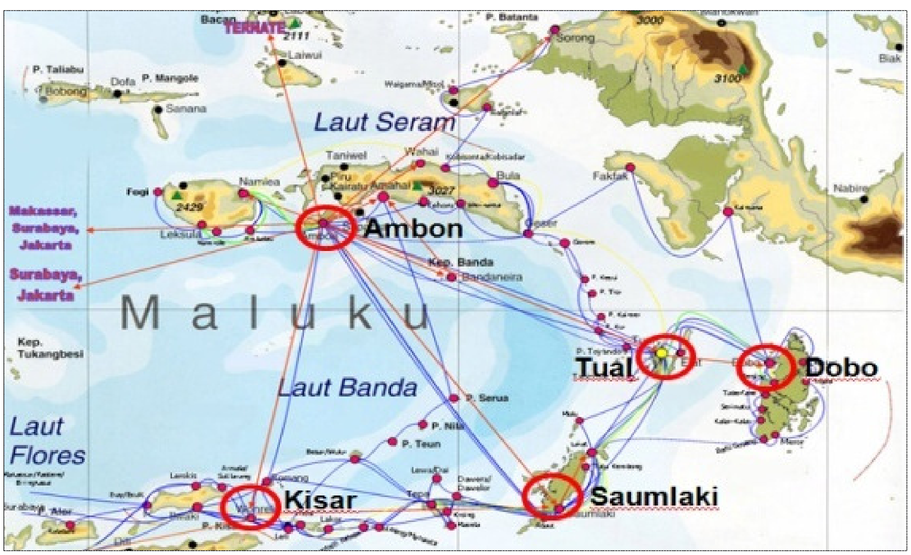

Figure 1. Ports in Maluku

Indonesia as a maritime country in the world, the vast area of study, and to save time and cost then choose the port instance to be important in modeling the relationship between investment long dock with economic growth typical of the islands. The decision to establish the best alternative of selecting a sample port location is important, the Multiple Criteria Decision Making (MCDM) is a decision-making method is used to determine the best alternative based on criteria (Cr) are in charge. The decision process that involves many criteria, for it MCDM able to resolve mutual conflict among the criteria in the decision making process, (Artana, 2005). Some common features used in MCDM (Janko

& Wolfgang, 2005), among others: the alternative is a different object, but have an equal chance to be selected. Often referred to as the characteristic attributes or criteria decision despite most of the criteria is the level but did not rule out the existence of sub-criteria related to the criteria given. There is often a conflict between the criteria of each other, for example criteria for benefits and costs., Weights decision shows the relative importance of each criterion, $W = (w_1, w_2, ..., w_n)$ to be searched weight MCDM importance of each criterion. Matrix decision X size m x n, contains elements x_{ij}, which represents the rating of alternative A_i (i = 1, 2,., m) the criteria C_j (j = 1, 2,., n). Econometrics is the integration of economic theory, mathematics, and statistics in order to test the truth of these theorems by using empirical data, (Setiawan & Kusrini, 2010). And econometric models are generally intended for use in policy-making and forecasting somewhat controversial (Lesser, 1966),

The research was conducted on the island of Maluku with 5 ports namely Ambon, Tual, Dobo, Saumlaki and Kisar. Figure 1 shows the location of the five ports:

METHOD

Determining the sample port with the Method Attribute Decision Making (MADM) were used to evaluate the m alternatives A_i (i = 1, 2, 3, ..., m) the set of attributes C_{ij} (i = 1, 2, 3, ..., n) can be written in matrix form as follows;

$$X=\begin{bmatrix} X_{11} & X_{12} & . & . & X_{1n} \\ X_{21} & X_{22} & . & . & X_{2n} \\ \vdots & . & . & . & . \\ & . & . & . & . \\ X_{m1} & X_{m2} & . & . & X_{mn} \end{bmatrix} \quad .....1$$

where X_{ij} = alternative performance rating i to j attribute.

Weights indicate the relative importance to each attribute, and symbolized as

$$W = (w_1, w_2 ...... w_n) \quad .... 2$$

In the case of ports in Maluku to do with a weighted sum method by finding the weighted sum of rating the performance of each alternative on all attributes, (Fishburn, 2002, Mac Crimmon, 2002), is done by normalizing the decision matrix (X) to a scale comparable to all rating alternatives. In this study set out five criteria as a guide in decision-making, where criteria-criteria are obtained from the deepening problems and interviews with people who have the competence and experience in the fields of port development, and criteria-criteria include:

1. Cr.1 is the availability of supporting infrastructure and port facilities
2. Cr.2 is the geographical position and the distance between the harbor to the center of economic growth
3. Cr.3 is the availability of performance data ports
4. Cr.4 is the frequency of ship traffic in the harbor
5. Cr.5 is a human resources manager at the port.

6. Table 1. Port Tabulation

Alternative	Cr.1	Cr.2	Cr.3	Cr.4	Cr.5
Port of Tual	3	3	4	4	3
Port of Saumlaki	3	4	3	3	3
Port of Ambon	5	5	4	5	4
Port of Dobo	3	3	2	3	2
Port of Kisar	2	4	2	3	2

Weighting suitability rating each alternative on each criterion are described by the weight of 1 to 5, where: 5 = excellent, 4 = good, 3 = adequate, 2 = quite bad, 1 = poor. By doing distribution of questionnaires, addressed to the people who are considered to have experience and knowledge in the areas such as the management of port and harbor operators and academics who are involved with the issue of port infrastructure. From the tabulated results obtained suitability rating for each alternative on each criterion and can be described in Table 1.

Where each value assigned to each alternative in each criterion is the value corresponding match observations, the criteria given assumed as criterion advantage (benefit). Preference given by the experts in the field of port by giving preference value of W = (5, 4, 4, 3, 3) So the decision matrix can be derived from the compatibility table (Table 1) as follows:

r_i alternative $$X = \begin{bmatrix} 4 & 3 & 4 & 4 & 3 \\ 3 & 4 & 3 & 3 & 3 \\ 5 & 5 & 4 & 5 & 4 \\ 3 & 3 & 2 & 3 & 2 \\ 2 & 4 & 2 & 3 & 2 \end{bmatrix}$$

Methods Technique for Order Preference by Similarity to Ideal Solution (TOPSIS), which selected the best alternative not only have the shortest distance from the positive ideal solution, but it also has the longest distance from the negative ideal solution (Hwang and Lai, 2002) where this concept is widely used in some models MADM decision on practical problem solving [27, 28].In general, the procedure TOPSIS follow the following steps:

a. Create a normalized decision matrix.
b. Make the normalized decision matrix and weighted
c. Make positive ideal solution matrix and the matrix of the negative ideal solution.
d. Determine the distance between the value of each alternative to the ideal solution matrix positive and negative ideal solution matrix
e. Determining preference value for each alternative

In the case of the determination of the sample ports can be solved by TOPSIS procedure that requires the selection of rating the performance of each alternative port on any C_{RJ} a normalized rating criteria, namely:

$$r_{ij} = \frac{x_{ij}}{\sqrt{\sum_{i=1}^{m} x_{ij}^2}} \; ; \qquad \text{.......3}$$

where $i = 1, 2, \ldots.m$,

$j = 1, 2, \ldots.n$

Then the equation :

$$V = W_j X_{ij} \qquad \text{......4}$$

then the matrix Y is:

$$Y = \begin{bmatrix} Y_{11} & Y_{12} & . & . & Y_{1n} \\ Y_{21} & Y_{22} & . & . & Y_{2n} \\ \vdots & . & . & . & . \\ & . & . & . & . \\ Y_{m1} & Y_{m2} & . & . & Y_{mn} \end{bmatrix}$$

Positive ideal solution A + and A- can be determined based on normalized weight rating (Y_{ij}) as

$$Y_{ij} = W_i r_{ij} \qquad \text{...... 5}$$

with i = 1, 2, 3, ..., m and j = 1, 2, 3, ..., n

$$A^+ = (y_1^+, y_2^+, y_3^+. \quad \ldots\ldots y_n^+ \qquad \text{......6}$$

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Vol. 3, No. 3, November 2012

$A^- = (y_1^-, y_2^-, y_3^- . \quad \ldots\ldots y_n^-$ ……7

The distance between the weighted value of each alternative to the positive and negative ideal solution D_i+ and D_i- is calculated using the equation:

$$D_{i^+} = \sqrt{\sum_{i=1}^{m} x_{ij}^2}\ , \qquad \ldots\ldots 8$$

$$D_{i^-} = \sqrt{\sum_{i=1}^{m} x_{ij}^2}\ , \qquad \ldots\ldots 9$$

Proximity each alternative to the ideal solution is calculated by the equation:

$$V_i = \frac{D_i^-}{D_i^- + D_i^+}\ ; \qquad \ldots..10$$

For the maximum value of Vi is the best alternative to choose.

Transport has a strong positive effect on economic growth and development, theory Button, from the statement above shows a strong correlation between transport to the economy, the port and economic relations can be modeled as follows: Increased volume loading/unloading could encourage economic growth can be expressed as follows;

Gross Domestic Product (GDP) = f (∑Loading/Unloading) …….11

The relationship between the growth of GDP (y) and the potential loading/unloading (x) can be expressed as a linear relationship or non-linear. For linear equations, relations x and y can be expressed by

y □□□□□□□□□ x_1 …….12

The independent variable (x) is expressed on the right equation and the dependent variable or a dependent variable (y) is expressed on the left side of the equation. □□ and □□ called a parameter. □□ is the intercept when the value of x is equal to zero. □□ also called slope. Slope stating how much change the loading/unloading if the GDP growth rate changes by one unit. Therefore, to accommodate the other variable is actually enough to affect the loading and unloading but not stated explicitly in the model we used the variable μ. So the relationship between the loading and unloading and GDP can be expressed by;

y □□□□□□□□□ $x_1 + \mu$ …….13

Where μ is a random error term or more commonly referred to as error term. Error is the difference between econometrics with mathematical equations in general. Equation 3 above is referred to as the econometric equations or linear regression models. If unloading and GDP growth showed a non-linear production function to make it linear function can be performed by logarithmic transformation, so that the Cobb Douglas functions will be:

ln(y) = ln(□□□□□□□□□lnx_1 + μ …….14

if ln(y) = y*, ln(□□□□□□□□*, lnx_1 = x_1* then the model will be :

y* = , □□* + □□x_1* + μ …….15

Model in Equation 3 is a linear. While the regression coefficient is scale production elasticity is the percentage change in output as a result of one percent change in input. □□□ and □□ called a parameter. □□□is the intercept when the value of x =0. □□ also called slope. The slope tells us how big the change of loading and unloading if the GDP growth rate changes by one unit. In mathematical economics, scale elasticity can be obtained by the following equation:

$$E_{xi} = \frac{Y}{X_i} \qquad \ldots\ldots 16$$

AP_{xi} is *average product* for input x (loading/unloading) acquired view of the following equation:

$$AP_{xi} = \frac{MP_{xi}}{AP_{xi}} \qquad ....17$$

Unloading elasticity equations for input x (loading/unloading) are as follows:

$$E_{xi} = \frac{MP_{xi}}{AP_{xi}} = \frac{\beta_1 \beta_0 x_i^{\beta_1 - 1}}{y/x_i} = \frac{\beta_1 x_i^{-1} \beta_0 x_i^{\beta_1}}{y/x_i} = \frac{\beta_1 x_i^{-1} x y_1}{y} = \beta$$
.......18

If during a performance at the port of loading/unloading process then to be able to carry out a number of charges per time unit, is required GT vessel with a payload capacity, and can be written as;

$d$loading/unloading = f (dGT) 19

dGT = f (dLOA) 20

dLOA = f (dL_d) 21

$$\frac{d\text{LOA}}{d\text{L}d} = d\text{BOR} \qquad ....22$$

where;
GDP = gross domestic product of a region
Loading / Unloading = total cargo loading and unloading cargo
GT = loading capacity of the ship
LOA = length of the entire ship
Ld = length of the dock
BOR = performance dock

In this study should be given the constraints so it does not affect the mathematical study of a model of development, which include:

$LOA \leq L_d$ (*constraint 1*) 23

$Q_k \leq \sum X_e + \sum M_i$ (*constraint 2*) 24

$(d_p) > (d_k)$ (*constraint 3*) 25

In terms of operational 60%≤ BOR ≤ 70% (ideal conditions (Port Development A Handbook for Planners in Developing. UNCTAD, 1985)

In the diagram of Figure 2 describes the dynamics model of the economic performance of the the dock, where if the growth of the charge per time (Q total) continues to increase to the extent it is to carry out a number of cargo can be done by adding the frequency of ship visits (Call) or other means to add capacity unloading ships (GT) which increase the GT vessel will have an impact on the entire length of the ship (LOA). And if the above is the case then dock length (Ld) are affected as well as the performance of the dock (BOR), which would certainly affect the growth of GDP. The relationship between the length of the dock with the economic growth can be modeled as a parabolic shape where the length of the dock only developed to a certain extent but still can deliver economic growth, where the length of the dock and a boat trip boat load capacity is a free variable that can be increased to some extent in an effort to increase the capacity of the loading / unloading at the port:

log L_d = ln(□□□□□□□□lnLOA + □□lnGDP + μ 26

lnLoading/Unloading = ln(□□□□□□□□lnGDP + μ 27

From the above equations, then made some hypotheses, as follows:

I. The increasing growth of loading and unloading ships will encourage economic growth of a region
II. The availability of good infrastructure and adequate port (is positive) can enhance the smooth operation of the ship in port and encourage regional economic growth

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Vol. 3, No. 3, November 2012

III. An increase in the growth of investment in the port (dock length) may affect the availability of port infrastructure in the existing conditions and create economic activity either new or are expanding.

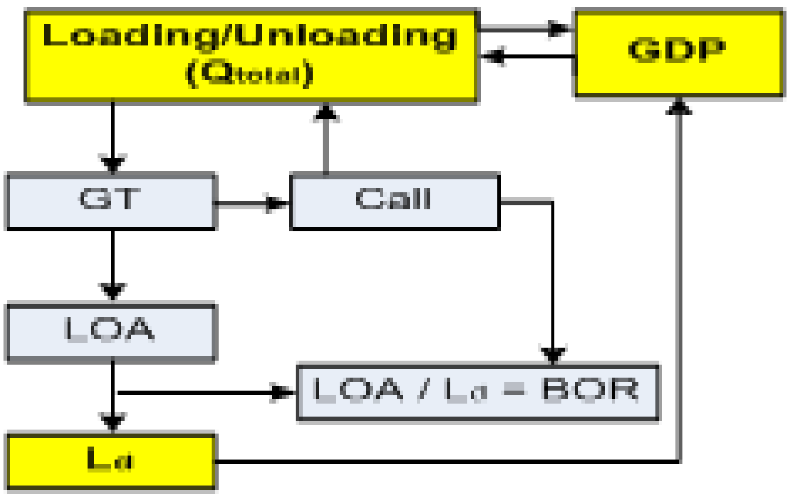

Figure 2. Dock Performance Against Economic Growth

RESULT AND DISCUSSION

Selection of Pilot Ports

With the method Methods Technique for Order Preference by Similarity to Ideal Solution (TOPSIS), which selected the best alternative not only have the shortest distance from the positive ideal solution, but it also has the longest distance from the negative ideal solution. Equation 3 can be solved:

$$|X_1| = \sqrt{4^2 \quad 3^2 \quad 5^2 \quad 3^{\,2} \quad 2^2} = 7{,}937$$

$$|X_3| = \sqrt{4^2 \quad 3^2 \quad 4^2 \quad 2^{\,2} \quad 2^2} = 7{,}000$$

$$|X_4| = \sqrt{4^2 \quad 3^2 \quad 5^2 \quad 3^{\,2} \quad 3^2} = 8{,}246$$

$$|X_5| = \sqrt{3^2 \quad 3^2 \quad 4^2 \quad 2^{\,2} \quad 2^2} = 6{,}481$$

Matrix R :

$$R = \begin{bmatrix} 0{,}504 & 0{,}346 & 0{,}571 & 0{,}485 & 0{,}462 \\ 0{,}377 & 0{,}462 & 0{,}428 & 0{,}364 & 0{,}462 \\ 0{,}630 & 0{,}577 & 0{,}571 & 0{,}606 & 0{,}617 \\ 0{,}377 & 0{,}346 & 0{,}286 & 0{,}364 & 0{,}308 \\ 0{,}252 & 0{,}462 & 0{,}286 & 0{,}286 & 0{,}308 \end{bmatrix}$$

Matrix Y :

$$Y = \begin{bmatrix} 2{,}520 & 1{,}384 & 2{,}284 & 1{,}455 & 1{,}386 \\ 1{,}885 & 1{,}848 & 1{,}712 & 1{,}092 & 1{,}386 \\ 3{,}150 & 2{,}308 & 2{,}284 & 1{,}818 & 1{,}851 \\ 1{,}885 & 1{,}384 & 1{,}144 & 1{,}092 & 0{,}924 \\ 1{,}260 & 1{,}848 & 1{,}144 & 0{,}858 & 0{,}924 \end{bmatrix}$$

$Y_1^+ = 3{,}150$, $Y_2^+ = 2{,}308$, $Y_3^+ = 2{,}284$, $Y_4^+ = 1{,}858$, $Y_5^+ = 1{,}851$

$A^+ = \{3{,}150;\ 2{,}308;\ 2{,}284;\ 1{,}818;\ 1{,}923\}$

$Y_1^- = 1{,}260$, $Y_2^- = 1{,}384$, $Y_3^- = 1{,}144$, $Y_4^- = 0{,}858$, $Y_5^- = 0{,}924$

$A^- = \{1{,}260;\ 1{,}384;\ 1{,}144;\ 0{,}858;\ 0{,}924\}$

Equation 6 can be solved :

$D_1^+ = 1{,}350,\ D_2^+ = 0{,}994,\ D_3^+ = 0{,}440,\ D_4^+ = 2{,}160,\ D_5^+ = 2{,}437$

$D_1^- = 1{,}879,\ D_2^- = 1{,}127,\ D_3^- = 2{,}579,\ D_4^- = 1{,}274,\ D_5^- = 0{,}463$

$V_{Tual} = 0{,}582,\ V_{Saumlaki} = 0{,}531,\ V_{Ambon} = 0{,}983,\ V_{Dobo} = 0{,}371,\ V_{Kisar} = 0{,}159$. for the maximum value of V_i is the best alternative to choose .

Long dock Investments to Economic Growth an Island

The model used in this study is a model of simultaneous over-identified. Therefore, to produce good estimates required through the stages as follows: Two-Stage Least Squares (TSLS) where to get the estimated parameters of each variable in the system information is needed, because each equation is not independent and not all variables estimator in each equation are independent. TSLS estimation appropriately used in the system equations in which each equation in a system of simultaneous equations over-identified. All dependent variables must be estimated in advance by all the independent variables in the system, and then substituted into the estimation of each equation that is as dependent variable estimator. This is to eliminate the link between all the independent variables in the equation with a confounding variable (error term).

Economic Modeling

$GDP = 610272 + 0.413 \sum Loading/Unloading$

$Unloading = - 290762 + 0.842\ GT$

$LOA = 72.1 + 0.0163\ Ton/Call\ \_Unloading$

$LOA = 33.2 + 0.350\ L_d$

$L_d\ X360 = 85519 - 71.1\ Call + 0.0190\ GT$

$L_{d\ X360} = 22464 + 269\ LOA + 0.0150\ GDP$

Model of the relationship between economic growth and port infrastructure particularly long dock dimensions that can be used as a variable control of the impact of port infrastructure investment to economic growth. The estimation model using Minitab-15 software for the 2000-2010 period data in Table 2 to Table 7 shows that the Adjusted R-squared value of each equation in the model as a whole ranged from 84.2% - 89.5%. Thus the diversity of each endogenous variable can be explained by the explanatory variables included in the model.

Table 2. Dependent Variable GDP

Predictor	Coef	SE Coef	t-Statistic	Prob
Constant	574611	180402	3.19	0.011
Load/ Unload	0.39334	0.04495	8.75	0.000
S = 256968 R-Sq = 89.5% R-Sq(adj) = 88.3%				

Table 3. Dependent Variable Loading/Unloading

Predictor	Coef	SE Coef	t-Statistic	Prob
Constant	-290762	226266	-1.29	0.231
GT	0.84197	0.05043	16.70	0.000
S = 297287 R-Sq = 96.9% R-Sq(adj) = 96.5%				

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Vol. 3, No. 3, November 2012

Table 4. Dependent Variable LOA

Predictor	Coef	SE Coef	t-Statistic	Prob
Constant	72.084	7.471	9.65	0.000
Ton/Call	0.016287	0.002729	5.97	0.000
S = 8.60015 R-Sq = 79.8% R-Sq(adj) = 77.6%				

Table 5. Dependent Variable LOA

Predictor	Coef	SE Coef	t-Statistic	Prob
Constant	33.20	11.98	2.77	0.022
L_d	0.34952	0.05089	6.87	0.000
S = 7.66597 R-Sq = 84.0% R-Sq(adj) = 82.2%				

Table 6. Dependent Variable Call

Predictor	Coef	SE Coef	t-Statistic	Prob
Constant	85519	20316 0	4.21 3	0.003
L_d	-71.05	0.006930	-1.73	0.122
S = 9841.69 R-Sq = 73.7% R-Sq(adj) = 67.1%				

Table l 7. Dependent Variable L_{d_years}

Predictor	Coef	SE Coef	t-Statistic	Prob
Constant	22464	29377	0.76	0.466
LOA	269.3	425.8	0.63	0.545
GDP	0.01499	0.01029	1.46	0.183
S = 6823.04 R-Sq = 87.3% R-Sq(adj) = 84.2%				

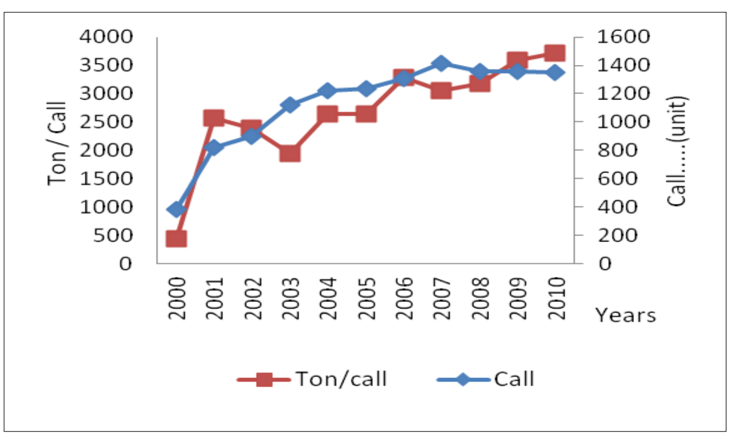

Figure 3. Growth Trends Payload (tons / Call) and a Pattern Ship Visits (Call) Port of Ambon

For equations with Dependent Variable, it appears that economic growth is strongly influenced by a variety of variables in the model. And partially, all variables significantly influence economic growth. If increase of the B/M goods by 1% then economic growth of 0.413% (Table 2). Which is generally the islands dominate the unloading cargo on which the determination of the capacity of the ship is unloading cargo capacity. To increase the capacity of the vessel 1% will encourage the growth of 0.842% unloading cargo.

In figure 3 can be explained that the increase will be followed by the phenomenon of decline in the number of ship visits. This indicates an increase in load capacity and the size of the entire length of the vessel. Where with increased load capacity and size of the vessel is expected to ship can carry out a number of charges per time unit.

Increase the availability of long dock for one year (Ld X360) of 1% may affect the economic growth of 0.0150%, and this result is not very significant, but the growth in cargo ton / Call a significant impact to the decline in ship traffic (Call). Conversely call drop followed by GT and LOA vessel growth, where the length of the vessel 1% lead to the long dock by 0.350%.

This is reflected by the performance of the BOR (see figure 4). And ship traffic within a certain period of the season is also influenced by the size of the ship loading capacity and the length of the ship where the selection of the ship loading capacity adjusted to the volume of cargo available on each carriage of goods (see Figures 5, 6 and 7) are relations GT and LOA

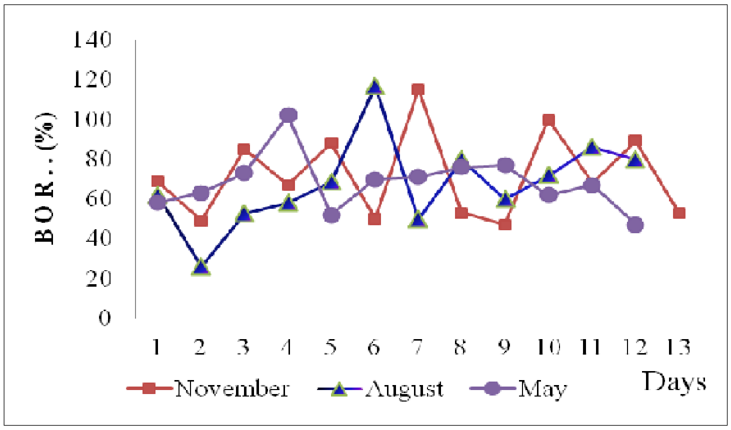

Figure 4. Daily BOR Year 2010

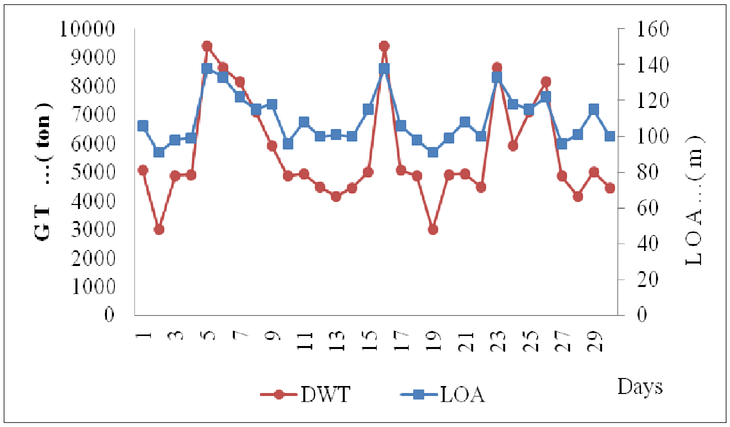

Figure 5. Relationship LOA and GT in November 2010

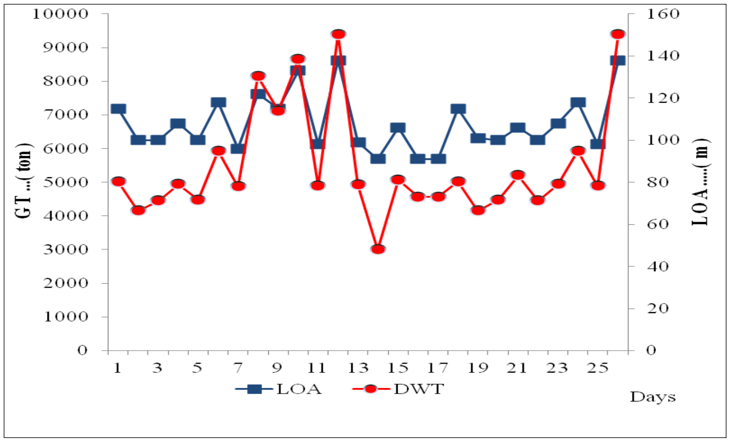

Figure 6. Relationship LOA and GT in August 2010

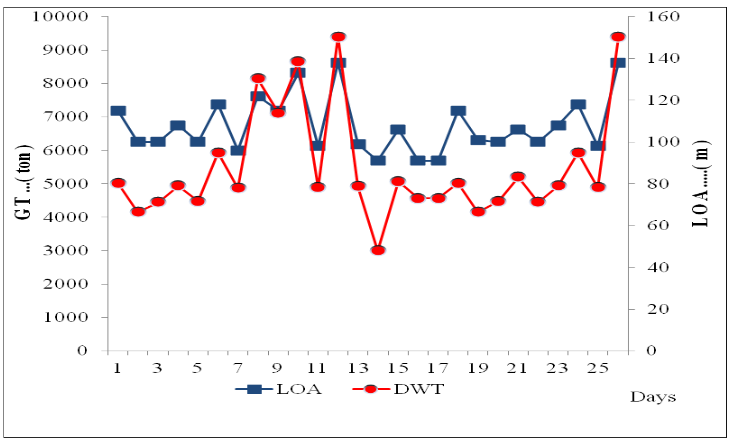

Figure 7. Relationship LOA and GT in Mei 2010

Simulation of Long Dock Investments against Economic Growth

From the results of the econometric estimation, we can see the simulation of the relationship between economic growth and investment with the unloading of the islands. Where table 8 for each the length of the dock (Ld) by 1% to stimulate economic growth indirectly by 0.000042%, assuming other variables constant, and vice versa with a 1% increase dock can accommodate ships that happened long% by 0,350. if the length of the dock increased to 5% of the length of the dock will be able to accommodate vessels up to 1.75% which means it can cope with queues going vessels in the archipelago because of the limited length of the dock.

In Table 9 enhanced growth of loading and unloading of goods (Loading/Unloading) of 1% to stimulate economic growth by 0,393%. and 0,626% growth in vessel capacity. If unloading volume increased by 5% then of economic growth can be increased by 1.96%, then economic growth will increase if improved loading and unloading.

Table 8. Investment Scenario Long dock against LOA and Economic Growth

Growth LOA (%)	Impact Ld (%)	Growth L d (%)	Impact GDP (%)
5	1.75	5	0.08
10	3.50	10	0.15
15	5.25	15	0.23
20	7.00	20	0.30
25	8.75	25	0.38

Source: Results of calculation

Table 9. Scenario Loading / Unloading – Against Economic Growth and Capacity Ship

Growth Loading / Unloading (%)	Impact GDP (%)	Growth Unloading (%)	Impact GT/Call (%)
5	2.07	5	4.21
10	4.13	10	8.42
15	6.19	15	12.63
20	8.26	20	16.84
25	10.32	25	21.05

Source: Results of calculation

CONCLUSION

From the results of this study can be summarized as follows;

1. Port of Ambon can be used as the first alternative sample locations in the study of the development of port-based economy in the province of Maluku as has the development of criteria and can be used as a model for ports in Maluku
2. R-squared statistical tests showed that each of the equations in the model as a whole has the R-squared values are expressed strong relationship between transport parameters and economic parameters. Thus the diversity of each endogenous variable can be explained by the explanatory variables included in the model.
3. Econometric estimation results indicated that:
   a. The relationship between investment increase shelf dock with economic growth figures showed a less significant but growth unloading a significant impact on the growth of the size of vessels that affect the availability of the long dock to serve the loading and unloading of ships, and an increase in loading and unloading ships can boost growth significant economic region.
   b. Growth of volume loading and unloading of goods, followed by a decrease in the number of ship visits identifies an increase in the size of the ship loading capacity and the length of the vessel that required the addition of a long dock to serve the ship to lean for optimal effectiveness of the dock is still safe and there is no line of boats in harbor can degrade the performance of the port. So that the length of the dock in need to overcome the performance degradation dock / berth occupation ratio (BOR), as well as the performance of loading / unloading the trigger inflation and rising prices of goods and can affect the economic growth of the islands.
   c. To maintain the economic stability of the islands, it is suggested the need for supply chain modeling study of the basic food needs of performance-based loading / unloading of ships in the harbor.

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