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Application Of The 5S Method to Minimize Waiting Waste at The Yanti Shop, Brebes Regency

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ABSTRACT

This research aims to overcome the problem of waste waiting, especially long queues, faced by Toko Yanti, a grocery store in Brebes Regency, Central Java Province. The approach applies the 5S method (Seiri, Seiton, Seiso, Seiketsu, Shitsuke). The steps involve sorting items, improving layout, arranging items, designing storage areas, implementing work rules, and ongoing evaluation. Observations before implementation show ρ (utilization) is more than one, indicating queue buildup. After implementing 5S, the value of ρ (utilization) becomes less than one, which means there is no accumulation. The implementation of the 5S method succeeded in minimizing waste waiting and increasing service efficiency at Toko Yanti. This process shows increased service resources and reduced queues, which are important indicators of a store's operational efficiency. The results of this research can be used as a reference for similar businesses to increase productivity and customer satisfaction. The 5S approach can also help reduce queue build-up and increase service efficiency in various types of businesses.

Keywords: *ρ (utilization), 5S Method, Queue Stacking, Grocery Stores, Waste Waiting*

Introduction

Business competition is increasingly fierce, especially in the middle to upper class. Companies must pay attention to consumer needs and optimize services to remain competitive. Long queues and slow service can frustrate consumers and even cause them to abandon transactions. Physical and online stores are the main place for everyday purchases [1].

As one of society's most familiar types of stores, grocery stores offer daily necessities and are often independently owned. In Indonesia, grocery stores dominate the retail market, especially in areas such as Brebes Regency, where Toko Yanti is one example. With millions of retail stores in Indonesia, grocery stores remain the main choice for consumers because of their abundant availability and presence in almost every region[2].

Toko Yanti, located on Jalan Wanagati No 17, Klampok Village, Wanasari District, Brebes Regency, Central Java, is a privately owned grocery store established in the area in 2000, as shown in Figure 1. This shop provides various necessities, such as rice, oil, sugar, coffee, milk, soap, shampoo, instant noodles, and cigarettes. Most customers come from the local community, buying retail and wholesale[3]–[6].

With an area of 5 meters x 5 meters, Toko Yanti has a common sales system in grocery stores. When the buyer arrives, the order will be recorded in a receipt for payment transactions, although some goods can be taken directly by the buyer without intermediary employees[7]–[9]. For buyers who order online via chat or telephone, the order will be prepared after a note has been made and verified by the shop owner, Mrs. Yanti. After payment is made, buyers can immediately take their order home.

To serve buyers, the Yanti Shop has various facilities such as shelves, display cases, showcase refrigerators, ice cream freezers, scales, and warehouses for storing goods. However, the observations show that the layout of goods and facilities at the Yanti Shop is still very disorganized, especially in display cases, which should be used to place merchandise[7], [10].

The description of the observations shows that items are not well organized, with shampoo, clothes freshener, floor freshener, baby food, condiments, and coffee sachets piled up without clear groups. Shop owners stated that inconsistent work procedures by waiters were often the main cause of such irregularities. This problem causes customer service difficulties because finding the goods buyers

request becomes more difficult and time-consuming. This also results in a buildup of queues of buyers, especially during peak hours. Observations on 28 May 2023 recorded the number of arrivals and customers served at Toko Yanti, showing the direct impact of irregularities in the layout of goods on store performance[11]–[14].

Table 1. Time To Search for Items In Yanti Store

Types of Goods	Search time (Seconds)
Clothes brush	83
Electrical equipment	94
Medicine for headache	97
Plastic size 1/4	131
Total Time	405 seconds/6.75 minute

According to Toko Yanti, the store experienced a significant queue buildup. The arrival rate reached 16 buyers every 45 minutes, while the service level could only handle 12.33 buyers every 45 minutes. This indicates that the queue conditions do not meet the steady state, which can result in a buildup of queues and the potential for buyers to leave the shop because they wait too long.

In Table 1, searching for items at Toko Yanti takes quite a long time, with an average search for one item reaching 6.75 minutes. This problem is related to the irregular layout of goods in the store, which also occurs in the warehouse storage area. Warehouses measuring 2 x 2.5 meters store goods by stacking cardboard boxes without clear grouping, making it difficult to find and retrieve goods. Therefore, this condition disrupts service and creates a buildup of queues at the Yanti Shop.

Figure 1. Yanti Shop

Figure 2. Yanti Shop Warehouse

The problems that occurred in the Yanti Store's warehouse area were caused by the arrangement of goods that were not organized or not properly arranged, as in Figure 2. The goods in cardboard packaging were stacked irregularly, so several items that should not be close together were placed together, such as cardboard mosquito repellent piled with instant noodle cartons and sauce cartons. In addition, the messy pile of cardboard makes some boxes closed and difficult to reach, making it difficult to collect items. Even though the warehouse is small, the arrangement of goods should be optimized to utilize them efficiently. The main factors influencing problems at Toko Yanti include man, method, environment, machine, and material, which are depicted through the fishbone diagram in Figure 3.

Based on the analysis in Figure 3, several factors cause queues to build up at Toko Yanti. Human factors include the difficulty of workers in finding and retrieving goods, the owner's limitations in checking goods and transactions, and buyers who buy in large quantities. The method factor is related to the absence of a proper place method[1], [2], [15], [16]. Environmental factors include narrow store circulation and the simultaneous arrival of buyers. Machine factors include the absence of tools such as cash registers and instructions to speed up the search for goods[17], [18]. Material factors relate to the number of items that are not placed in their proper place. The Yanti Shop owner wants a solution without increasing the shop area or changing the existing service system, while the workers want a solution that makes it easier to find and retrieve goods to minimize queue times

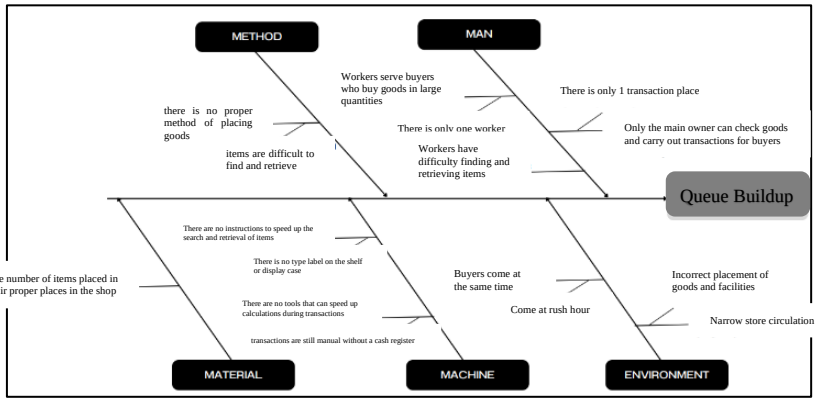

Figure 3. Fishbone Causes Queue Backup

From the selection of alternative solutions that have been carried out based on analysis of the fishbone diagram and assessment of potential solution criteria, it is concluded that applying the 5S method to overcome the queue buildup problem at the Yanti Store is a top priority. Therefore, the problem formulation for this research is how to reduce waste waiting by overcoming the buildup of queues at the Yanti Shop, Brebes Regency. The research aims to provide suggestions and implement solutions to overcome this problem, while the benefits are to improve shop conditions and reduce waste waiting due to the buildup of queues at the Yanti Shop. Thus, it is hoped that this research can positively contribute to shop owners and customers in improving the efficiency and quality of service at Yanti Shop.

Research Methods

At this stage, the data needed for research will be collected at Toko Yanti, Brebes Regency. This data is obtained from either direct or real-time data.

Data Collection Techniques

The data obtained in this research consists of two types, namely primary data and secondary data. Primary data was obtained through direct observation, including information about the shop layout, actual shop conditions, number of queues, facilities, and goods available. On the other hand, secondary data comes from store documents, specifically weekly sales data, which will be used to analyze the most frequently sold products. After data collection, the next stage is data processing, which uses the 5S method[19]–[22]. This data processing stage involves sorting, identification, cleanliness checking, maintenance, and evaluation to obtain improvement proposals appropriate to the required shop conditions. This process is expected to help improve overall store conditions and productivity.

Research Flow Diagram

Figure 5 below is a systematic problem solving, where it can be seen that the systematic problem-solving in this research is divided into five stages, namely in the form of a preliminary stage, data collection stage, data processing stage, data analysis stage, and the final stage, namely in the form of conclusions and suggestions.

This research's proposal and analysis stages were based on data processing from the 5S method, which consists of seiri, seiton, seiso, seiketsu, and shitsuke[23]–[25]. The improvement proposals include designing and implementing various 5S steps to improve shop conditions. For example, at the seiri stage, there is sorting of goods and identification of items that are frequently sold. In contrast, at the seiton stage, there are proposals for improving the layout and rearranging goods in storage areas. Next, the seiso stage involves designing proposals for trash cans and cleaning equipment and implementing routine cleaning activities.

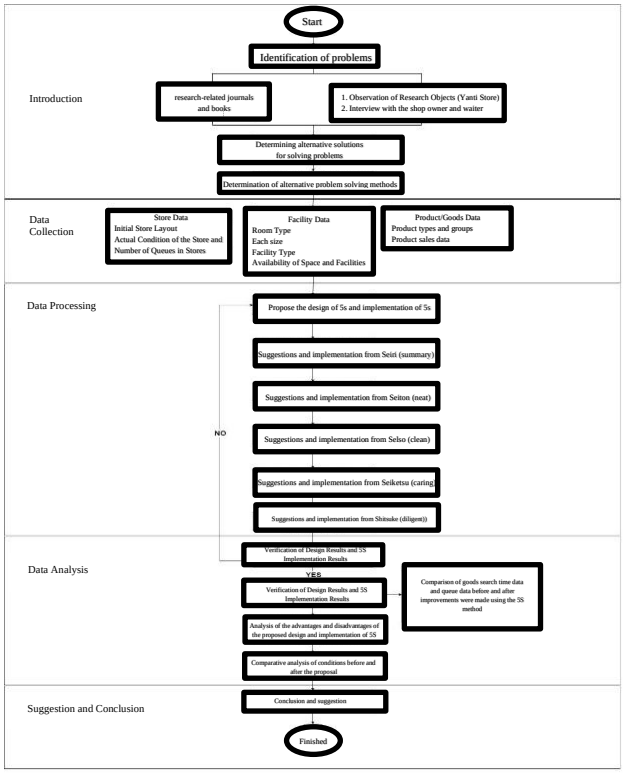

Figure 4. Flow Diagram

The analysis stage involves verifying the results of the proposed design and implementation of 5S to ensure suitability for store conditions. Apart from that, validation was carried out by comparing queue conditions before and after implementing 5S to determine the impact of the changes that occurred. In the closing stage, this research concludes the success of implementing the 5S method in minimizing waste waiting and offers suggestions regarding design proposals that cannot yet be implemented directly. Assumptions in this research include a consistent number of facilities and products daily and a stable number of goods sold weekly.

Results and Discussion

Toko Yanti is a grocery store that was established in 2000. It is located on Jalan Wanagati No. 17, Brebes Regency, Central Java. This shop provides various daily necessities such as rice, sugar, oil, milk, shampoo, soap, etc. Owned by Mrs. Riyanti, this shop has one worker who helps in serving customers. Yanti Shop operational hours start from 07.00 WIB to 21.00 WIB daily, from Monday to Sunday. Before repairs were carried out, this shop had a layout which can be seen in Figure 5.

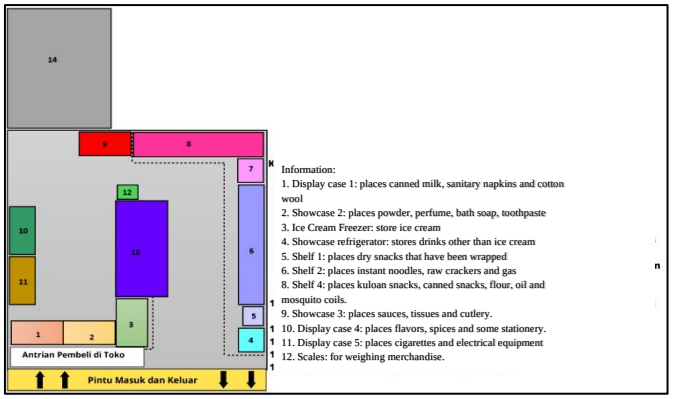

Figure 5. Initial Layout of The Yanti Store

Based on Figure 5, the Yanti Store has several facilities such as shelves and display cases for storing merchandise. Several areas, such as the showcase refrigerator, snack rack, noodle and gas storage rack, sandal storage area, kilo snack rack, oil, flour, and ice cream freezer, allow customers to take their own items. However, for items stored in the display case facing the shopkeeper, customers need to ask the shopkeeper for help to retrieve them.

Room Type

The following are the types of rooms and sizes available at the Yanti Shop.

Table 2. Yanti Shop Room Type

Type of Room	Length (m)	Width (m)	Breadth(m2)
Yanti Shop	5	5	25
Warehouse Yanti Shop	2.5	2	5

Based on Table 2, it shows that the Yanti Shop consists of two rooms: a shop and a warehouse. The shop has dimensions of 5 meters x 5 meters, while the warehouse has 2.5 meters x 2 meters. In function, the shop is used for buying and selling activities and placing merchandise, while the warehouse stores goods in large quantities.

Table 3. Yanti Shop Room Type

Facilities Name	Length (cm)	Width (cm)	Height (cm)
Display window 1	100	50	200
Display window 2	100	50	100
Freezer ice cream	100	60	70
Showcase Refrigerator	50	50	150
Rak 1	40	40	100
Rak 2	250	50	200
Rak 3	50	50	100
Rak 4	250	50	200
Display window 3	100	50	200
Display window 4	100	50	200
Display window 5	100	50	200
Scales	40	30	15
Display window 6	200	100	120
Warehouse	259	200	300

Table 3 shows the various facilities available at the Yanti Shop and their length, width, and height dimensions. There are 14 facilities, including display cases, ice cream freezers, showcase refrigerators, shelves, scales, and warehouses. Each facility has a special role and function implemented in Toko Yanti's operations.

Proposed 5S Method

a. Seiri (Concise)

Seiri is the first stage in the 5S method, which involves arranging goods and tools that are still needed from those not in Toko Yanti. This step aims to make finding goods easier for workers and increase customer service efficiency. This process includes grouping goods by category, identifying often or rarely sold goods, and sorting damaged or expired goods from those still worth selling.

Table 3. Grouping Categories of Goods and Facilities

Symbol	Goods/Facilities Category	Storage Method
A	Merchandise required	Stored according to the facilities in the shop or warehouse
B	Unnecessary merchandise	Eliminated in shop or warehouse areas
C	Required facilities	Stored in the shop or warehouse area
D	Unnecessary facilities	Eliminated in shop or warehouse areas
E	Unnecessary non-merchandise items	Eliminated in shop or warehouse areas
F	Rubbish	Thrown away

Implementation of seiri at Toko Yanti involves grouping goods and facilities and identifying items that need to be stored or thrown away. Grouping goods and facilities, identifying goods and facilities, and identifying frequently and rarely sold goods allows Toko Yanti to manage inventory more efficiently. The results show that food, cigarettes, and drinks are the items most frequently sold at Toko Yanti. Seiri helps stores optimize services and better manage inventory.

b. Seiton (Neat)

The step after seiri is the seiton stage, where items are arranged according to their place and proposals for improving facilities are carried out. This principle aims to make it easier for buyers to find and retrieve goods and reduce store service time. This stage is important to increase efficiency and reduce buyer queues at the Yanti Store. See figure 6

The improved shelf design with the addition of stairs aims to make it easier to access tall items. Using sliding stairs also considers the buyer's space around the shelves. Implementation of this design in the store requires owner approval and adequate budget allocation. The process of applying this design can also be applied to the warehouse area to maintain orderly goods.

c. Seiso (Rehearsal)

The seiso or cleanliness stage in the 5S method involves cleaning the shop and warehouse areas. The goal is to remove trash and dust and maintain cleanliness, providing comfort for owners and customers. Observations at the Yanti Shop showed problems such as piles of used cardboard and cans in front of the shop due to limited storage space and cleaning equipment. See figure 7

Figure 7 shows the design of a used cardboard and can storage device with two storage areas, each 50 cm wide. This size was chosen based on the average size of cardboard, ranging from 39 cm to 50 cm. This adjustment allows oversized cardboard boxes to be folded for storage. Even though the design has been created, its implementation cannot yet be carried out because it requires costs and time in the design process. Therefore, this design is only a proposal to the shop owner to consider its application in the work area. See figure 8

Figure 8 shows the dimensions of the height of the cleaning equipment storage area adjusted to the average height of workers and shop owners, which is around 143 cm. The proposed design for this storage area is made of aluminum because this material is heat resistant, suitable for placement in work areas. The design of the cleaning equipment storage area results from a proposal that can make it easier to use cleaning equipment in the shop. See figure 9

In designing the trash cans at Toko Yanti, two types were prepared for organic and inorganic waste. The trash can is planned to be 143 cm long, in accordance with the average height of shop owners and employees. The width of the trash can is set at 40 cm, adjusted to the available space. Trash bins are planned in green for organic waste and yellow for inorganic waste. Even though the design cannot yet be realized, buckets are temporarily used to keep the shop area clean.

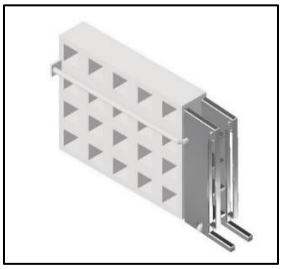

Figure 6. Proposed Storage Shelf Improvements

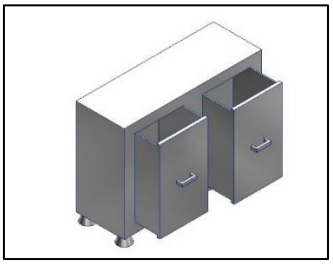

Figure 7. Proposed Storage Shelf Improvements

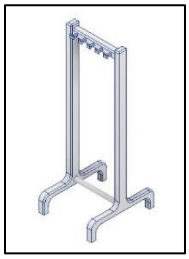

Figure 8. Cleaning Equipment Storage Place

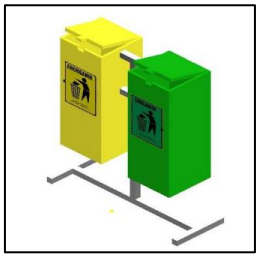

Figure 9. Proposed Trash Can

d. Seiketsu (Rawat)

The fourth stage of the 5S method is Seiketsu, which is carried out to maintain activities from the previous 3S stages (seiri, seiton, and seiso). This seiketsu stage is the responsibility of Yanti workers or shop owners to maintain the continuity of 3S. Therefore, there is a need to propose regulations that workers or shop owners can implement to create and maintain good and consistent performance. Based on the conditions at the Yanti Shop, this shop still does not have work rules that can enable workers or shop owners to be consistent and responsible for maintaining the comfort and cleanliness of the shop area. Therefore, it is necessary to have work rules and ensure that workers or owners maintain cleanliness consistently. It is also necessary to make a picket schedule or schedule for cleaning the shop in Table 6.

Table 4. Yanti Store Cleaning Schedule

Areas	Time	Days						
		Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
Shop	06.00	Shop's Owner	Shop's Owner	Shop's Owner	Shop's Owner	Shop's Owner	Shop's Owner	Shop's Owner
	22.00	Worker	Worker	Worker	Worker	Worker	Worker	Worker
Warehouse	06.00	Shop's Owner	Shop's Owner	Shop's Owner	Shop's Owner	Shop's Owner	Shop's Owner	Shop's Owner
	22.00	Worker	Worker	Worker	Worker	Worker	Worker	Worker

A schedule of cleaning activities, as listed in Table 6, has been prepared for shop owners and staff. The hours set in this schedule are adjusted to the times before and after the shop opens. The shop owner is responsible for cleaning activities in the morning because he is usually in the shop area at that time. At the same time, the staff has a cleaning schedule in the evening after the shop closes.

e. Shitsuke (Diligent)

The fifth stage of the 5S method, namely Shitsuke, involves getting shop owners and workers accustomed to consistently implementing the procedures set out in the previous 4S. This aims to maintain motivation and consistency in maintaining the work area. Suggestions such as designing displays in the form of posters and creating audit checklists are important to remind and ensure that the 5S method is implemented effectively.

Figure 10. Proposed Trash Can

When making a display in the form of a poster, it is important to pay attention to the size of the letters so that they are easy to read. Additionally, the characteristics of a good poster include a clear idea for achieving a goal, writing that is easy to read, and the use of primary colors that attract the reader's attention. The poster design for Toko Yanti uses three primary colors: blue, red, and yellow.

Implementation of 5S Method Evaluation Using Audit Check sheet

The shop owner evaluates the 5S method implementation through an audit check sheet every month. These check sheets assess the five aspects of 5S using a rating scale from 1 to 5. The higher the weight value given, the more successful the implementation of 5S is considered. The expected total score for an 'excellent' condition is 90, calculated based on a formula shown below

$$\text{Total Score 5S (\%)} = \frac{\text{Total Score}}{90} \text{ x } 100\% \quad (1)$$

Based on the scores above, the practice of implementing the 5S method at Toko Yanti has also had a positive impact on all parties involved. These habituation activities positively change the efficiency, productivity, and orderliness of work in the shop. Before starting a 5S program, it is important for shop owners and workers to understand the 5S concept well. 5S practice can be done through routine briefings held every Monday before the shop opens, where the owner conveys important information regarding implementing rules, cleaning activities, audits, and the importance of 5S practice. Apart from that, awards in the form of rewards can also be given to workers who successfully implement 5S well every six months, as a form of appreciation for consistency in maintaining the work area in accordance with established rules.

5S analysis

Analysis of the implementation of 5S activities is carried out to identify necessary improvements and evaluate the effectiveness of 5S proposals and implementation. Through this analysis, relevant information regarding store conditions can be obtained, enabling informed decisions. The analysis table outlines the advantages and disadvantages of the proposal and implementation of 5S at each stage. For example, sorting goods increases efficiency in the Seiri (Concise) stage but requires time and effort. Meanwhile, identifying frequently and rarely sold items helps stock management, but collecting data manually takes longer.

Likewise, at the Seiton (Neat) stage, improving the store layout can increase buyer comfort but requires sufficient time and effort. Furthermore, making product labels makes it easier to find buyers, but changing labels takes time. At the Seiso (Resik) stage, the proposed storage area design for used cardboard and cans cannot yet be implemented because it requires money and time. Likewise, with designing cleaning equipment storage areas and trash cans.

At the Seiketsu (Treatment) stage, designing work rules can improve discipline, but it requires time to adapt. Finally, at the Shitsuke (Diligent) stage, making 5S posters can increase awareness, but

monotonous posters can confuse readers. Likewise, the existence of a 5S audit checksheet is effective if supported by user awareness. Briefing and rewards can help people get used to 5S, but it requires a lot of time and adaptation. This analysis is the basis for developing and improving the implementation of 5S in Toko Yanti.

Conclusion

Based on research at Toko Yanti, it was concluded that the store experienced a buildup of queues due to conditions that were not neatly organized and storage facilities that were ineffective. The proposal and implementation of the 5S method is carried out in the stages Seiri (Concise), Seiton (Neat), Seiso (Tidy), Seiketsu (Careful), and Shitsuke (Diligent). Observations show decreased queue buildup after 5S implementation, indicating increased efficiency. The suggestion for this research is to apply 5S consistently and implement 5S design proposals that have not been implemented to maximize effectiveness.

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