

# Improvement of Work Environment Governance Based on 6S (Sort, Set in Order, Shine, Standardization, Sustain, and Safety) Method

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Article History	Abstract
<p><b>Received:</b> 04 July 2025</p> <p><b>Revised:</b> 04 Aug. 2025</p> <p><b>Accepted:</b> 04 Aug. 2025</p>	<p>This study aims to improve work area governance at PT. XYZ, a telecommunications service provider, using the 6S method (Sort, Set in Order, Shine, Standardization, Sustain, and Safety). Employees at the maintenance unit reported discomfort due to poor organization and unclear operational standards. The research employed field observations, interviews, and a 6S identification form using a Likert scale to evaluate the current work environment. Results showed a total 6S score of 2.437, which was classified into the poor category. The "Set in Order" dimension scored the lowest (1.4), with root causes identified through a fishbone diagram. Recommended improvements include establishing clear SOPs, providing appropriate storage facilities, and conducting 6S training. These measures are expected to enhance employee awareness, reduce clutter, and improve safety. The findings emphasize the relevance of 6S in technical operational environments and its practical impact on work area efficiency and employee well-being.</p>
<b>Keywords</b>	6S; 6S Identification form; Fishbone diagram; Improvement; Work area
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## 1. INTRODUCTION

The Covid-19 pandemic has served as a major catalyst in accelerating digital transformation across industries in Indonesia. With a sharp rise in the number of internet users growing by over 10% annually, Indonesia is now ranked among the top five countries in global internet usage (Rajagukguk et al., 2024). This explosive growth in connectivity has placed significant pressure on telecommunication providers to deliver uninterrupted and high-quality services to meet the demands of a digitally reliant society (Hafizni & Fahmy, 2021).

In this context, PT XYZ a national telecommunications company operating in Sumatra plays a crucial role in ensuring infrastructure reliability. The company is responsible for conducting both preventive maintenance and emergency service restoration across its network. One of the key operational segments within PT XYZ is its Field Maintenance Division, which requires its employees to operate in a dynamic, on-site environment that demands speed, precision, and responsiveness.

However, initial assessments of this division revealed various problems that hinder work efficiency and employee comfort. Disorganized tools, unclear storage arrangements, and the lack of structured

procedures were frequently observed. These conditions not only reduce productivity but also contribute to delays and increase the likelihood of accidents or errors during operational tasks (Zhang et al., 2021). To gain deeper insights, the research team conducted a series of field observations and informal interviews with technicians and supervisors. The findings revealed a recurring set of issues: misplaced tools, absence of visual cues such as labels or directional signs, and low employee awareness regarding work area tidiness and accountability. These problems, though seemingly minor, collectively disrupt workflow and reduce operational efficiency (Hang, 2021).

Photographic documentation and written field notes provided visual evidence supporting these observations. Taken together, these qualitative insights emphasized the urgent need for a systematic improvement initiative. As a result, the 6S methodology comprising Sort, Set in Order, Shine, Standardization, Sustain, and Safety was selected as the framework for analysis and intervention. The 6S approach not only offers a structured strategy for workplace improvement but is also highly adaptable to high-mobility environments like PT XYZ's maintenance unit, where conventional work area management tools often fall short. By applying the 6S method, this study aims to evaluate current conditions, identify root causes of disorganization, and propose actionable recommendations that are both practical and sustainable.

## **2. LITERATURE REVIEW AND HYPOTHESIS DEVELOPMENT**

The 6S method comprising Sort, Set in Order, Shine, Standardization, Sustain, and Safety—is an enhancement of the widely applied 5S framework. While the original 5S approach focused primarily on work area organization and efficiency, the integration of “Safety” as a sixth pillar extends its utility toward occupational health and risk prevention (Dhouchak & Kumar, 2017). As noted by Anvari (2011), the inclusion of Safety ensures that work area improvements not only promote productivity but also mitigate hazards and enhance employee well-being.

Early applications of the 6S method have demonstrated benefits in small-scale industries. Nadira et al. (2020) and Maizir et al. (2020), for example, observed improvements in tidiness, workflow efficiency, and equipment management in SMEs and local workshops. Similarly, Priska et al. (2020) documented how 6S implementation in a workshop environment led to reductions in time waste and workplace incidents.

In more recent developments, Misiurek and Misiurek (2020) explored how the 6S system could be systematically applied in the construction sector through the Plan-Do-Check-Act (PDCA) cycle. Their findings emphasized the importance of structured planning and ongoing feedback, particularly in high-risk environments, where the Safety component plays a vital role. In a manufacturing context, Lestyánszka Škúrková (2022) implemented the 6S framework in a technical textile company, reporting functional improvements across production areas and observing that 6S became an embedded part of company culture.

Further, Irawati (2019) studied the influence of 6S culture on operator performance in the machining and welding division of PT Cameron Systems Batam. Although some individual components had statistically insignificant effects, their simultaneous application was found to positively influence overall employee performance, particularly when the Sustain component was consistently upheld.

Despite these promising outcomes, the existing body of literature remains largely focused on stable industrial or manufacturing environments. Studies applying the 6S framework in fast-paced, technical service sectors, such as telecommunications field maintenance are still limited. These environments are characterized by spatial unpredictability, frequent mobility, and the need for real-time response, which pose unique challenges to maintaining work area discipline and safety.

To fill this gap, the current study investigates the implementation of the 6S method in PT XYZ, a telecommunications company operating in Indonesia. The study aims to assess the existing work area conditions within a field-based maintenance unit and to propose targeted improvement strategies through a structured 6S evaluation. Based on the identified gap and previous literature, the following hypothesis is proposed:

**H1:** The implementation of the 6S method (Sort, Set in Order, Shine, Standardization, Sustain, and Safety) significantly improves work environment governance and employee productivity in operational units within telecommunications companies.

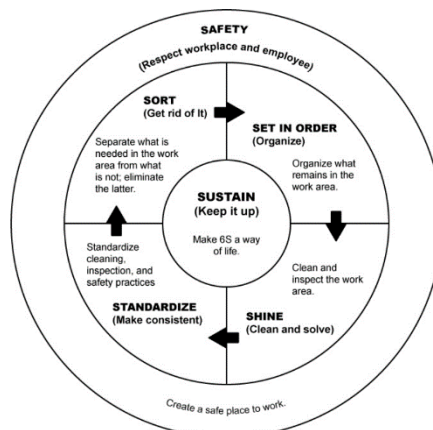
### **3. RESEARCH METHOD**

This research adopts a descriptive case study design conducted in the operational maintenance division of PT XYZ. This unit was chosen due to its strategic role in responding to network service disruptions and maintaining infrastructure reliability. The unit's working conditions require high efficiency, rapid response, and well-organized support facilities. However, initial assessments revealed a poorly structured work environment that had the potential to hinder technical performance, making it a relevant setting for implementing the 6S method.

The main objective of this study is to evaluate the extent to which the 6S method (Sort, Set in Order, Shine, Standardization, Sustain, and Safety) has been applied in the work area and to identify opportunities for improvement. The 6S method is widely used to establish and maintain quality, safety, and efficiency in work environments (Dhouchak & Kumar, 2017). Its implementation is interrelated across the six dimensions, with the Safety pillar acting as a foundation that protects and reinforces the other five aspects. This relationship is illustrated in Figure 1.

**Figure 1.**

The 6S Method Cycle



Source: Anvari (2011)

According to Dhouchak and Khatak (2017), work area safety must be prioritized in all 5S activities to prevent accidents and support long-term sustainability. To evaluate 6S implementation at PT XYZ, data were collected through a combination of qualitative and quantitative methods:

- 1) Direct field observations of daily activities and physical layout,
- 2) Semi-structured interviews with eight field technicians and two supervisors, selected through purposive sampling, and
- 3) A structured 6S assessment form.

The 6S assessment form was adapted from Maizir et al. (2020) and contains 32 indicators covering all six dimensions of the 6S method, scored on a Likert scale from 1 to 5. The classification criteria for each score are presented in Table 1.

**Table 1.**

6S Score Classification

Score	Classification	Description
1	Unacceptable	Activity is not performed at all.
2	Poor	Activity is performed only on a small scale and unevenly.
3	Good	Activity is performed adequately and applied in most areas.
4	Excellent	Activity is well performed and applied throughout all areas.
5	World Class	Activity is performed excellently, supported by clear and concrete evidence.

Source: Maizir et al. (2020)

Each element's average score is calculated, and a cumulative score is derived to assess the overall level of 6S implementation. To complement this, a fishbone diagram is used to analyze the root causes

of deficiencies in the lowest scoring dimension, categorizing them into four major factors: human, method, material, and environment (Sakdiyah et al., 2022).

Lastly, a 6S Identification Form is completed supported by photographic documentation and site layout plans to identify specific areas or facilities that can be prioritized for improvement. This integrated approach ensures data triangulation by cross-referencing interview insights and field observations with quantitative form scores. It allows for both a numeric evaluation and a qualitative diagnosis of work area governance issues, forming a solid foundation for targeted corrective actions.

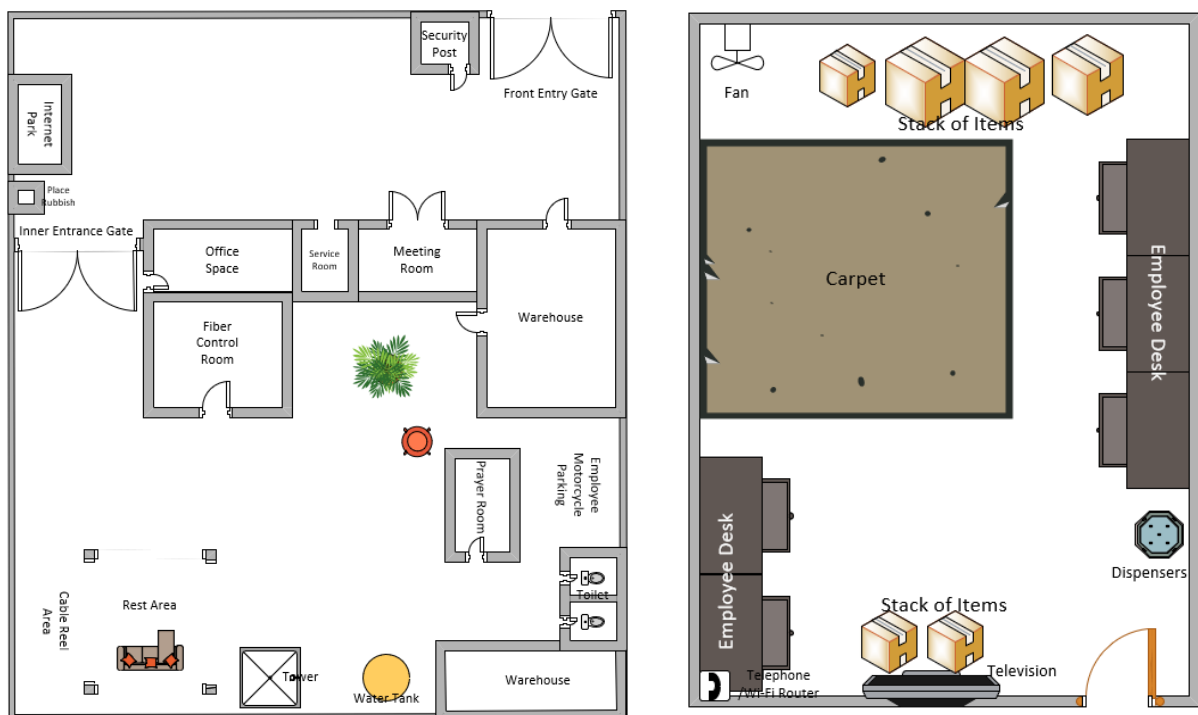
## 4. RESULTS AND DISCUSSIONS

### Data Collection

Based on direct field observations, various physical and organizational data were collected. The observed location includes both the general work area and a dedicated office space located within it. The complete spatial configuration of both zones is illustrated in Figure 2, which presents the layout of the work area and the enclosed office space. This layout serves as a visual reference for understanding the current physical arrangement, which plays a critical role in evaluating the implementation of the 6S method.

**Figure 2.**

Layout of the Work Area and Office Space



After identifying the area being studied, the next step was to complete the 6S Assessment Form based on the current condition of the object by analyzing each 6S variable in detail. The result of the 6S Assessment Form for the work area is shown in Figure 3.

**Figure 3.**  
Result of 6S Assessment Form

6S	No.	ASPECT	No.	REVIEW ITEM	Score				
					1	2	3	4	5
SORT	1	Parts or materials	1	All equipment as required is available			✓		
	2	Equipment	2	Damaged tools are separated		✓			
	3	Office Supplies & Filing	3	All unused items (hard or soft files) are tagged with 6S red tag	✓				
SET IN ORDER	4	Identity Labelling	4	Storage areas are well arranged for easy viewing, retrieval, and return		✓			
	5	Storage of materials/tools	5	Clear indication of maximum or minimum inventory levels					
	6	Quantity Indicators	6	All areas have boundary lines and all items are within the lines	✓				
	7	Area Boundaries	7	Document storage is well arranged and easy to find quickly		✓			
SHINE	8	Documentation	8	Documents are neatly arranged and easily accessible	✓				
	9	Floors, walls, ceilings	9	No dust, dirt, stains, insect nests/spider webs, and cleaned regularly			✓		
	10	Equipment	10	Adequate trash bins, identified and used appropriately		✓			
	11	Waste Management	11	Sufficient cleaning tools, neatly placed and protected from dirt		✓			
SAFETY	12	Tools & Cleaning Responsibility	12	Clear mechanism for assigning cleaning responsibilities		✓			
	13	Ergonomics	13	Lifting goods beyond physical capacity		✓			
			14	Manual material handling tools available			✓		
			15	Normal working posture is maintained	✓				
			16	Fire extinguishers of appropriate type are available					✓
	14	Fire Extinguishers	17	There are signs and procedures for using extinguishers				✓	
			18	Fire extinguishers function well and are easily accessible					✓
			19	Fire extinguishers are checked regularly	✓				
			20	There are OHS signs or posters				✓	
	16	Evacuation Route	21	There are evacuation route signs	✓				
			22	There is an evacuation route map	✓				
	17	Personal Protective Equipment	23	Suitable and standard PPE is available and wearable		✓			
			24	Cables are neatly arranged, sockets are covered		✓			
	18	Electrical Panel	25	Panel is kept closed					✓
			26	Indicator panel functions properly					✓
	19	Emergency Light / Generator	27	Emergency lighting/generator is available					✓
			28	First aid box and medicines are available		✓			
STANDARDIZATION	21	Maintaining all 6S methods	29	Efforts and mechanisms exist to ensure continuous implementation of 6S		✓			
	22	6S Spirit & Understanding	30	There are slogans, reminders, or other signs to encourage 6S		✓			
SUSTAIN	23	Training	31	6S training efforts and employee/facility user involvement exist	✓		✓		
	24	6S Audit	32	Internal 6S audits are conducted periodically					
TOTAL SCORE					9	12	4	2	5

### 6S Score Analysis

After obtaining the results for each 6S variable, the next step is to calculate the score to determine whether the work area falls within an acceptable level for 6S implementation. The score calculation is shown in Table 2.

**Table 2.**  
Score Calculation Results

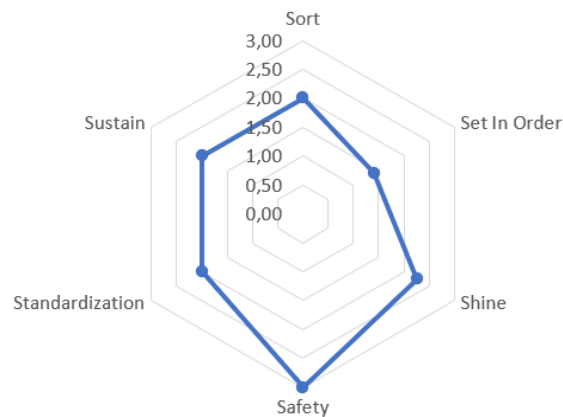
Score	1	2	3	4	5
Count	9	12	4	2	5
Calculation	$1 \times 9 = 9$	$2 \times 12 = 24$	$3 \times 4 = 12$	$4 \times 2 = 8$	$5 \times 5 = 25$
Total	$9 + 24 + 12 + 8 + 25 = 78$				
Final Score	$78 / 32 = 2,437$				

Based on the calculation results in Table 2, it was found that the score for the work area is 2.437. This score is classified into the poor category (Maizir et al., 2020), indicating that improvements are needed in the work area according to the 6S variables. Before making suggestions, it is essential to first identify which 6S variable shows the lowest score. Table 3 presents the average score for each 6S variable, and Figure 4 is the radar chart illustrating the results of all 6S variables.

**Table 3.**  
Average Score for Each 6S Variable

No	6S	Average Score
1	Sort	2
2	Set In Order	1,4
3	Shine	2,25
4	Safety	3
5	Standardization	2
6	Sustain	2

**Figure 4.**  
6S Radar Chart for Work Area



From Figure 4, it can be seen that the Set in Order variable has the lowest score, which is 1.4. The next step is to identify the causes and effects related to the Set in Order variable using a fishbone diagram tool. Below, Figure 5 shows the fishbone diagram for the Set in Order variable.

**Figure 5.**  
Fishbone Diagram

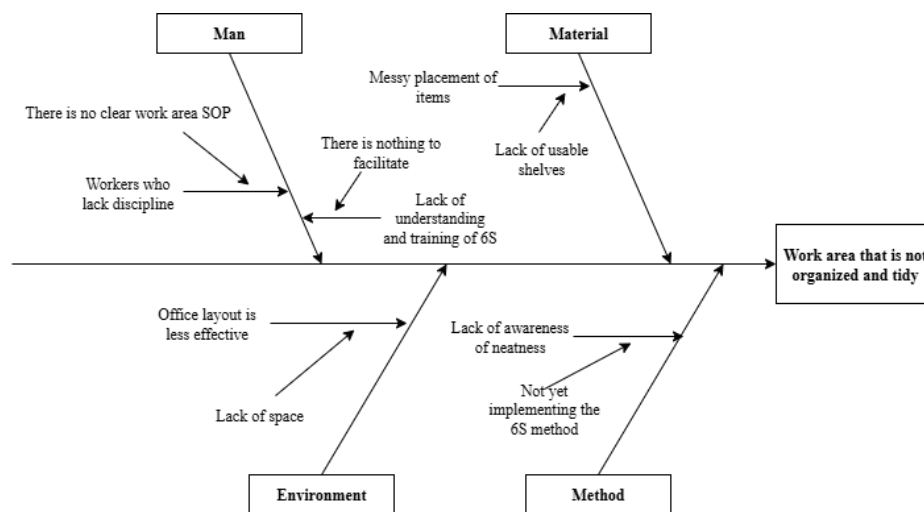


Figure 5 explains that the disorganized and untidy work area (Set in Order) is caused by several factors, including:





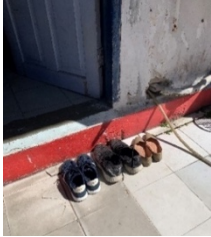







1. Human factors: Employees are undisciplined due to the absence of clear Standard Operating Procedures (SOP) for the work area and a lack of understanding of 6S.
2. Material factors: Items are placed haphazardly due to a shortage of shelves that could be used.
3. Method factors: There is a lack of worker awareness regarding tidiness due to the non-implementation of the 6S method.
4. Environmental factors: The office layout is ineffective due to the limited space available.



## Recommendations

After identifying the causes of the disorganized and untidy work area (Set in Order), the 6S Identification Form in Table 4 identifies several areas or facilities in the work area that can be replaced according to the suggestions below.

**Table 4.**  
6S Identification Form

No.	Image	Description	Category	Action	Recommended Image
1.		Dispenser and dining equipment are scattered	Set In Order	Provide a dispenser table with a shelf for dining equipment underneath	
2.		No shelves to store boxes and other tool	Set In Order	Provide a large shelf for organizing boxes and	
3.		Employees' shoes are scattered	Set In Order	Provide a shoe rack at the office entrance	
4.		No parking lines	Set In Order	Draw parking lines	
5.		Small, dirty, and disorganized trash bins	Set In Order and Shine	Provide a waste container	
6.		Large cable coils are scattered	Set In Order	Provide a cable reel rack	

Based on the fishbone diagram and the 6S Identification Form, the following suggestions are made to improve the work area:



1. Create clear and firm SOPs to ensure that employees are more disciplined, and the work area adheres to 6S standards.
2. Purchase or create a dispenser table with a shelf for dining equipment underneath to prevent the dispenser and dining equipment from becoming disorganized.
3. Purchase or create large shelves to store boxes and other tools, thus creating more space in the work area.
4. Purchase or create a shoe rack so that shoes are neatly arranged at the front of the office, making the space more organized and safer.
5. Purchase or create a cable reel rack to keep cable coils neatly arranged, saving space in the work area.
6. Replace the existing trash bins with larger waste containers to accommodate more waste and facilitate easier cleaning.
7. Provide 6S training to employees to improve their understanding and raise awareness of the importance of applying 6S as a work culture.

The implications of these findings show that improvements in the Set in Order aspect, such as providing shelves and clear SOPs, can directly improve the efficiency of tool searches and reduce the potential for work area accidents due to an unorganized environment. Additionally, providing larger trash containers and 6S training contributes to collective awareness of cleanliness and safety. This study is consistent with the findings of Maizir et al. (2020), which state that orderliness and good work standards can significantly increase work productivity.

## **5. CONCLUSION**

This study evaluated the implementation of the 6S method in the operational maintenance division of PT XYZ as a strategy to improve work area governance and operational efficiency. Based on the 6S Assessment Form, the total score obtained was 2.437, which is classified as poor category, indicating a general need for work environment improvement. Among the six dimensions of 6S, the Set in Order category received the lowest average score of 1.4, highlighting significant deficiencies related to space organization, tool arrangement, and the lack of visual structure. In response to this critical finding, a fishbone diagram analysis was conducted specifically for the Set in Order dimension. The root causes identified include the absence of Standard Operating Procedures (SOPs), lack of proper shelving or storage equipment, ineffective layout planning, and low employee awareness of spatial discipline.

While the study also measured the other 6S elements, such as Sort, Shine, Standardization, Sustain, and Safety, the analysis and resulting recommendations were intentionally focused on Set in Order, as it was deemed the most problematic and had the greatest potential for immediate impact. In contrast, Safety received the highest score (3.0), suggesting that while physical safety hazards are moderately controlled, underlying organizational issues persist, particularly in dimensions that affect daily operational flow.

This targeted approach allowed the study to develop detailed and actionable recommendations, including the provision of designated shelving units, structured layout markings, and SOP development specifically for spatial arrangement. The findings emphasize the importance of addressing work area organization as a foundational element of 6S implementation. Although this study was limited in scope to one operational unit and focused only on one 6S dimension for root cause analysis, the results provide a practical entry point for broader improvement initiatives. Future research is recommended to expand the assessment across departments, and evaluate the long-term sustainability and cultural integration of 6S practices through post-implementation audits and follow-up evaluations.

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