Factors Affecting Loading and Unloading Productivity: A Case Study of PT. Tangguh Samudera Jaya

Abstract—PT. Tangguh Samudera Jaya is a stevedoring company which operates the wharf 303, 304, and 305 at Terminal 3 in Tanjung Priok Port. Terminal 3 is predominantly serving international container stevedoring and small portions of domestic containers. Every time a vessel berths at Terminal 3 Tanjung Priok Port, especially at the wharf 303, 304, and 305, there is a decrease in the productivity of loading and unloading, which causes Key Performance Indicators (KPI) that company set can’t be achieved. Therefore, this study uses the method of Multiple Linear Regression Analysis and Stepwise Regression, to determine the effect of loading and unloading time at the wharfs, loading and unloading time in a container yard, truck cycle time, and the number of ganks on productivity of loading and unloading and identifying the variables that have the greatest influence on loading and unloading productivity at the port. It was found that the independent variables can explain the dependent variable which is the loading and unloading productivity with a value of 99.9% while 1% is found in other variables besides the variables mentioned in this study. Overall or partially the independent variables significantly influence the loading and unloading productivity, and the variable that has the greatest influence on the loading and unloading productivity is loading and unloading time at wharfs.

Keywords—loading and unloading productivity, Box Container Hour (B/C/H), Multiple Linear Regression Analysis, Stepwise Regression

Table 1. Loading and Unloading Productivity (B/C/H) in July, August, September 2018 at Terminal 3 of Tanjung Priok Port

| VESSEL          | JULI  | AGUSTUS | SEPTEMBER |
|-----------------|-------|---------|-----------|
| CTP GOLDEN      | 16.24 | 20.07   | JONATHAN SWIFT | 10.74       |
| CARPENTERS SIRIUS | 10.08 | ST GREEN | 15.56 |
| SENDANG MAS     | 18.5  | ALS JUVENTUS | 12.65 | JOHAN FORTUNE | 29.23       |
| ST GREEN        | 13.42 | CTP HONOUR | 17.79 | ALS APOLLO | 11.93       |
| CTP DELTA       | 15.84 | SEGARA MAS | 18.47 | SEGARA MAS | 16.04       |
| SMILEY LADY     | 12.13 | PUTNAM | 22.13 | CTP GOLDEN | 27.05 |
| SEGARA MAS      | 17.31 | CTP GOLDEN | 17.26 | ISLAND CHIEF | 18.27 |
| CTP FORTUNE     | 14.79 | BAVARIA | 13.94 | MAERSK ABERDEEN | 16.64 |
| CTP GOLDEN      | 11.91 | CTP DELTA | 17.32 | CTP INNOVATION | 25.00 |

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In a previous study conducted by Gunawan [3], using factors that allegedly affected the loading and unloading process at PT. Pelayaran Meratus which are the number of ganks, full empty ratio, total container weights, loading/unloading equipment, and loading/unloading time. It was concluded that the container weight factor is the most influential factor on all ships.

This study uses four factors that are suspected to influence loading and unloading productivity, which are loading and unloading time at wharf (using Harbour Mobile Crane and Quay Container Crane), loading and unloading time in Container Yard (using Rubber Tyred Gantry and Reach Stacker), truck cycle time, and the number of ganks.

II. METHODS

The data used in this study are primary data and secondary data. The primary data obtained is by conducting field observations namely counting loading and unloading time on each equipment used in wharf (Harbour Mobile Crane/ HMC and Quay Container Crane/ QCC) and in container yard (Rubber Tire Gantry/ RTG and Reach Stacker/ RS), counting the truck cycle time in the cargodoring process.

For secondary data taken directly from PT. Tangguh Samudera Jaya is the data of vessels in July, August, and September 2018, namely the TDR (Terminal Departure Report) data to find out information about berth and the realization of productivity of loading and unloading, Crane Sequence data to find out reports of the process of loading and unloading of vessels.

For the input variables (independent variables) used, they are:
1. Variable X1: loading and unloading time at the wharfs (HMC, QCC)
2. Variable X2: loading and unloading time in container yard (RTG, RS)
3. Variable X3: truck cycle time
4. Variable X4: number of ganks

A. Ordinary Least Square (OLS) Test

1. Normality Test

Normality test is conducted to determine whether the residual value is normally distributed or not. According to Gendro Wijoyo [4] for testing normality with One Sample Kolmogorov-Smirnov can be stated normally distributed if the significance is greater than 0.05 (5%).

2. Multicollinearity Test

According to Imam Ghozali [5] "Multicollinearity test aims to test whether the regression model found a correlation between independent variables (independent).” A good regression model should not occur correlation between independent variables. If the independent variables are correlated with each other, then these variables are not orthogonal.

3. Autocorrelation Test

According to Imam Ghozali [5] Autocorrelation test aims to test whether in the linear regression model there is a correlation between the error of the intruder in the period t with an error in the period t-1 (previous).

4. Heteroskedacity Test

Based on the explanation of Imam Ghozali [5], "The heteroskedacity test aims to test whether in the regression model there is an inequality of variance and other residuals”.

B. Factor Analysis

The main purpose of factor analysis is to describe the structure of relationships among many variables in the form factors or latent variables or variable formations. Factors that formed a random quantity (random quantities) that previously could not be observed or measured or determined directly.

C. Multiple Regression Analysis

Multiple Regression Analysis is used because the regression model used consists of one dependent variable and has more than one independent variable to find the correlation between the dependent variable and the

| JULI | AGUSTUS | SEPTEMBER |
|------|---------|-----------|
| VESSEL | B/C/H | VESSEL | B/C/H | VESSEL | B/C/H |
| CTP INNOVATION | 25.38 | SMILEY LADY | 11.11 | HOLSATIA | 11.06 |
| SENDANG MAS | 17.17 | GH MISTRAL | 18.54 | CTP DELTA | 18.88 |
| CTP DELTA | 17.34 | CARPENTERS SIRIUS | 10.47 | GH MISTRAL | 18.83 |
| ST GREEN | 13.81 | ST GREEN | 15.19 | SHAO SHING | 6.76 |
| CTP FORTUNE | 11.89 | SEGARA MAS | 17.83 | ST GREEN | 14.87 |
| SEGARA MAS | 15.47 | CTP HONOUR | 20.07 | SZECHUEN | 15.51 |
| SHAO SHING | 12.79 | HANNE DANICA | 1.84 | ALS JUVENTUS | 15.21 |
| FLORA DELMAS | 9.73 | MAERSK ABERDEEN | 13.22 | CTP GOLDEN | 20.92 |
| CTP GOLDEN | 18.83 | CTP GOLDEN | 19.45 | SEGARA MAS | 18.04 |
| | | CTP DELTA | 16.08 | SMILEY LADY | 14.00 |
| | | SINGAPORE BRIDGE | 15.44 | CTP HONOUR | 15.66 |
| | | GH MISTRAL | 19.09 | CTP INNOVATION | 16.95 |
| | | FLORA DELMAS | 14.46 | GH MISTRAL | 16.19 |
| | | | | CTP DELTA | 19.35 |
| | | | | MAERSK ABERDEEN | 17.85 |
| | | | | ST GREEN | 13.62 |

Source: Terminal Departure Report (TDR) of Terminal 3 of Tanjung Priok Port
independent variable, and to find out the regression model used in the study are as follows:

\[ Y = \beta + \beta_1 X_1 + \ldots + \beta_n X_n + e \quad (1) \]

1. **t-Test**

T-test aims to find out whether or not there is a partial effect (alone) given the independent variable \((x)\) to the dependent variable \((y)\). On the basis of decision making: If the Sig value < 0.05 or t arithmetic < t table then there is the influence of the independent variable \((x)\) on the dependent variable \((y)\), and if the Sig value > 0.05 or t arithmetic > t table then there is no influence of the independent variable \((x)\) with respect to the dependent variable \((y)\).

2. **F-Test**

The F test aims to determine whether there is a simultaneous influence (together) given the independent variable \((x)\) to the dependent variable \((y)\). On the basis of decision making: If the value of Sig. < 0.05 or F arithmetic > F table then there is a simultaneous influence of the independent variable \((x)\) on the dependent variable \((y)\), and if the Sig value > 0.05 or t arithmetic < t table then there is no influence of the independent variable \((x)\) on the dependent variable \((y)\).

3. **Stepwise**

Regression analysis using the stepwise method is used to find out which statement of the independent variable most influences the dependent variable. Stepwise regression involves two types of processes namely forward selection and backward elimination. The incoming variable is the variable that has the highest and significant correlation with the dependent variable, after certain variables enter the model, the other variables in the model are evaluated, if there are insignificant variables, the variable is excluded.

### III. RESULTS AND DISCUSSIONS

#### A. Loading and Unloading Time at Wharfs

The loading and unloading equipments at wharfs are HMC and QCC by taking sample from 56 containers from each vessel that berthed. The following is the average time data from all loading and unloading processes on each vessel.

| No | Vessel                  | Time  | No | Vessel                  | Time  |
|----|-------------------------|-------|----|-------------------------|-------|
| 1  | CTP GOLDEN              | 140.40| 34 | HANNE DANICA            | 145.80|
| 2  | CARPENTERS SIRIUS       | 141.60| 35 | MAERSK ABERDEEN         | 139.80|
| 3  | SENDANG MAS             | 145.20| 36 | CTP GOLDEN              | 134.40|
| 4  | ST GREEN                | 133.20| 37 | CTP DELTA               | 151.80|
| 5  | CTP DELTA               | 154.80| 38 | SINGAPORE BRIDGE        | 141.60|
| 6  | SMILEY LADY             | 139.80| 39 | GH MISTRAL              | 154.20|
| 7  | SEGARA MAS              | 140.40| 40 | FLORA DELMAS            | 137.40|
| 8  | CTP FORTUNE             | 153.60| 41 | JONATHAN SWIFT          | 183.60|
| 9  | CTP GOLDEN              | 149.40| 42 | ST GREEN                | 151.80|
| 10 | CTP INNOVATION          | 188.40| 43 | JOHAN FORTUNE           | 144.60|
| 11 | SENDANG MAS             | 137.40| 44 | ALS APOLLO              | 188.40|
| 12 | CTP DELTA               | 183.60| 45 | SEGARA MAS              | 139.80|
| 13 | ST GREEN                | 151.80| 46 | CTP GOLDEN              | 145.80|
| 14 | CTP FORTUNE             | 144.60| 47 | ISLAND CHIEF            | 139.80|
| 15 | SEGARA MAS              | 188.40| 48 | MAERSK ABERDEEN         | 134.40|
| 16 | SHAOSHING               | 139.80| 49 | CTP INNOVATION          | 151.80|
| 17 | FLORA DELMAS            | 145.80| 50 | HOLSATIA                | 141.60|
| 18 | CTP GOLDEN              | 139.80| 51 | CTP DELTA               | 154.20|
| 19 | SENDANG MAS             | 134.40| 52 | GH MISTRAL              | 139.80|
| 20 | ST GREEN                | 151.80| 53 | SHAOSHING               | 145.80|
| 21 | ALS JUVENTUS            | 141.60| 54 | ST GREEN                | 139.80|
| 22 | CTP HONOUR              | 154.20| 55 | SZECHUEN                | 134.40|
| 23 | SEGARA MAS              | 139.80| 56 | ALS JUVENTUS            | 151.80|
| 24 | PUTNAM                  | 140.40| 57 | CTP GOLDEN              | 141.60|
| 25 | CTP GOLDEN              | 153.60| 58 | SEGARA MAS              | 154.20|
| 26 | BAVARIA                 | 149.40| 59 | SMILEY LADY             | 151.80|
| 27 | CTP DELTA               | 188.40| 60 | CTP HONOUR              | 144.60|
| 28 | SMILEY LADY             | 137.40| 61 | CTP INNOVATION          | 188.40|
| 29 | GH MISTRAL              | 183.60| 62 | GH MISTRAL              | 139.80|
| 30 | CARPENTERS SIRIUS       | 151.80| 63 | CTP DELTA               | 145.80|
| 31 | ST GREEN                | 144.60| 64 | MAERSK ABERDEEN         | 139.80|
| 32 | SEGARA MAS              | 188.40| 65 | ST GREEN                | 144.60|
| 33 | CTP HONOUR              | 139.80|     |                         |       |

#### B. Loading and Unloading Time at Container Yard

The loading and unloading tool at CY is RTG and RS by taking sample from 56 containers in the loading and unloading process to/from the chassis truck for each vessel that berthed.
### TABLE 3. LOADING AND UNLOADING TIME (SECONDS) AT CONTAINER YARD

| No | Vessel            | Time | No | Vessel            | Time |
|----|-------------------|------|----|-------------------|------|
| 1  | CTP GOLDEN        | 198.00 | 34 | HANNE DANICA     | 241.80 |
| 2  | CARPENTERS SIRIUS | 144.00 | 35 | MAERSK ABERDEEN  | 147.60 |
| 3  | SENDANG MAS       | 85.20  | 36 | CTP GOLDEN       | 199.80 |
| 4  | ST GREEN          | 153.00 | 37 | CTP DELTA        | 183.60 |
| 5  | CTP DELTA         | 138.00 | 38 | SINGAPORE BRIDGE | 195.60 |
| 6  | SMILEY LADY       | 132.00 | 39 | GH MISTRAL       | 195.00 |
| 7  | SEGARA MAS        | 81.00  | 40 | FLORA DELMAS     | 141.60 |
| 8  | CTP FORTUNE       | 154.20 | 41 | JONATHAN SWIFT   | 87.60  |
| 9  | CTP GOLDEN        | 184.80 | 42 | ST GREEN         | 88.20  |
| 10 | CTP INNOVATION    | 258.60 | 43 | JOHAN FORTUNE    | 85.20  |
| 11 | SENDANG MAS       | 141.60 | 44 | ALS APOLLO       | 138.00 |
| 12 | CTP DELTA         | 87.60  | 45 | SEGARA MAS       | 138.00 |
| 13 | ST GREEN          | 88.20  | 46 | CTP GOLDEN       | 241.80 |
| 14 | CTP FORTUNE       | 85.20  | 47 | ISLAND CHIEF     | 147.60 |
| 15 | SEGARA MAS        | 138.00 | 48 | MAERSK ABERDEEN  | 199.80 |
| 16 | SHAOSHING         | 138.00 | 49 | CTP INNOVATION   | 183.60 |
| 17 | FLORA DELMAS      | 241.80 | 50 | HOLSATIA         | 195.60 |
| 18 | CTP GOLDEN        | 147.60 | 51 | CTP DELTA        | 195.00 |
| 19 | SENDANG MAS       | 199.80 | 52 | GH MISTRAL       | 138.00 |
| 20 | ST GREEN          | 183.60 | 53 | SHAOSHING        | 241.80 |
| 21 | ALS JUVENTUS      | 195.60 | 54 | ST GREEN         | 147.60 |
| 22 | CTP HONOUR        | 195.00 | 55 | SZECHUEN         | 199.80 |
| 23 | SEGARA MAS        | 132.00 | 56 | ALS JUVENTUS     | 183.60 |
| 24 | PUTNAM            | 81.00  | 57 | CTP GOLDEN       | 195.60 |
| 25 | CTP GOLDEN        | 154.20 | 58 | SEGARA MAS       | 195.00 |
| 26 | BAVARIA           | 184.80 | 59 | SMILEY LADY      | 88.20  |
| 27 | CTP DELTA         | 258.60 | 60 | CTP HONOUR       | 85.20  |
| 28 | SMILEY LADY       | 141.60 | 61 | CTP INNOVATION   | 138.00 |
| 29 | GH MISTRAL        | 87.60  | 62 | GH MISTRAL       | 138.00 |
| 30 | CARPENTERS SIRIUS | 88.20  | 63 | CTP DELTA        | 241.80 |
| 31 | ST GREEN          | 85.20  | 64 | MAERSK ABERDEEN  | 147.60 |
| 32 | SEGARA MAS        | 138.00 | 65 | ST GREEN         | 85.20  |
| 33 | CTP HONOUR        | 138.00 |      |                  |       |

C. **Truck Cycle Time**

Trucks used are trucks owned by PT. Samudera Perdana is a type of hino and volvo truck, by taking a sample of 19 rounds from each vessel that is berthed to see when the trucking turns on the loading and unloading process.

### TABLE 4. TRUCK CYCLE TIME (SECONDS)

| No | Vessel            | Time | No | Vessel            | Time |
|----|-------------------|------|----|-------------------|------|
| 1  | CTP GOLDEN        | 964.80 | 34 | HANNE DANICA     | 973.20 |
| 2  | CARPENTERS SIRIUS | 1450.20 | 35 | MAERSK ABERDEEN  | 904.20 |
| 3  | SENDANG MAS       | 621.60 | 36 | CTP GOLDEN       | 991.80 |
| 4  | ST GREEN          | 484.20 | 37 | CTP DELTA        | 870.60 |
| 5  | CTP DELTA         | 690.00 | 38 | SINGAPORE BRIDGE | 806.40 |
| 6  | SMILEY LADY       | 486.00 | 39 | GH MISTRAL       | 784.80 |
| 7  | SEGARA MAS        | 602.40 | 40 | FLORA DELMAS     | 933.60 |
| 8  | CTP FORTUNE       | 841.20 | 41 | JONATHAN SWIFT   | 982.20 |
| 9  | CTP GOLDEN        | 690.60 | 42 | ST GREEN         | 1215.60 |
| 10 | CTP INNOVATION    | 688.20 | 43 | JOHAN FORTUNE    | 724.80 |
| 11 | SENDANG MAS       | 933.60 | 44 | ALS APOLLO       | 488.40 |
| 12 | CTP DELTA         | 982.20 | 45 | SEGARA MAS       | 322.80 |
| 13 | ST GREEN          | 1215.60 | 46 | CTP GOLDEN       | 973.20 |
| 14 | CTP FORTUNE       | 724.80 | 47 | ISLAND CHIEF     | 904.20 |
| 15 | SEGARA MAS        | 488.40 | 48 | MAERSK ABERDEEN  | 991.80 |
| 16 | SHAOSHING         | 322.80 | 49 | CTP INNOVATION   | 870.60 |
| 17 | FLORA DELMAS      | 973.20 | 50 | HOLSATIA         | 806.40 |
| 18 | CTP GOLDEN        | 904.20 | 51 | CTP DELTA        | 784.80 |
| 19 | SENDANG MAS       | 991.80 | 52 | GH MISTRAL       | 322.80 |
| 20 | ST GREEN          | 870.60 | 53 | SHAOSHING        | 973.20 |
| 21 | ALS JUVENTUS      | 806.40 | 54 | ST GREEN         | 904.20 |
D. Number of Ganks

Number of ganks is number workers in one work team.

| JULI | AGUSTUS | SEPTEMBER |
|------|---------|-----------|
| VESSEL | GANK | VESSEL | GANK | VESSEL | GANK |
| CTP GOLDEN | 2.00 | SENDANG MAS | 4.00 | JONATHAN SWIFT | 1.00 |
| CARPENTERS SIRIUS | 2.00 | ST GREEN | 3.00 | ST GREEN | 3.00 |
| SENDANG MAS | 4.00 | ALS JUVENTUS | 1.00 | JOHAN FORTUNE | 1.00 |
| ST GREEN | 4.00 | CTP HONOUR | 5.00 | ALS APOLLO | 1.00 |
| CTP DELTA | 2.00 | SEGARA MAS | 3.00 | SEGARA MAS | 3.00 |
| SMILEY LADY | 1.00 | PUTNAM | 1.00 | CTP GOLDEN | 1.00 |
| SEGARA MAS | 4.00 | CTP GOLDEN | 3.00 | ISLAND CHIEF | 3.00 |
| CTP FORTUNE | 3.00 | BAVARIA | 1.00 | MAERSK ABERDEEN | 3.00 |
| CTP GOLDEN | 4.00 | CTP DELTA | 1.00 | CTP INNOVATION | 1.00 |
| CTP INNOVATION | 1.00 | SMILEY LADY | 1.00 | HOLSATIA | 1.00 |
| SENDANG MAS | 4.00 | GH MISTRAL | 3.00 | CTP DELTA | 2.00 |
| CTP DELTA | 1.00 | CARPENTERS SIRIUS | 2.00 | GH MISTRAL | 2.00 |
| ST GREEN | 4.00 | ST GREEN | 4.00 | SHAOSHING | 3.00 |
| CTP FORTUNE | 3.00 | SEGARA MAS | 3.00 | ST GREEN | 3.00 |
| SEGARA MAS | 4.00 | CTP HONOUR | 2.00 | SZECHUEN | 2.00 |
| SHAOSHING | 2.00 | HANNE DANICA | 2.00 | ALS JUVENTUS | 1.00 |
| FLORA DELMAS | 2.00 | MAERSK ABERDEEN | 3.00 | CTP GOLDEN | 2.00 |
| CTP GOLDEN | 3.00 | CTP GOLDEN | 2.00 | SEGARA MAS | 3.00 |
| CTP DELTA | 2.00 | SMILEY LADY | 2.00 |
| SINGAPORE BRIDGE | 1.00 | CTP HONOUR | 2.00 |
| GH MISTRAL | 3.00 | CTP INNOVATION | 1.00 |
| FLORA DELMAS | 1.00 | GH MISTRAL | 2.00 |
| CTP DELTA | 2.00 | MAERSK ABERDEEN | 2.00 |
| ST GREEN | 3.00 |

E. Ordinary Least Square (OLS) Test Result

There are some test are carried out in OLS test:
1. normality test
2. multicollinearity test
3. autocorrelation test
4. heteroskedacity test

| TABLE 6. NORMALITY TEST RESULT |
|--------------------------------|
| Model | Asymp.Sig (2-tailed) | Criteria | Conclusion |
|-------|----------------------|----------|------------|
| Undstandardized Residual | 0,200 | >0,05 | normal distribution |

| TABLE 7. MULTICOLLINEARITY TEST RESULT |
|----------------------------------------|
| Variable | Tolerance | VIF | Criteria | Conclusion |
| loading and unloading time at the wharfs (HMC, QCC) | 0,958 | 1,044 | Tolerance ≥ 0,1 VIF ≤ 10 | No Multicollinearity Occurs |
| loading and unloading time in container yard (RTG, RS) | 0,956 | 1,046 | | |
Table 8. Autocorrelation Test Result

| Variable                  | Tolerance | VIF  |
|---------------------------|-----------|------|
| truck cycle time          | 0.980     | 1.020 |
| number of ganks           | 0.937     | 1.067 |

The results of data processing show that there is no autocorrelation in the regression model because the Durbin Watson (DW) value is between the Durbin Upper (DU) value and the 4-Durbin Upper (DU) value.

Table 9. Heteroscedacity Test Result

| Variable                                      | Sig. | Criteria | Conclusion                        |
|-----------------------------------------------|------|----------|-----------------------------------|
| loading and unloading time at the wharfs (HMC, QCC) | 0.761 | ≥ 0.05   | No symptoms of heteroscedasticity occur |
| loading and unloading time in container yard (RTG, RS) | 0.843 |          |                                   |
| truck cycle time                              | 0.172 |          |                                   |
| number of ganks                               | 0.666 |          |                                   |

F. Factor Analysis Result

Initial Eigenvalues indicate the factors formed. If all the factors added together indicate the number of variables (i.e. 1.231 + 1.159 + 0.872 + 0.738 = 4 variables). Whereas the Extraction Sums of Squared Loadings section shows the number of variations or the number of factors that can be formed from 4 variables, where the requirement to be a factor is the Eigenvalue value must be greater than 1. The Eigenvalue Component 1 value of 1.231 or more than 1 will be a factor of 1 and is able to explain 30.787% variation. While the Eigenvalue Component 2 value of 1.159 or more than 1 becomes a factor of 2 and is able to explain 59.752% variation.

Table 10. Factor Analysis Result

| Component | Initial Eigenvalues | Extraction Sums of Squared Loadings |
|-----------|---------------------|-------------------------------------|
|           | Total | % of Variance | Cumulative % | Total | % of Variance | Cumulative % |
| 1         | 1.231 | 30.787        | 30.787       | 1.231 | 30.787        | 30.787       |
| 2         | 1.159 | 28.966        | 59.752       | 1.159 | 28.966        | 59.752       |
| 3         | 0.872 | 21.801        | 81.554       | 0.872 | 21.801        | 81.554       |
| 4         | 0.738 | 18.446        | 100.000      | 0.738 | 18.446        | 100.000      |

The scree plot image also shows the number of factors formed, by looking at the value of component points that have an Eigenvalue> 1. From the images that have been obtained there are two component points that have an Eigenvalue> 1, it can be interpreted that there are two factors that can formed.
G. Multiple Regression Analysis Result

Based on the regression analysis results using the stepwise method, it can be seen that the loading and unloading time at wharfs or the X1 variable have a statistical influence on the regression equation model with an X1 coefficient value of 0.107 and an R2 value of 0.999. With the equation obtained, \( Y = 0.005 + 0.107 \times X1 \).

| Variable | Coefficients | R-Square | Adjusted R-Square | T Stat | Sig. t | F | Sig. F. |
|----------|--------------|----------|-------------------|--------|--------|---|--------|
| Intercept| 0.005        | 0.999    | 0.999             |        |        | 24153.364 | 0.000 |
| X1       | 0.107        |          |                   | 0.531  | 0.597  |   |         |

IV. CONCLUSIONS

The variable that has the most influence on loading and unloading productivity is the loading and unloading time at wharfs variable. The slower the loading and unloading equipment (HMC and QCC) at wharfs will decrease the loading and unloading productivity. To increase the loading and unloading process time that has an affect on loading and unloading productivity, PT. Tangguh Samudera Jaya should pay more attention to the condition of the loading and unloading equipment (QCC and HMC) especially in terms of maintenance or the company can add the equipment used so that the loading and unloading productivity can reach KPI which have been set. In addition, companies should pay attention to the human resources involved in the loading and unloading process, especially the crane operators (QCC and HMC), good human resources will make the performance better and the results of loading and unloading productivity will increase.

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