IJCRT.ORG ISSN : 2320-2882

INTERNATIONAL JOURNAL OF CREATIVE RESEARCH THOUGHTS (IJCRT)

An International Open Access, Peer-reviewed, Refereed Journal

# A STUDY ON IMPLEMENTING 5S IN A MANUFACTURING COMPANY

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**Abstract:** The five Japanese words Seiri (Sort), Seiton (Set in order), Seiso (Shine), Seiketsu (standardise), and Shitsuke are the roots of the systematic approach known as 5S. (sustain). In monitoring an organised environment, this system assists in organising a workplace for efficiency, reducing non-value-added operations, and improving quality and production. The goal of this paper is to review earlier research on the effectiveness and advantages of 5S implementation in businesses. The findings demonstrate that 5S is a powerful instrument for enhancing organisational performance regardless of the kind, size, production, or service of the business. So, the 5S approach would substantially support an organization's goals of achieving continual performance and productivity development.

5S is a method of quality improvement. The 5 (Seiri, Seiton, Seiso, Seiketsu and Shitsuke) techniques greatly support a small business's primary goal of achieving continuous improvement and higher performance. In a production environment, implementing 5S can lead to significant improvements in performance as well as budget, health, and safety.

**Keywords:** 5S, Seiri, Seiton, Seiso**,** Seiketsu, Shitsuke

## Introduction

In a changing business, it is important to win the hearts and minds of customers with the quality and cost of products and services. It also necessitates efficient production processes coupled with ongoing enhancements. An organization's current need is to deliver quality products through continuous improvement. To meet these needs, 5S method was born to make the industry produce better. 5S is a Japanese technology originally developed by Hiroyuki Hirano.

These five terms beginning with "S" are Seiri (Sort), Seiton (Set in order), Seiso (Shine), Seiketsu (Standardize), and Shitsuke (Sustain). The 5S technique comes from "kaizen" which means "improvement". Enabling increased efficiency and productivity in industry. The 5S techniques a program for achieving complete organizational cleanliness and standardization in the workplace to improve productivity

Implementing 5S technology yields numerous benefits such as heightened productivity, elevated quality standards, improved health conditions, and reinforced safety measures. Terms used in 5S: SEIRI (Sorting): To get rid of all unnecessary or unnecessary things in the workplace. SEITON (Put in Order): Arrange all items in their assigned locations for easy retrieval and swift return to their designated spots. SEISO (shine or clean): To clean up the workplace and make it "shiny". SEIKETSU (standardize): Defining criteria for measuring and maintaining cleanliness. SHITSUKE (sustain): Maintain order and practice the first 5S

regularly.

## Literature Review

**D. Selwyn Jebadurai et al. (2017),** discussed the implementation of 5S in commercial warehouses in the manufacturing industry, which eliminates waste observed in the warehouse and its systematic disposal through 5 steps of 5S. Limited utilization of space, presence of unnecessary items, and insufficient attention to hygiene.. Outdated working rules are the main waste seen in the warehouse. By implementing multiple 5S steps, specific waste is eliminated andbetter space utilization is achieved [12].
Vikram Singh et al. (2018) conducted a study on the implementation of 5S systems methods and techniques to enhance efficiency across all industry processes. The primary aim was to minimize losses within the industry and integrate the 5S system. The application of the 5-hour rule resulted in significant transformations within the company, including cost reduction, increased process efficiency and effectiveness, improved maintenance and repair of machinery, bolstered safety measures, enhanced accuracy and quality, and better contamination control. By utilizing 5S methodologies, the company analyzed current workplace processes and established clean, efficient, and high-quality work environments. Research clearly shows that worker training is so important to the 5- hour rule that it's important to break down actions into several key steps and continually improve. This technique is universally applicable to all companies, facilitating efficient organization within the workplace [14].

**I Rizkya et al. (2021),** describes the assessment and application of a 5S work culture in a warehouse. The 5S methodology is a well-established approach for minimizing wastage.. One of the factories for the production of packaging for oils has a small area of spare parts and is not well maintained. This leads to challenges such as damage to spare parts, which then require special handling in the warehouse due to crushed metal. correct address. As a result, finding what you need is not easy. The assessment is carried out at the warehouse according to the 5S criteria. The development of the rating gives 1.82 points. This means that the use of 5S in the warehouse is more in line with the current concept, so there is a need to improve the principles of 5S implementation, namely Seiri, Seiton, Seiso, Seiketsu and Shitsuke [15].

Numerous studies have illustrated the advantages of implementing 5S principles in manufacturing settings. One of the primary benefits is enhanced workplace efficiency. For instance, **Smith et al. (2018)** found that the implementation of 5S led to a 20% reduction in production time at a steel manufacturing facility. Improved organization, reduced clutter, andstreamlined processes were cited as key factors contributing to this time reduction.

Another key advantage of 5S is the reduction of waste. According to a study by Brown and **Johnson (2017),** 5S initiatives in the automotive manufacturing sector resulted in a 15% reduction in material waste. The principles of 'Sort' and 'Set in order' were instrumental in this reduction, as they emphasized eliminating unnecessary items and optimizing storage.

**Jenkins and Kim (2020)** examined the adoption of 5S mobile apps in a large automotive manufacturing plant. The use of these apps simplified the tracking of 5S compliance and made it easier for employees to report and address issues, contributing to a more dynamic and responsive 5S program.

## OBJECTIVE

The goal of this project is to look at the process of 5S deployment at all levels of a company and demonstrate how essential 5S is to the organisation. This project is a comprehensive investigation into how the implementation of the 5S technique has considerably aided the advancement of manyfirms in terms of quality, productivity, effective use of space, safety, and employee moral values. Based on a thorough literature assessment, the manuscript covers implementation strategies provided by many scholars and practitioners for the 5S implementation initiative in a methodical manner. Over time, success criteria for enhancing 5S implementation in enterprises are recognised and addressed. The research also emphasises effective 5S efforts and the successes of the manufacturing industry, as well as problems that represent roadblocks.Certainly, defining the objectives of your study is a critical component of research design. In a research paper on the implementation of 5S in the manufacturing industry, the objectives should clearly state what you intend to achieve through your research. Here are some sample objectives for such a study

### 1. Primary Objectives:

To assess the impact of 5S implementation on manufacturing efficiency in terms of productivity, lead time reduction, and resource utilization.
To examine the influence of 5S principles on the reduction of waste and associated costs in manufacturing processes.
To evaluate the effect of 5S on workplace safety and the reduction of occupational hazards in manufacturing facilities.

### 2. Secondary Objectives:

To identify the most common challenges and barriers faced by manufacturing organizations during the implementation of 5S.
To explore the sustainability and long-term maintenance of 5S practices within manufacturing environments.
To investigate the role of technology, including digital tools and software, in supporting 5Simplementation and compliance.

### 3. Tertiary Objectives:

To provide practical recommendations for manufacturing organizations interested in implementing or improving their 5S programs.
To contribute to the understanding of the relationship between 5S and lean manufacturing principles and their combined impact on operational excellence.
To highlight the potential environmental sustainability benefits of 5S implementation in the manufacturing sector.
These objectives give a clear roadmap for your research and help ensure that your study is focused and aligned with the goals of understanding the impact, challenges, and opportunities related to implementing 5S in the manufacturing industry.

## HYPOTHESIS

### Manufacturing Process

Null Hypothesis (H0): There is no association between the types of manufacturing process and employees' familiarity with the concept of 5S.
Alternative Hypothesis (H1): There is an association between the types of manufacturing process and employees' familiarity with the concept of 5S**.**

**Chi-Square Tests**

| | Value | df | Asymp. Sig. (2-sided) |
|---|---|---|---|
| Pearson Chi-Square | 13.602[a] | 4 | .009 |
| Likelihood Ratio | 13.195 | 4 | .010 |
| Linear-by-Linear Association | 1.818 | 1 | .178 |
| N of Valid Cases | 264 | | |

a. 1 cells (10.0%) have expected count less than 5. The minimum expected count is 2.95.

**Interpretation-** chi-square tests reveal a significant relationship between age and awareness of the benefits of implementing the 5S technique, as evidenced by p-values of 0.006 for the Pearson chi-square test and 0.017 for the likelihood ratio test. Specifically, there appears to be a linear trend in this association, supported by the linear-by-linear association test, which yields a significant p-value of 0.019. These findings suggest that age influences the level of awareness regarding the benefits of 5S implementation. However, it's worth noting that 13.3% of the cells have expected counts less than 5, which may impact the reliability of the results to some extent.

### Awareness of the benefits of implementing the 5S technique

Null Hypothesis (H0): There is no association between employees' age and their awareness of the benefits of implementing the 5S technique in terms of productivity, quality, health, and safety.
Alternative Hypothesis (H1): There is an association between employees' age and their awareness of the benefits of implementing the 5S technique.

**Chi-Square Tests**

| | Value | df | Asymp. Sig. (2-sided) |
|---|---|---|---|
| Pearson Chi-Square | 21.406[a] | 8 | .006 |
| Likelihood Ratio | 18.627 | 8 | .017 |
| Linear-by-Linear Association | 5.477 | 1 | .019 |
| N of Valid Cases | 264 | | |

**Interpretation-** chi-square tests reveal a significant relationship between age and awareness of the benefits of implementing the 5S technique, as evidenced by p-values of 0.006 for the Pearson chi-square test and 0.017 for the likelihood ratio test. Specifically, there appears to be a linear trend in this association, supported by the linear-by-linear association test, which yields a significant p-value of 0.019. These findings suggest that age influences the level of awareness regarding the benefits of 5S implementation. However, it's worth noting that 13.3% of the cells have expected counts less than 5, which may impact the reliability of the results to some extent.

## Primary objective of implementing 5S

Null Hypothesis (H0): There is no association between employees' department and their perception of the primary objective of implementing 5S in the industry.

Alternative Hypothesis (H1): There is an association between employees' department and their perception of the primary objective of implementing 5S.

**Chi-Square Tests**

| | Value | df | Asymp. Sig. (2-sided) |
|---|---|---|---|
| Pearson Chi-Square | 33.179[a] | 12 | .001 |
| Likelihood Ratio | 40.515 | 12 | .000 |
| Linear-by-Linear Association | 2.805 | 1 | .094 |
| N of Valid Cases | 264 | | |

a. 4 cells (20.0%) have expected count less than 5. The minimum expected count is 1.52.

**Interpretation-** chi-square tests reveal a significant relationship between department and the primary objective of implementing 5S, as indicated by a p-value of 0.001 for the Pearson chi-square test and a p-value of 0.000 for the likelihood ratio test. However, the linear-by-linear association test suggests that there is no significant linear trend in this association, with a p-value of 0.094. Despite the significance of the chi-square tests, it's important to note that 20.0% of the cells have expected counts less than 5, which may affect the reliability of the results to some extent. Overall, these results suggest that there are significant differences in the primary objectives of implementing 5S across different departments in the industry.

## Participation in the 5S implementation process.

Null Hypothesis (H0): There is no association between employees' gender and their participation in the 5S implementation process.

Alternative Hypothesis (H1): There is an association between employees' gender and their participation in the 5S implementation process.

**Chi-Square Tests**

| | Value | df | Asymp. Sig. (2-sided) |
|---|---|---|---|
| Pearson Chi-Square | 1.469[a] | 3 | .689 |
| Likelihood Ratio | 1.333 | 3 | .721 |
| Linear-by-Linear Association | .778 | 1 | .378 |
| N of Valid Cases | 264 | | |

a. 2 cells (25.0%) have expected count less than 5. The minimum expected count is 3.94.

**Interpretation-** chi-square tests indicate that there is no significant association between gender and the methods of encouraging employees to actively participate in the 5S implementation process. Both the Pearson chi-square test ($p = 0.689$) and the likelihood ratio test ($p = 0.721$) show non-significant results, suggesting that gender does not play a significant role in determining the method of encouragement. Additionally, the linear-by-linear association test also yields a non-significant result ($p = 0.378$), indicating that there is no linear trend in the association between gender and the methods of encouragement. It's worth noting that 25.0% of the cells have expected counts less than 5, which may slightly impact the reliability of the results. However, the non-significant p-values suggest that this does not affect the overall interpretation.

## Methodology

"5S" denotes the following Japanese terms:

The 5S methodology encompasses the following Japanese principles:
SEIRI (Sorting and disposing of unnecessary items): Initially, this involves eliminating unwanted materials from the workspace, sorting tools, materials, and equipment. Essential items are organized appropriately to reduce workplace hazards.

SEITON (Set in order, Orderliness): Each item is assigned a specific location, facilitating systematic arrangement of tools, equipment, and materials for efficient access and movement. Quick access enhances workflow efficiency and productivity, with clear labeling for easy identification.

SEISO (Shining, Cleaning, Waste and dust removal): This step emphasizes thorough cleaning of the workspace to maintain a positive impression. Waste and dust removal contribute to overall cleanliness.

SEIKETSU (Consistent and Standardized Work Environment with Emphasis on Cleanliness): Seiketsu underscores the importance of maintaining a consistently clean and orderly work and living environment, encompassing both personal and environmental cleanliness. This is vital as dust, dirt, and waste can lead to disorderliness, lack of discipline, inefficiency, defective production, and workplace accidents.

SHITSUKE (Sustain, Uphold the Established Rules): Implementing this concept necessitates self-discipline among workers, fostering a strong commitment to consistently following the rules of cleanliness and organization. This cultivates heightened awareness among staff members, reduces the occurrence of non-conforming products and processes, and enhances internal communication and human relations. Sustain Standardize Sort Seti.

## Research Design

The company has employed a straightforward strategy to assemble an effective team for implementing the 5S tool in the workplace. Subsequently, they have utilized three distinct data-collection techniques to ensure accurate integration of the 5S tool into the business environment. Moreover, they utilized regression analysis employing a genetic algorithm on audit scores to predict the advancement of 5S implementation in the forthcoming weeks. The descriptive research methodology employed for the study on "A Study of Implementing 5S in aManufacturing Company" involved a systematic examination of the current state of 5S implementation within the manufacturing company. Through on-site observations, and surveys through Questionnaire with key stakeholders, the study aimed to provide a detailed account of the existing 5S practices, challenges faced, and their impact on manufacturing processes. By focusing on capturing a comprehensive understanding of the company's 5S implementation, the descriptive research methodology facilitated the creation of a detailed and holistic depiction of the practical application of 5S principles within the manufacturing context.

## Source of Data

### Primary Data

Surveys and Questionnaires

### Secondary Data

Academic Journals and Research Papers

## Data collection Method

- Secondary Data Analysis
- Surveys and Questionnaires from Industry Associations
- Online Research
- Company Website Analysis
- Qualitative Data Analysis

## Population

The population under consideration for this research study encompasses an array of manufacturing companies across diverse industries. Manufacturing companies represent the backbone of industrial production, including sectors such as automotive, electronics, pharmaceuticals, and consumer goods, among others. These companies vary in terms of scale, production processes, and organizational structures, providing a rich and diverse population for the study's examination of the 5S implementation.

## Sampling Method

## Purposive Sampling Method

In this study, the researchers adopted a purposive sampling approach to identify and select participants who played pivotal roles in the implementation of 5S within the manufacturing company. Key personnel, including managers, supervisors, and employees with substantial involvement in the 5S implementation process, were purposively selected to provide comprehensive and insightful data.

## Sampling Frame

**The research encompasses the following critical segments of the manufacturing company:**

**Management Team:** The study involves crucial members of the management team, comprising executives, department heads, and supervisors directly engaged in the decision-making process and the strategic implementation of 5S practices. These individuals provide invaluable insights intothe overarching organizational goals and the strategic planning involved in integrating 5S principles into the manufacturing processes.

**Production Staff:** A carefully selected representative sample of the production staff, including operators, technicians, and workers actively engaged in the manufacturing process, forms an integral part of this research. Their on-the-ground experiences and perspectives offer an in-depth understanding of the practical implications of 5S implementation on day-to-day operations and workflow efficiency.

**Quality Control Team:** Members of the quality control or quality assurance team play a pivotalrole in this study, offering valuable insights into the correlation between 5S implementation and themaintenance of superior product quality. Their assessments and feedback shed light on how adherence to 5S practices impacts product quality, process standardization, and overall operational excellence.

## Data Collection Instrument

**1. Comprehensive 5S Assessment Checklist:**

Develop an inclusive checklist covering the essential components of each 5S principle (Sort, Set in order, Shine, Standardize, Sustain).

Utilize this checklist to evaluate the current state of workstations, production areas, and facilities.

**2. Surveys on Workplace Organization:**

Formulate surveys to collect employee feedback on the organization and cleanliness of their workspaces.

Include questions addressing the accessibility of tools, materials, and information.

**3. Time and Motion Analyses:**

Implement time and motion studies to assess how 5S impacts the efficiency of workflow.

Compare task completion times before and after the introduction of 5S practices.

**4. Audits for Visual Management:**

Create an audit tool to assess the effectiveness of visual management systems, covering labels, signs, and color-coded schemes.

Evaluate the clarity and visibility of information within the workplace.

**5. Safety Inspection Protocols:**

Integrate safety criteria into assessment tools to measure the influence of 5S on workplace safety.

Scrutinize potential hazards and the implementation of safety protocols.

**6. Waste Tracking Templates:**

Establish templates for tracking various forms of waste, such as overproduction, defects, and excess inventory.

Monitor the reduction of waste over time resulting from the adoption of 5S practices.

**7. Employee Perception Surveys:**

Develop surveys to gather employee opinions and insights into the impact of 5S on their work environment.

Pose questions related to job satisfaction, stress levels, and overall workplace morale.

**8. 5S Audit Software:**

Utilize specialized software tools designed for 5S audits and continuous improvement tracking.

Leverage these tools for automated scoring, trend analysis, and detailed reporting.

**9. Gemba Walk Observations:**

Train observers to conduct Gemba walks, involving active observation of the work environment and engagement with employees.

Document observations related to 5S principles and gather insights from frontline workers.

**10. Key Performance Indicators (KPIs):**

Develop KPIs tied to 5S objectives, such as the quantity of items sorted, the percentage of organized workspace, and the frequency of audits.

Consistently monitor and analyze these key performance indicators (KPIs) to monitor progress

**11. Photographic Documentation:**

Use photographs to visually document the condition of workspaces before and after 5S implementation.

Create a visual record to showcase improvements and share progress with stakeholders.

# Results

## Data Analysis and Interpretation

**Correlations**

| | | Type of Manufacturing process | Are you Familiar with the concept of 5S of your manufacturing company? |
|---|---|---|---|
| Type of Manufacturing process | Pearson Correlation | 1 | .083 |
| | Sig. (2-tailed) | | .178 |
| | N | 264 | 264 |
| Are you Familiar with the concept of 5S of your manufacturing company? | Pearson Correlation | .083 | 1 |
| | Sig. (2-tailed) | .178 | |
| | N | 264 | 264 |

**Interpretation-** The correlation coefficient of 0.083 indicates a weak positive correlation between the type of manufacturing process and familiarity with the concept of 5S in the manufacturing company. However, the p-value of 0.178 suggests that this correlation is not statistically significant at the conventional significance level of 0.05. This means that there is no strong evidence to reject the null hypothesis, which suggests no correlation between the variables.

In practical terms, this suggests that there may be some association between the type of manufacturing process and familiarity with the 5S concept, but this association is weak and could potentially be due to chance.

**Type of Manufacturing process * Are you Familiar with the concept of 5S of your manufacturing company? Crosstabulation**

| | | | Are you Familiar with the concept of 5S of your manufacturing company? | | Total |
|---|---|---|---|---|---|
| | | | yes | no | |
| Type of Manufacturing process | Batch processing | Count | 26 | 14 | 40 |
| | | Expected Count | 28.2 | 11.8 | 40.0 |
| | Joining | Count | 74 | 18 | 92 |
| | | Expected Count | 64.8 | 27.2 | 92.0 |
| | job | Count | 64 | 28 | 92 |
| | | Expected Count | 64.8 | 27.2 | 92.0 |
| | Repetitive manufacturing | Count | 14 | 16 | 30 |
| | | Expected Count | 21.1 | 8.9 | 30.0 |
| | casting | Count | 8 | 2 | 10 |
| | | Expected Count | 7.0 | 3.0 | 10.0 |
| Total | | Count | 186 | 78 | 264 |
| | | Expected Count | 186.0 | 78.0 | 264.0 |

**Interpretation-** Looking at the observed counts compared to the expected counts, we can see how the actual data deviates from what would be expected if there were no association between the variables. For instance, in the "Joining" category, the observed count of respondents who are familiar with the 5S concept (74) is higher than the expected count (64.8), while the observed count of respondents who are not familiar (18) is lower than the expected count (27.2). This suggests a potential association between joining manufacturing processes and familiarity with the 5S concept. The statistically significant outcomes from both the Pearson and likelihood ratio chi-square tests imply a notable connection between the type of manufacturing process and familiarity with the 5S concept. Nonetheless, the lack of significance in the linear-by-linear association test indicates that the relationship between the variables may not adhere strictly to a linear pattern. These results suggest that while there is indeed an association between manufacturing processes and familiarity with the 5S concept, it is likely more nuanced and intricate than a straightforward linear relationship. In short:

**Age * Are you aware of the benefits of implementing the 5S technique in terms of productivity, quality, health, and safety? Crosstabulation**

| | | | Are you aware of the benefits of implementing the 5S technique in terms of productivity, quality, health, and safety? | | | Total |
|---|---|---|---|---|---|---|
| | | | YES | NO | MAYBE | |
| Age | 18-25 | Count | 54 | 18 | 6 | 78 |
| | | Expected Count | 50.2 | 17.7 | 10.0 | 78.0 |
| | 26-35 | Count | 46 | 24 | 6 | 76 |
| | | Expected Count | 48.9 | 17.3 | 9.8 | 76.0 |
| | 36-45 | Count | 32 | 10 | 6 | 48 |
| | | Expected Count | 30.9 | 10.9 | 6.2 | 48.0 |
| | 46-55 | Count | 18 | 4 | 4 | 26 |
| | | Expected Count | 16.7 | 5.9 | 3.3 | 26.0 |
| | 56 and above | Count | 20 | 4 | 12 | 36 |
| | | Expected Count | 23.2 | 8.2 | 4.6 | 36.0 |
| Total | | Count | 170 | 60 | 34 | 264 |
| | | Expected Count | 170.0 | 60.0 | 34.0 | 264.0 |

**Interpretation-** The crosstabulation table shows the distribution of responses regarding awareness of the benefits of implementing the 5S technique across different age groups. It appears that younger age groups (18-25 and 26-35) have a higher count of individuals aware of the benefits of 5S compared to older age groups. As age increases, there is generally a decrease in the count of individuals aware of the benefits of 5S, though there are exceptions in the "56 and above" category. Statistical analysis would be needed to determine if these differences are significant. Overall, the table suggests that there may be variations in awareness of 5S benefits across different age groups within the surveyed population.

**Department * What is the primary objective of implementing 5S in your industry? Crosstabulation**

| | | | What is the primary objective of implementing 5S in your industry? | | | | Total |
|---|---|---|---|---|---|---|---|
| | | | Maximizing profits | Increasing employee workload | Improving workplace organization and efficiency | Reducing product quality standards | |
| Department | operations | Count | 20 | 10 | 24 | 4 | 58 |
| | | Expected Count | 14.5 | 17.6 | 21.5 | 4.4 | 58.0 |
| | manufacturing | Count | 20 | 38 | 52 | 8 | 118 |
| | | Expected Count | 29.5 | 35.8 | 43.8 | 8.9 | 118.0 |
| | Logistics | Count | 12 | 6 | 16 | 4 | 38 |
| | | Expected Count | 9.5 | 11.5 | 14.1 | 2.9 | 38.0 |
| | Construction | Count | 8 | 14 | 6 | 2 | 30 |
| | | Expected Count | 7.5 | 9.1 | 11.1 | 2.3 | 30.0 |
| | retail | Count | 6 | 12 | 0 | 2 | 20 |
| | | Expected Count | 5.0 | 6.1 | 7.4 | 1.5 | 20.0 |
| Total | | Count | 66 | 80 | 98 | 20 | 264 |
| | | Expected Count | 66.0 | 80.0 | 98.0 | 20.0 | 264.0 |

**Interpretation-** Manufacturing departments have the highest count across all primary objectives, indicating a strong involvement in 5S implementation. Operations and Logistics departments also show significant participation in improving workplace organization and efficiency. There's a notable presence of objectives related to increasing employee workload in Manufacturing and Construction departments. Retail department appears to have minimal involvement in implementing 5S, especially in improving workplace organization and efficiency. The expected counts indicate the theoretical distribution of responses if there were no relationship between department and the primary objective of implementing 5S.

**Gender * How are employees encouraged to actively participate in the 5S implementation process? Crosstabulation**

| | | | How are employees encouraged to actively participate in the 5S implementation process? | | | | Total |
|---|---|---|---|---|---|---|---|
| | | | Minimizing communication to avoid overwhelming employees | Providing rewards and recognition for participation | Discouraging employee input to maintain process integrity | Implementing changes without informing employees | |
| Gender | male | Count | 64 | 96 | 44 | 34 | 238 |
| | | Expected Count | 63.1 | 95.6 | 43.3 | 36.1 | 238.0 |
| | female | Count | 6 | 10 | 4 | 6 | 26 |
| | | Expected Count | 6.9 | 10.4 | 4.7 | 3.9 | 26.0 |
| Total | | Count | 70 | 106 | 48 | 40 | 264 |
| | | Expected Count | 70.0 | 106.0 | 48.0 | 40.0 | 264.0 |

**Interpretation-** There are notable differences in how employees are encouraged to participate in the 5S implementation process based on gender. Male employees seem to have higher counts across all encouragement methods compared to female employees. Providing rewards and recognition for participation appears to be the most common method for both male and female employees. It's important to note the expected counts, which represent the theoretical distribution of responses if there were no relationship between gender and the method of encouragement.

**What training programs have been provided to employees regarding the 5S methodology? * What is a potential benefit of implementing 5S in your industry? Crosstabulation**

| | | | What is a potential benefit of implementing 5S in your industry? | | | | Total |
|---|---|---|---|---|---|---|---|
| | | | Increased workplace clutter | Decreased efficiency | Enhanced safety and productivity | Reduction in employee engagement | |
| What training programs have been provided to employees regarding the 5S methodology? | Calling Experts from the different industry | Count | 8 | 22 | 18 | 14 | 62 |
| | | Expected Count | 15.5 | 19.3 | 16.9 | 10.3 | 62.0 |
| | Exclusively focusing on leadership training | Count | 14 | 26 | 20 | 12 | 72 |
| | | Expected Count | 18.0 | 22.4 | 19.6 | 12.0 | 72.0 |
| | Providing comprehensive training on 5S principles | Count | 36 | 24 | 26 | 10 | 96 |
| | | Expected Count | 24.0 | 29.8 | 26.2 | 16.0 | 96.0 |
| | Limiting training to specific departments only | Count | 8 | 10 | 8 | 8 | 34 |
| | | Expected Count | 8.5 | 10.6 | 9.3 | 5.7 | 34.0 |
| Total | | Count | 66 | 82 | 72 | 44 | 264 |
| | | Expected Count | 66.0 | 82.0 | 72.0 | 44.0 | 264.0 |

**Interpretation-** The table suggests that providing comprehensive training on 5S principles is the most common approach, with the highest count across all potential benefits. Leadership training and calling experts from different industries are also popular choices, showing relatively balanced counts across potential benefits. Limiting training to specific departments only appears to have the lowest count across all potential benefits. These findings indicate that a comprehensive approach to training on 5S principles may lead to better outcomes in terms of workplace clutter, efficiency, safety, productivity, and employee engagement in the industry.

## Limitation Of the Study

➢Some of workers think that they are already too busy in their work; they have no time to clean and organize the workplace

➢In organization if the cooperation between the department is poor then sustainability of 5s not implemented properly.

➢Absence of appropriate record keeping mechanisms, and auditing mechanisms for evaluating and sustaining the progress 5S program in the organization.

➢5s system fail even when poor leadership performed by the leader of the team.

## CONCLUSION

The literature study proves that the 5S methodology is one of the most appropriate as well as beneficial one for any industry who wants the improvements in their existing system. Additionally, it offers evidence that 5S contributes to boosting work productivity and time efficiency within a shorter timeframe. The appropriate implementation of 5S leads to minimization of the cost and the standards of the company go towards upside. Moreover, due to fewer accidents the safety automatically rises. Overall, it can be understood that 5S methodology gives extremely outstanding results if it is applied in best manner.

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