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The Effect of The Optimalization Crane and Yard Occupancy Ratio On Container Movement at JICT's Terminal in 2023

Aileen Firmaroberta Angel, Sukrenia Rahmanisa Putri, Denny J. Najoan, Chandra M. Saputra
Faculty of Management and Business, Institut Transportasi dan Logistik Trisakti,
Jakarta, Indonesia
Corresponding author: aileenangel28@gmail.com

Abstract: The use of containers in freight forwarding systems continues to grow, demanding increased efficiency in cargo handling at ports. PT. Jakarta International Container Terminal (JICT) as one of the companies that owns the largest container terminal in Indonesia, seeks to optimize the performance of Quay Container Crane (QCC) and Rubber Tyred Gantry Crane (RTGC) to improve the efficiency of *Container Movement*. *Container Movement* refers to the movement of containers from and to ships, measured by the speed of *the loading* and *unloading* process supported by the crane's performance. In addition, the Yard Occupancy Ratio (YOR), which describes the level of density in the container stacking area, is also a crucial factor in determining operational efficiency. This research was carried out quantitatively and analyzed data obtained from JICT in 2023. The purpose of the study is to identify the influence of QCC and RTGC optimization and YOR management on the efficiency of *Container Movement* in JICT terminals. The results of the research are expected to provide strategic insights for improving operational performance and container terminal management at JICT.
Keywords: *Container movement, Yard Occupancy Ratio (YOR), Quay Container Crane, Rubber Tyred Gantry Crane, Container, JICT's terminal.*

1. Introduction

Operational efficiency in the loading and unloading process at the port is the main key in increasing port productivity and competitiveness. Efforts that can be made are to optimize the performance of cranes in ports. Container Movement is a term used by the port to interpret the movement of containers from and onto the ship, calculated from the speed of loading and unloading activities supported by several loading and unloading tools, one of which is a crane. The availability and optimization of the performance of loading and unloading equipment, especially cranes, certainly has an important role in optimizing time in container movement activities. Thus, it is concluded that cranes are a crucial factor that has a very close relationship with port container movement activities.

Tanjung Priok Port is one of the busiest main ports that handles various loading and unloading activities of goods by sea, both for domestic purposes and for international

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purposes such as export-import and export of goods. Tanjung Priok Port is located in Tanjung Priok, North Jakarta with a water area of 424 ha and a land area of 604 ha. Tanjung Priok Port has several terminals operated by various companies. There are 5 export-import container service terminals at Tanjung Priok Port, including: Jakarta International Container Terminal I (JICT I), Jakarta International Container Terminal II (JICT II), Koja Container Terminal (TPK Koja), Mustika Alam Lestari (MAL) and Multi Terminal Indonesia (MTI).

Jakarta International Container Terminals I and II are terminals operated directly by PT. Jakarta International Container Terminal *(JICT).* This company has two main loading and unloading service focuses, namely supporting export and import activities*. JICT* is one of the largest and busiest container loading and unloading service companies in Indonesia with an area of 1640 m in length with a width of 26.5 m - 34.9 m and a depth of 12 m - 16 m, while the area of the stacking field is 45.5 Ha with a capacity of 39,884 Teus. To support container loading and unloading activities, JICT involves cranes as one of the loading and unloading tools, while the cranes owned by JICT are QCC and RTGC. Given the importance of the role of such equipment, optimizing crane performance is very important in improving operational efficiency in terminals. In addition, the Yard Occupancy Ratio (YOR), which describes the level of density in the container stacking area, also has an important role in determining the smooth flow of *Container Movement*. Thus, this study aims to analyze the influence of crane optimization and YOR on the efficiency of *Container Movement* at JICT Terminal in 2023.

2. Literature review

Optimization is a process that is carried out to achieve high and maximum results. In the context of container movement, optimization means ensuring that container movement runs efficiently without damaging important aspects. This process also aims to improve the quality of service. Thus, optimization in container movement focuses on efficiency and overall service improvement.

Crane is a tool used to lift goods or containers, especially for the shipping sector, cranes are equipped with mechanically operated cables, chains and steel ropes. The number of cranes used will greatly affect the volume of goods transported in a predetermined amount of time and usually this is related to the Box/Hour or BSH which is related to the term Container Movement. Quay Container Crane and Rubber Tyred Gantry are types of cranes used for loading and unloading at JCT wharf. Rubber Tyred Gantry is a crane that functions to lift and move containers using rubber wheels and machines.

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Container Movement is a term used in several ports to describe the movement of containers from and onto ships. This term includes the process of loading and unloading containers, which are measured based on their operating speed. Speed is an important indicator in assessing port efficiency. Thus, Container Movement plays a role in determining how fast and effective loading and unloading operations can be carried out.

The Yard Occupancy Ratio (YOR) is a measure that is often used in the context of planning and managing open spaces in industries or infrastructure, such as ports or storage areas. The term refers to the ratio or percentage of the total area used for storage or other activities compared to the total available area or total area planned to be used. In summary, YOR can help measure how efficiently an area is being used. For example, in the context of a port, YOR will indicate how much of the available yard area has been used to store containers or goods. (Wardhana, 2019) This ratio is important to ensure that the area is used optimally and to aid in capacity planning and space management. According to D.A Lasse, Danang Drunaanto, the 2016 Yard Occupancy Ratio is a measure of the proportion of the yard's capacity (Hold Capacity) used to the available yard's capacity (Affiat et al., 2021)

Tanjung Priok Port is one of the busiest main ports that handles various loading and unloading activities of goods by sea, both for domestic purposes and for international purposes such as export-import and export of goods. Every port in Indonesia has a terminal, including Tanjung Priok Port which has 5 export-import container service terminals, one of which is the Jakarta International Container Terminal. JICT has a crane that is used for unloading or loading containers on/onto ships. JICT is one of the port terminals operated by PT. JICT serves container loading and unloading shipping with two main services are to support export and import activities.

With this, the role of the crane in carrying out loading and unloading activities plays a very important role, with a change in the number of cranes in one loading and unloading, the volume that will be produced will automatically change, because that is why the volume of each container that is processed all depends on the number of cranes prepared or used. In addition to the role of the crane, YOR also plays a role in calculating the capacity of the container storage area, because if the ratio of the yard is not right, there will be errors in the stacking and storage process.

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Framework and Hypothesis:

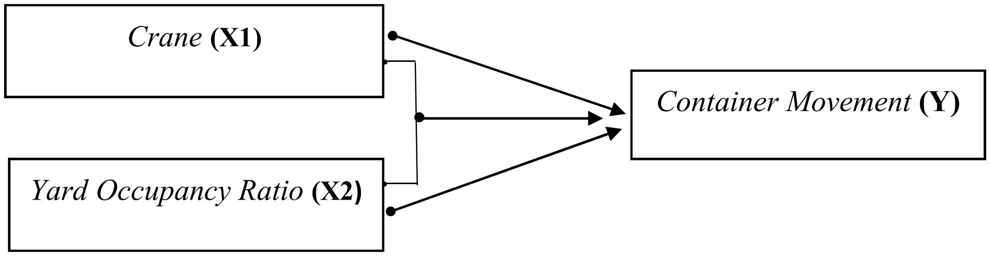

Figure 1. *Framework* and Hypothesis

Conjecture (Hypothesis):
H0 : Crane (X1) and Yard Occupancy Ratio / YOR (X2) have no relationship to Container Movement (Y)
H1 : Crane (X1) has a relationship to Container Movement (Y)
H2 : Yard Occupancy Ratio / YOR (X2) has a relationship to Container Movement (Y)
H3 : Crane (X1) and Yard Occupancy Ratio / YOR (X2) have a relationship to Container Movement (Y)

3. Research method

The research method in this study was carried out quantitatively by distributing questionnaires and analyzing data directly from PT. Jakarta International Container Terminal (JICT). The data obtained is related to container movement activities consisting of container loading and unloading activities with the number of boxes or BSH (Box Ship Hour), occupancy ratio in the container stacking field at the JICT terminal owned by PT. Jakarta International Container Terminal (JICT).

In this study, data analysis was carried out based on statistical calculations by conducting multiple linear regression and correlation analysis on the Statistical Package for the Social Sciences (SPSS) application. The multiple linear regression analysis is an analytical activity involving more than one free variable or predictor (X), the goal is to find out the influence of the free variable (X) on one bound variable (Y). Meanwhile, correlation analysis is an analysis carried out to find out how closely the relationship between the free variable (X) and the bound variable (Y) is.

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The following is an explanation table of the variables X1, X2 and Y:

Variable	Variable Concept	Indicator
Crane Optimization (X1)	Crane optimization means an increase in the efficiency and productivity of cranes in container terminal operations, including aspects such as productivity, availability, and utilization of cranes.	• Frequency of use • The effect of loading and unloading tools on the smooth process • Inventory and maintenance of loading and unloading equipment
Yard Occupancy Ratio (X2)	Will indicate how much of the available yard area has been used to store containers or goods	• The frequency of YOR efficiency in its use • Use of yard capacity
Container Movement (Y)	Container Movement means the movement of containers starting from being lifted to being lowered until leaving the port.	• Movement frequency • Generated capacity /hour • Migration flow

Table 1

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4. Results and discussion

4.1. Test Instrument

4.1.1. Validity Test

4.1.1.1. Validity Test (x1)

Correlations

		X1.1	X1.2	X1.3	X1.4	X1.5	X1.6	X1.7	X1.8	X1.9	X1.10	TOTAL_X1
X1.1	Pearson Correlation	1	.584**	.623**	.603**	.650**	.697**	.704**	.582**	.524**	.457**	.864**
	Sig. (2-tailed)		<,001	<,001	<,001	<,001	<,001	<,001	<,001	.002	.008	<,001
	N	33	33	33	33	33	33	33	33	33	33	33
X1.2	Pearson Correlation	.584**	1	.539**	.619**	.599**	.476**	.491**	.324	.391*	.181	.711**
	Sig. (2-tailed)	<,001		.001	<,001	<,001	.005	.004	.066	.025	.312	<,001
	N	33	33	33	33	33	33	33	33	33	33	33
X1.3	Pearson Correlation	.623**	.539**	1	.570**	.667**	.644**	.665**	.371*	.375*	.399*	.790**
	Sig. (2-tailed)	<,001	.001		<,001	<,001	<,001	<,001	.033	.031	.021	<,001
	N	33	33	33	33	33	33	33	33	33	33	33
X1.4	Pearson Correlation	.603**	.619**	.570**	1	.758**	.642**	.631**	.488**	.321	.477**	.823**
	Sig. (2-tailed)	<,001	<,001	<,001		<,001	<,001	<,001	.004	.069	.005	<,001
	N	33	33	33	33	33	33	33	33	33	33	33
X1.5	Pearson Correlation	.650**	.599**	.667**	.758**	1	.601**	.636**	.510**	.271	.405*	.822**
	Sig. (2-tailed)	<,001	<,001	<,001	<,001		<,001	<,001	.002	.127	.019	<,001
	N	33	33	33	33	33	33	33	33	33	33	33
X1.6	Pearson Correlation	.697**	.476**	.644**	.642**	.601**	1	.647**	.423*	.594**	.319	.811**
	Sig. (2-tailed)	<,001	.005	<,001	<,001	<,001		<,001	.014	<,001	.070	<,001
	N	33	33	33	33	33	33	33	33	33	33	33
X1.7	Pearson Correlation	.704**	.491**	.665**	.631**	.636**	.647**	1	.274	.381*	.324	.791**
	Sig. (2-tailed)	<,001	.004	<,001	<,001	<,001	<,001		.122	.029	.066	<,001
	N	33	33	33	33	33	33	33	33	33	33	33
X1.8	Pearson Correlation	.582**	.324	.371*	.488**	.510**	.423*	.274	1	.398*	.685**	.653**
	Sig. (2-tailed)	<,001	.066	.033	.004	.002	.014	.122		.022	<,001	<,001
	N	33	33	33	33	33	33	33	33	33	33	33
X1.9	Pearson Correlation	.524**	.391*	.375*	.321	.271	.594**	.381*	.398*	1	.340	.605**
	Sig. (2-tailed)	.002	.025	.031	.069	.127	<,001	.029	.022		.053	<,001
	N	33	33	33	33	33	33	33	33	33	33	33
X1.10	Pearson Correlation	.457**	.181	.399*	.477**	.405*	.319	.324	.685**	.340	1	.588**
	Sig. (2-tailed)	.008	.312	.021	.005	.019	.070	.066	<,001	.053		<,001
	N	33	33	33	33	33	33	33	33	33	33	33
TOTAL_X1	Pearson Correlation	.864**	.711**	.790**	.823**	.822**	.811**	.791**	.653**	.605**	.588**	1
	Sig. (2-tailed)	<,001	<,001	<,001	<,001	<,001	<,001	<,001	<,001	<,001	<,001	
	N	33	33	33	33	33	33	33	33	33	33	33

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

Table 2.1 Validity Test Results X1 (Processed using SPSS)

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4.1.1.2. X2 Validity Test

Correlations

		X2.1	X2.2	X2.3	X2.4	X2.5	X2.6	X2.7	X2.8	X2.9	X2.10	TOTAL_X2
X2.1	Pearson Correlation	1	.624**	.632**	.767**	.639**	.415*	.407*	.382*	.644**	.460**	.789**
	Sig. (2-tailed)		<,001	<,001	<,001	<,001	.016	.019	.028	<,001	.007	<,001
	N	33	33	33	33	33	33	33	33	33	33	33
X2.2	Pearson Correlation	.624**	1	.467**	.591**	.697**	.325	.427*	.301	.695**	.389*	.730**
	Sig. (2-tailed)	<,001		.006	<,001	<,001	.065	.013	.089	<,001	.025	<,001
	N	33	33	33	33	33	33	33	33	33	33	33
X2.3	Pearson Correlation	.632**	.467**	1	.592**	.504**	.552**	.568**	.618**	.683**	.377*	.816**
	Sig. (2-tailed)	<,001	.006		<,001	.003	<,001	<,001	<,001	<,001	.031	<,001
	N	33	33	33	33	33	33	33	33	33	33	33
X2.4	Pearson Correlation	.767**	.591**	.592**	1	.596**	.448**	.491**	.386*	.650**	.510**	.799**
	Sig. (2-tailed)	<,001	<,001	<,001		<,001	.009	.004	.027	<,001	.002	<,001
	N	33	33	33	33	33	33	33	33	33	33	33
X2.5	Pearson Correlation	.639**	.697**	.504**	.596**	1	.299	.361*	.434*	.641**	.403*	.742**
	Sig. (2-tailed)	<,001	<,001	.003	<,001		.091	.039	.012	<,001	.020	<,001
	N	33	33	33	33	33	33	33	33	33	33	33
X2.6	Pearson Correlation	.415*	.325	.552**	.448**	.299	1	.573**	.585**	.300	.194	.664**
	Sig. (2-tailed)	.016	.065	<,001	.009	.091		<,001	<,001	.090	.280	<,001
	N	33	33	33	33	33	33	33	33	33	33	33
X2.7	Pearson Correlation	.407*	.427*	.568**	.491**	.361*	.573**	1	.525**	.607**	.360*	.736**
	Sig. (2-tailed)	.019	.013	<,001	.004	.039	<,001		.002	<,001	.040	<,001
	N	33	33	33	33	33	33	33	33	33	33	33
X2.8	Pearson Correlation	.382*	.301	.618**	.386*	.434*	.585**	.525**	1	.350*	.331	.698**
	Sig. (2-tailed)	.028	.089	<,001	.027	.012	<,001	.002		.046	.060	<,001
	N	33	33	33	33	33	33	33	33	33	33	33
X2.9	Pearson Correlation	.644**	.695**	.683**	.650**	.641**	.300	.607**	.350*	1	.556**	.813**
	Sig. (2-tailed)	<,001	<,001	<,001	<,001	<,001	.090	<,001	.046		<,001	<,001
	N	33	33	33	33	33	33	33	33	33	33	33
X2.10	Pearson Correlation	.460**	.389*	.377*	.510**	.403*	.194	.360*	.331	.556**	1	.598**
	Sig. (2-tailed)	.007	.025	.031	.002	.020	.280	.040	.060	<,001		<,001
	N	33	33	33	33	33	33	33	33	33	33	33
TOTAL_X2	Pearson Correlation	.789**	.730**	.816**	.799**	.742**	.664**	.736**	.698**	.813**	.598**	1
	Sig. (2-tailed)	<,001	<,001	<,001	<,001	<,001	<,001	<,001	<,001	<,001	<,001	
	N	33	33	33	33	33	33	33	33	33	33	33

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

Table 2.2 Validity Test Results X2 (Processed using SPSS)

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4.1.1.3. Y Validity Test

Correlations

		Y1	Y2	Y3	Y4	Y5	Y6	Y7	Y8	Y9	Y10	TOTAL_Y
Y1	Pearson Correlation	1	.545**	.573**	.629**	.573**	.749**	.699**	.570**	.458**	.577**	.777**
	Sig. (2-tailed)		.001	<,001	<,001	<,001	<,001	<,001	<,001	.007	<,001	<,001
	N	33	33	33	33	33	33	33	33	33	33	33
Y2	Pearson Correlation	.545**	1	.596**	.571**	.721**	.661**	.643**	.625**	.761**	.534**	.806**
	Sig. (2-tailed)	.001		<,001	<,001	<,001	<,001	<,001	<,001	<,001	.001	<,001
	N	33	33	33	33	33	33	33	33	33	33	33
Y3	Pearson Correlation	.573**	.596**	1	.634**	.504**	.670**	.659**	.647**	.535**	.807**	.813**
	Sig. (2-tailed)	<,001	<,001		<,001	.003	<,001	<,001	<,001	.001	<,001	<,001
	N	33	33	33	33	33	33	33	33	33	33	33
Y4	Pearson Correlation	.629**	.571**	.634**	1	.597**	.619**	.725**	.697**	.572**	.721**	.826**
	Sig. (2-tailed)	<,001	<,001	<,001		<,001	<,001	<,001	<,001	<,001	<,001	<,001
	N	33	33	33	33	33	33	33	33	33	33	33
Y5	Pearson Correlation	.573**	.721**	.504**	.597**	1	.633**	.774**	.686**	.681**	.549**	.818**
	Sig. (2-tailed)	<,001	<,001	.003	<,001		<,001	<,001	<,001	<,001	<,001	<,001
	N	33	33	33	33	33	33	33	33	33	33	33
Y6	Pearson Correlation	.749**	.661**	.670**	.619**	.633**	1	.684**	.631**	.630**	.703**	.853**
	Sig. (2-tailed)	<,001	<,001	<,001	<,001	<,001		<,001	<,001	<,001	<,001	<,001
	N	33	33	33	33	33	33	33	33	33	33	33
Y7	Pearson Correlation	.699**	.643**	.659**	.725**	.774**	.684**	1	.783**	.695**	.592**	.883**
	Sig. (2-tailed)	<,001	<,001	<,001	<,001	<,001	<,001		<,001	<,001	<,001	<,001
	N	33	33	33	33	33	33	33	33	33	33	33
Y8	Pearson Correlation	.570**	.625**	.647**	.697**	.686**	.631**	.783**	1	.578**	.608**	.830**
	Sig. (2-tailed)	<,001	<,001	<,001	<,001	<,001	<,001	<,001		<,001	<,001	<,001
	N	33	33	33	33	33	33	33	33	33	33	33
Y9	Pearson Correlation	.458**	.761**	.535**	.572**	.681**	.630**	.695**	.578**	1	.499**	.779**
	Sig. (2-tailed)	.007	<,001	.001	<,001	<,001	<,001	<,001	<,001		.003	<,001
	N	33	33	33	33	33	33	33	33	33	33	33
Y10	Pearson Correlation	.577**	.534**	.807**	.721**	.549**	.703**	.592**	.608**	.499**	1	.813**
	Sig. (2-tailed)	<,001	.001	<,001	<,001	<,001	<,001	<,001	<,001	.003		<,001
	N	33	33	33	33	33	33	33	33	33	33	33
TOTAL_Y	Pearson Correlation	.777**	.806**	.813**	.826**	.818**	.853**	.883**	.830**	.779**	.813**	1
	Sig. (2-tailed)	<,001	<,001	<,001	<,001	<,001	<,001	<,001	<,001	<,001	<,001	
	N	33	33	33	33	33	33	33	33	33	33	33

**. Correlation is significant at the 0.01 level (2-tailed).

Table 2.3 Y Validity Test Results (Processed using SPSS)

Validity test testing criteria

a) If the significant value < 0.05, it can be said to be valid.
b) If the significance value > 0.05, it can be said that the data **is invalid** .
c) If R counts > R table, it can be concluded that the data is valid.
d) If R counts < R table, it can be concluded that the data **is invalid** .

<u>Validity test conclusion:</u>

From the data, it is concluded that the validity test value per variable x1,x2,y < 0.05, then it can be concluded that the data is valid,
And it is fairly valid by looking at the R value of x1,x2 and y > r table. N = 33 with a table R value of 0.3440.

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Reliability Test

4.1.2.1. X1 Reliability Test

Reliability Statistics

Cronbach's Alpha	N of Items
.912	10

Table 3.1 Reliability Test Result X1 (Processed using SPSS)

4.1.2.2. X2 Reliability Test

Reliability Statistics

Cronbach's Alpha	N of Items
.902	10

Table 3.2 X2 Reliability Test Results (Processed using SPSS)

4.1.2.3. Y Reliability Test

Reliability Statistics

Cronbach's Alpha	N of Items
.945	10

Table 3.3 Reliability Test Results Y (Processed using SPSS)

<u>Reliability test notes:</u>
Generally, the criterion value of the Cronbach's alpha value test is 0.60.
<u>Reliability test conclusion:</u>
From the results of the reliability test above:

a) The alpha value of Cronbach X1 (Crane) is 0.912.
b) The alpha value of Cronbach X2 (Yard Occupancy Ratio) is 0.902.
c) The alpha value of Cronbach Y (Container Movement) is 0.945.

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4.2. Classical Assumption Test

4.2.1. Normality Test

One-Sample Kolmogorov-Smirnov Test

			Unstandardized Residual
N			33
Normal Parameters[a,b]	Mean		.0000000
	Std. Deviation		3.04407794
Most Extreme Differences	Absolute		.153
	Positive		.153
	Negative		-.089
Test Statistic			.153
Asymp. Sig. (2-tailed)			.047[c]
Monte Carlo Sig. (2-tailed)	Sig.		.386[d]
	99% Confidence Interval	Lower Bound	.373
		Upper Bound	.398

a. Test distribution is Normal.

b. Calculated from data.

c. Lilliefors Significance Correction.

d. Based on 10000 sampled tables with starting seed 2000000.

Table 4.1 Results of the Classical Assumption Normality Test (Processed using

Normality test test criteria:

a) If the significant value > 0.05, then the residual value of the data is distributed normally.
b) If the significant value < 0.05, then the residual value of the data **is not** distributed normally.

Normality test conclusion:

From the above results, it can be seen that the normality test has a significance value by the Monte Carlo method of 0.386 so that it can be concluded that the data is distributed normally.

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4.2.2. Multicollinearity Test

Coefficients[a]

Model		Collinearity Statistics Tolerance	VIF
1	X1	.182	5.497
	X2	.182	5.497

a. Dependent Variable: Y

Table 4.2 Results of the Classic Assumption Multicollinearity Test (Processed using SPSS)

Multicollinearity test test criteria:

a) If the Tolerance value < 0.10 and VIF > 10, multicollinearity occurs.
b) If the Tolerance value > 0.10 and the VIF < 10, then **multicollinearity** does not occur.

Conclusion of the multicollinearity test :

From the above results, it can be seen that the multicollinearity test has a tolerance value of > 0.10, which is 0.182 with a VIF < 10, which is 5.497.

4.2.3. Heteroscedasticity Test

Coefficients[a]

Model		Unstandardized Coefficients B	Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	7.627	2.194		3.477	.002
	X1	-.024	.117	-.080	-.207	.837
	X2	-.111	.124	-.345	-.889	.381

a. Dependent Variable: ABS_RES

Table 4.3 Results of Classical Assumption Heteroscedasticity Test (Processed using SPSS)

Heteroscedasticity test test criteria:

a) If the significance value > 0.05, then heteroscedasticity does not occur.
b) If the significance value < 0.05, then heteroscedasticity occurs.

Heteroscedasticity test conclusion :

From the above results, it can be seen that the heteroscedasticity test has a significance value of X > 0.05, which is X1 = 0.837 and X2 = 0.381.

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4.3. Regression Analysis Test

The regression data analysis technique aims to determine the relationship between independent variables and bound variables in a regression model and determine whether the variables are significantly related.

4.3.1. Test T

Coefficients[a]

Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	2.294	3.463		.662	.513
	X1	.945	.185	.903	5.120	<,001
	X2	.010	.196	.009	.050	.960

a. Dependent Variable: Y

Table 5.1 Results of Classical Assumption T-Test Analysis (Processed

Test Criteria T-Test:

a) If the value of sig < 0.05 and the value of T calculated > T of the table, it can be concluded that there is an influence of the free variable (X) on the bound variable Y or the hypothesis is acceptable.
b) If the value of sig > 0.05 and the value of T is calculated < T of the table, it can be concluded that **there is no** influence of the free variable (X) on the bound variable Y or the hypothesis is rejected.

<u>From the above data, it can be concluded that:</u>

- X1 partially has a significant influence on the Y variable and the hypothesis is accepted because of the value of sig. 0.001 < 0.05 and the T value is calculated 5.120 > T table 2.042.
- X2 partially has no significant influence on the Y variable and the hypothesis is rejected because of the value of sig. 0.960 > 0.05 and the T value is 0.50 < T table 2.042.

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4.3.2. Test F

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	1449.717	2	724.859	73.335	<,001[b]
	Residual	296.525	30	9.884		
	Total	1746.242	32			

a. Dependent Variable: Y

b. Predictors: (Constant), X2, X1

Table 5.2 Results of Analysis of Classical Assumption F Test (Processed

Test F test criteria:

a) If the sig value < 0.05 and the F value is calculated > F table, it can be concluded that there is an influence of the free variable (X) on the bound variable Y or the hypothesis is acceptable.
b) If the sig value > 0.05 and the F value is calculated < F table, it can be concluded that **there is no** influence of the free variable (X) on the bound variable Y or the hypothesis is rejected.

<u>From the above data, it can be concluded that:</u>

X1 and X2 partially have a significant influence on the Y variable and the hypothesis is accepted because of the value of sig. 0.001 < 0.05 and the T value is 73.335 > T table 2.042.

4.3.3. Determination Test

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.911[a]	.830	.819	3.144

a. Predictors: (Constant), X2, X1

Table 5.3 Results of Analysis of Classical Assumption Determination Test (Processed

<u>From the above data, it can be concluded that:</u>

Variable X1 and Variable X2 simultaneously (Together) had an effect on Variable Y by 81.90%. While the rest are influenced by other variables outside the regression equation above.

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4.4. JICT Company Supporting Data

Tabel 6. Tabulasi data Crane, Yard Occupancy Ratio and Container Movement per tahun 2023

Moon	Crane Productivity	Yard Occupancy Ratio (YOR)	Container Movement
	(Box)	(Percentage)	(Day)
JANUARY	4524,52	51.48 %	3,31
FEBRUARY	3464,14	42.63 %	2,91
MARCH	4635,56	47.26 %	2,91
APRIL	3981,83	47.79 %	3,7
MAY	4479,71	42.95 %	3,28
JUNE	4314,22	47.97 %	3,32
JULY	4930,17	48.75 %	3,05
AUGUST'	4834,62	43.16 %	3,09
SEPTEMBER	5007,72	44.44 %	3,06
OCTOBER	5086,81	51.39 %	3,15
NOVEMBER	5509,14	53.07 %	3,13
DECEMBER	5426,59	45.32 %	3,59

Source : JICT Data, 2023

5. Conclusion

This study was carried out to find out and identify whether there is a relationship between variable X1, namely cranes at JICT terminals (such as Quay Container Cranes and Rubber Tyred Gantry) and variable X2, namely Yard Occupancy Ratio (YOR) to variable Y, namely container movement activities at JICT Terminal. Through a quantitative approach and various analyses, we successfully identified and proved that the X1 (Crane) variable X1 partially has a significant influence on the Y variable and the hypothesis accepted. While X2 (Yard Occupancy Ratio / YOR) partially has no significant influence on the Y variable and the hypothesis is rejected. However, simultaneously the significant value of the two X variables affects the Y variable with a percentage rate of 81.90%. Thus, it can be concluded that the existence of these two variables can certainly optimize the performance of container movement, it can be emphasized that the terminal must pay attention to the two aspects above such as routine maintenance and efficient and effective field management in order to produce optimal results in container movement activities.

6. Implications

6.1. Practical Implications: This study shows that improving the quality of loading and unloading cranes such as Quay Container Cranes and Rubber Tyred Gantries Cranes is essential for the productivity of container movement in JICT terminals. In addition, the proper and good use of YOR can also help to optimize container movement.

6.2. Theoretical Implications: This study will increase knowledge about the relationship of the two variables to Container Movement activities, and from this study supports the theory that existing infrastructure and storage facilities or container stacking (yards) are the main key to achieving the productivity of loading and unloading activities, and can confirm that the involvement of technology for YOR calculations and for the smooth operation of loading and unloading equipment will also affect the movement Container.

6.3. Application and Impact: The results of this research can be used by the parties concerned to improve things that are less than optimal in their implementation, and can also be used to plan and design a strategy in order to produce a good performance or a result that is optimal and effective.

7. Research limitations

With the research limitations, this study has its limitations, First, the number of respondents we got was a saturated sample where we used 31 respondents. Second, the small sample size results in us not being able to find many results. Third, the data we obtained may be less accurate or less optimal because the scope of the research we took was too small to adjust to the existing population. So, with other studies, it is recommended to determine the external and internal factors so that they can be realized properly and optimally in the future and can plan a good strategy for a long period of time.

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