The monozukuri concept as the right 5S implementation tool in Jakarta Vocational High Schools

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Abstract. The concept of monozukuri as the implementation of 5S will have an impact on changes in the environment and work procedures towards a better direction. This development can also affect the mindset of ignorance of the environment itself. In general, the dream of every society expects a clean, neat, safe, comfortable environment to be maintained around. In achieving a clean and healthy environment, one of the patterns of approach that will be taken is to apply the 5S lifestyle that will improve the performance of the Vocational High School teachers in Jakarta. How does the monozukuri concept with the implementation of 5S affect the performance of teachers in Vocational High Schools which aims to create a work environment that is free of obstacles and produces work effectiveness. The work method is carried out starting with creating a questionnaire Likert scale based on 5S implementation variables. Provisions on the judge's approach to the number of respondents and then the pre-questionnaire test and the results will be tested for validity for the validity of each questionnaire as a parameter of actual data collection. The results of actual data collection will be tested for validity and then analyze the effect of dominant 5S / R by multiple regression methods.

1. Introduction
The increasingly rapid development of technology demands an increase in the skills of human resources in order to create something more quality. Ideas held by a human being, especially in designing work systems, in this case the design of the workspace, need to be poured in a physical form in order to increase the effectiveness of work time and the quality of human resources.

Japanese society has a philosophy of "Monozukuri" which has been rooted for a millennium. Armed with this philosophy, Japan succeeded in giving birth to various innovations in industrial technology systems. The concept of Monozukuri as an effective 5S implementation tool means having the spirit of building quality human resources, building a living culture and not just merely employing people, also producing the most efficient and value-added work processes. In this monozukuri concept instruments will be used in the 5S implementation [1-3].
2. Theoretical basis

2.1. Monozukuri

The word Monozukuri can be compared with the word "craftsmanship" in English, but with pressure on humans and their skills. Monozukuri emphasizes the word "mono" means goods and "zukuri" means the process of making. That means manufacturing. The word Monozukuri has a deeper meaning, which is about having a mind, the spirit to produce not only a very good product, but also the ability to continue to improve the production system and its processes [4,5].

Professor Takahiro Fujimoto from the Center for Manufacturing Management Research at the University of Tokyo, who is known as the Monozukuri theorist, defined Monozukuri as "duplicating design data into material" [1], and also "art, science and craft to make things" [2]. Japan Economic and Trade Organization (JETRO) explained Monozukuri as having the spirit of producing superior products and the ability to continuously improve production and process systems.

Companies have been designed to optimize their costs through existing system functions and programs. The existing quality system must maintain costs that do not support quality, as well as the existing purchasing system must keep prices from suppliers down and so on. All of this is done to make the right product in the right way for customers and develop technical competence in the spirit of mutual respect and cooperation of the team on the other side.

2.2. Monozukuri – Hitozukuri

Monozukuri cannot be separated from Hitozukuri ("hito" means human, and "zukuri" means process). Hitozukuri is the root of the tree, the strongest foundation. The formation of Hitozukuri is supported by innovation and productivity. Monozukuri is a tree trunk, which shows the process to develop. Monozukuri through Hitozukuri can be described as a tree, complete with roots, stems, fruits and leaves. Monozukuri through Hitozukuri can be described as a tree, complete with roots, stems, fruits and leaves. From here will grow stems that will produce fruit, as a tool for implementation in manufacturing, such as 5S (Seiri-Seiton-Seisho-Seiketu-Seisuke), 3G (Gemba-Genji-Gembutsu), 4R (Reduce-Reuse-Recycle-Recovery), 3M (Young-Mura-Muri), 8 waste (Down Time) [3] and others. The growing leaves show Kaizen which must be done continuously. And what will connect the processes to the roots, stems and fruit is Horenso (Houkoku-Renraku-Soudan). Here's the picture [1]. Shows the relationship between Monozukuri, Hitozukuri, 5S and Kaizen [6-8].

![Image of a tree with labels for Monozukuri, Hitozukuri, 5S, and Kaizen.](image-url)
2.3. Understanding, objectives and detail 5S

5S is a method of structuring and maintaining an intensive work area originating from Japan that is used by management in an effort to maintain order, efficiency, and discipline in the workplace while at the same time increasing the overall performance of the company. 5S is a five-step arrangement and maintenance workplace developed through intensive arrangement in manufacturing.

The purpose of 5S is to create a workplace that is normal / not normal to know. If the work in the field does not work well, the real reason is the view in a poor workplace environment. Bad view refers to the poor conditions of view in the progress of the work, and the poor outlook in the quality of work. Well, 5S is an effort to create a foundation to improve it [9,10].

2.3.1. Detail 5S consist of.

a. Seiri/Concise. The first step in maintaining the workplace is concise, relating to the activities of cloning the items contained in the building needed or not needed and removing unnecessary items from gemba.

b. Seiton/Neat. Neat means classifying items based on their use and arranging them adequately so that the effort and time to find / find are minimum. to implement this, all items must have a certain address and a certain volume.

c. Seiso/Rehearsing. Seisho means cleansing, then adjusted in the Indonesian spelling that is good and right to become rehearsal. Rehearsing is clean, so 5S Rehearsing is cleaning every piece of equipment and workplace from detailed dirt. Objects in implementing this concept are machines, work equipment and workplaces.

d. Seiketsu/care. Take care in Japanese Seiketsu which means personal discipline, like wearing clothes that are appropriate and clean. another understanding of concise is maintaining the condition that has been concise, neat, rehearsing every day continuously.

e. Shitsuke/Diligent. Diligent means personal discipline. People who practice concise, neat, receptive, and caring continuously and make this activity a habitual activity in their daily lives can call themselves having personal discipline.

2.4. Basic concepts of 5S

![Diagram of 5S concepts]

**Figure 2.** 5 S basic concepts.
To apply this concept and be able to see the positive impact of implementing 5S in the world of education, a study will be conducted that can see the final results of the philosophy of 5S which is the fruit of the monozukuri tree. It is expected that with some normative approaches in conventional application that will be compared with the 5S conceptual approach in a system, it will have an effect on improving the performance of an educational institution.

2.5. **Validity test**
Validity is level of compatibility of measuring instruments for measurement, which is really suitable to measure something that is being measured. In measuring validity need to be assessed the content and usefulness of a measuring instrument. for example, the number of working hours of a worker is useful for knowing the level of productivity, but it is not suitable to assess the level of loyalty to the company. In this case the working hours are accurate in assessing the level of productivity or a high level of validity [11].

2.6. **Reliabilities test**
Reliability is the provision or regularity of the tool in measuring what is measured. Means, whenever the measuring instrument is used it will give the same size results to occur for measuring a symptom, behavior, characteristics or individual traits etc. For example, measuring instruments of learning achievement such as learning outcomes tests, attitude measurement tools, questionnaires and others, would like to examine the regularity.

2.7. **Flow chart work activity**

![Flow chart work activity](image)

**Figure 3.** Flow chart work activity.

3. **Analysis of results**

3.1. **Validity test**
The results of the validity test for the questionnaire collected from respondents using the SPSS software program are as follows:
3.2. Reliability test

Table 1. Reliability description of statement part 1.

| Cronbach's Alpha | Information |
|------------------|-------------|
| Result           | Provisions  |
| 0.761            | 0.60        |

Reliable

Source: Data Collection (SPSS), 2018.

3.3. Data adequacy test

3.4. Determining dominant factors 5S
From this matrix correlation table, it will be seen how the relationship between one variable and another in the correlation section can be seen the magnitude of the correlation between variables. Then on the sig line (1-tailed) shows the significance of the correlation between these variable variables. the correlation between S21 and S34 is significant, it can be seen from the p-value of 0.000 (<0.05) which means that there is indeed a relationship between S21 and S34. Results obtained.

To apply this concept and be able to see the positive impact of implementing 5S in the world of education, a study was conducted that could see the final results of the philosophy of 5S which is the fruit of the monozukuri tree. It is expected that with some normative approaches in conventional application that will be compared with the 5S conceptual approach in a system, it will have an effect on improving the performance of an educational institution.

3.5. Multiple regression analysis
This analysis determines the Variable independent relationship to the dependent variable.

4. Conclusion
The most dominant factors that affect the performance of teachers are where the storage is clear with signs or codes that are easily understood and seen with a correlation value of 0.819.

Implementation of 5S on the performance of teachers and employees in maintaining the cleanliness of the work environment increased from 59.66% to 88.96%, namely: improving the performance of teachers and employees, where the performance of teachers and previous employees was 59.66% to 78.96%.

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