A STUDY ON EFFECTIVE IMPLEMENTATION OF 5S PRINCIPLE IN ARAVIND POLYMER CHENNAI

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ABSTRACT

This study examines the implementation of the 5S principles—Sort, Set in Order, Shine, Standardize, and Sustain—at Aravind Polymer in Chennai, focusing on enhancing work- place organization and productivity. Despite the simplicity of 5S, many organizations struggle with its execution due to insufficient understanding and management commitment. This research employs a mixed-methods approach, combining quantitative surveys and qualitative interviews with 120 employees to assess awareness, training effectiveness, and barriers to 5S adoption. Findings indicate strong agreement on the development of 5S guidelines but highlight gaps in employee awareness and communication. The study proposes a methodology to align 5S objectives with organizational goals, emphasizing training and management support to reduce waste and improve efficiency. The results underscore the potential of 5S to enhance productivity, safety, and morale in small-scale industries, contributing to their competitiveness in global markets.

Keywords: *5S Principles, Lean Manufacturing, Productivity Enhancement, Management Commitment, Workplace Organization.*

1. INTRODUCTION

1.1. BACKGROUND OF THE STUDY

The 5S methodology, originating from Japan, is a lean manufacturing tool aimed at im- proving workplace efficiency through organization and cleanliness. This study focuses on its implementation at Aravind Polymer, a manufacturing firm in Chennai, to address challenges in productivity and cost reduction. Effective 5S practices can enhance operational performance, particularly in small-scale industries critical to India's economy.

1.2. RESEARCH PROBLEM

The research addresses the difficulty in achieving cost reduction and productivity enhancement through 5S implementation, hindered by barriers such as lack of awareness and inadequate training among employees.

1.3 OBJECTIVES OF THE STUDY

Primary Objective: To study the effective implementation of 5S principles at Aravind Polymer in Chennai.
Secondary Objectives:

- To examine the stages of the 5S implementation model.
- To assess the training on 5S provided to employees.
- To evaluate the level of awareness about 5S among employees.
- To analyze factors contributing to effective 5S implementation

1.4 SCOPE AND LIMITATIONS

The study investigates 5S as a performance improvement tool within Aravind Polymer, aiming to position it within the total quality management framework. Limitations include a sample size that may not fully represent all departments and potential biases in self- reported data.

1.5 SIGNIFICANCE OF THE STUDY

This research highlights 5S as a robust management practice to enhance workplace efficiency and competitiveness in small-scale industries, addressing global market demands for high-quality, low-cost products.

2. RELATED WORK

2.1 IMPACT ON QUALITY AND PERFORMANCE

This Studies, such as Ahuja (2017), demonstrate that effective 5S implementation significantly improves productivity, quality, safety and employee morale, aligning with business excellence frameworks.

2.2 BARRIERS TO IMPLEMENTATION

Research identifies lack of management commitment and insufficient training as key barriers to 5S adoption, necessitating strategies to overcome these challenges.

2.3 COMPARISON STUDIES

Literature reviews categorize 5S contributions to manufacturing performance, noting its effectiveness depends on organizational culture and employee involvement.

2.4 TRAINING AND AWARENESS

Competency-based training correlates positively with 5S success, though challenges per- sist in ensuring comprehensive employee awareness.

2.4 LIMITED CLASSIFICATION STUDIES

There is a scarcity of studies classifying 5S methods in small-scale industries, leading to ambiguity in implementation approaches.

2.5 CULTURAL FACTORS

Few studies explore how organizational culture influences 5S adoption, an area warranting further investigation.

2.6 INTEGRATION WITH OTHER LEAN TOOLS

The synergy between 5S and other lean tools remains underexplored, potentially offering a holistic framework for continuous improvement.

3 RESEARCH METHODOLOGY

3.1 RESEARCH DESIGN

A mixed-methods design integrates quantitative surveys and qualitative interviews to comprehensively examine 5S implementation at Aravind Polymer.

3.2 POPULATION AND SAMPLE

The population comprises employees at Aravind Polymer, with a sample of 120 respondents selected to represent various job functions.

3.3 DATA COLLECTION

- Primary Data: Collected via structured questionnaires and management interviews to assess 5S knowledge and challenges.
- Secondary Data: Derived from journals and articles to contextualize findings.

3.4 DATA ANALYSIS TECHNIQUES

Quantitative data is analyzed using descriptive statistics, ANOVA, and chi-square tests. Qualitative data undergoes thematic analysis to extract insights from open-ended responses.

3.4 ETHICAL CONSIDERATIONS

Participants were informed of the study's purpose, assured confidentiality and provided informed consent, with the right to withdraw at any time.

4 RESULTS

4.1 DEMOGRAPHIC PROFILE

- Gender: 55% male, 45% female.
- Age: 39.2% aged 26–35 years, 35% aged 36–45 years.
- Experience: 39.2% with 1–3 years, 31.7% with 3–5 years.
- Education: 69.2% degree holders, 24.2% postgraduates.
- Department: 30% from central fabric store, 19.2% from central trims store.

4.2 WORKPLACE ORGANIZATION

71.7% strongly agree that 5S guidelines are developed, but only 0.8% agree that "a place for every part" is fully implemented, indicating partial adoption.

4.3 TRAINING AND AWARENESS

Chi-square tests show no significant relationship between education and awareness training periodicity ($p = 0.303$) or between training interactivity and quick turnaround ($p = 0.277$).

4.4 DEPARTMENTAL TRAINING

ANOVA results ($p = 0.735$) indicate no significant relationship between department and opinions on workforce-wide 5S training.

4.5 TOLERANCE FOR AMBIGUITY

An independent t-test shows no significant gender-based difference in perceiving 5S as providing tolerance for ambiguity ($p = 0.063$).

5 DISCUSSION

5.1 INTERPRETATION OF RESULTS

The study confirms strong guideline development but reveals awareness gaps, with only 16.7% fully aware of 5S principles, highlighting training deficiencies.

5.2 COMPARISON WITH EXISTING STUDIES

Findings align with Ahuja (2017), emphasizing 5S benefits, and Mehra, noting communication and training barriers.

5.3 IMPLICATIONS

Organizations should prioritize structured training and clear communication to enhance 5S adoption and foster continuous improvement.

5.3 LIMITATIONS

The sample size may not capture all departmental perspectives, and reliance on self- reported data introduces potential bias.

6 DISCUSSION

The study underscores the potential of 5S to improve productivity and safety at Aravind Polymer, contingent on effective training and communication. Recommendations include continuous training programs, clear communication strategies, and regular 5S evaluations to ensure sustainability.

7 RECOMMENDATIONS FOR FUTURE RESEARCH

- Conduct longitudinal studies to assess long-term 5S impacts.
- Expand research to multiple industries for broader insights.
- Investigate cultural influences on 5S effectiveness.

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9 ANNEXURE

9.1 QUESTIONNAIRE

1. Gender: a. Male b. Female
2. Age: a. Less than 25 Years b. 26–35 Years c. 36–45 Years d. 46–55 Years e. 55 and above
3. Designation: _____
4. Total years of experience: a. Less than 1 Year b. 1–3 years c. 3–5 Years d. 5–10 Years e. More than 10 Years
5. Education Level: a. +2 b. Diploma/ITI c. Degree d. Post graduate e. Others
6. Department: Materials Production Packaging Transportation.

5S Model Stages of Implementation (SA: Strongly Agree, A: Agree, N: Neutral, SD: Strongly Disagree, D: Disagree).

- Workplace organization (5S) guidelines are developed.
- A place for every part' present in the plant.
- Written requirements are sufficient.
- 5S requirements are communicated in local language.
- Training checklists are made mandatory.
- Training audits are conducted occasionally.