GROSTLOG 2023
Global Research on Sustainable Transport & Logistics

ISSN: 2622-5778 (online)
Advances in Transportation and Logistics Research
http://proceedings.itltrisakti.ac.id/index.php/altr

Optimizing Operational System to Enhance Distribution Effectiveness at PT. WM Using Value Stream Mapping Method

Danie Hayam Mada Chamsudi[a], Lukas Beladi Sihombing[b], Angga Kurniawan[c], Iqbal Firmansyah[d], Sesaria Mardhiani Rachma Puspita[e], Anissa Veronica Sungsangan Simatupang[f]

[a,b,c,d,e, f] Institut Transportasi dan Logistik Trisakti, Indonesia
Corresponding author: lukas_sihombing@yahoo.com

Abstract: Distribution activities play a vital role in an industrial operation to enhance operational quality for consumers, streamline costs, and reduce inventory levels. An effective distribution channel will closely interconnect a series of activities, making the distribution process more efficient. One of the challenges faced by PT. WM in their distribution activities is the long delivery time of 940 minutes. By using the Value Stream Mapping method, several non-value-added or wasteful activities were identified. These activities were then improved using an e-system, resulting in a more efficient distribution process with a duration of 439 minutes.

Keywords: *Distribution, E-system, Value Stream Mapping, Waste*

1. Introduction

Distribution activities play a vital role in an industrial operation to enhance operational quality for consumers, streamline costs, and reduce inventory levels (Gaspersz, 2005). Distribution activities based on lean principles result in more efficient costs (Wistyanto & Intifada, 2012). Lean distribution is used to simplify processes and reduce reliance on optimal plans to achieve effective outcomes, focusing on reducing lead time and lot size (Hines & Taylor, 2000).

A well-structured distribution channel interconnects a series of activities, making the distribution process more effective. The goal of lean distribution is to reduce lead time, which can decrease costs and improve the distribution services provided by a company (Reichhart & Holweg, 2007). Currently, manufacturing-focused companies outsource their distribution activities to freight forwarders. Freight forwarders are companies in the shipping service industry that act as intermediaries between shippers and receivers of goods (Rizaldy, et al., 2017).

ISSN: 2622-5778 (online)
Advances in Transportation and Logistics Research
http://proceedings.itltrisakti.ac.id/index.php/altr

There are some activities that do not add value, resulting in an inefficient workflow (Siswati & Jannah, 2010). PT. WM is a freight forwarder company in the shipping service industry. One of the issues faced by PT. WM in its distribution activities is the long lead time for delivering goods. Non-value-added operational activities, such as manual creation of delivery orders and waybills, document returns to the operational department, lengthy document processing, and manual Excel-based data entry, hinder the data collection process and make the distribution workflow less effective, resulting in waste.

The implementation of the Value Stream Mapping (VSM) method can address the waste issues in distribution operations. VSM is used to analyze and minimize waste and design improvement proposals for distribution systems using a lean distribution approach (Pujawan & Priskandana, 2010). With VSM, you can quickly identify the types of waste occurring in the product delivery process. Among the various types of waste, the most frequent, challenging, and detrimental types are identified, allowing you to focus on the waste type that has the most significant impact on the distribution activity workflow. Subsequently, improvements and waste elimination are designed to create an effective, efficient, and smooth workflow.

2. Literature review

Logistics is the efficient process of planning, executing, and controlling the movement and storage of goods and services, as well as all related information, from the point of origin to the point of consumption to meet customer demand. This definition encompasses the inbound, outbound, internal and external movements, and the return of materials.

Distribution can be defined as a marketing activity that aims to facilitate and streamline the delivery of goods and services from the manufacturer to the consumer, ensuring that they are used according to what is required (type, quantity, price, location, and timing). Distribution plays a crucial role in maximizing costs; the more optimal the distribution, the lower the costs incurred (Tjiptono, 2008).

According to Kotler (2001), **distribution channels** are interdependent supply sources involved in the process of making goods or services available for use or consumption. Distribution channels essentially serve as intermediaries bridging the gap between producers and consumers.

Challenges in distribution are divided into two categories: internal and external. Internal challenges can include company policies related to distribution and service, as well as infrastructure within the distribution process. External challenges may arise from the methods of distribution and the destinations (Moriza, Adianto, & Nurdiansyah, 2016). Distribution is a crucial component for expedition companies, as it significantly impacts their business operations. The better the route and processes for distributing goods to customers, the more profitable the company becomes.

ISSN: 2622-5778 (online)
Advances in Transportation and Logistics Research
http://proceedings.itltrisakti.ac.id/index.php/altr

A **freight forwarder** is a company that operates in the field of shipping services, serving as a third-party intermediary between the sender and receiver of goods (Rizaldy, et al., 2017). The primary responsibilities of a freight forwarder include determining shipping routes, handling shipping documentation and cargo reception, packaging, storage, selecting transportation modes, and managing insurance (Fitriah, 2007). Furthermore, according to the Regulation of the Minister of Transportation (Permenhub) PM 49 of 2017 concerning the Organization and Operation of Transportation Management Services, issued on July 6, 2017, Freight Forwarder Services are defined as follows: "Activities aimed at all the necessary activities for the delivery and receipt of goods via land, rail, sea, and/or air transportation."

Optimization is the process of seeking the best solution, not necessarily the highest profit that can be achieved if the optimization goal is to maximize profit, or not always the lowest cost that can be minimized if the optimization goal is to minimize costs (Siringoringo, 2008).

According to Asnawi (2013), **effectiveness** can be understood as the success in achieving predetermined objectives. Furthermore, effectiveness is the relationship between outcomes and objectives, where effectiveness is measured by how well the results of a policy or outcome are aimed at achieving the set objectives. Moreover, the term effectiveness is the attainment of a desired goal or outcome without regard to energy, time, costs, thoughts, tools, and other identified factors.

According to Fat as cited in Hutahaean (2014), a **system** is a real or abstract collection of interconnected, related, interdependent, mutually supportive parts or components that together form a unity to achieve a specific goal efficiently and effectively. According to Jogianto as cited in Hutahaean (2014), a system is a collection of elements that interact to achieve a specific goal. This system describes events and real entities, such as places, objects, and people, that truly exist and occur.

The **characteristics of a system**, according to Susanto (2013), include the system's objectives, system boundaries, subsystems, system relationships, the system environment, and input, process, and output components. To provide further clarity, the characteristics of a system can be elaborated as follows:

1. System Objectives: These are the ultimate targets or goals that a system aims to achieve. To reach these objectives, the characteristics and criteria of the goals must be known in advance.
2. System Boundaries: These are abstract lines that separate a system from its environment. Subsystems are components or parts of a system, which can be physical or abstract.
3. System Relationships and Hierarchy: System relationships refer to the connections between subsystems at the same level or between subsystems and a larger system.
4. Input, Process, Output: These are the three functional components of a system or

ISSN: 2622-5778 (online)
Advances in Transportation and Logistics Research
http://proceedings.itltrisakti.ac.id/index.php/altr

subsystem, indicating that a system, as a process, cannot function on its own; there must be inputs and outputs. Inputs encompass everything that enters a system and can include energy, humans, data, capital, etc.

5. System Environment: This refers to external factors that influence the system. The system environment can be categorized into two types: the external environment (outside the system) and the internal environment (inside a system).

According to Pandiangan & Liberty (2008), e-system is a system used to facilitate administration through internet technology, with the expectation that all tax-related processes and services run smoothly, swiftly, and accurately.

Lean means slim or thin. Lean is a management system and method aimed at improving the quality, safety, and efficiency of service processes (Kim & Kummar, 2006). Lean is defined as an approach to identifying and eliminating waste or non-value-added activities through radical, sustainable improvements by flowing products and information using both internal and external customer acquisition systems to achieve excellence and perfection (Gaspersz, 2005). According to Graban (2009), there are five main principles of lean:

1. Identifying value
2. Mapping the value stream
3. Implementing one-piece flow
4. Applying a pull system
5. Pursuing continuous improvement

In the lean philosophy, there are several types of waste that need to be reduced and eliminated specifically (Gaspersz & Fontana, 2011):

1. Transportation: A necessary company expense, but its costs should be minimized to prevent losses.
2. Overproduction: Producing more than what is needed can lead to business losses as excess inventory is stored.
3. Waiting: Waiting time is a form of waste caused by idle time.
4. Overprocessing: This occurs when processes include unnecessary steps.
5. Unnecessary Activities: Not all business or factory operations add value to the produced goods.
6. Inventory: Excess inventory or purchasing items from the warehouse reduces working capital.
7. Defective Products: Defective items must be replaced with new ones as consumers will not buy flawed products. Defective items increase production costs due to the need to

ISSN: 2622-5778 (online)
Advances in Transportation and Logistics Research
http://proceedings.itltrisakti.ac.id/index.php/altr

replace them.

Value Stream Mapping is one of the methods for mapping the flow of production and information to produce a single product or a product family, not just in individual work areas but at the overall production level. It aims to identify activities that are value-added and non-value-added (Rother & Shook, 2009).

According to Rother & Shook (2009), streamlining is a tool for reducing and simplifying the process of achieving goals by enhancing business processes. There are 12 efficiency tools, which are:

1. Bureaucracy Elimination
2. Duplication Elimination
3. Value-added Assessment
4. Simplification
5. Process Cycle-time Reduction
6. Error Proofing
7. Upgrading
8. Simple Language
9. Standardization
10. Supplier Partnerships
11. Big Picture Improvement
12. Automation and/or Mechanization

3. Research method

The method used in this research employs a Mixed Method approach. According to Sugiyono (2015), this mixed method combines or integrates both quantitative and qualitative research methods to be used together in a research activity, in order to obtain more comprehensive, valid, reliable, and objective data.

The research location was conducted by the author at PT. WM, located in Pondok Gede, Bekasi, West Java. The research period started from November 2021 and continued until February 2022.

Data sources are categorized into two types: primary and secondary data sources. Primary data sources are obtained directly from research subjects using data collection tools as the main source of information. Secondary data, on the other hand, is obtained indirectly and typically includes research journals, reports, or documentation from other sources (Sudaryana, 2017). In this study, two types of data were used:

ISSN: 2622-5778 (online)
Advances in Transportation and Logistics Research
http://proceedings.itltrisakti.ac.id/index.php/altr

1. Primary data, which includes direct observation by the researcher during operational activities, the time required for these operational activities, and brainstorming sessions with operational distribution supervisors who have been working at PT. WM since 2010 and operational managers who have been with PT. WM since 2007.
2. Secondary data, which is derived from books, previous research journals, websites, articles, and company reports.

The researcher conducted direct observations related to operational activity data and the amount of time required by PT. WM and processed it using Value Stream Mapping. The data obtained from the observations were processed according to the data analysis technique used. The data was then processed in several parts, as follows:

1. **Current state**: In this stage, the researcher used current state mapping to understand the current operational processes.
2. **Process Analysis Mapping**: In this step, the researcher identified the value of activities as value-added (VA), non-value-added (NVA), and necessary non-value-added (NNVA), grouping them into five functions: operation, transportation, inspection, storage, and delay.
3. **Brainstorming**: At this stage, the researcher discussed with the operational distribution supervisor who has been working at PT. WM since 2010 and the operational manager who has been with PT. WM since 2007.
4. **Waste Identification**: This stage involved identifying the waste produced and which activities were included in that waste.
5. **Fishbone Analysis**: This stage analyzed the root causes of problems generated in the current operational processes.
6. **Streamlining**: This stage involved determining the waste in operational distribution activities and reducing the waste that occurred.
7. **Future state mapping**: This technique was used to depict the improved operational distribution activities.

4. Results and discussion

In this research, data collection was conducted through the recording of the time used. The data can be seen in Appendix 2 for the January period, comprising 10 orders with the average time for each activity as follows:

Table 1
Average Time for Distribution Operational Activities

ISSN: 2622-5778 (online)
Advances in Transportation and Logistics Research
http://proceedings.itltrisakti.ac.id/index.php/altr

Activity	Duration (Minute)
P.O Enter	5
Making Letter Road Manuals	5
Submission SJ To Driver	15
Taking Goods	120
Load Goods	60
Delivery Goods	120
Demolish Goods	60
Making News Program Hand it over Accept	5
Return BAST To Operational	480
Checking Document	5
Input Data	10

In Table 1, it can be observed that the activities can be divided into several categories, including the entry of purchase orders (PO), followed by the creation of delivery notes, which are then handed over to the driver. The total time for these activities is 25 minutes. This time was derived from the average time recorded in the company's records, which can be found in Appendix 2. The time calculation can be carried out efficiently and applies to all activities, including data input activities.

The mapping of the current operational distribution system at PT. WM is still being done manually. As shown in the example in Figure 1, it demonstrates several activities that can still be improved to streamline the operational system flow.

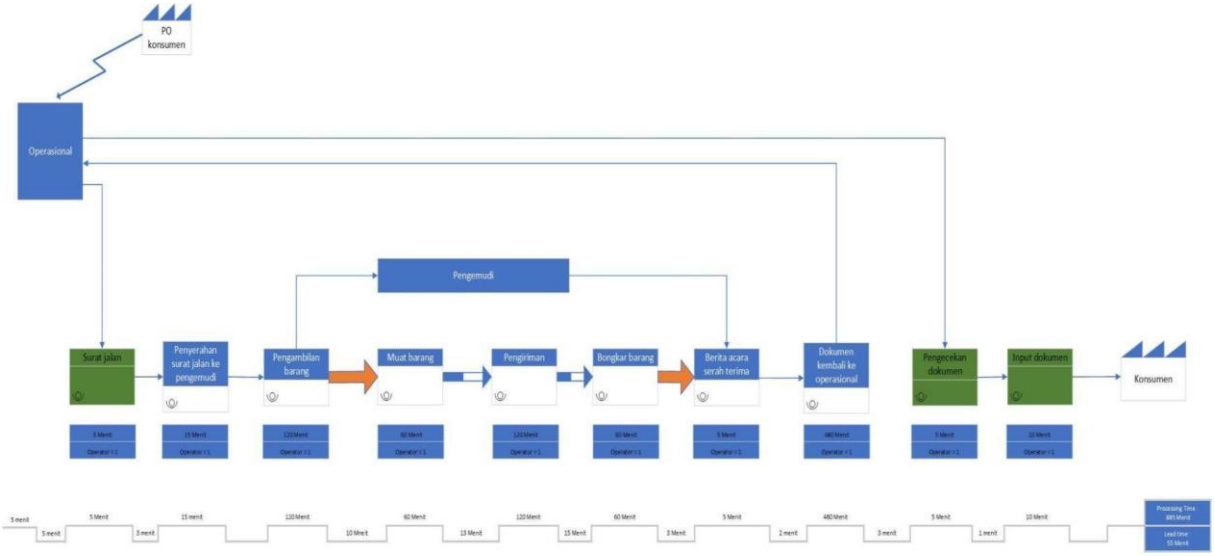

Fig. 1 Current State Map

ISSN: 2622-5778 (online)
Advances in Transportation and Logistics Research
http://proceedings.itltrisakti.ac.id/index.php/altr

In the distribution process flow depicted in Figure 4.1, customer orders are sent via email to the operational department. After receiving the email, the operational department creates a delivery note, which takes 5 minutes. Then, the operational department hands over the document, which requires 15 minutes, to the driver for collecting the goods from the designated customer pick-up location. Once the driver receives the delivery note, they can head to the pick-up location with a travel time of 120 minutes.

Upon reaching the pick-up destination, the driver loads the goods into the vehicle within 60 minutes. When the goods are loaded, the driver proceeds directly to the delivery destination with a travel time of 120 minutes. After arriving at the destination, the driver unloads the goods within 60 minutes.

After completing the unloading, the driver creates a bill of lading document with the recipient in 5 minutes. Once the goods handover is finished, the driver returns the bill of lading document to the operational department, which can take up to 480 minutes, as the driver often does not return the document to the operational department immediately. Upon receiving the document back from the driver, the operational department checks the completeness of the document and obtains the recipient's signature, which takes 5 minutes.

Once the document and complete signatures are returned, the operational department proceeds to input the document into Microsoft Excel, which takes 10 minutes to complete. Afterward, the operational department hands it over to the finance department for billing the service fees to the customer.

4.1. Process Analysis Mapping

According to Gaspersz & Fontana (2011), Process Analysis Mapping (PAM) is used to identify the current delivery process. The activities in the delivery process are classified into three categories: Value-Added Activities (VA), Non-Value-Added Activities (NVA), Necessary Non-Value-Added Activities (NNVA), and further categorized into five based on their functions: Operation (O), Transportation (T), Inspection (I), Storage (S), and Delay (D).

This is explained as follows:

1. Value-Added Activity (VA): Activities that add value to the distribution flow.
2. Non-value-added activity (NVA): Activities that do not add value to the distribution process.
3. Necessary non-value-added activity (NNVA): Activities that do not add value to the delivery process but are important and must be carried out.
4. O (Operation): Activities that add value and are essential in the distribution process flow. Table 2 explains that in terms of time, operation requires the most time.
5. T (Transportation): Activities related to the movement of transport fleets and goods. Transportation activities can be value-added (VA) or non-value-added (NVA), but they

ISSN: 2622-5778 (online)
Advances in Transportation and Logistics Research
http://proceedings.itltrisakti.ac.id/index.php/altr

are essential or unnecessary in terms of value addition (NNVA).

6. I (Inspection): Activities that do not add value but are necessary without adding value (NNVA). In the distribution flow in Table 2, inspection is part of the distribution process.
7. S (Storage): Activities that do not add value or are non-value-added (NVA), which are not found in the distribution flow.
8. D (Delay): Delay is an activity that is non-value-added (NVA), and in distribution channels, there is always a delay process, such as waiting for loading and unloading.

Table 2
Analysis Mapping

No	Activity Activity Operational	Time Processing (Minute)	Power Work	Category	O	Q	I	S	D
1	Order from consumer	5	1	VA	O				
2	Operational prepare computer	5	1	N.VA	O				
3	Making letter road manually	5	1	NNVA	O				
4	Inform driver letter road Already available	3	1	N.VA	O				
5	Submission letter road to driver	15	1	NNVA	O				
6	Driver take goods	120	1	VA		Q			
7	Wait preparation load goods	10	1	N.VA					D
8	Driver do load goods	60	1	VA					D
9	Prepare car before leave	13	1	N.VA		Q			
10	Driver send goods	120	1	VA		Q			
11	Prepare tool for demolish goods	15	1	N.VA					D
12	Driver do demolish goods	60	1	VA					D
13	Wait prepare document hand over accept goods	3	1	N.VA					D
14	News program hand over accept goods	5	1	VA			I		
15	Driver ready return to warehouse	2	1	N.VA		Q			
16	Driver deliver BAST to operational	480	1	NNVA		Q			
17	Part operational prepare computer	3	1	N.VA	O				
18	Checking document by operational	5	1	VA			I		
19	Operational ready For input document	1	1	N.VA	O				
20	Input data	10	1	NNVA	O				
21	Billing to consumer	0	1	NNVA	O				
	Total			**940 Minute**					

Table 3
Analysis Mapping Category

Category Mark	Amount Activity Activity	Total Time Which Generated (Minute)	Percentage Time
Value Added (VA)	8	380	40.43%

ISSN: 2622-5778 (online)
Advances in Transportation and Logistics Research
http://proceedings.itltrisakti.ac.id/index.php/altr

Nacessary Non-Value Added (NNVA)	3	505	53.73%
Non-Value Added (NVA)	10	55	5.84%
TOTAL	**21**	**940**	**100%**

From this data, it can be concluded that the time required for one distribution flow is 940 minutes, with a breakdown of 380 minutes for Value Added (VA), 505 minutes for Necessary Non-Value Added (NNVA), and 55 minutes for Non-Value Added (NVA).

4.2. Waste Identification

After creating the entire distribution flow, the next step is to identify waste through brainstorming with the operational distribution supervisor. The results are summarized in Table 4 as follows:

Table 4
Waste Identification

No	Activity Activity Operational Distribution	Time Processing (Minute)	Information *Waste*
	A. *Defects*		
1.	No found	-	-
	B. *Over Production*		
1.	No found	-	-
	C. Waiting		
1.	Driver deliver BAST to operational	480	NNVA
	D. Non – utilized talent		
1.	No found	-	-
	E. Transportaion		
1.	No found	-	-
	F. Inventory		
1.	No found	-	-
	G. Motion		
1.	Making letter road manually	5	NNVA
2.	Submission letter road to driver	15	NNVA
	H. Over processing		
1.	Checking document	5	NNVA
2.	Input data in a way manually on *Microsoft excel*	10	NNVA

According to Rother & Shook (2009), the waste that can be improved in the distribution flow, as seen in Table 4, includes 3 types: waiting, motion, and over-processing. These are described as follows:

1. The driver handing over the BAST to the operational department takes 480 minutes, resulting in waiting waste, categorized as Necessary Non-Value-Added Activity

ISSN: 2622-5778 (online)
Advances in Transportation and Logistics Research
http://proceedings.itltrisakti.ac.id/index.php/altr

(NNVA).

2. Manual creation of delivery notes, taking 5 minutes, falls under the motion waste category, classified as Necessary Non-Value-Added Activity (NNVA).
3. Handing over delivery notes to the driver, which takes 15 minutes, leads to motion waste, also categorized as Necessary Non-Value-Added Activity (NNVA).
4. Document checking requires 5 minutes, contributing to over-processing waste, categorized as Necessary Non-Value-Added Activity (NNVA).
5. Manually inputting data into Microsoft Excel takes 10 minutes, resulting in over-processing waste, also classified as Necessary Non-Value-Added Activity (NNVA).

4.3. Fishbone Analysis

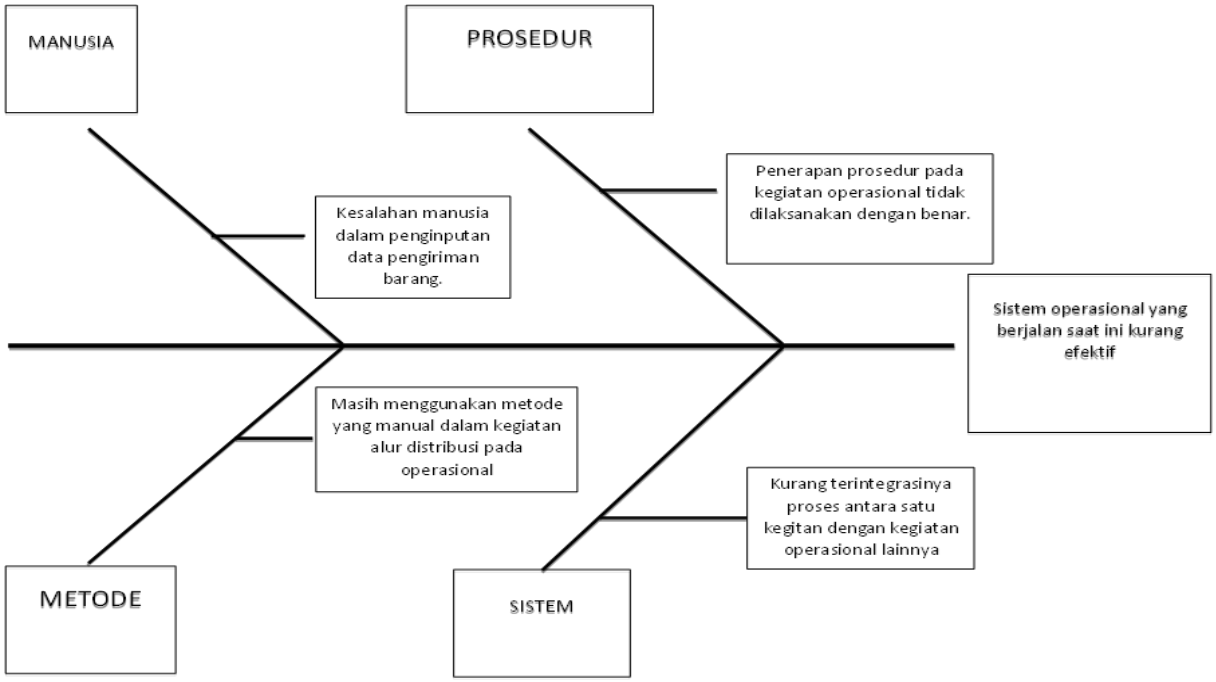

Fig. 2 Fishbone Analysis

According to Pramujaya & Kurniawati (2019), Figure 4.2, the fishbone analysis, is used to identify the factors that cause the ineffectiveness of the operational system at PT. WM, with the following explanations:

1. Human Resources: It is one of the causes of waste due to human resources being undisciplined in carrying out distribution activities.

ISSN: 2622-5778 (online)
Advances in Transportation and Logistics Research
http://proceedings.itltrisakti.ac.id/index.php/altr

2. Method: It is one of the causes of waste because the distribution process still relies on manual methods.
3. Procedures: It is one of the causes of waste because procedures are not followed as they should be.
4. System: It is one of the causes of waste because the current system is not effective.

4.4. Streamlining

In Table 5, streamlining is achieved through brainstorming with the operational distribution supervisor to explain each activity that has waste in its process, and tools for solving the issues related to that waste have also been determined as needed for improvement in each of these processes. Here are the activities that have waste and the explanations for their improvement:

1. Manual waybill creation: The waybill creation process is still done manually, using Microsoft Word and handwriting. After streamlining, the improvement made is an upgrading process by transforming it into an electronic waybill on the e-system. With this process, the risk of losing or damaging waybill documents will be eliminated.
2. Waybill handover to drivers: In this process, the physical waybill needs to be given to the driver before they pick up the goods. After streamlining, the improvement can be an elimination process by inputting customer orders into the e-system. When customer orders are input into the e-system, the waybill will be automatically available and can be downloaded by the driver, allowing them to proceed directly to the pickup location.
3. Driver's handover of the Delivery Receipt or BAST to the operations: The waiting time for the BAST document from the driver takes a long time, and it requires a face-to-face meeting with the operations because the document is still in physical form (paper). After streamlining, the improvement can be an upgrading process by inputting the BAST document into the e-system. With the e-system, the driver only needs to input the BAST without having to meet the operational team to hand it over. This process makes the required time more efficient than before.
4. Document checking: In this process, document checking is still done manually and occurs when the documents are handed over by the driver. After streamlining, the improvement can be an upgrading process. Document checking can be done in the e-system and can be performed along with the process of updating shipment data. This process makes operational activities more efficient.
5. Manual data input into Microsoft Excel: This process can be eliminated because shipment data input is already performed during the initial purchase order input process at the beginning of the distribution process. In this section, you can also improve this activity by updating it to a process of updating the shipment status. This change will make the distribution process within operations more efficient.

ISSN: 2622-5778 (online)
Advances in Transportation and Logistics Research
http://proceedings.itltrisakti.ac.id/index.php/altr

Table 5
Streamlining

Waste	Jenis *streamlining*	Proses bisnisrekomendasi
Pembuatan surat jalan manual	*Upgrading*	Surat jalan akan dibuat secara otomatis ketika penginputan PO ke *E-system*
Penyerahan surat jalan ke pengemudi	*Elimination*	Dengan e-system pengemudi tidak perlu bertemu operasional ketika akan melakukan pengambilan barang ke konsumen
Pengemudi menyerahkan BAST ke operasional	*Upgrading*	Dengan adanya e- system pengemudi hanya perlu menginput BAST, tanpa harus bertemu untuk menyerahkan dokumen BAST kepada bagian operasional
Pengecekan dokumen	*Upgrading*	Pengecekan dokumen dapat dilakukan bersamaan dengan proses update data pengiriman

4.5. Improvements

With reference to Astuti & Apriliana (2018), the use of an e-system in the VSM method to optimize operational systems and distribution effectiveness after the streamlining process of the previous distribution process flow, here are the recommended outcomes to make the operational distribution flow more effective:

Table 6
Improvement

No	Activity *Processing Time*	Time (Minute)
1	Order from consumer	0
2	Input _ _ order to *the e-system*	5

ISSN: 2622-5778 (online)
Advances in Transportation and Logistics Research
http://proceedings.itltrisakti.ac.id/index.php/altr

3	Driver download letter road in *e-system*	5
4	Driver take goods	120
5	Driver do load goods	60
6	Driver send goods	120
7	Driver do demolish goods	60
8	News program hand over accept goods	5
9	Driver input BAST from consumer to e-system	5
10	Checking And updates document in e-system	5
11	Billing to consumer	0
	Total	**385**

In the new distribution process flow, several processes have been eliminated, and the time for these processes has been adjusted to be more effective. Through brainstorming with the operational distribution supervisor, it was found that eliminating various wastes in the previous distribution process flow significantly reduced the time required. Previously, it took 940 minutes, but by removing waste and making the process more effective, it was reduced to 439 minutes, with a breakdown of 385 minutes of processing time and 54 minutes of lead time in the distribution flow.

Table 7
Percentage of Effectiveness

Activity Time	Activity Time Proposal	Effectiveness Percentsge
90 Minutes	**439 Minutes**	**46.7%**

The percentage of effectiveness resulting from the current activity process compared to the proposed activity process was found to be 46.7%. This calculation was performed by dividing 439 minutes by 940 minutes and then multiplying by 100%.

4.6. Future State Mapping

ISSN: 2622-5778 (online)
Advances in Transportation and Logistics Research
http://proceedings.itltrisakti.ac.id/index.php/altr

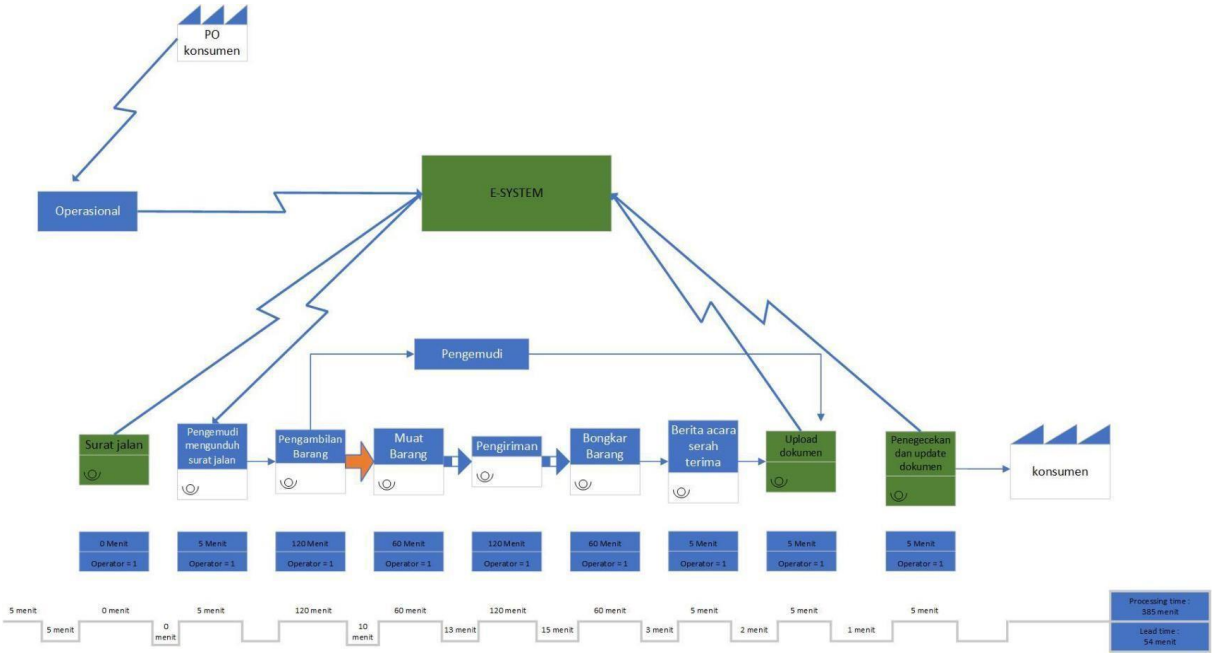

Fig. 3 Future State Mapping

In the distribution flow results that have been discussed with the supervisor and operational manager at PT. WM, the flow is as shown in Figure 3. Customer orders are emailed to the operational department, and then the operational department takes 5 minutes to input the order into the E-system. After the input is completed, the driver can download the waybill from the E-system, which is in digital form, taking 5 minutes in the process.

Afterward, the driver can proceed to the location for picking up the goods, which takes 120 minutes in travel time. Upon arrival at the goods collection point, the driver spends 60 minutes loading the goods into the vehicle. When the goods are loaded, the driver can proceed directly to the destination for delivering the goods, which takes 120 minutes in travel time. Upon arrival at the destination, the driver spends 60 minutes unloading the goods.

After finishing unloading the goods, the driver creates a document for the handover of the goods to the recipient, which takes 5 minutes. Once the handover is complete, the driver uploads the document to the E-system, requiring 5 minutes. After the document is in the E-system, the operational department checks and updates the delivery document, taking 5 minutes, and then forwards it to the finance department for invoicing the delivery service fees.

5. Conclusion

ISSN: 2622-5778 (online)
Advances in Transportation and Logistics Research
http://proceedings.itltrisakti.ac.id/index.php/altr

In the distribution flow results that have been discussed with the supervisor and operational manager at PT. WM, the flow is as shown in Figure 3. Customer orders are emailed to the operational department, and then the operational department takes 5 minutes to input the order into the E-system. After the input is completed, the driver can download the waybill from the E-system, which is in digital form, taking 5 minutes in the process.

Afterward, the driver can proceed to the location for picking up the goods, which takes 120 minutes in travel time. Upon arrival at the goods collection point, the driver spends 60 minutes loading the goods into the vehicle. When the goods are loaded, the driver can proceed directly to the destination for delivering the goods, which takes 120 minutes in travel time. Upon arrival at the destination, the driver spends 60 minutes unloading the goods.

After finishing unloading the goods, the driver creates a document for the handover of the goods to the recipient, which takes 5 minutes. Once the handover is complete, the driver uploads the document to the E-system, requiring 5 minutes. After the document is in the E-system, the operational department checks and updates the delivery document, taking 5 minutes, and then forwards it to the finance department for invoicing the delivery service fees.

6. Implications

In the distribution flow results that have been discussed with the supervisor and operational manager at PT. WM, the flow is as shown in Figure 4.3. Customer orders are emailed to the operational department, and then the operational department takes 5 minutes to input the order into the E-system. After the input is completed, the driver can download the waybill from the E-system, which is in digital form, taking 5 minutes in the process.

Afterward, the driver can proceed to the location for picking up the goods, which takes 120 minutes in travel time. Upon arrival at the goods collection point, the driver spends 60 minutes loading the goods into the vehicle. When the goods are loaded, the driver can proceed directly to the destination for delivering the goods, which takes 120 minutes in travel time. Upon arrival at the destination, the driver spends 60 minutes unloading the goods.

After finishing unloading the goods, the driver creates a document for the handover of the goods to the recipient, which takes 5 minutes. Once the handover is complete, the driver uploads the document to the E-system, requiring 5 minutes. After the document is in the E-system, the operational department checks and updates the delivery document, taking 5 minutes, and then forwards it to the finance department for invoicing the delivery service fees.

7. Research limitations

With the limitations of the research timeframe, the scope of this research is the analytical tool employed in this research is value stream mapping. The research object is to identify waste

ISSN: 2622-5778 (online)
Advances in Transportation and Logistics Research
http://proceedings.itltrisakti.ac.id/index.php/altr

within the distribution activities conducted by PT. WM, which operates in the freight forwarding industry. The research assumes that deliveries are made using land transportation routes. The number of required workers is assumed to be equal.

References

Abryandoko, E. W. (2019). Studi Penerapan Value Stream Mapping Untuk Mengurangi Pemborosan Pada Proses Supply Chain (Studi Kasus di Home Industry Batu Bara Merah Di Desa Ledok Kulon Kabupaten Bojonegoro. Industrial Engineering National Conference.

Ahmad, F., & Aditya, D. (2019). Minimasi Waste Dengan Pendekatan Value Stream Mapping. Bandung.

Asnawi. (2013). Efektivitas Penyelenggaraan Publik Pada Samsat Corner Wilayah Malang Kota. Malang.

Astuti, R. D., & Apriliana, F. S. (2018). Penerapan Value Stream Mapping (VSM) Untuk Mengurangi Keterlambatan Proses Pengadaan Barang dan Jasa di PT. X. Jakarta.

Bowersox, D. (1999). Lean Launch: Managing Product Introduction Risk Through Response-Based Logistics. Production Innovative Management.

Cangara, H. (2006). Pengantar Ilmu Komunikasi. Jakarta : PT. Raja Grafindo Persada.

Fitriah, W. (2007). Peranan / Tujuan Freight Forwarder . Jakarta. Gaspersz, V. (2005). Integrated Performance Management System The Balanced Scorecard With Six Sigma In A Production Enterprise. Jakarta : Gramedia Utama.

Gaspersz, V., & Fontana, A. (2011). Lean Six Sigma for Manufacturing and Services Industries, Waste Elimination, and Continous Cost Reduction. Bogor.

Graban, M. (2009). Lean Hospitals Improving Quality, Patient Safety, and Employee Satisfaction. Taylor & Francis Group.

Hambajawa, D. L., Handoko, F., & Kiswandono. (2020). Implementasi Lean Distribusi Untuk Mengurangi Lead Time Pengiriman Semen Holcim Pada Distribusi Jalur Darat Di Pt. Bumi Pembangunan Palembang. Malang.

ISSN: 2622-5778 (online)
Advances in Transportation and Logistics Research
http://proceedings.itltrisakti.ac.id/index.php/altr

Handayaningrat, S. (1995). Pengantar Studi Ilmu Administrasi dan Manajemen. Jakarta : PT. Toko Gunung Agung.

Hines, P., & Taylor, D. (2000). Going Lean : A Guide to Implementation Enterprises Research Centre. UK: Cardiff University.

Hutahaean, J. (2014). Konsep Sistem Informasi. Yogyakarta. Karundeng, T., Mandey, S., & Sumarauw, J. (2018). Analisis

Saluran Distribusi Kayu (Studi Kasus Di CV. Karya Abadi). Jurnal EMBA : Jurnal Riset Ekonomi, Manajemen, Bisnis, dan Akutansi.

KBBI. (2022). Kamus Besar Bahasa Indonesia.

Kim, D., & Kummar, V. (2006). Relationship Between Quality Management Practices And Innovation. Operation Management.

Kotler, P. (2001). Manajemen Pemasaran : Analisis, Perencanaan, Implementasi, dan Kontrol. Jakarta : PT. Prehallindo.

Kurniawan, A. (2005). Transformasi Pelayanan Publik. Pembaruan.

Moriza, D., Adianto, H., & Nurdiansyah, Y. (2016). Rute Pendistribusian Air Mineral Dalam Kemasan Menggunakan Metode Nearest Neighbor dan Branch and Bound Di PT. Agronesia BMC. REKA INTEGRA.

Murnawan, H. (2011). Evaluasi Produktivitas Dengan Metode Fishbone Di Perusahaan Percetakan Kemasan PT. X. Jakarta.

Mursid, M. (2014). Manajemen Pemasaran. Jakarta : PT. Bumi Aksara.

Musselman, V., & Jackson, J. (1994). Pengantar Ekonomi Perusahaan. Jakarta : Erlangga.

Pandiangan, & Liberty. (2008). Modernisasi Dan Reformasi Pelayanan Perpajakan Berdasarkan Undang-Undang Terbaru. Jakarta : PT. Elex Media Komput.

Poerdwadarminta. (1997). Optimalan Biaya. Bandung. Pramujaya, V., & Kurniawati, D. A. (2019). Analisis Penyebab

Kegagalan Packer Machine Pada Bag Transfer System Dengan Menggunakan Metode Fault Tree Analysis (FTA), Failure Mode and Effect Analysis (FMEA), dan Fishbone Analysis. Jakarta.

ISSN: 2622-5778 (online)
Advances in Transportation and Logistics Research
http://proceedings.itltrisakti.ac.id/index.php/altr

Pujawan, N., & Priskandana, R. (2010). Simulasi Value Stream Mapping Untuk Perbaikan Pada Proses Produksi Pelumas. Surabaya.

Puspitawati, L., & Anggadini, S. (2011). Sistem Informasi Akutansi. Yogyakarta : Graha Ilmu.

Putri, M., Rosmayani, R., & Rosmita, R. (2018). Analisis Faktor- Faktor Yang Mempengaruhi Saluran Distribusi Usaha Kecil Menengah (ukm). Valuta.

Reichhart, A., & Holweg, M. (2007). Lean Distribution : Concepts, Contributions, Conflicts. International Journal of Production Research.

Rizaldy, W., Rifni, M., Setiawan, A., Agustina, I. L., Permadi, A., Irhamna, N., . . . Subandrio, J. (2017). Manajemen Multimoda Transportation Dan Freight Forwarder. IN Media.

Rother, M., & Shook, J. (2009). Value Stream Mapping to Create Value and Eliminate Muda. Cambridge.

Silalahi, U. (2009). Metode Penelitian Sosial. Refika Aditama. Siregar, M. T., & Puar, Z. M. (2018). Implementasi Lean Distribution Untuk Mengurangi Lead Time Pengiriman Pada Sistem Distribusi Ekspor. Jakarta.

Siringoringo, H. (2005). Pemrogaman Linear : Seri Teknik Riset Operasi. Yogyakarta : Graha Ilmu.

Siswati, D., & Jannah, M. (2010). Analisis Penerapan Lean Manufacturing Untuk Mereduksi Over Production Waste Menggunakan Value Stream Mapping Dan Fishbone Diagram. Malang.

Steers, & Richard, M. (1985). Efektivitas Organisasi. Jakarta : Erlangga.

Sudaryana, B. (2017). Metode Penelitian. Deepublish. Sugiyono. (2015). Metode Penelitian Kombinasi (Mix Method). Alfabeta.

Sujarweni , W. (2015). Sistem Akutansi. Yogyakarta : Pustaka Baru Press.

Susanto, A. (2013). Sistem Informasi Manajemen. Bandung. Swastha, B. (1998). Manajemen Penjualan Edisi Tiga. Yogyakarta : BPFE.

Syamsi, I. (1994). Pokok - Pokok Organisasi & Manajemen. Jakarta : Rineka Cipta.

ISSN: 2622-5778 (online)
Advances in Transportation and Logistics Research
http://proceedings.itltrisakti.ac.id/index.php/altr

Tambunan, R. A., Handayani, N. U., & Puspitasari, D. (2018). Penerapan Lean Manufacturing Menggunakan Value Stream Mapping (VSM) Untuk Identifikasi Waste & Performance Improvement Pada UKM "Shoes and Care". Semarang.

Tjiptono, F. (2008). Strategi Pemasaran, Edisi Ketiga . Yogyakarta.

Wistyanto, & Intifada, S. (2012). Minimasi Waste Menggunakan Value Stream Mapping Analysis Tools Untuk Meningkatkan Efisiensi Waktu Produksi. Surabaya.

Womack, J., Jones, D. T., & Roos, D. (1991). The Machine That Changed the World. HapperCollins.

Yola, M., Wahyudi, F., & Hartati, M. (2017). Value Stream Mapping Untuk Mereduksi Waste Dominan dan Meningkatkan Produktivitas Produksi di Industri Kayu. Pekanbaru.

Zylstra, K. (2006). Lean Distribution : Menciptakan Jalur Distribusi Yang Ramping, Logistik, Dan Supply Chain Yang Ramping, Hemat Biaya, Efektif Dan Responsif Terhadap Kebutuhan Pelanggan. Jakarta : PP.