IDENTIFICATION OF LOADING AND UNLOADING PROCESS TIME AT DENPASAR GOODS TERMINAL

Dynes Rizky Navianti*, Putu Ayu Govika Krisna Dewi, Stefanus Sylvan Ryanto
Politeknik Transportasi Darat Bali, Jl. Batuyang No.109X, Batubulan Kangin, Sukawati, Gianyar, Bali 80582, Indonesia
*dynes@poltradabali.ac.id

ABSTRACT

One of the goals of a company organization is to minimize production costs to obtain a guarantee of survival. The creation of a production company (both goods and services) requires qualified and competent human resources. In a production system, there is an inventory or inventory process. Inventory is an effort to anticipate stock due to high demand from consumers. This is due to the delay in the goods. In an inventory process, there are two processes, namely loading (loading process) and unloading (unloading process). In the process of inventory loading and unloading, there is a problem, namely the inefficiency of time. These problems disrupt and hinder the product distribution process which has implications for wasting time. However, in this study related factors have been identified that affect loading and unloading processing time. The result is that the fatigue variable and the driver psychology variable do not significantly influence the loading and unloading processing time. Simultaneous or joint significance test, has a probability/significance value of the F test of 0.150087 with a significance level of 0.05

Keywords: fatigue; inventory; loading and unloading; psychology

INTRODUCTION

Urban transportation has broad goals, one of which is to form a city, where the city will live if the existing transportation system is running well. This means having roads that are in accordance with their function, regulations and proper traffic routing arrangements, as well as adequate traffic equipment. Transportation also has the aim of disseminating and increasing the ease of service of both goods and services, expanding urban development opportunities, and increasing the efficiency of the use of existing resources.Urban transportation problems generally include traffic congestion, parking, public transportation, pollution, and traffic order problems. Traffic congestion will always have a negative impact, both on the drivers themselves, as well as from an economic and environmental perspective. The connection with the activity of loading and unloading of goods is due to the large number of freight vehicles entering the urban main roads during rush hours, such as in the morning at 07.00-09.00, and in the afternoon at 16.00-18.00. Both hours are rush hours and there is a peak of density in traffic flow. This is very disturbing and adds to the severity of traffic jams. Traffic will be greatly disrupted, because the volume of transport vehicles which are usually large cars, such as trucks, box cars, container cars, and the like, will fill the road space.

The next alternative solution to overcome this problem is to provide a special terminal for freight vehicles. According to Wikipedia, a truck terminal is a loading and unloading facility for truck loads, which is built on the outskirts of a city to serve the flow of goods to and from that city. The difference with public passenger transport terminals is that the parking lots are adjusted to the size and load of goods transport vehicles. Entering the era of globalization, the industrial sector plays an important role in creating a product or service in free market competition. Companies are often faced with complex problems in making a decision to achieve a goal, namely meeting the needs and desires of consumers. One of the other goals of the company is to minimize production costs and maximize profits to ensure the survival of the company. To create a product or service that is of high quality and can satisfy its customers requires competent and qualified human resources. Some companies often experience problems during the loading

and unloading process. These problems disrupt and hinder the product distribution process. Not only hindering the distribution process, these problems cause a waste of time and losses. From these obstacles, also received complaints from customers due to delays in delivery. Therefore, it is necessary to conduct research on why there are delays in the delivery of goods in several companies.

METODE

This research included: literature study, preliminary survey, preparation and distribution of questionnaires (to drivers), processing and analyzing questionnaire data, and drawing conclusions. The interview technique is a data collection technique that is carried out by asking oral questions to the research subjects using a questionnaire. Questionnaires are a method of collecting data by making a number of written questions which are distributed to respondents to obtain data related to the process of loading and unloading goods.

Variables are anything that can be the object and subject of research (Indriantoro, 1999:26). The variables to be studied are as follows:

1. The dependent variable or dependent variable is a variable that depends on other variables or is the result of the independent variable. The dependent variable of this research is the inventory processing time.
2. Independent variables or independent variables, are variables that do not depend on other variables. The independent variables in this study are driver fatigue and driver psychology. The illustration can be presented in Figure 1.

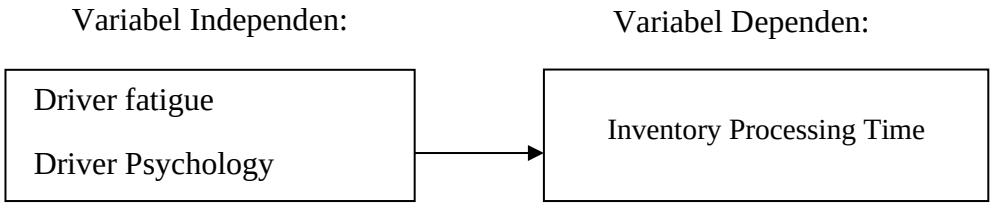


Figure 1. Illustration of Dependent and Independent Variables

1. Regression Analysis Techniques
   In is study using regression analysis techniques. Regression analysis is one of the analytical techniques in statistics used to find the relationship between two variables that are quantitative. The classical assumption test is carried out before calculations are carried out using the correlation technique, first the assumption test is carried out, namely:a. Uji
   a. Normality
      The normality test is a test that the sample used comes from a normally distributed population. According to Sugiyono (2011) data can be said to be normally distributed if it has a significance level or probability value of more than 0.05 if it is not normal it will use non-parametric techniques. The normality test was carried out using the Kolmogorov-Smirnov test of normality with the help of the SPSS (Statistical Program and Social Science) version 24.0 for windows.
   b. Multicollinearity Test
      Multicollinearity test is used to determine the relationship between independent variables. Ghozali (2018), shows that the purpose of the multicollinearity test is to test whether the regression model finds a correlation between independent variables. Multicollinearity test can be confirmed with margin of error and variance factor (VIF). If the VIF value is 10, then the data is multicollinear.

c. Heteroscedasticity Test
Ghozali (2018) shows that the heterogeneous variance test helps to find out whether the regression model has an inequality of variance from the residual observations of other observations. The non-uniformity test can be seen from the Spearman rank correlation coefficient between the independent variables and the dependent variable. If the probability value (sig) > 0.05, then there is no non-uniform variance (Ghozali, 2018).

d. Linearity Test
The linearity test is used to find out whether the relationship between the dependent variable and the independent variable is linear (Nabila, 2019). In addition, according to Sugiyono & Susanto, Dewi & Nathania (2018) uses a linearity test to find a linear or non-linear relationship between the independent variable and the dependent variable. The criteria for testing linearity is if the significance value of the linearity deviation is > 0.05, it can be concluded that the relationship between variables is linear, if ≤ 0.05 then the data is not linear. (Priyatno, in Salim and Radianto, 2014).

2. Multiple Linear Regression Analysis
According to Sanusi in Ghozali (2018), multiple linear regression is an extension of simple linear regression which means adding a number of independent variables where previously there was one to become more independent variables. The multiple linear regression equation in this study is:$Y= \alpha + \beta_1X_1 + \beta_2X_2 + \varepsilon$
Information :
Y : Loading and unloading processing time
A : Constant
β1 : Regression coefficient of social support
β2 : Regression coefficient of motivation

X1 : Social support
X2 : Motivation
ε : Residual

3. Hypothesis testing
a. F test
According to Sugiyono (2017: 135) revealed that the F test is useful for seeing a regression model whether it is feasible or not feasible. If a regression model is said to be feasible, then the regression model can be used to explain the effect of the independent variables on the dependent variable. The F test uses the ANOVA table, the regression model is declared feasible if the significance value is <0.05.

b. t test
The partial test (T test) according to Ghozali (2018), aims to see whether the independent variable affects the dependent variable when the other independent variables are constant. The test criterion used is to compare the significance value obtained at a given significance level of 0.05. However, if the value is significant <0.05, then the independent variable can have a significant effect on the independent variable and the dependent variable.

c. Determination Coefficient Test
The coefficient of determination (R2) is useful for measuring the ability of the regression model to explain the dependent variable. The coefficient of determination (R2) is between 0 and 1, if R2 is close to 1, then the influence of the independent variable (X) is large on the dependent variable (Y). if the value of R2 is close to 0, then the effect of the independent variable (X) is small on the dependent variable (Y).

RESULTS

There are many factors influencing the loading and unloading process at the goods terminal in the city of Denpasar, so it is necessary to identify the influencing factors. As for the technique to determine the factors, used with statistical analysis techniques. The technique used in this study is the regression analysis technique. Here are the results and explanations:

Initial Regression Model

Testing the research hypothesis was first carried out by carrying out initial modeling of multiple linear regression based on the theoretical model that had been built. The initial modeling aims to issue/generate multiple regression residual values (estimator errors), so that the assumptions of the regression model used can be checked/tested. The initial regression model for this study can be seen in table 5.1 below.

Table 1.
Initial Model of Linear Regression Identification of Loading and Unloading Time

Variabel	Koefisien	Std. Error	t-Statistik	Prob.
C	11.77142	7.095779	1.658933	0.1145
X1	0.419102	0.372755	1.124336	0.2756
X2	0.162768	0.348796	0.466655	0.6463

R-squared	0.190005	Mean dependent var	26.00000
Adjusted R-squared	0.100005	S.D. dependent var	6.356099
S.E. of regression	6.029908	Akaike info criterion	6.562904
Sum squared resid	654.4762	Schwarz criterion	6.712122
Log likelihood	-65.91049	Hannan-Quinn criter.	6.595288
F-statistic	2.111176	Durbin-Watson stat	1.808978
Prob(F-statistic)	0.150087		

Table 1 before testing the statistical hypothesis of the study using multiple linear regression analysis, the assumptions/requisites of the analysis were first tested, namely the normality error/residual regression test, the homoscedasticity test of variance error/residual, the autocorrelation free test between observational errors, and the multicollinearity free test between independent variables based on the regression residual value that has been obtained in the initial regression model.

1. Residual Normality Test
   The residual normality test aims to test whether in the regression model, the residual variable (error) follows a normal distribution. Residual normality testing can be done with the Jarque-Bera (JB) test with the following equation (Ghozali & Ratmono, 2013)
   :$\boldsymbol{JB = n\left[\frac{S^2}{6} + \frac{(K-3)^2}{24}\right]}$

Where: n = sample size, S = skewness coefficient, and K = kurtosis coefficient.
The statistical value of JB follows the Chi-Square distribution with df (dgree of freedom) 2. The hypotheses tested are:
H0: The residuals follow a normal distribution
H1: Residuals do not follow a normal distribution

The results of the residual normality test can be seen in Figure 2 below.

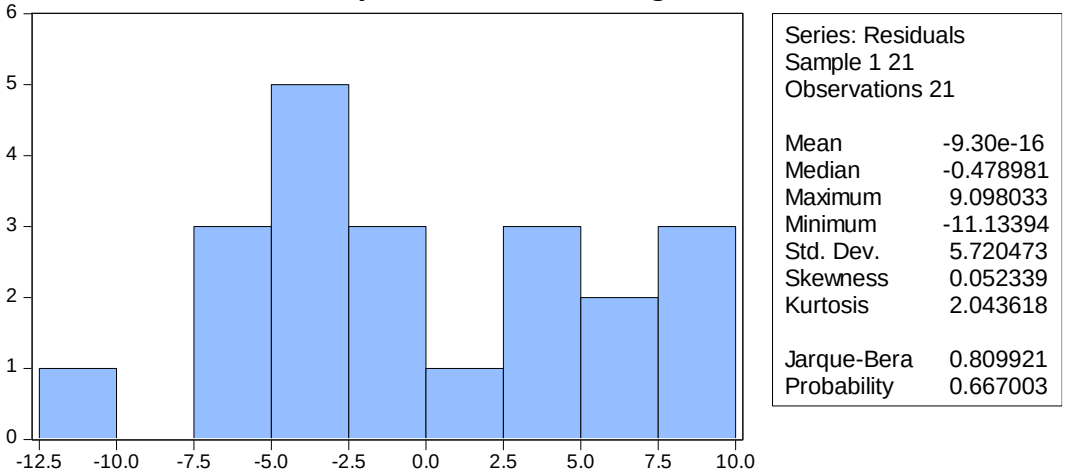


Figure 2. Residual Histogram Graph and Jarque-Bera Test Results

Figure 2, it is known that the probability/significance value of the Jarque-Bera test is 0.667003 > α = 0.05, which means that H0 fails to be rejected. By failing to reject H0, it can be said that the residuals follow a normal distribution.

2. Homoscedasticity Test (Heteroscedasticity Free) Between Residual Variances
   One way that can be done to test whether there are symptoms of heteroscedasticity or not is to use the White test. This test can be carried out by regressing the squared residual (Ui2) with independent variables, squared independent variables, and multiplication (interaction) between independent variables (Ghozali & Ratmono, 2013). The hypothesis tested is:

H0: Homogeneous residual variance (no signs of heteroscedasticity)
H1: The residual variance is not homogeneous (there are symptoms of heteroscedasticity)

The results of the error variance homoscedasticity test can be seen in Table 2 below.

Table 2. White Test Results

F-statistic	2.593451	Prob. F(5,15)	0.0698
Obs*R-squared	9.736827	Prob. Chi-Square(5)	0.0830
Scaled explained SS	3.732807	Prob. Chi-Square(5)	0.5885

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	170.1514	113.0844	1.504641	0.1532
X1^2	-0.096142	0.347438	-0.276717	0.7858
X1*X2	0.159869	0.633716	0.252271	0.8043
X1	1.601702	12.41412	0.129023	0.8991
X2^2	0.384602	0.455418	0.844505	0.4117
X2	-18.74553	15.18187	-1.234732	0.2359

R-squared	0.463658	Mean dependent var	31.16553
Adjusted R-squared	0.284878	S.D. dependent var	32.62421
S.E. of regression	27.58863	Akaike info criterion	9.707641
Sum squared resid	11416.99	Schwarz criterion	10.00608
Log likelihood	-95.93023	Hannan-Quinn criter.	9.772409
F-statistic	2.593451	Durbin-Watson stat	1.547043
Prob(F-statistic)	0.069817		

Table 2, it is known that the Obs*R-squared value has a Chi-Square probability value that is greater than the value $\alpha = 0.05$ ($p = 0.0830 > \alpha = 0.05$), which means that H0 failed to be rejected, or with in other words Homogeneous residual variance (there are no symptoms of heteroscedasticity).

3. Autocorrelation Free Test
   The autocorrelation free test aims to test whether in a linear regression model there is a residual correlation (error) in period t with errors in period t-1 (previous). Autocorrelation arises because successive observations over time are related to one another. This problem arises because the residuals are not independent from one observation to another. The autocorrelation-free test is based on testing the following hypotheses (Ghozali & Ratmono, 2013):

H0: There is no autocorrelation between residuals
H1: There is autocorrelation between residuals

The decision making of whether or not autocorrelation exists is based on Table 3 below:

Table 3.
Autocorrelation Test Decision Criteria

Hipotesis Nol (H0)	Decision	If
There is no positive autocorrelation	Reject	$0 < d < d_L$
There is no positive autocorrelation	*No Decision*	$d_L \leq d \leq d_U$
There is no positive autocorrelation	Reject	$4 - d_L < d < 4$
There is no positive autocorrelation	*No Decision*	$4 - d_U \leq d \leq 4 - d_L$
There is no positive or negative autocorrelation	Not denied	$d_U < d < 4 - d_U$

The test results and values of the Durbin-Watson table can be seen in Table 4 below:

Table 4.
Durbin-Watson Test Results and Tables

d	dL	dU	4 – dL	4 – dU
1,808978	0,890	1,277	3,11	2,191022

Table 4 because the value of $dU < d < 4 - dU$, the decision is not to reject H0 or in other words there is no positive or negative autocorrelation in the regression model.

4. Multicollinearity Free Test
   Multicollinearity test between independent variables can be done by looking at the Variance Inflation Factor (VIF) value. VIF values > 10 indicate the presence of multicollinearity between independent variables (Ghozali & Ratmono, 2013). The test results can be seen in Table 5.

Table 5.
Multicollinearity Test Using Variance Inflation Factor (VIF)

Variable	Coefficient Variance	VIF
C	50.35008	NA
X1	0.138946	1.913260
X2	0.121659	1.913260

Table 5 it can be seen that there is no VIF value above 10. So it can be said that there is no violation of perfect multicollinearity between independent variables in the regression model.

5. The Final Regression Model and the Goodness of Fit Model
   Because the entire assumption test has been fulfilled the final regression model is the same as the initial research regression model in Table 6 as follows:

Table 6.
Final Model of Linear Regression for Unloading Time After the Assumption Test is Fulfilled

Variabel	Koefisien	Std. Error	t-Statistik	Prob.
C	11.77142	7.095779	1.658933	0.1145
Kelelahan Fisik (X1)	0.419102	0.372755	1.124336	0.2756
Psikologi Pengemudi (X2)	0.162768	0.348796	0.466655	0.6463

R-squared	0.190005	Mean dependent var	26.00000
Adjusted R-squared	0.100005	S.D. dependent var	6.356099
S.E. of regression	6.029908	Akaike info criterion	6.562904
Sum squared resid	654.4762	Schwarz criterion	6.712122
Log likelihood	-65.91049	Hannan-Quinn criter.	6.595288
F-statistic	2.111176	Durbin-Watson stat	1.808978
Prob(F-statistic)	0.150087		

Table 6 it can be seen that there is no independent variable (X) that affects the dependent variable (Y). Or in other words, physical fatigue (X1) and driver psychology (X2) have no significant effect on loading and unloading time (Y) at $\alpha = 0.05$. This can be seen from the probability/significance value of the F test of 0.150087 > 0.05 or in other words none of the independent variables affect the dependent variable. The coefficient of determination (R2) of 0.19 explains that the independent variables of physical fatigue (X1) and driver psychology (X2) can only explain variations in loading and unloading time (Y) of 19%. The remaining 81% can only be explained by other variables outside this study.

Driver Characteristics Analysis

The driver who was surveyed at the Denpasar goods terminal related to the loading and unloading process of goods was male. Most of the age range is 50-58 years or 39% of the total respondents. Then followed by the age range of 41-49 years which amounted to 33%. Furthermore, the age range of 59-67 years was 17%. When presented in a visualization, it can be shown in Figure 3.

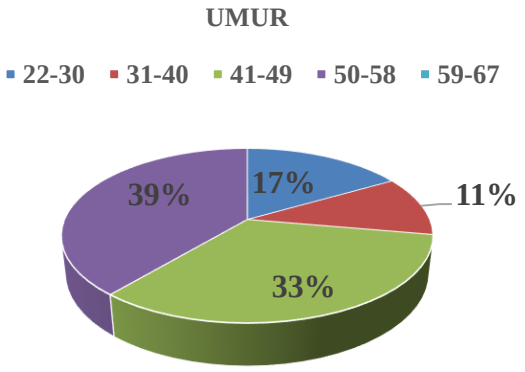
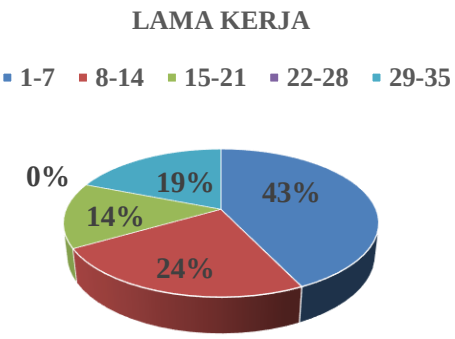


Figure 3. Age Percentage of Drivers at the Denpasar Goods Terminal

Apart from age, the researchers also looked at their length of time working in loading and unloading activities. Most of them work for 1 to 7 years with a percentage of 43%. Furthermore, they also work for 8 to 14 years with a percentage of 24%. And there are even those who work for 29 to 35 years with a percentage of 19%. Presentation of the data can be presented in the form of a pie chart in Figure 4.



Gambar 3. Persentase Usia Pengemudi di Terminal Barang Denpasar

Identification of loading and unloading time at the Denpasar Goods Terminal

Based on the results using the inferential statistical approach, it was found that the physical fatigue variable and the driver's psychology variable did not have a significant effect. This is different from the results of Kindangan P. Elia, et al (2016). His research shows that there is a relationship between length of service and work productivity in loading and unloading workers and there is a relationship between work fatigue and work productivity in loading and unloading workers at the Port of Bitung. This is different from Rendi Ahmad's research (2014) which says that there is no relationship between length of service and labor productivity in the home shoe industry. Furthermore, there is also research from Nur Ulfah (2013) which says that there is a relationship between work fatigue and rice milling work productivity.

This study is different from previous studies with similar case analyses. The results of this study indicate that the majority of respondents or 29% of the total respondents surveyed. They said that they felt tired because of the lack of opportunity to rest during the process of loading and unloading goods. Drivers feel tired, representing or one indicator of the physical fatigue variable. Furthermore, the second largest percentage of 28% of the total respondents felt not too tired during the process of loading and unloading goods. This is because each company provides different treatment between one driver and another. For example, the company provides a schedule or shift for changing drivers or other employees who carry out a more flexible process of loading and unloading goods. Presentation of the percentage as supporting data can be presented in Figure 4.

Figure 4. Percentage of Respondents Related to Physical Fatigue

In addition to the explanation of the reasons above, the company also provides goods transportation facilities, making it easier for drivers to load and unload their goods. This transportation facility represents or is an indicator of the psychological variables of the driver when carrying out his daily activities. This is indicated by the highest percentage of respondents who feel that there is a lack of means of transportation in the process of loading and unloading goods by 38% of the total. They feel it takes a long time if there is no adequate means of transportation at their respective companies. Furthermore, the second highest percentage, namely 24% of the total respondents, felt that there was no lack of means of transportation in their company so that it could facilitate their work in the process of loading and unloading goods.

The explanation above illustrates that the proportion of the percentage related to one of the indicators of the driver's physical and psychological fatigue variables is almost the same. The implication that occurs is that the variables used in this study do not significantly influence the variable loading and unloading processing time at the Denpasar city goods terminal. A visual presentation of transportation facilities as supporting data can be shown in Figure 5.

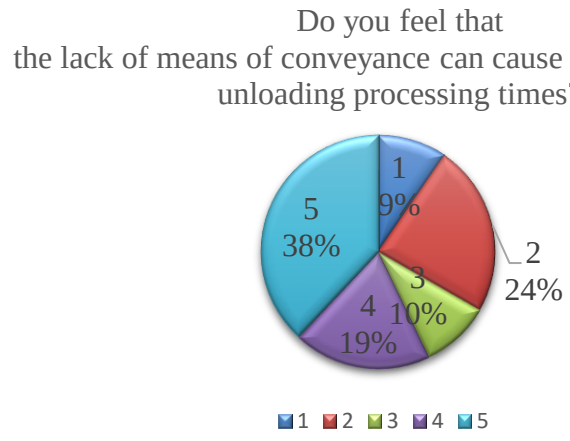


Figure 5. Percentage of Respondents Regarding Means of Transportation

CONCLUSION

The conclusions of this study are as follows. Based on the results of the survey, the drivers who were selected as respondents were male with a productive age range of 41-49 years and length of service in the range of 1 to 7 years. The result is that the fatigue variable and the driver

psychology variable do not significantly influence the loading and unloading processing time. The joint or simultaneous significance test has a probability/significance value of the F test of 0.150087 with a significance level of 5%.

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