Jurnal Siber Multi Disiplin (JSMD)
E-ISSN: 2987-0380
P-ISSN: 2987-0402
+62 822 1012 3600 https://research.e-siber.org siberpublisher.info@gmail.com
DOI: https://doi.org/10.38035/jsmd.v3i4

The Effect of 5S and Kaizen on Productivity through Work Safety at DSV Solutions Indonesia Bekasi in 2024

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Abstract: Implementation of 5S (Sort,Set in Order,Shine,Standardize,Sustain) and Kaizen can improve work safety and productivity. In improving DSV Solutions Indonesia productivity, necessary to implement 5S and Kaizen. Objective of this research is to examine the impact of 5S and Kaizen Implementation on Productivity directly and also wants to analyze how the role of The role of Work Safety as an intermediary in the indirect correlation between 5S and Kaizen on Productivity at DSV Solutions Indonesia. This research uses a quantitative approach, with the type of explanatory survey research and the sampling technique used is purposive sampling with the Slovin formula. The population consists of 884 employees with a sample of 90 respondents. Data were collected through observation and Likert scale-based questionnaires, the data was examined with Structural Equation Modeling PLS (SEM-PLS). The research findings proved that the application of 5s and kaizen had significant effects on work safety and productivity.

Keyword: 5S, Kaizen, Productivity, Work Safety.

INTRODUCTION

The logistics and warehouse sector are crucial for the efficient organization, execution, and oversight of the transportation of goods and services from their starting point to their final destination (Amonalisa et al., 2018). “Logistics refers to the systematic coordination and control of the flow of goods and associated information, encompassing their sourcing, transportation, and storage, with the aim of achieving optimal effectiveness and efficiency” (Firdausi Dzulhianty et al., 2020). DSV Solutions Indonesia, a leading player in this industry, specializes in logistics, warehousing, and distribution services, managing a wide range of goods including retail, FMCG (Fast Moving Consumer Goods), Dangerous goods, and Health Care. To improve productivity and work safety, DSV Solutions Indonesia has adopted *Lean* methodologies such as 5S and Kaizen, which focus on continuous improvement and maintaining a clean, organized, and safe working environment.

5S method is a work organization methodology that originated in Japan (Sitanggang et al., 2021). It is based on five fundamental principles: Sort, Set in Order, Shine, Standardize, and Sustain. These principles aim to eliminate waste, improve cleanliness, and maintain order, ultimately enhancing the work's quality and reducing expenses. In the literature written by Ortiz (2015) has explained that 5S significantly impacts productivity by reducing waiting time and increasing output.

Kaizen is another Japanese concept that emphasizes continuous improvement through small, incremental changes. Kaizen involves all employees, from management to workers on the ground floor, in making suggestions and implementing improvements. According to Khan (2011) Kaizen helps improve productivity, quality, customer satisfaction, and overall efficiency by reducing waste and improving Work standards. Kaizen's methodical approach also has a significant impact on mitigating risks and enhancing work safety.

Work safety is an important factor affecting productivity. Research by Panjaitan (2017) Showed a significant and positive relationship between work safety and productivity levels, suggesting that an enhanced work environment will lead to increased output for employees. This research supports the idea that the implementation of 5S and Kaizen can have a positive impact on safety, which in turn increases productivity.

The primary research objective of this research is to figure out its effect of 5S and Kaizen on productivity through work safety at DSV Solutions Indonesia. Specifically, this research aims to answer the following questions: Does the implementation of 5S affect Work safety? Does Kaizen have an impact on Work safety? How does Work safety affect productivity? In addition, does 5S affect productivity directly and indirectly through Work safety? Similarly, does Kaizen affect productivity directly and indirectly through Work safety? DSV Solutions Indonesia is highly committed to ensuring the health, safety and environment (HSE) of its workforce, as evidenced by its QHSE (Quality, Health, Safety, Environment) policy, which emphasizes on continuous efforts to improve safety standards and manage risks effectively to protect employees.

This research is unique in its approach to integrating 5S and Kaizen methodologies in the operational context of DSV Solutions Indonesia's warehouse, specifically focusing on their combined effects on productivity through work safety. While previous research, such as that conducted by Srinivasan et al. and Lan Chi (2024) have assessed the impact of 5S and Kaizen on productivity and safety individually, the novelty of this study lies in the comprehensive analysis of these methodologies as interrelated variables that affect overall operational efficiency and employee safety. For example, Srinivasan et al. (2016) explained the positive effects of 5S on safety climate and productivity in a manufacturing environment, while Lan Chi (2024) showed how the combined implementation of 5S and Kaizen in a production facility resulted in significant improvements in economic efficiency and Work safety. This research builds on these findings by exploring the synergistic impact of 5S and Kaizen on work safety and productivity in the context of logistics and warehousing.

The importance of this research stems from DSV Solutions Indonesia's need to maintain operational safety and improve its operational efficiency and productivity in a highly competitive logistics market. Implementing an effective work organization and Countinous Improvement strategy is critical to maintaining competitive advantage and ensuring employee safety and well-being. By systematically implementing 5S and Kaizen, companies can achieve significant cost savings, reduce Work accidents, and improve employee morale, ultimately leading to sustainable productivity and growth.

Literature review

1. Productivity

Productivity is defined by Sukirno (2010) as the amount of work produced during a specific period. Improving productivity is crucial for companies to increase production and profitability. Implementing lean methods is one way for companies to achieve significant productivity improvements. Lean principles focus on reducing waste and optimizing processes, ensuring that resources are used as efficiently as possible. Furthermore Saptodewo et al. (2020) define Productivity is the comparison between input and output, where input is often limited by labor, while output is measured in physical units, form and value. “Productivity can be defined as the ratio between input and output, which quantifies the extent to which the final result can be efficiently and effectively obtained in the production process” (Veronica et al., 2022).

According to Sedarmayanti (2007) productivity is divided into two dimensions: effectiveness and efficiency. The effectiveness dimension involves achieving goals related to quality, quantity, and time, while the efficiency dimension compares inputs with their usefulness related to cost, time, and benefits. Indicators of work productivity include performing tasks or jobs that go beyond meeting job qualifications, being positively motivated, having a positive work orientation, being responsible, and interacting effectively with others. These indicators provide a comprehensive measure of productivity within the organization.

Productivity is the amount of work output completed during a specific time period and its crucial part in maximization or manufacturing and profit for any company. Thus, in research terminology "ratio" is the desired output-input relationship indicating resource utilization level ideally suited for a specific production activity.

2. 5S (Sort, Set in Order, Shine, Standardize and Sustain)

The 5S (Sort, Set in Order, Shine, Standardize, and Sustain) method, attempts to establish and sustain an organized, healthy, and productive work environment. (Wedgwood, 2016). This systematic approach not only improves operational efficiency but also encourages safer work. Applying 5S in a warehouse setting helps in organizing tools and materials systematically, which reduces the time spent searching for items and minimizes the risk of accidents.

According to Osada (1991) the 5S methodology consists of five sequential and systematic dimensions: Sort (*Seiri*), Set in Order (*Seiton*), Shine (*Seiso*), Standardize (*Seiketsu*), and Sustain (*Shitsuke*). The 5S concept aims to eliminate *waste*, improve cleanliness and order in work, improve work quality, and reduce costs. Indicators of 5S include sorting items and equipment, discarding unnecessary items, arranging items neatly, grouping items logically, cleaning up trash, checking for cleanliness, maintaining the Work, complying with regulations, and showing discipline both in applying 5S and in following regulations.

The 5S method systematically enhances workplace organization, safety, efficiency, and cost-effectiveness by eliminating waste and maintaining disciplined cleanliness and order. This approach promotes strict adherence to standards, thereby improving overall productivity and ensuring work safety.

3. Kaizen

Kaizen, which means continous improvement, involves small, incremental changes to processes with the goal of improving efficiency and quality. Imai (2012) describes Kaizen is a strategic approach where employees at all levels of a company collaborate proactively to achieve consistent and gradual improvements to production processes. This philosophy supports the idea that continuous and incremental changes can lead to significant improvements in productivity and quality over time. “Kaizen can increase the productivity

and profit of the company needs to be applied continuous improvement, one of the principles that can be applied in management is the Kaizen principle" (Lesmini et al., 2022).

Continuous improvement, a key dimension of Kaizen, focuses on systematically and continuously improving processes, products, or services, as emphasized by Imai (2012). This approach aims to achieve higher efficiency, better quality, and reduce waste in the organization. Kaizen indicators include Total Quality Control (TQC), Just in Time (JIT), Zero Defect, and Kaizen Suggestion System, which collectively drive continuous improvement efforts.

Kaizen, which refers to the concept of continuous improvement, entails making small, gradual modifications that improve efficiency, quality, and minimize waste by fostering proactive collaboration across all levels of an organization. The Key Kaizen indicators, such as Total Quality Control, Just in Time, Zero Defect, and the Kaizen Suggestion System, collectively contribute to continuous enhancements in productivity and profitability.

4. Work Safety

Work safety is an important factor in improving productivity. Busyairi et al. (2014) found a positive correlation between work safety and employee productivity, indicating that a safe work environment contributes significantly to higher productivity levels. Ensuring proper safety measures not only protects employees but also improves their efficiency and performance by reducing the likelihood of accidents and injuries. "Work safety refers to the state of being secure and protected from harm, injury, or loss in the workplace. It is the primary focus of work safety" (Jaenudin et al., 2022) .

Work safety is assessed considering both the physical and social-psychological aspects of the environment, as described by Moenir (1983) The physical work environment includes company efforts to improve employee safety by installing warning signs and providing equipment to prevent and handle accidents in the Work. The socio-psychological environment relates to company regulations that ensure fair treatment of all employees and provide insurance for those involved in dangerous or risky work. Indicators of safety in the work include the placement of work objects or tools with adequate warning signs, provision of equipment for accident prevention and relief, fair treatment of all employees, and maintenance and provision of insurance for employees.

The implementation of 5S and Kaizen methodologies at DSV Solutions Indonesia has been proven to improve work safety in its warehouses. According to observations made during the internship at DSV Solutions Indonesia, the structured environment fostered by 5S and the continuous improvement ethos of Kaizen significantly contributed to safer and more productive work.

Conceptual Framework

Previous studies have shown a relationship between Kaizen and 5S on productivity through workplace safety. The conceptual framework explains the relationship between the research variables, as described below:

1. Relationship between 5S and Work Safety

According to research conducted by Nurissa'adah et al. (2022) and Lan Chi (2024) there is a correlation between 5S and Work safety. Nurissa'adah et al.'s research shows that the implementation of 5S at each workstation can minimize Work accidents through cleanliness, orderliness, and good machine maintenance, as well as the use of complete personal protective equipment (PPE). Research Lan Chi (2024) further explains that 5S creates a safer work environment.

H1: 5S implementation has a significant impact on work safety.

2. Relationship between Kaizen and Work Safety

James et al. (2014) found a significant relationship between Kaizen and Work safety. Their research showed that Kaizen significantly reduced the risk of Work accidents, indicating its effectiveness in improving safety measures.

H2**:** Kaizen implementation has a significant impact on Work safety.

3. Relationship between Work Safety and Productivity

Research by Panjaitan (2017) showed a strong relationship between work safety and productivity. The study revealed that Work safety contributes positively and significantly to productivity levels, with a contribution rate of 65.5%.

H3: Work safety has a significant impact on productivity.

4. Relationship between 5S and Productivity

Research Siregar et al. (2021) identified a correlation between 5S and productivity. Their research shows that the implementation of 5S leads to a marked increase in productivity, highlighting the benefits of maintaining a structured and organized work environment.

H4: 5S implementation has a significant impact on productivity.

5. Relationship between Kaizen and Productivity

According to research conducted by and Lesmini et al. (2022) there is a connection between Kaizen and productivity. The study explains that Kaizen improves productivity, quality, customer satisfaction, reduces waste, and increases efficiency. These improvements underscore the role of Kaizen in fostering a productive work environment.

H5: Kaizen implementation has a significant impact on productivity.

6. Relationship between 5S and Productivity through Work Safety

Srinivasan et al. explored the relationship between 5S, Work safety, and productivity. Their research shows that implementing 5S improves safety conditions and productivity, suggesting a positive relationship between 5S and improved Work safety, which in turn improves productivity.

H6: 5S implementation has a significant impact on productivity through Work safety.

7. Relationship between Kaizen and Productivity through Work Safety

Lan Chi (2024) also examined the relationship between Kaizen, Work safety, and productivity. This study concluded that the implementation of 5S-Kaizen leads to cost savings, increased labor efficiency, and reduced Work accidents. These findings illustrate that Kaizen not only improves safety but also increases overall productivity.

H7: Kaizen implementation has a significant impact on productivity through Work safety.

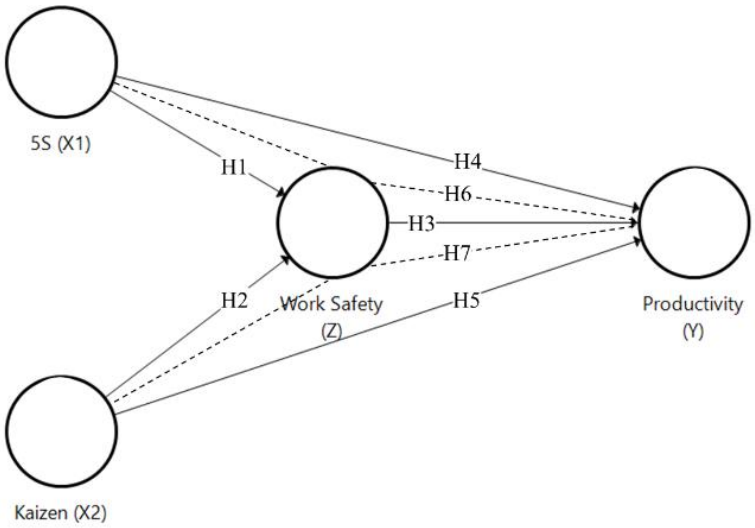

Figure 1. **Research Model**

METHOD

This study uses quantitative methods to examine the impact of 5S and Kaizen implementation on productivity through work safety at DSV Solutions Indonesia. This approach was chosen because it allows the collection of measurable data and accurate statistical analysis to test the proposed hypothesis.

The research was conducted at DSV Solutions Indonesia's warehouse located in Medan Satria, Bekasi, from June 2024 to August 2024. During this period, direct observation and interviews with resource persons were conducted to gather the necessary information. The population of this study consisted of all employees at DSV Solutions Indonesia in Bekasi, totaling 884 people. A purposive sample of 90 people, the sample size was determined using the Slovin formula to ensure accurate representation of the population.

Primary data was collected through questionnaires filled out by respondents, while secondary data was obtained from relevant literature, journals, and books related to the research topic. Data Collection Technique:

1. Questionnaire: The questionnaire was designed using a Likert scale to measure the predetermined indicators, a questionnaire distributed through Google Forms. This scale helps measure respondents' perceptions and attitudes towards the implementation of 5S, Kaizen, work safety, and productivity. Google Forms allowed for easy online distribution and efficient data collection.
2. Observation: Direct observation of 5S and Kaizen implementation in the field, including operational activities and safety conditions.

The collected data were analyzed using descriptive and inferential statistics. Descriptive statistics provide an overall picture of the data, while inferential analysis is performed use Structural Equation Modelling (SEM) using Partial Least Squares (PLS-SEM) involves several key tests, including instrument validity and reliability to assess measurement accuracy, path analysis to examine relationships between variables, the R-Square test to determine the explained variance in dependent variables, and the Q-Square test to evaluate the model's predictive relevance. These tests ensure that both the measurement and structural models are valid, reliable, and have strong predictive power.

RESULTS AND DISCUSSION

Respondent Profile

Table 1. Demographic Summary

	Demographic Summary	Frequency	%
Gender	Male	77	84,62%
	Female	14	15,38%
Age	20-30 years	68	74,73%
	31-40 years	21	23,08%
	41-50 years	2	2,20%
Position	Warehouse Staff	75	82,42%
	Warehouse Manager	1	1,10%
	Warehouse Supervisor	2	2,20%
	Human Resources Staff	4	4,40%
	QHSSE Auditor	9	9,89%
Length of Service	Less than 1 Year	34	37,36%
	1 to 3 Years	42	46,15%
	4 to 6 Years	10	10.99%
	7 to 10 Years	3	3,30%
	More than 10 Years	2	2,20%
n= 91			

The respondents were predominantly male, representing 84.62% of the sample, while females were 15.38%. The most represented age group was 20-30 years old, representing 74.73% of the respondents, followed by the 31-40 years age group at 23.08%, and a small proportion aged 41-50 years at 2.20%. In terms of length of service, the majority of respondents have worked for 1 to 3 years (46.15%), followed by respondents with less than 1 year of service (37.36%), 4 to 6 years (10.99%), 7 to 10 years (3.30%), and more than 10 years (2.20%). Most respondents held positions as warehouse staff (82.42%), with other roles including warehouse managers, supervisors, HRD staff, and QHSSE auditors. This diverse sample provides a comprehensive picture of the workforce at DSV Solutions Indonesia, contributing valuable insights into research on the implementation of *lean* methodologies and their impact on productivity and safety.

Validity and Reliability

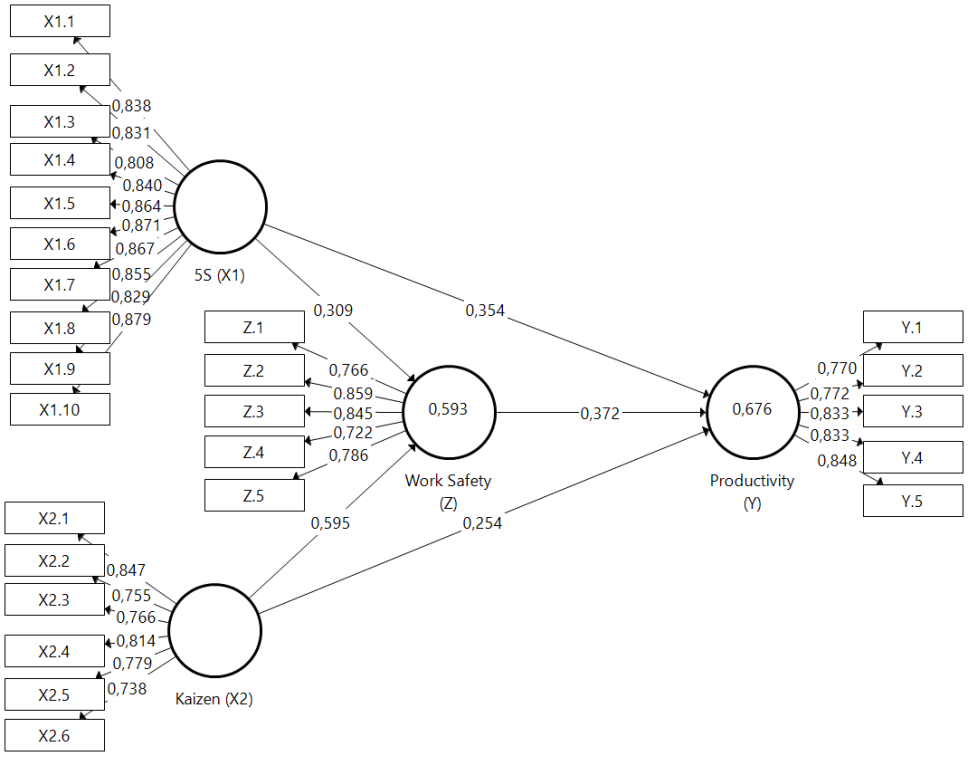

Figure 2. PLS Algorithm

The results presented in the figure show that the indicators for the constructs 5S (X1), Kaizen (X2), Work Safety (Z), and Productivity (Y) all show values that exceed 0.70. thus confirming that the convergent validity requirements have been met. Furthermore, alternative methodologies can be used to ensure convergent and discriminant validity. One such method involves evaluating the Average Variance Extracted (AVE) for each indicator, with values greater than 0.50 signaling a good model fit.

Table 2. Validity Test

Indicator	5S (X1)	Kaizen (X2)	Productivity (Y)	Work Safety (Z)	Results
5S.1	0.838				Valid
5S.2	0.831				Valid
5S.3	0.808				Valid
5S.4	0.840				Valid
5S.5	0.864				Valid
5S.6	0.871				Valid
5S.7	0.867				Valid
5S.8	0.855				Valid
5S.9	0.829				Valid
5S.10	0.879				Valid
KZ.1		0.847			Valid
KZ.2		0.755			Valid
KZ.3		0.766			Valid
KZ.4		0,814			Valid
KZ.5		0,779			Valid
KZ.6		0.738			Valid
PY.1			0.770		Valid
PY.2			0.772		Valid
PY.3			0.833		Valid
PY.4			0.833		Valid
PY.5			0.848		Valid
WS.1				0.766	Valid
WS.2				0.859	Valid
WS.3				0.845	Valid
WS.4				0.722	Valid
WS.5				0.786	Valid

Reliability test

Reliability test is a test conducted to determine whether variables can be trusted or reliable.

Table 3. Reliability test

	Cronbach's Alpha	rho_A	Composite Reliability	Average Variance Extracted (AVE)	Result
5S (X1)	0.957	0.959	0.963	0.720	*Reliable*
Kaizen (X2)	0.874	0.879	0.905	0.615	*Reliable*
Productivity (Y)	0.870	0.870	0.906	0.659	*Reliable*
Work Safety (Z)	0.855	0.857	0.897	0.635	*Reliable*

According to the results from the validity and reliability tests, all indicators utilized in this study have been considered valid with load factor results > 0.5. All variables in this trial are reliable by obtaining Cronbach alpha> 0.70 and Ave> 0.5.

R-Square

Table 4. R-Square

	R Square	R Square Adjusted	Result
Productivity (Y)	0.676	0.665	Moderate
Work Safety (Z)	0.593	0.583	Moderate

A coefficient of determination (R-square) with a value of 0.75 is classified as strong, whereas a value of 0.50 is considered moderate, and a value of 0.25 is categorized as weak. The table shows research findings that reveal an R-square value of 0.676, equivalent to

67.6%, for the Productivity variable (Y), along with an adjusted R-square of 0.665. This suggests that 32.4% of the variance in Productivity cannot be covered by the model. The coefficient of determination (R-square) for the Work Safety variable (Z) is 0.593, indicating that 59.3% of the variability in the dependent variable can be explained by the independent variable. The revised R-square value is 0.583. This suggests that the study fails to account for 40.7% of the variation in Work Safety. Both R-square values are moderate, indicating a significant but not full account of the variation in the dependent variable by the independent variables in the model.

Q-Square

Table 5. Q-Square

	Q-Square
Productivity (Y)	0.420
Work Safety (Z)	0.352

Q-Square values of 0.420 for productivity (Y) and 0.352 for work safety (Z) indicate that the model used in this study has moderate to high predictive relevance for these constructs. This means that the implementation of 5S and Kaizen at DSV Solutions Indonesia can effectively predict improvements in productivity and work safety.

Hypothesis Test

Table 6. Path Coefficients

Item	Original Sample (O)	Sample Mean (M)	Standard Deviation	T Statistics	P Values
5S (X1) -> Work Safety (Z)	0.309	0.324	0.118	2.628	0.009
5S (X1) -> Productivity (Y)	0.354	0.375	0.116	3.039	0.003
Kaizen (X2) -> Work Safety (Z)	0.595	0.581	0.117	5.099	0.000
Kaizen (X2) -> Productivity (Y)	0.254	0.244	0.099	2.566	0.011
Work Safety (Z) -> Productivity (Y)	0.372	0.355	0.142	2.622	0.009

H1: Impact of 5S on Work Safety

The first hypothesis (H1) studied the impact of 5S (X1) on Work Safety (Z). The findings demonstrated that 5S has significant effects on Work Safety, as proven by the Original Sample (O) value of 0.309, which exceeds zero, and the t-statistic value of 2.628, which surpasses 1.96. The P-value of 0.009 is less than 0.05. Therefore, the initial hypothesis has been confirmed, indicating that the implementation of the 5S methodology has significant effects on ensuring work safety at the DSV Solutions Indonesia Warehouse in Bekasi in 2024. This is in line with the results of research conducted by Nurissa'adah et al. (2022) and Lan Chi (2024) that the 5S variable has a relationship and influence on Work Safety.

H2: Impact of Kaizen on Work Safety

The second hypothesis (H2) studies the impact of Kaizen (X2) on Work Safety (Z). The findings showed that Kaizen had a significant effect on Work Safety, as proven by the Original Sample (O) value of 0.595, which exceeded 0, and the t-statistic of 5.099, which surpassed 1.96. The P-value of 0.000 is less than 0.05. Thus, the second hypothesis is confirmed, demonstrating that the implementation of Kaizen has a significant effect on Work Safety at the DSV Solutions Indonesia Warehouse in Bekasi in 2024. This is in line with the results of research conducted by James et al. (2014) that Kaizen variables have a relationship and impact on Work Safety.

H3: Impact of Work Safety on Productivity

The third hypothesis (H3) studied the impact of Work Safety (Z) on Productivity (Y). The findings showed that Work Safety has a notable impact on Productivity, as proven by the Original Sample (O) value of 0.372, which exceeds 0, and a t-statistic of 2.622, which surpasses 1.96. The P-value of 0.009 is statistically significant at a significance level of 0.05. Work Safety has a pronounced impact on Productivity. Therefore, the third hypothesis has been validated, proving that Work Safety has a significant effect on Productivity at the DSV Solutions Indonesia Warehouse in Bekasi in 2024. This is in line with the results of research conducted by James et al. (2014) that the Work Safety variable has a relationship and influence on Productivity.

H4: Impact of 5S on Productivity

The fourth hypothesis (H4) tested the effect of 5S (X1) on Productivity (Y). The results showed that 5S has a significant influence on Productivity, as indicated by the Original Sample (O) value of 0.354 more than 0 and t-statistic of 3.039 more than 1.96. The P-value of 0.003 is less than 0.05. Therefore, the fourth hypothesis is proven that 5S implementation has a significant effect on Productivity at DSV Solutions Indonesia Warehouse in Bekasi in 2024. This is in line with the results of research conducted by Siregar et al. (2021) that 5S variables have a relationship and influence on Productivity.

H5: Impact of Kaizen on Productivity

The fifth hypothesis (H5) tested the effect of Kaizen (X2) on Productivity (Y). The results showed that Kaizen has a significant effect on Productivity, as indicated by the Original Sample (O) value of 0.254 more than 0 and t-statistic of 2.566 more than 1.96. P Values of 0.011 are smaller than 0.05. Indicates that Kaizen has a significant effect on Productivity. Thus, the fifth hypothesis is proven that the application of Kaizen has a significant effect on Productivity at DSV Solutions Indonesia Warehouse in Bekasi in 2024. This is in line with the results of research conducted by Khan (2011) that the Kaizen variable has a relationship and influence on Productivity.

Thus, the table provides a complete picture of the test results for each hypothesis in this study. Any t-statistic value greater than 1.96 indicates that the tested effect is significant, which means the hypothesis is accepted.

Table 7. Specific Indirect Effects

Item	Original Sample (O)	Sample Average (M)	Standard Deviation	Statistic T	P-value
5S (X1) -> Work Safety (Z) -> Productivity (Y)	0.115	0.109	0.051	2.257	0.024
Kaizen (X2) -> Work Safety (Z) -> Productivity (Y)	0.221	0.214	0.107	2.075	0.038

Table 7 displays the results of the statistical analysis conducted to test the mediation effect in this study. The purpose of testing the mediation effect is to determine the direct or indirect effect of the independent variable on the dependent variable through the intervening variable.

Determination of Mediation Procedure (Mediation Analysis Procedure)

1. 5S variables have a significant direct effect on Productivity and Safety is significant in mediating, then the role of Safety is Complementary (Partial Mediaton). This is in accordance with the explanation of Hair et al. (2017) Complementary Partial Mediation if path coefficient 1 x path coefficient 2 x path coefficient3 is positive.
2. It can be concluded that the Kazien variable has a significant direct effect on Productivity and Work Safety significantly mediates, so the role of Work Safety is Complementary

(Partial Mediaton). This is in accordance with the explanation of Hair et al. (2017) Complementary Partial Mediation if path coefficient 1 x path coefficient 2 x path coefficient3 is positive.

H6: Impact of 5S on Productivity through Work Safety

The sixth hypothesis (H6) tested the impact of 5S (X1) on Productivity (Y) through Work Safety (Z). The findings show that the impact of 5S on Productivity through Safety is statistically significant, as evidenced by the Original Sample (O) value of 0.115 and the t-statistic value of 2.257, which is above the threshold of 1.96. The P-value of 0.024 is statistically significant at the 0.05 level of significance. Therefore, the sixth hypothesis (H6) has been confirmed, indicating that the introduction of 5S (X1) has an indirect impact on Productivity (Y) through Work Safety (Z) at DSV Solutions Indonesia Warehouse in Bekasi in 2024. This fits in with the results of a study carried out by Srinivasan et al. (2016) that the 5S variable has a relationship and impact on Productivity through Work Safety

H7: Impact of Kaizen on Productivity through Work Safety

Hypothesis 7 (H7) tested the impact of Kaizen (X2) on Productivity (Y) through Work Safety (Z). The findings show that Kaizen has a substantial impact on Productivity through Work Safety, as evidenced by the Original Sample (O) value of 0.221 and the t-statistic value of 2.075, which exceeds 1.96. The P-value of 0.038 is statistically significant at the 0.05 level of significance. Therefore, it has been proven that the seventh hypothesis (H7) is valid, indicating that Kaizen implementation (X2) has an indirect effect on Productivity (Y) through Work Safety (Z) at DSV Solutions Indonesia Warehouse in Bekasi in 2024. This is in line with the findings of research conducted by Lan Chi (2024) that Kaizen variables have a relationship and influence on productivity through work safety.

CONCLUSION

This study emphasizes the advantages of implementing 5s and Kaizen methodologies to enhance the production capacity of DSV Solutions Indonesia in Bekasi, with a specific focus on improving health and safety performance and productivity. By systematically implementing Lean Management principles, the company has experienced significant improvements in both operations and employee safety.

The findings demonstrate that both 5S and Kaizen have a statistically significant and beneficial influence on work safety while also impacting productivity. The study highlights that implementing a 5S methodology enhances Work safety and organization, increasing productivity. Similarly, Kaizen's focus on improving Work safety can lead to increased production levels.

The findings also indicate that Work safety plays a crucial intermediary role in strengthening the beneficial effects of 5S and Kaizen on productivity. Implementing improved safety practices results in various indirect advantages, as these methodologies are essential for achieving operational excellence.

Implementing 5S and Kaizen into DSV Solutions Indonesia operations enhances Work safety and boosts productivity by implementing efficient management practices in the logistics and warehousing sector.

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