The Influence of Storage Layout and Material Handling Equipment on Distribution Timeliness in Cross-Docking Operations at PT. Serasi Logistics Indonesia

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ARTICLE INFO

Article history:
Received : January 13,2025
Revised : March 15, 2025
Accepted : March 20, 2025

Keywords:
Storage Layout;
Material Handling ;
Equipment;
Distribution Timeliness;

ABSTRACT

This study aims to analyze the influence of storage layout and the use of material handling equipment on the timeliness of distribution in the Crossdocking hub warehouse of PT. Serasi Logistics Indonesia. The main problem faced is inefficiency in the arrangement of the placement of goods and the handling of material equipment which causes delays in delivery, especially in the outbound process. Using a survey-based quantitative method, data was collected through a questionnaire involving respondents related to warehouse operations. Data analysis was carried out by multiple linear regression, t-test for partial significance, F-test for model significance, and determination coefficient (R^2) to measure the relationship between independent variables (storage layout and material handling equipment) and dependent variables (distribution timeliness). The results show that the storage layout and material handling equipment significantly affect the timeliness of distribution, both partially and simultaneously, with a strong contribution to distribution efficiency. The implications of this study highlight the importance of optimizing warehouse layouts and the use of more efficient material handling equipment in improving logistics performance, which can also be a reference for other Crossdocking warehouses.

1. INTRODUCTION

The rapid development of industry, supported by technological advances, has led to the increasing complexity of problems in the manufacturing sector. One issue that often arises is related to the layout of the finished product warehouse. Warehouse is a place to store goods, both raw materials to be processed and final products. In the manufacturing industry, managing the layout of the finished product warehouse is often a challenge. If the layout is not well designed, then the process of moving goods in and out can experience obstacles, especially if it does not consider the available storage capacity. Therefore, optimal management of the finished product warehouse is expected to reduce potential company losses, reduce operational costs, and increase efficiency in the distribution and service process of goods.

Material handling equipment is equipment used to organize the movement, storage, control, and protection of goods during the process in the warehouse (Vrerick, 2017). PT Serasi Logistics Indonesia (SELOG) is a company engaged in logistics services and one of its core businesses is warehouse operations and distribution in the automotive sector. In 2014, PT Astra Honda Motor (AHM) experienced several problems with the management of raw material warehouses for assembly production at plant 4 and plant 5 Karawang due to the distance of the supplier's factory location far enough to make deliveries and the issue of heavy traffic in the Cikampek area. For this , PT AHM entrusts PT Serasi Logistics Indonesia (SELOG) to carry out warehouse handling and distribution as a HUB Crossdocking warehouse. And for this research was conducted at the AHM Crossdocking Hub warehouse located in the Indonesia China Integrated Industrial Zone in Cikarang, the center of Bekasi Regency. This warehouse supports production at plant 4 and plant 5 AHM in Karawang. The incoming and outgoing process at the AHM Crossdocking Hub warehouse is carried out using hand pallets or

Majalah Ilmiah Bijak Vol 22 , No. 1, Maret 2025, pp. 74 - 88
E ISSN 2621-749X **doi.org/10.31334/bijak.v21i1. 4445**

forklifts, depending on the weight, volume, and type of goods. Storage of goods in this warehouse does not use shelves, but utilizes pallets as a medium for storing spare part boxes.

The problems that occur in the Crossdocking Hub warehouse include the placement of spare part boxes on pallets that are still not neat, as well as the irregular arrangement of goods. In addition, there are errors in the allocation of storage areas, where one area should only contain one type of item, but there is still mixing with other items. This increases the risk of items being switched or tucked away, hindering work efficiency. As a result, passageways for hand pallets or forklifts become narrow, causing difficulties in storing and retrieving goods. This condition slows down the warehouse's operational process, especially in finding spare parts, which leads to delays in the outgoing process. This can potentially cause delays in the delivery of goods, and can even cause a production stop line at PT AHM. Loading and unloading activities when goods arrive from suppliers are also hampered because they have to tidy up and prepare pallets and wrapping and space for newly arrived goods, so that the accumulation of goods with different types of goods in the same location is also one of the obstacles that must be fixed. The following is data on the achievement of KPIs in the Crossdocking warehouse hub in 2024.

Table 1. KPI achievement at the warehouse hub crossdocking in 2024

KPI	Area	Target	Uom	Month 2024								Avg	Gap	Result
				Jan	Feb	Mar	Apr	Mei	Jun	Jul	Agu			
Incoming	Unloading	40	menit/truck	40	38	40	39	39	38	39	38	38.9	1,2	OK
	Quality Inspection	30	menit/truck	28	25	29	27	27	28	28	28	27.5	2,7	OK
	Binning	30	menit/truck	31	30	32	30	30	32	31	31	30.9	-0,9	Not OK
	Claim	10	Case	0	1	0	0	1	0	0	0	0.3	9,8	OK
Outgoing	Picking	30	menit/trip	32	31	33	30	31	30	31	30	31.0	-1,0	Not OK
	Quality Control	30	menit/trip	31	30	30	29	30	28	29	28	29.4	0,6	OK
	Loading	40	menit/trip	38	39	38	39	37	37	38	39	38.1	2,0	OK
	Delivery	180	menit/trip	182	178	181	179	180	178	180	178	179.5	1,8	OK
	Claim	10	Case	1	0	1	1	0	1	0	0	0.5	9,6	OK

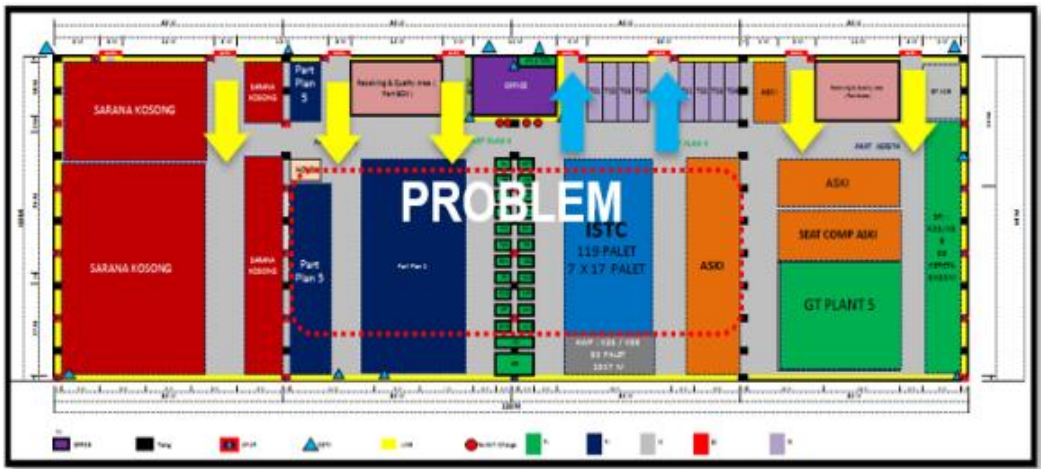

Figure 1. Layout of warehouse hub crossdocking AHM 2024

Scope of Research

Distribution timeliness can be influenced by many factors such as storage layout, work productivity, service quality, environmental quality, quality of work equipment. Based on the background described by the researcher above, the researcher limits it to discussing only the effect of storage layout and material handling equipment on the timeliness of distribution at the warehouse hub Crossdocking PT. Serasi Logistics Indonesia in cikarang.

Problem Formulation

How big is the effect of storage layout on the timeliness of distribution, How big is the effect of material handling equipment on the timeliness of distribution, How big is the effect of storage layout and material handling equipment together on the timeliness of distribution. Based on the background that has been explained, the author will raise a research topic with the title: "The Influence Of Storage Layout And Material Handling Equipment On Distribution Timeliness In Crossdocking Operations At Pt. Serasi Logistics Indonesia".

Research Objectives

1. To measure the extent to which the storage layout affects the timeliness of distribution,
2. To determine how much influence material handling equipment has on the timeliness of distribution,
3. To identify the effect of a combination of storage layout and material handling equipment together on the timeliness of distribution.

Previous Research

Researcher name	**Anisa Utami, Vicky F. Sanjaya**
Research Title	The effect of warehouse layout on the smooth distribution of goods to consumers at the Alfamart Kotabumi branch office
Journal Name	Journal of Widya Mataram University
Journal Address	https://www.ejournal.widyamataram.ac.id/index.php/jmae/article /view/513/312
Research Results	Hypothesis testing for the warehouse layout variable shows that the significance value of the t statistic is greater than the t table value, namely 9.171> 1.99300, and the level of significance value (P Value) is smaller than the tolerance limit of 0.000 <0.05. This means that the warehouse layout variable has a positive and significant effect on the smooth distribution of goods to consumers.
Researcher name	**Tiffany Dwi Januarny, Cundo Harimurti**
Research Title	The effect of warehouse layout on the smooth productivity of loading and unloading in the pt warehouse. Nct
Journal Name	Journal of Indonesian Logistics
Journal Address	www.ejournal.widyamataram.ac.id/index.php/jmae/article
Research Results	The results of the analysis show that the warehouse layout has a positive and significant effect on loading and unloading productivity in the warehouse.

2. LITERATURE REVIEW

Logistics Management

According to Martono (2015: 2) concluded that logistics management which later developed into Supply Chain Management (SCM) is an integrated system that coordinates the entire process in an organization or company in preparing and delivering products or services to consumers.

Storage layout

Storage layout is the arrangement of space in a warehouse or storage facility to optimize the use of space and facilitate access to materials. A good layout can affect the efficiency of the distribution process, because the location of easily accessible goods can speed up the picking and shipping process. According to Heizer and Render (2009), layout is a strategic decision that impacts overall operational efficiency. Some of the dimensions used to determine a good layout or space planning include:

Majalah Ilmiah Bijak Vol 22 , No. 1, Maret 2025, pp. 74 - 88
E ISSN 2621-749X **doi.org/10.31334/bijak.v21i1. 4445**

a. Equipment and material handling.
b. Capacity and space requirements.
c. Environment and beauty.
d. Information flow

Material handling

Material handling equipment (MHE) includes all equipment used to move, lift and manage materials in a warehouse or distribution facility. Proper selection and use of MHE can improve speed and accuracy in the material delivery process. According to Groover (2007), material handling is defined as "an activity associated with moving, storing, controlling, and protecting materials in the industrial process, from the procurement of raw materials to the distribution of finished products, Groover (2007) states that efficient MHE can reduce material transfer time, increase productivity, and reduce errors and the risk of material damage during handling. Effect of Material handling equipment on Distribution Timeliness (Y):

a. The use of the right MHE (e.g., forklifts, conveyors, pallets or Automated Guided Vehicles - AGVs) can speed up the process of moving materials, so that distribution can be done on time.
b. Selection of inappropriate or less efficient MHE will hinder the speed of the material handling process, causing distribution delays.

Distribution timeliness

Distribution timeliness refers to the company's ability to deliver goods or products according to a predetermined schedule. This is an important factor in the supply chain, because distribution timeliness affects customer satisfaction and operating efficiency. According to Eviani and Hidayat (2021), delivery timeliness is very important and has a positive effect on customer satisfaction. This shows that the time discipline applied by the company greatly affects the company's image. The more punctual the company is in fulfilling the promise of delivering goods, the better the company's image, because customers feel satisfied and have more confidence in the services provided.

Hypothesis I

H0: Storage layout has no effect on distribution timeliness

H1: Storage layout affects distribution timeliness

Hypothesis II

H0: Material handling equipment has no effect on distribution timeliness

H1: Material handling equipment affects distribution timeliness

Hypothesis III

H0: Storage layout and material handling equipment have no effect on the timeliness of distribution.

H1: Storage layout and material handling equipment affect the timeliness of distribution.

3. METHOD

The method used in this research is quantitative method with correlational research type is a variety of research that focuses on analyzing the relationship between variables. In this study using primary data, namely data obtained from a sample of the research population, then analyzed in accordance with the statistical methods used. Quantitative research methods are used to test populations or samples using measuring instruments or research, quantitative or statistical data analysis to test the hypotheses made. In this study data and information were collected from respondents using a questionnaire. After the data is obtained, the results will be explained in perspective at the end of the study will be analyzed to test the hypothesis proposed at the beginning of this study.

Data Collection Technique

According to Ridwan (2010: 51) Data collection techniques are techniques or ways that researchers can use to collect data. Obtained through surveys and field observations. Field survey, namely by giving questionnaires to respondents. The questionnaire consists of certain questions, namely questions that have been given alternative answers, so that respondents are not given freedom in answering them.

Questionnaire

According to Sugiyono (2012: 93) the Likert scale is a scale used to measure the attitudes, opinions and perceptions of a person or group of people about social phenomena. For each answer choice is given a score, then the respondent must describe, support the statement (positive) or not support the statement (negative).

Observation

According to Riyanto (2010: 96) "observation is a data collection method that uses direct or indirect observation". In using this Likert scale, respondents are asked to strongly agree, agree, neutral, disagree, and strongly disagree on each question, Likert scales usually use five points with a neutral table in the middle position. The use of this scale instrument can be done by placing a cross in the column provided for each question. The variables of this study are the independent variables of storage layout and material handling equipment, and the dependent variable is the timeliness of delivery. Data were analyzed using multiple linear regression. Data were collected using a questionnaire.

Population

According to Sugiyono (2016: 135) population is a generalization area consisting of objects / subjects that have certain quantities and characteristics that researchers determine to study and then make conclusions. The population in this study were employees of the Warehouse Hub Crossdocking PT. Serasi Logistics Indonesia located in central Cikarang, with a population of 42 employees in the Warehouse.

Sample

Saturated sample, where all the population in this study is sampled. Saturated Samples According to Sugiyono (2019) Samples are part of the number and characteristics of the population. If the population is large, and it is not possible for researchers to study everything in the population, for example due to limited funds, energy and time, then researchers can use samples taken from that population. Therefore, the sample taken from the population must be truly representative or representative. In this study, the population and saturated samples taken were all employees of the warehouse hub crossdocking PT Serasi Logistics Indonesia, whose population was 42 samples. According to Sugiyono (2019) Saturated Sampling is a sample selection technique if all members of the population are sampled.

Questionnaire Data

No	Nama	Gender	Usia	Pendidikan	Tata Letak Penyimpanan (X1)								Total	Material Handling Equipment (X2)								Total	Ketepatan Waktu Distribusi (Y)										Total
					P1	P2	P3	P4	P5	P6	P7	P8	X1	P1	P2	P3	P4	P5	P6	P7	P8	X2	P1	P2	P3	P4	P5	P6	P7	P8	P9	P10	Y
1	MUDLOFARUDDIN	Pria	38	SMK	4	3	4	3	3	4	4	3	28	3	3	3	3	4	3	3	3	25	3	3	3	4	3	4	3	4	3	33
2	BRISTAM ENDI JAMBORE	Pria	34	SMK	4	4	4	4	3	4	4	4	31	3	4	4	3	4	4	4	4	30	4	3	4	4	3	4	4	4	4	38
3	ANDI NAUFAL PRIBADI	Pria	39	S1	4	4	4	4	4	4	4	4	32	4	4	4	3	4	4	4	4	31	4	3	4	4	4	4	4	4	4	39
4	PUTRA ANUGRAH SUNARYA	Pria	29	S1	4	3	4	4	4	4	4	4	31	4	4	4	4	4	3	3	4	30	4	4	3	4	4	4	4	3	4	38
5	SAHRONI	Pria	41	S1	4	3	4	3	4	4	4	3	29	4	3	3	3	4	3	3	3	26	3	3	3	4	4	4	3	3	4	34
6	DIDIT ALAMSYAH	Pria	27	S1	4	4	4	4	3	4	4	3	30	4	3	4	4	4	4	4	4	31	3	4	4	4	3	4	4	4	4	38
7	ACHMAD MUSOVIE	Pria	28	SMK	3	3	3	4	4	3	3	3	26	4	3	4	4	3	3	3	4	28	3	4	3	3	4	3	4	3	3	34
8	CAROLUS JEFRIANUS KAY SERAN	Pria	29	D3	4	3	4	4	3	3	4	3	28	4	3	4	4	4	3	3	4	29	3	4	3	4	3	3	4	3	4	35
9	JUNAIDI	Pria	29	D3	4	4	4	3	3	4	4	4	30	4	4	3	4	4	4	4	3	30	4	4	4	4	3	4	3	4	4	37
10	MURTADO	Pria	31	SMK	4	4	3	4	3	4	4	3	29	4	3	4	4	4	4	4	4	31	3	4	4	4	3	4	4	4	4	38
11	SUGENG RIYADI	Pria	30	SMK	3	4	4	4	4	4	3	4	30	4	4	4	3	3	4	4	4	30	4	3	4	3	4	4	4	4	3	37
12	AJAS KUSNADI	Pria	31	SMK	4	4	4	4	3	4	4	4	31	4	4	4	4	4	4	4	4	32	4	4	4	4	3	4	4	4	4	39
13	FAHMI NUR YAHYA	Pria	28	SMK	3	4	4	4	4	4	3	4	30	4	4	4	4	4	3	4	4	31	4	4	4	4	3	4	4	4	3	38
14	TRIHADI NURYONO	Pria	30	SMK	4	4	4	4	4	4	4	4	32	3	4	4	4	4	4	4	4	31	4	4	4	4	4	4	4	4	4	40
15	SUYATMAN	Pria	25	SMK	4	3	3	4	4	4	4	4	30	4	4	4	4	4	3	3	4	30	4	4	3	4	4	4	3	4	4	38
16	NUR APRIYANTO	Pria	29	SMA	4	4	4	4	4	4	4	4	32	4	4	4	4	4	4	4	4	32	4	4	4	4	4	4	4	4	4	40
17	HERI PRIYANTO	Pria	32	SMK	4	4	4	4	4	4	4	3	31	3	3	4	4	4	4	4	4	30	3	4	4	4	4	4	4	4	4	39
18	HADIAN WAHAB PERMANA	Pria	34	SMA	4	3	4	4	4	4	4	4	31	4	4	4	4	4	3	3	4	30	4	4	3	4	4	4	4	3	4	38
19	MARASIH SIMBOLON	Pria	27	SMK	4	4	4	4	4	4	4	3	31	4	3	4	4	4	4	4	4	31	3	4	4	4	4	4	4	4	4	39
20	ADMAN	Pria	37	SMK	3	3	4	4	4	3	4	4	29	4	4	4	3	3	3	3	4	28	4	3	3	3	4	4	4	3	3	35
21	TEGUH TRI WIBOWO	Pria	29	D3	4	4	4	4	4	4	4	4	32	4	4	4	4	4	4	4	4	32	4	4	4	4	4	4	4	4	4	40
22	DARMO	Pria	28	SMA	3	4	4	4	4	3	4	4	30	4	4	4	3	3	4	4	4	30	4	3	4	3	4	4	4	4	3	37
23	ESA PRINGADI	Pria	27	SMA	3	3	4	3	3	3	3	3	25	3	3	3	3	3	3	3	3	24	3	3	3	3	3	3	3	3	3	30
24	DENI FEBRIANSYAH	Pria	29	SMA	4	4	4	4	4	4	4	4	32	4	4	4	4	4	4	4	4	32	4	4	4	4	4	4	4	4	4	40
25	EKO BUDI HERWANTO	Pria	30	SMK	4	4	3	4	4	3	4	3	29	4	3	4	4	4	4	4	4	31	3	4	4	4	4	3	4	4	4	38
26	M. HADI YUSMAN	Pria	32	SMK	4	4	4	4	4	4	4	4	32	4	4	4	4	4	4	4	4	32	4	4	4	4	4	4	4	4	4	40
27	AHMAD MAULANA	Pria	28	SMA	4	4	4	4	3	4	4	4	31	4	4	4	4	4	4	4	4	32	4	4	4	4	3	4	4	4	4	39
28	ARIF SETIAWAN	Pria	30	SMA	4	4	4	4	3	3	4	4	30	4	4	4	4	4	4	4	4	32	4	4	4	4	3	3	4	4	4	38
29	OKI YANTO	Pria	32	SMA	4	4	4	4	4	4	4	4	32	4	4	4	4	4	4	4	4	32	4	4	4	4	4	4	4	4	4	40
30	KIKI REZKI	Pria	31	SMK	4	4	4	4	3	4	4	4	31	4	4	4	4	4	4	4	4	32	4	4	4	4	3	4	4	4	4	39
31	RIKI MAULANA	Pria	34	SMA	3	4	4	4	4	4	3	4	30	4	4	4	4	3	4	4	4	31	4	4	4	4	3	4	4	4	3	38
32	DIMAS EDITIA SANTOSO	Pria	30	D3	4	4	4	4	4	4	4	4	32	4	4	4	4	4	4	4	4	32	4	4	4	4	4	4	4	4	4	40
33	FENDI RIANTO	Pria	28	SMA	4	4	4	4	4	4	4	4	32	4	4	4	4	4	4	4	4	32	4	4	4	4	4	4	4	4	4	40
34	KADORI HABIB ROHMAN	Pria	29	SMK	4	4	4	4	3	4	4	4	31	4	4	4	4	4	4	4	4	32	4	4	4	4	3	4	4	4	4	39
35	TARMIDI TAHER	Pria	33	D3	4	4	4	4	3	4	4	4	31	4	4	4	4	4	4	4	4	32	4	4	4	4	4	3	4	4	4	39
36	AFRIANTO	Pria	29	SMA	4	4	4	4	3	4	4	4	31	4	4	4	4	4	4	4	4	32	4	4	4	4	3	4	4	4	4	39
37	IKHSAN BEKTI SUGIHARTO	Pria	28	SMK	4	4	4	4	3	4	4	4	31	3	4	4	4	4	4	4	4	31	4	4	4	4	4	3	4	4	4	39
38	SUHENDRA	Pria	28	SMA	4	4	4	4	4	4	4	4	32	4	4	4	4	4	4	4	4	32	4	4	4	4	4	4	4	4	4	40
39	TEGAR KHAOLAN IQSANTORO	Pria	24	SMK	4	4	4	4	4	4	4	4	32	4	4	4	4	4	4	4	4	32	4	4	4	4	4	4	4	4	4	40
40	ICHSAN TRINOVANTO	Pria	25	SMK	4	4	4	4	4	4	4	4	32	3	4	4	4	4	4	4	4	31	4	4	4	4	4	4	4	4	4	40
41	IRMAN NURCAHYA	Pria	26	SMK	4	4	4	4	4	4	4	4	32	4	4	4	4	4	4	4	4	32	4	4	4	4	4	4	4	4	4	40
42	ABDUL KHARIDH	Pria	29	SMK	4	4	4	4	4	4	4	4	32	4	4	4	4	4	4	4	4	32	4	4	4	4	4	4	4	4	4	40

Figure 2. Questionnaire Data

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doi.org/10.31334/bijak.v21i1. 4445

4. RESULT AND DISCUSSION

Validity Test

The criteria for determining the validity of a questionnaire according to Sugiyono (2016: 183) are as follows:

1. If r ≥ 0.30 then the items of the questionnaire are declared valid
2. If r ≤ 0.30 then the items of the questionnaire are declared invalid

The formula used uses the Product correlation technique Moment according to Sugiyono (2010: 183) is as follows:

$$= \sum y - (\sum) (\sum)y$$

$$\sqrt{\{2 - (\sum) 2\} \{ \sum y 2 - (\sum y) 2\}}$$

Description:

r = Correlation coefficient

∑xy = The sum of the multiplication of the variables x and y

∑x = Total score for variable X 40

∑y = Total score for variable Y

$\sum x^2$ = Sum of the powers in the

X $\sum y^2$ = Sum of the

In variable Y heteroscedasticity can be done by means of the Harvey test.

Table 2. Validation Results

Variables	No. of questions	r-count	Ket
Storage Layout	1	.550**	Valid
	2	.648**	Valid
	3	.414**	Valid
	4	.514**	Valid
	5	.356**	Valid
	6	.550**	Valid
	7	.550**	Valid
	8	.678**	Valid

Variables	No. of questions	r-count	Ket
Material Handling Equipmen	1	.414**	Valid
	2	.593**	Valid
	3	.745**	Valid
	4	.668**	Valid
	5	.414**	Valid
	6	.780**	Valid
	7	.780**	Valid
	8	.745**	Valid

Variables	No. Question	r-count	Ket
Distribution Timeliness	1	.596**	Valid
	2	.610**	Valid
	3	.746**	Valid
	4	.523**	Valid
	5	.325**	Valid
	6	.407**	Valid
	7	.685**	Valid
	8	.746**	Valid
	9	.523**	Valid
	10	.685**	Valid

Based on the information in the table above, the data analyzed involves three variables, namely the independent variables of Storage Layout, Material Handling Equipment, and the dependent variable of Distribution Timeliness.

To analyze the results of the validity test, the r-Count value of the questionnaire was calculated and compared to the r-Table; in this study, the r-Table is 0.2973 for variables with n=42 and k=3, with a significance level of 0.05. All correlation values, or r-Count, for each question are greater than r-Table, which is shown in the table. This indicates from the validity test results that all data is valid.

1. Reliability Test

According to (Ghozali, 2006) the way to calculate reliability is to calculate the Cronbach's Alpha (α) reliability coefficient, the criteria are as follows:

1. If the Cronbach's Alpha (α) value> 0.60 then it is said to be reliable
2. If the Cronbach's Alpha (α) value <0.60 then it is said to be unreliable

According to Husein Umar (2003: 293) says that to test the reliability of Likert scale instruments (1 to 5) with the Alpha Cronbach method, the following formula is used:).

Table 3. Storage Layout Reliability Test (X1)

Reliability Statistics

Cronbach's Alpha	N of Items
,633	8

Source: SPSS 25 Data Processing Results (2024)

Based on table 3. for the storage layout variable, the reliability value obtained using Cronbach Alpha statistics is 0.633, which is greater than 0.5. This shows that the results of the reliability test on the research data scores involving 42 respondents surveyed meet the criteria as valid data and have good quality.

Table 4. Reliability Test Material handling equipment (X2)

Reliability Statistics

Cronbach's Alpha	N of Items
,788	8

Source: SPSS 25 Data Processing Results (2024)

E ISSN 2621-749X
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doi.org/10.31334/bijak.v21i1. 4445

Based on table 4. the reliability test results for the goods control equipment variable conducted with 42 participants show a statistical reliability value (Cronbach Alpha) of 0.788, which is higher than 0.5. This indicates that the data obtained from this study can be considered accurate and meet good data quality standards.

Table 5. Reliability Test of Distribution Timeliness (Y)

Reliability Statistics

Cronbach's Alpha	N of Items
,772	10

Source: SPSS 25 Data Processing Results (2024)

Based on table 5. the statistical reliability value (Cronbach Alpha) for the distribution timeliness variable is 0.772, which is greater than 0.5. This shows that the results of the reliability test on the research data scores conducted with 42 participants produce valid data and meet the criteria for good data quality.

2. Normality Test Kolmogorov-Smirnov Test One-Sample Kolmogorov-Smirnov Test

Table 6. Kolmogorov Normality Test

One-Sample Kolmogorov-Smirnov Test

		Unstandardized Residual
N		42
Normal Parameters[a,b]	Mean	,0000000
	Std. Deviation	,36770463
Most Extreme Differences	Absolute	,257
	Positive	,257
	Negative	-,117
Test Statistic		,257
Asymp. Sig. (2-tailed)		,000[c]

a. Test distribution is Normal.
b. Calculated from data.
c. Lilliefors Significance Correction.

Based on Table 6. the value of Asymp Sig. The value obtained is 0.000 which is greater than 0.05, meaning that the data is normally distributed. This is in accordance with the provisions that if the points are far from the diagonal, the data is considered to be abnormally distributed. Conversely, if the points are close to or along the diagonal, the data is considered normally distributed (Imam Ghozali, 2011: 160-161).

Table 7. Normal P-Plot Graph

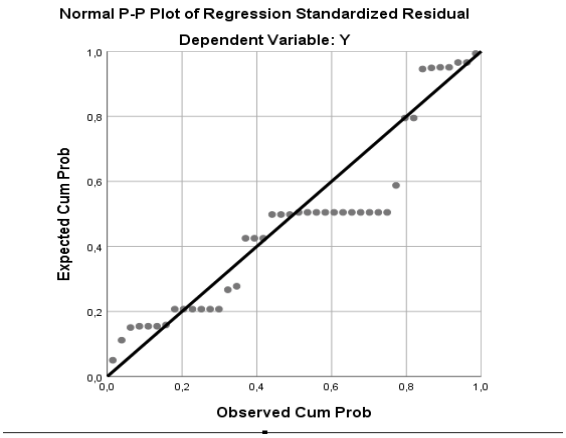
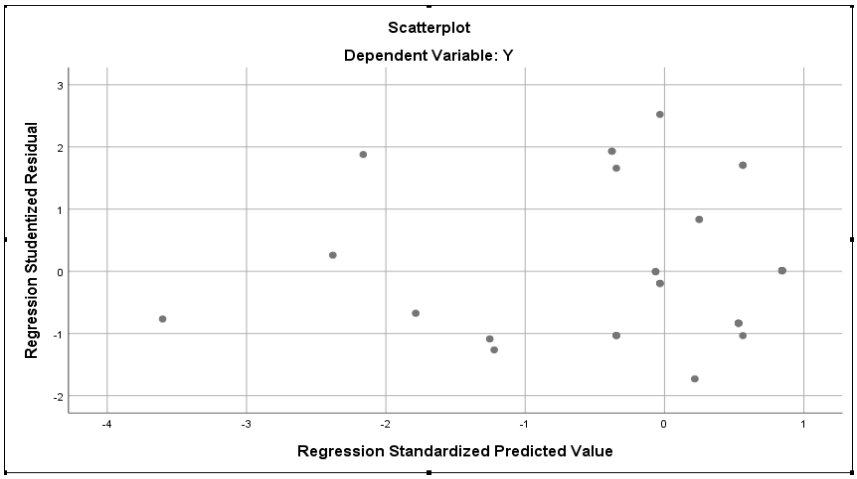


Table 7. shows that the points approach and follow the diagonal, indicating that the data is normally distributed. A data is considered normally distributed if it spreads around the diagonal and follows the diagonal direction or histogram, otherwise if the data is far from the diagonal or does not follow the diagonal direction or histogram, the data is considered normally distributed. data is not normally distributed.

3. Heteroskedasticity Test

The heteroscedasticity test aims to test whether in the regression model there is an inequality of variance from the residuals of one observation to another (Ghozali, 2018: 120). If there are points that form a certain regular pattern like waves, first widening then narrowing, then heteroscedasticity will occur. Heteroscedasticity does not occur if the dots are scattered above and below the number 0 on the Y axis but do not form a certain pattern.

Table 8. Heteroscedasticity Test Results



In table 8. it can be concluded that there is no Heteroskedastistas problem seen from the points that spread above, below, right and left of point 0. So it can be concluded that there is no heterokedasitas.

Correlation Coefficient Test

Correlation coefficient analysis is used to determine the direction and strength of the relationship between two or more variables. The direction is expressed by positive and negative relationships, while the strength of the relationship is expressed by the magnitude of the correlation coefficient (Sugiyono: 62). According to the decision:

a. If the significance value <0.05, then it is

b. If the significance value > 0.05, then it is not correlated

Table 9. Results of Correlation Coefficient X1 to Y

Correlations

		Variabel X1	Variabel Y
Variabel X1	Pearson Correlation	1	,935**
	Sig. (2-tailed)		,000
	N	42	42
Variabel Y	Pearson Correlation	,935**	1
	Sig. (2-tailed)	,000	
	N	42	42

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

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Table 9. shows that the pearson correlation value of the Storage Layout variable (X1) of 0.935 is included in the strong correlation. While the significance value is 0.000, the data is correlated.

Table 10. Results of Correlation Coefficient X2 to Y

Correlations

		Variabel X2	Variabel Y
Variabel X2	Pearson Correlation	1	,941**
	Sig. (2-tailed)		,000
	N	42	42
Variabel Y	Pearson Correlation	,941**	1
	Sig. (2-tailed)	,000	
	N	42	42

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

In table 10. it can be seen that the Pearson correlation value of the material handling equipment (X2) variable of 0.941 is included in the strong correlation. While the significance value is 0.000, the data is correlated.

Table 11. Correlation Coefficient Results X1 & X2 to Y

Correlations

		X1	X2	Y
X1	Pearson Correlation	1	,809**	,935**
	Sig. (2-tailed)		,000	,000
	N	42	42	42
X2	Pearson Correlation	,809**	1	,941**
	Sig. (2-tailed)	,000		,000
	N	42	42	42
Y	Pearson Correlation	,935**	,941**	1
	Sig. (2-tailed)	,000	,000	
	N	42	42	42

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

In table 11. it can be seen that the pearson correlation value of the Storage Layout variable (X1) of 0.935 and Material handling equipment (X2) of 0.941 is included in the strong correlation. While the significance value is 0.000, the data is correlated.

4. Multiple Linear Regression Test

According to Sugiyono (2010: 66), multiple linear regression analysis is used by researchers, if they intend to predict how the state (increase or decrease) of the dependent variable, if two or more independent variables as predictor factors are manipulated (increase or decrease in value). Multiple linear regression tests are used to obtain a systematic relationship in the form of an equation between the dependent variable or dependent variable and a single independent variable. The following are the results of the multiple linear regression test:

Table 12. Multiple Linear regression Test Results

Coefficients[a]

Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	-1,799	1,110		-1,621	,113
	Variabel X1	,688	,062	,502	11,176	,000
	Variabel X2	,618	,052	,535	11,892	,000

a. Dependent Variable: Variabel Y

Table 12. shows the results of multiple linear regression processing and the following equation is obtained:

Y = -1.799 + 0.688 (X1) + 0.618 (X2)

1. Constant (a) = -1.799 systematically that if the value of variables X1 and X2 does not exist. Then the value of variable Y = -1.799. In other words, the value of Storage Layout and timeliness of distribution is -1.799.
2. The regression coefficient of the X1 Storage Layout variable of 0.688 shows that the price variable has a positive influence on Distribution Timeliness. That every 1 unit increase in the Storage Layout variable will affect the Timeliness of Distribution by 0.688.
3. The regression coefficient of the material handling equipment variable X2 of 0.618 shows that the price variable has a positive influence on the timeliness of distribution. That every 1 unit increase in the material handling equipment variable will affect the timeliness of distribution by 0.618.

5. Determination Coefficient Test

The Coefficient of Determination (R2) measures the extent to which the model's ability to explain variations in the dependent variable. The formula for calculating the derermination coefficient is:

$$2 = \frac{(SS - SS)}{SS} = \frac{SS}{SS}$$

The coefficient of determination/R2 is between zero (0) and one (1). When the coefficient of determination is closer to zero (0), it indicates that the ability of the model to explain the dependent variable is very limited. Conversely, when the coefficient of determination value is closer to one (1), it indicates that the ability of the independent variable is getting stronger to indicate the existence of the dependent variable. The results of the coefficient of determination test are as follows:

Table 13. Results of the Coefficient of Determination X1 on Y

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,935[a]	,874	,871	,801

a. Predictors: (Constant), X1

Table 13. explains that R = 0.935 shows that the relationship between Storage Layout and Distribution Timeliness is 93.5%. This means that the Storage Layout on Distribution Timeliness has a strong relationship. R Square (R2) of 0.874 shows that the Storage Layout is able to explain the Timeliness of Distribution by 87.4% while the remaining 12.6% is influenced by other variables not examined in this study.

Table 14. Results of the Coefficient of Determination X2 on Y

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,941[a]	,885	,882	,763

a. Predictors: (Constant), X2

Table 14. explains that R = 0.941 shows that the relationship between material handling equipment and distribution timeliness is 94.1%. This means that material handling equipment to the timeliness of distribution has a strong relationship. R Square (R2) of 0.885 shows that material handling equipment is able to explain the timeliness of distribution by 88.5% while the remaining 11.5% is influenced by other variables not examined in this study.

E ISSN 2621-749X
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Table 15. Results of the Coefficient of Determination X1 & X2 on Y

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,986[a]	,973	,971	,377

a. Predictors: (Constant), X2, X1

Table 15. explains that R = 0.986 shows that the relationship between Storage Layout & Material handling equipment on Distribution Timeliness is 98.6%. This means that the Storage Layout & Material handling equipment on Distribution Timeliness has a strong relationship. R Square (R2) of 0.973 shows that the Storage Layout & Material handling equipment is able to explain the Timeliness of Distribution by 97.3% while the remaining 2.7% is influenced by other variables not examined in this study.

6. Hypothesis Test t (Partial)

The t-test basically shows how far the influence of one independent variable individually in explaining the variation in the dependent variable.

H0: i = 0

That is, whether an independent variable is not a significant explanation for the dependent variable. Alternative hypothesis (Ha), the parameter of a variable is not equal to zero, or

Ha: i ≠ 0

This means that the independent variable is a significant explanatory factor for the dependent variable. To test both hypotheses, the t-test is used, which is calculated from the following formula: The criteria used are if the significance probability value > 0.05 then there is no significant effect. Meanwhile, if the significance probability value <0.05 then there is a significant influence. The following are the results of the t test hypothesis:

Table 16. t Test Results of Storage Layout Variables on Distribution Timeliness

Coefficients[a]

Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	-,946	2,352		-,402	,690
	Variabel X1	1,280	,077	,935	16,639	,000

a. Dependent Variable: Variabel Y

In table 16. of the t hypothesis test results of the price variable on consumer loyalty, there is a t-count value of 16.639> t-table value of 2.018 and a significance value of 0.000, it can be concluded that partially variable X1 has a significant effect on variable Y. This means that H1 is accepted and H0 is rejected.

Table 17. t Test Results of Material handling equipment Variables on Distribution Timeliness

Coefficients[a]

Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	4,827	1,900		2,541	,015
	Variabel X2	1,088	,062	,941	17,572	,000

a. Dependent Variable: Variabel Y

In table 17. the results of the t hypothesis test of the price variable on consumer loyalty, there is a t-count value of 17.572> t table value of 2.018 and a significance value of 0.000, it can be concluded that

partially variable X2 has a significant effect on variable Y. This means that H1 is accepted and H0 is rejected.

7. F Test (Simultaneous)

The F test is carried out by comparing the significance value (Sig.) with the level of confidence to be achieved (α), which is 0.05 or comparing the Fcount and Ftable values. The decision-making criteria in the F test are:

(1) If the significance value of F>0.05, then Ho is accepted. This means that simultaneously the independent variable does not have a significant effect on the dependent variable. Conversely, if the significance value of F ≤0.05, then Ho is rejected and Ha is accepted. This means that simultaneously the independent variables have a significant influence on the dependent variable.

(2) Comparing the Fcount and Ftable values. If the Fcount value is greater than the Ftable value, then Ho is rejected and Ha is accepted. The way to determine Ftable = (df1; df2) or (k; n-k-1), where (k) is the number of independent variables and (n) is the number of samples.

To make a decision, the calculated F value is divided and the significance level is compared with the set significance level of 0.05. A calculated F value below 0.05 indicates that the independent variables affect the dependent variable simultaneously. The results of the F test are as follows:

Table 18. F Test Results of Storage Layout Variables and Material handling equipment on Distribution Timeliness

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	197,599	2	98,800	695,085	,000[b]
	Residual	5,543	39	,142		
	Total	203,143	41			

a. Dependent Variable: Variabel Y

b. Predictors: (Constant), Variabel X2, Variabel X1

In table 18. the results of the F hypothesis test show the fcount value of 695.085> ftabel value of 2.44 and a significance value of 0.000 <0.05 so it can be concluded that the storage layout variable (X1) and material handling equipment Delivery variables (X2) together have a positive and significant influence on the variable timeliness of delivery (Y). This means that H3 is accepted and H0 is rejected.

5. CONCLUSION

a. Based on research results, the influence of Storage Layout on Timeliness of Distribution through the correlation test has a value of 0.935, which means it has a strong influence, then according to the determination test with a value of R Square (R2) = 0.874, this shows that Storage Layout is able to explain Timeliness The distribution was 87.4% while the remaining 12.6% was influenced by other variables not examined in this study. Furthermore, according to the t-test, the Storage Layout variable has a significant influence on Timeliness of Distribution. This can be proven by the t-count value of 16.639 > t-table value of 2.018 and a significance value of 0.000. This means that H1 is accepted and H0 is rejected.

b. Based on research results, the influence of Material Handling Equipment on Timeliness of Distribution through the correlation test has a value of 0.941, which means it has a strong influence, then according to the determination test with a value of R Square (R2) = 0.885, this shows that Material Handling Equipment is able to explain Timeliness The distribution was 88.5% while the remaining 11.5% was influenced by other variables not examined in this research. Furthermore, according to the t-test, the Material Handling Equipment variable has a significant influence on Timeliness of Distribution. This can be proven by the t-count value of 17.572 > t-table value of 2.018 and a significance value of 0.000. This means that H1 is accepted and H0 is rejected.

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E ISSN 2621-749X **doi.org/10.31334/bijak.v21i1. 4445**

c. Based on the results of research on the influence of Storage Layout and Material Handling Equipment delivery together on Distribution Timeliness through a correlation test, the Storage Layout variable has a value of 0.935 and Material Handling Equipment has a value of 0.941, which means it has a strong influence. Furthermore, according to the determination test, R Square (R2) = 0.973 shows that the Storage Layout and Material Handling Equipment is able to explain the Timeliness of Distribution by 97.3% while the remaining 2.7% is influenced by other variables not examined in this research. Furthermore, according to the f test, it can be concluded that the Storage Layout variable and the Material Handling Equipment variable together have a positive and significant effect on the Timeliness of Distribution variable. This can be proven by the f-count value of 695,085 > f-table value of 2.44 and a significance value of 0.000 < 0.05. This means that H3 is accepted and H0 is rejected.

Advice

Based on the conclusions that have been determined, the author can provide several suggestions as follows:

1. Based on the recapitulation results of the Storage Layout variable, namely the instrument, Is the current operational Security Quality in the storage area in accordance with procedures, it has the smallest value of 3.69, therefore the author gives a suggestion, namely PT. Serasi Logistics Indonesia ensures that the quality of operational security for storing goods is further improved to comply with procedures, to reduce the level of loss in the warehouse area.
2. Based on the recapitulation results of the Storage Layout variable, namely the instrument, Is the current operational Security Quality in the storage area in accordance with procedures, it has the smallest value of 3.69, therefore the author gives a suggestion, namely PT. Serasi Logistics Indonesia ensures that the quality of operational security for storing goods is further improved to comply with procedures, to reduce the level of loss in the warehouse area.

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