

Exploring the Impact of 5S Implementation in Industrial Organizations: A Review

Daniel M. Brown¹, Sarah L. Johnson², Mark E. Thompson³

¹Department of Electrical Engineering, Harvard University, USA

²Department of Computer Science, University of Michigan, USA

³Department of Mechanical Engineering, Georgia Tech, USA

ABSTRACT

In the process of implementation of the Total Quality Management(TQM) in the organizational level, 5'S' will become the first step. It is a Japanese concept for increasing quality of products and productivity. 5'S' is a quality technique used by organizations comes from five Japanese words: Seiri (sort), Seiton (set in order), Seiso (shine), Seiketsu (standardize), and Shitsuke (sustain). This system helps to organize a work space for efficiency and decrease wasting and for optimizing quality and productivity. It uses visual evidences to obtain more firm results effectiveness. This study aims to review previous vast literature about benefits of 5'S' implementation and its efficiency in organizations. 5'S' can support the objectives of organization to achieve continuous improvement in performance and productivity and to improve safety.

Keywords: 5 'S', quality, organization, efficiency.

I. INTRODUCTION

5 'S' is a technique originated from Japan and it was first developed by Hiroyuki Hirano. It is a method used for set up and keeps quality of working environment in an organization. Organization can organize and manage companies which require less space, human effort, time, quality and capital to make products with fewer faults and make a workplace well ordered, disciplined and clean. 5 'S' is a system to reducing wastage and optimize quality and productivity via monitoring an organized and well maintained environment and use visual evidences for obtaining results. Regarding the importance of 5 'S' implementation in today's organizations, this study aimsto review previous studies about benefits of 5 'S' implementation and its efficiency in organizations.

II. 5 'S' METHODOLOGY

The 5 'S' is a participative programme and is an effective approach for improving work environment and total quality. It becomes a base for continuous improvement in the organizations. The 5 'S' name stands for five Japanese words, i.e. Seiri, Seiton, Seiso, Seiketsu and Shitsuke (Osada, 1991; Ho, 1998).

Seiri :

Seiri is about sorting out between necessary and unnecessary items in the workplace and discard of unnecessary items. The idea of Seiri is to keep only the necessary items in workplace at a convenient location.

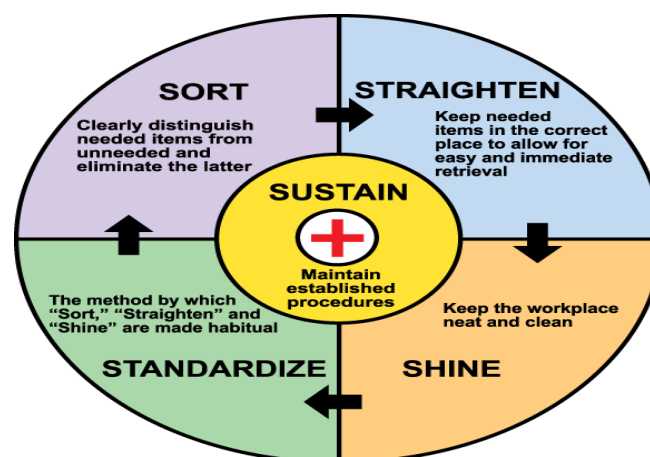


Fig.15 S Methodology

Seiton :

Seiton means "A place for every thing and every thing in its place." It is to make the arrangement of necessary items in good order so that they can be easily picked.

Seiso :

Seiso means cleanliness, which should be the concern of every body in the organization .Cleaning should be done by everyone in the organization, right from top management to the bottom. Cleaning is not for the sake of cleaning, but cleaning should be done with purpose.

Seiketsu :

Seiketsu means maintenance of 1 'S', 2 'S' and 3 'S' which has been so painstakingly done. Regular 5 'S' audits should be done and scores against each 'S' should be displayed. Display through photographs should be encouraged. The emphasis here is on visual management and 5 'S' standardization.

Shitsuke :

Shitsuke means instilling the ability to do things the way they are supposed to be done .Following 5 'S' should be part of the self-discipline. Continuous training and 5 'S' audit should be used to replace bad habits with good ones. This process helps people to become disciplined.

III. PROCESS IMPLEMENTATION

The basic pillars of 5 'S' are sort (Seiri), set in order (Seiton), shine (Seiso), standardize (Seiketsu), and sustain (Shitsuke). It reshapes how you think about a workplace and provides a foundation for quality improvement. The initial stage in 5S is deciding what is essential in the work environment and what is not. The second stage is put the things where they provide the best support for the functions. The third stage is inspection, repairing and cleaning things to find and remove the root causes of damage and dirt. The fourth stage is team working and the members must have consensus on normal and new way of work. The fifth stage is personal discipline to follow the standards and to perform the personal characteristics, cleanliness and neatness of the organization.

IV. FLOW CHART

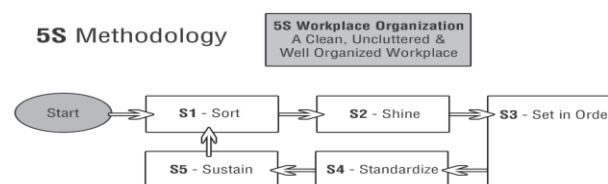


Fig. 2Flow Chart

V. LITERATURE REVIEW

5 'S' is a useful method for founding an organization and spread out a design that can improve communication and help employees to develop their characteristics to decrease downtime, lead time, inventory, defect, injury and associated costs [4]. Result of the study indicates that 5S technique is an effective way to improve health and safety standards, environmental performance and housekeeping [5]. 5S is a method for development of companies, change and training. Hirano in 1995 regards 5S as an industrial practice that distinguishes an organization from the others [2]. According to the Japanese organizations 5S have two components, a high level of management and organizational system with complexity meaning and it translates to perfect performance and the other one is management provision tools position [6]. Even though the 5S housekeeping program aids production [7] but the 5S technique is one of the most known in industrial and business environment and there is few proofs about its adoption in organizations [3]. Other studies still accept 5S as a method of housekeeping [7-10], however there are other ideas that believe 5S is a supportive way for Lean and TQM [11-14]. From the quality management point of view, order and cleanliness have been considered as a part for continuous improvement [15] and also a point to start continuous improvement and more advancement in organizations [16]. 5S can link with total productive maintenance (TPM) [17] and Japanese management approaches such as TPM, JIT and TQM [6]. Generally, the success of 5S implementation depends on organizational characteristics [18] as this mentioned in many surveys [19]. Survey of one factory in Iran supports pervious findings in this field and indicates that 5S execution provides better condition for implementation of TPM [20]. As it is mentioned in several studies, the 5S method is recorded as a way for A Review on 5S Implementation in Industrial and Business Organizations www.iosrjournals.org 12 | Page improving health and safety standard and performance in a holistic operation with high level of efficiency [21] and also helps improving data management system in factories [22]. On the other hand, there is correlation between the 5S and TQM which further approve the role of 5S as a training tool for TQM and also the need for a sound approach towards TQM [23]. There is a considerable decreasing in the rate of injuries in the companies where the objective is improving safety through the 5S practice.

Summary of Research Contribution**Table 2 Summary of Research Contribution**

Sr. No.	Authors	Title, Publication year	Major findings
01	Khanna V. K.	5 'S' and TQM status in Indian organizations, The TQM Journal, Vol.21, Iss: 5 pp. 486-501 /2009.	5'S' performance has direct bearing on performance of TQM journey.
02	Michalska J. and Szewieczek D.	The 5 'S' methodology as a tool for improving the organization, AMME journal Vol. 24, Iss 2 / 2007.	Introducing 5 'S' rules bring the great changes in company.
03	Ho S. K. M.	Japanese 5 'S' - where TQM begins, The TQM Magazine, Vol.11, Iss 5, pp.11-20./1999	5 'S' is foundation for TQM implementation
04	Nizam M. and Rahman A.B.	Implementation of 5 'S' practices in the manufacturing companies, American journal of applied sciences, iss: 7(8) pp. 1182-1189 / 2010.	5 'S' practice is seen as a effective technique that can improve overall performance of company.
05	R. Suresh Permil Kumar, C. Sudhahar, John F. Dickson, V. Senthil, S. R. Devadasan	Performance analysis of 5S using quality circle financial accounting system,2007	Study revealed the compatibility of employing QCFAS for financially accounting 5 S teams.
06	HarshaLingoreddy, G. Sahityareddy, K. Gogdeshwar	5S as a tool & strategy for improving the workplace,2013	Implementation of 5 S bring great changes in company.
07	S. B. Khedkar, R. D. Thakre, Y. V. Mahantane, Ravi Gondane	study of Implementing 5S technique in plastic moulding,2012	Research effort may show significant improvement to safety,productivity,efficiency and productivity.
08	Rod Gapp, Ron Fisher, Kaoru Kabpyashi	Implementing 5S within a Japanese context: an	Four key areas for 5S are management,activity,training and improvement.

		integrate management system,2008	
09	DeryaSevion, NevzatCakicier, E. SedaErdinler	5S activities & its application in sample industry,2009	5 S is an approach that can be easily applied in all organisations.
10	R. A. Pasale, Prof. J. S. Bagi	5S strategy for productivity improvement: A case study,2013	5S can result in considerable improvement in environmental performance.

VI. CONSTRAINTS IN 5 ‘S’ IMPLEMENTATION

The following are the constraints in 5S implementation.

1. Poor communication between employees.
2. Space between managerial level and shop-floor employees.
3. Poor training & awareness of 5S.
4. Lack of management support.
5. Improper training of 5S.
6. Resistance to change.

VII. ADVANTAGES OF 5 ‘S’ IMPLEMENTATION

The successful implementation and execution of the 5S principles in various organizations results several advantages as mentioned following.

1. 5S concept is very simple and easily understood by everyone because this only requires knowledge of the conventional discipline and high commitment. This practice can be implemented at all levels.
2. 5S will foster teamwork, discipline and will increase the sense of responsibility and compassion for company.
3. 5S will create clean, productive work environments and secure the delivery system towards a world-class.
4. On-going commitment from management and involvement are the cornerstone of all citizens for the successful implementation of 5S practices.
5. 5S is an on-going need to maintain excellent service delivery performance.
6. Assessment of Internal Audit will normally move the organization to continually repair the quality and effectiveness of services delivered to customers. Activities are planned and on-going audit to help people to be prepared to face the real 5S audits by the MPC to obtain and maintain certification of 5S.

VIII. CONCLUSION

The most important barrier for implementation of 5S effectively is poor communication. Techniques of communication and their efficiency are seldom evaluated and communication faults rarely addressed in an industrial workplace. Poor communication can cause wasting resources, time and money, and lowering morale amongst employees. The results of evolving communication systems in an uncontrolled fashion in industries or business could be confusing and complex. There must be an applicable way for using 5S as an improvement tool for communication system. The surveys indicate that there are difficulties in the effective 5S implementation. Another significant barrier is the space between managerial level and shop floor employees and the poor training and awareness of 5S. Since some critical decisions of 5S activities, including time and budget performance must approve and support by management, therefore more cooperation is recommended during implementation period [6]. It is concluded that 5S key of success is training. 5S implementation is not possible without proper training and employees are not capable to actively standardize the 5S [26]. Organization should pay attention to this fact that resistance to change is one issue which will be occurring during 5S implementation. Therefore, it is believed that continuous training is the key applying to change the organization culture, and assessment should focus on improvement and progress regarding all input from the organization until complete establishment of 5S system. It is obvious that the target of 5S application is vast and diverse and when effectively implemented, the business improvement can be surprising. However, the total benefits of 5S cannot be imagined in industries and business, until the barriers associated, fully understood, addressed and removed.

IX. REFERENCES

- [1] Chapman, C.D., *Clean house with lean 5S. Quality progress*, 2005. **38**(6): p. 27-32.
- [2] Osada, T., *The 5S's: five keys to a total quality environment*. 1991: Asian Productivity Organization Tokyo.
- [3] Bayo-Moriones, A., A. Bello-Pintado, and J.M.D. de Cerio, *5S use in manufacturing plants: contextual factors and impact on operating performance. International Journal of Quality & Reliability Management*, 2010. **27**(2): p. 217-230.
- [4] Van Patten, J., *A Second Look At 5S. Quality progress*, 2006. **39**(10): p. 55.
- [5] AbRahman, M.N., et al., *Implementation of 5S Practices in the Manufacturing Companies: A Case Study. American Journal of Applied Sciences*, 2010. **7**(8): p. 1182-1189.
- [6] Gapp, R., R. Fisher, and K. Kobayashi, *Implementing 5S within a Japanese context: an integrated management system. Management Decision*, 2008. **46**(4): p. 565-579.
- [7] Eckhardt, B., *The 5S housekeeping program aids production. Concrete products*, 2001. **104**(11): p. 56.
- [8] Becker, J.E., *Implementing 5S to promote safety & housekeeping. Professional Safety*, 2001. **46**(8): p. 29-31.
- [9] Ahmed, S. and M. Hassan, *Survey and case investigations on application of quality management tools and techniques in SMIs. International Journal of Quality & Reliability Management*, 2003. **20**(7): p. 795-826.
- [10] Chin, K.S. and K.F. Pun, *A proposed framework for implementing TQM in Chinese organizations. International Journal of Quality & Reliability Management*, 2002. **19**(3): p. 272-294.
- [11] James-Moore, S. and A. Gibbons, *Is lean manufacture universally relevant? An investigative methodology. International Journal of Operations & Production Management*, 1997. **17**(9): p. 899-911.
- [12] Hines, P., M. Holweg, and N. Rich, *Learning to evolve: a review of contemporary lean thinking. International Journal of Operations & Production Management*, 2004. **24**(10): p. 994-1011.
- [13] Pavnaskar, S., J. Gershenson, and A. Jambekar, *Classification scheme for lean manufacturing tools. International Journal of Production Research*, 2003. **41**(13): p. 3075-3090.
- [14] Kumar, M., et al., *Implementing the Lean Sigma framework in an Indian SME: a case study. Production Planning and Control*, 2006. **17**(4): p. 407-423.
- [15] Yusof, S.M. and E. Aspinwall, *Case studies on the implementation of TQM in the UK automotive SMEs. International Journal of Quality & Reliability Management*, 2001. **18**(7): p. 722-744.
- [16] Ho, S.K.M., *5S practice: the first step towards total quality management. Total Quality Management*, 1999. **10**(3): p. 345-356.
- [17] Ahuja, I. and J. Khamba, *Total productive maintenance: literature review and directions. International Journal of Quality & Reliability Management*, 2008. **25**(7): p. 709-756.
- [18] Sousa, R. and C.A. Voss, *Contingency research in operations management practices. Journal of Operations Management*, 2008. **26**(6): p. 697-713.
- [19] Bayo-Moriones, A., A. Bello-Pintado, and J. Merino-D  az-de-Cerio, *The role of organizational context and infrastructure practices in JIT implementation. International Journal of Operations & Production Management*, 2008. **28**(11): p. 1042-1066.
- [20] Moradi, M., M. Abdollahzadeh, and A. Vakili, *Effects of implementing 5S on Total Productive Maintenance: A case in Iran. 2011: IEEE*.
- [21] Khamis, N., et al. *Development of 5S Practice Checklist for Manufacturing Industry*. 2009.
- [22] Ananthanarayanan, K., *Application of 5S Management System in NDE Laboratory. National Seminar on Non-Destructive Evaluation*, 2006.
- [23] Ho, S.K., S. Cicmil, and C.K. Fung, *The Japanese 5-S practice and TQM training. Training for Quality*, 1995. **3**(4): p. 19-24.
- [24] Ansari, A. and B. Modarress, *World-class strategies for safety: a Boeing approach. International Journal of Operations & Production Management*, 1997. **17**(4): p. 389-398.
- [25] daSilveira, G.J.C., *Effects of simplicity and discipline on operational flexibility: An empirical reexamination of the rigid flexibility model. Journal of Operations Management*, 2006. **24**(6): p. 932-947.
- [26] Ho, S.K.M., *Japanese 5-S - where TQM begins. The TQM Magazine*, 1999. **11**(5): p. 311-321. *of tools and techniques", International Journal of Six Sigma and Competitive Advantage, Vol. 1 No. 2, pp. 44-64.*