

A Lean 7S methodology framework to improve efficiency and organizational performance: A review study in an SME organization

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Abstract

The Efficiency and Quality in Manufacturing Business are some of the key differentiators between competing entities in the business environment and the marketplace. Therefore, improving Efficiency and quality of means of production or services standards is the one of the main obstacle confronting South African's Small-Medium enterprises (SMEs) as well as other firms globally. Lean Approach techniques and methodologies are efficiency and process management Systems adapted largely from Toyota Production System (TPS). . Lean Approach is a gradual transformation overall work environment. Generally, Lean Approach is regarded as a set of tools to aid detection and Eradication of wastes in the process system. 7S Lean Methodology which could be applied by any scope organizations is derived from five Japanese lean 5s methodology; Sort, set in order, Shine, standardise and sustain, extended by Safety as well as Spirit in the recent years. This Methodology aids organisation in work environment for effectiveness and reduction hindrances in processes also enhances quality standards as well as throughput, through scrutinizing a prearranged work environment. This paper intends to evaluate prior investigations findings regarding values realised on implementation of 5S, as well as the extended 6s and 7s application and ability to improve efficiency in organisations for enhanced organisational performance. To assemble theoretical analysis various pertinent to the study objective narratives, articles and papers domestically and globally have been referred to. The outcomes illustrate that Lean 5s Methodology as well as the extended 6s and 7s Lean Methodology is an effective system to enhance of organisational performance, irrespective of organization scope. Therefore, 7S Lean Methodology would soundly aid the goals and purposes of organization to a realise sustained enhancement in organizational performance and throughput

Key words: Lean 7S Methodology, Efficiency, Lean approach

I. INTRODUCTION

Small-Medium enterprises (SMEs) companies need to be sustainable and productive in order to thrive and contribute significantly towards the South African economy by creating jobs and eradicating unemployment. To be sustainable and productive, SMEs companies need to adopt efficiency improvement systems. Efficient World-class operations make use of continuous improvement strategies and efficiency improvements methods to stay relevant and compete in the ever-changing business environment. Most World class Companies also started as small enterprises who me efforts to learn, adopt and improve via different efficiency improvement systems. This study focuses on 7S lean framework for Packaging and fulfilment SME Company, Packaging and fulfilment is the process of designing, evaluating, and producing packages [1]. [1] Further States that the efficiency of SMEs in packaging and fulfilment is the ability to use various lean techniques such as flowcharts; brainstorming; benchmarking and 5W2H (what, when, who, where, why, how, how much). This includes generation of products eliminating waste, ineffective time and unnecessary energy use in the business [1].

a. Problem statement

The research study attempts to investigate the current processes at the Case Company with the intention to improve efficiency in the case company, through site visits and observations, to discover and address issues that will be detected. The Case company is a start-up company, established in 2016. Prompting the need to introduce efficiency systems in the processes, to achieve optimum and desirable results to sustain the business.

b. Aim of the study

The research study aims to involve the application of Lean 7S methodology and subsequently make recommendations to adopt other investigated Lean approach tools and techniques that can be utilized. The primary aim of the research is to discover and eliminate deficiencies in the process to improve efficiency. By identifying the factors prompting the deficiencies that may be experienced.

c. Objectives of the study

1. Evaluate the process' current efficiency through 7S audit.
2. To administer organisational photography to Identify deficiencies in the process flow of the chosen packaging line.
3. Identify opportunities for efficiency improvements in the process flow by assessing key performance indicators.
4. To implement 7S methodology to improve the process flow.

d. Research gap.

- a) The inefficiencies challenges faced at the Case Company would diversify solution techniques and methods of addressing the current process flow.
- b) The focus of Lean approach implementation on SMEs is connected to the notion that SMEs are vital contributors to the economy.

II. RESEARCH METHODOLOGY

A longitudinal case study on a Packaging SMEs organisation has been nominated for the implementation of the Lean 7S methodology. The aim of the study is to enhance process efficiency to boost the Organisational performance. This investigation will be conducted using the mixed method, the mixed method emphasizes on collecting and examining data combining both positivism and anti-positivism approach on a single study. The fundamental principle is that mixed method condenses a superior understanding of research problem than either method alone, echoes [19]. Although not limited, some data collection methods will be incorporated or adapted, as study requires during the study. [11] Suggests employing several sources of evidence as means to warrant "construct validity".

This research study employs the longitudinal method with multiple sources of evidence, observation and survey instruments, Specifically Organisational Photography and a Lean 7S Audit as well as questionnaires. A simple random sampling procedure will be followed during the study. The application of photography is quite recent methodology for research studies; therefore, photos have been scarcely used in Organisational studies [18]. Direct photo analysis will be used in the study in which the researcher takes the photo and analyses it. Additionally, an audit will be conducted to verify and validate the objective to implement of the Lean 7S methodology. The results of the 8 week long audit will be quantified and represented to show effects of the implementation of Lean 7S methodology in the process

III. LITERATURE REVIEW

Literature review is essential as the researcher had to uncover the presently recognized body of knowledge prior to launch the investigation. The ultimate objective of the study is to discuss the subject theme effectively for literature analysis. This is done by recommending a detailed plot which directs the researcher, as the task assignment can become overwhelming. The investigation centers on supporting literature which relates to the research purposes. This will assist in leading the study thoroughly to the main subject and focus attention to related evidence data.

The literature review will aid the development of A Lean 7S methodology framework to improve efficiency and organizational performance at the Packaging and fulfilment SME. The literature that will be reviewed in this research will be on the Packaging and fulfilment Small medium enterprise (SME), Lean approach within Packaging and

Fulfilment SMEs, Barriers of Lean Approach in SMEs, Analysis of application of 5s, 6s and 7s. and Evolution from 5S to 7S methodology .The literature review will categorize the major themes of the subject and highlight the state of knowledge and gaps in the existing frame of knowledge.

a. *Small medium enterprise (SME).*

South African SMEs remain weak to win the main difficulty of access to sponsorship and funding resulting in the high failure rate, which result into an incapability to grow the business, [2]. [3] Also articulates that it remains of the view that the sum of unsuccessful SMEs may be projected next to 70-80 percent due failure to access fund and sustain the business. Additionally, [4] specify that the nonattainment of profitable achievement issues, cause it to be unbearable for the many subsistence industries operating in the informal sector to remain sustainable and display a somewhat system of progress. [4] Further iterates SMEs remain extremely exposed to collapse due to the lack or lethargies of their process efficiency systems. In 2010, SA graded 27th out of 59 states, with a Total Entrepreneurial Activity (TEA) rate of 8.9 percent underneath the usual (11.9 percent) of all partaking republics states. [5] However, [6] Argues that Small and Medium Enterprises (SME's) undertake a significant part in present day economies due to their adaptability and capacity to be enhanced. In most countries, SMEs undertake a critical part in rendering job opportunities and supporting bigger companies.

b. *Background Lean approach and its support to Packaging and Fulfilment SMEs*

Lean approach in packaging and fulfilment SMEs environment is planning cross functional structure, which includes a tool set of evaluation procedures utilized in order to eradicate excess waste and eliminate the inconsistency, of vendors, internal and external customers as well as means of production, as per [10] [11] details the birth of Lean, Lean originates from Japanese in the 1950s where Eiji Toyoda and Taiichi Ohno of Toyota Motor Corporation benchmarked Henry Ford's mass production system, it was detected that there was too much room for improvement in the production line at Ford company. They realized excessive waste in the production department at ford.

Later in the 90s the book "*The Machine that changed the world*" by Jim Womack in 1990 contributed massively to the lean systems, the book underlined the Japanese approaches compared to the traditional western methods; it also emphasized the improved performance of the approach before. The subsequent book "*Lean thinking: Banish waste and great wealth in your organisation*" again by Jim Womack this time featuring Dan Jones in 1996 Summarized Lean principles with a guide of action.

The benefits that can be realised from the literature mentioned above is that Packaging and fulfilment SMEs would adopt principles that will enable them to minimize process flow complexities or challenges in manufacturing systems because lean approach have been a key subject of research in the literature of manufacturing systems optimization in the last few decades. This gives the methods much higher success when implemented, Lean approaches in manufacturing create lean awareness, which in return creates a culture of lean thinking, workers are able to identify and eradicate waste in different forms in the production line to increase process flow. Lean approaches aim at increasing efficiency to a desired optimal level by enhancing the efficiency for all workstation or section in a given production system.

c. *Barriers of Lean Approach in Packaging and Fulfilment SMEs*

Introduction of new phenomena in any working environment can be can hugely received with the negative mind-set by workers, as these phenomenas are deemed to be disturbing status core.

According to [12] Lean approach introduction in working environment inclines to transform ways of doing things. Alternatively, status core, such transformations tend to be deemed as obstacles to the implementation methods of lean approach. Changes happening in the organization tend to cause uncertainties in people's behaviour in the organization. Substantial efforts have to be done to recognise transformations in the organization. Reacting and fitting become difficult when workers recognize changes in organizations' settings. The hurdles can be surmounted by enforcing a philosophy of appropriate communiqué and training workers in the organization the new phenomena.

Communiqué and training enable understanding and the need to accept changes as well as motivation to fit in and a sense of ownership in culture change in the organisation states [13]. [12] Further elaborates, there are key obstacles to applying lean Approach: In spite of the documented facts and literature written on the success stories of application of lean, some obstacles are still evident, limiting effective application. Obstacles include Poor mind-set, lack

involvement top management, funds constraints, lack of education and training for all involved and affected parties, demand unpredictability and lack of time (production is always prioritized) main downsides which are deemed as obstacles to applying lean.

d. Analysis of application of 5s, 6s and 7s.

According to [14] 5S is a valuable technique to establish productivity in organizations and spreads out a plan and can enhance communication, aids workers to be efficient, create attributes to reduce stoppages, delivery times, stock, Defects and related expenses. 5S system is a viable to enhance wellbeing and safety standards, environmental performance. [16] Says 5S is referred to as method for improvement of company's processes, transformation and training and upskilling Staff. 5S is furthermore regarded as an industrial custom that recognizes an organization from the others According to the Japanese organizations, 5S have two mechanisms, a high level of supervision and structural system with complexity meaning and it interprets to perfect performance and the other one is management provision tools position, although 5S is housekeeping practice, for clean and hygienic workplace, it supports total productivity enhancement in workplace. 5S system is one of the foremost known in industrial and business environment and there are few findings of its appropriation in organizations.

[17] Describe the extension of 5S Lean methodology, the 6S Lean Methodology, as a technique that is team-oriented tool. This concept can be applied to attain the specified results within the manufacturing plant. This tool provides continuous improvement in each department implemented on and promotes safety awareness. The main issue of the manufacturing industry is to most extreme utilization of assets and labor with less injuries. The main aim of 6S technology is to maximise utilization of all assets and gets the greatest output from all the resources. This technology settles all drawbacks and issues come within the work environment. This System increases the work productivity of plant as well as the quality and safety of the plant. This system helps the manufacturing industry to realize better quality, safe working environment as well as better customer fulfillment. This method can work as a group work within the organization. The 6S Lean Methodology can be utilized in any organization to improve the performance desired. This technique is around the world prevalent within the modern time. We are able to get maximum output from all resources by utilizing 6S innovation in our work environment. Use of this Method can reduce the 80 to 90% time in material handling and tool searching in the manufacturing plant or workplace. This Methodology gives quick response to every problem and resolves the problem very quickly at the workplace. The Essential idea to extent 5S lean methodology to 6s Lean methodology was to create safety awareness and reduce injuries in working environments

The recent addition of 7S to the 6s framework is to enhance team consistent cohesion, disposal of the waste in visual management and safety awareness. 5S, 6S and 7S are essential instruments of an organization in the working environment States. [16], [16] Further details that the visual management centers on the setting items, components or machinery at particular area with appropriate visible identification. With 5S organisations constantly improves the working environment by classification of materials and tools and arranging material and tools, intensive cleaning, standardization and maintaining the 4th S by compiling work instructions or SOPs to the workforces. The 6th S focuses on eliminating majority of accidents at the workplace after implementation of 6S method. The Lean 7S is the latest methodology which comprises of the seven phases namely Sort, set in order, Shine, Standardize, Sustain or Self Discipline, Safety and Spirit (team Spirit). The Essential idea of the methodology is the add to the other six Ss the principles of cooperation and cohesion from top down and up top in the Organisational hierarchy.

Table 1 is the discussion on Lean 7S pillars, expected outcome, and action requires. According to Joshi [16] Lean, 7S Methodology is a tool implemented by organization at the workplace to eliminate or eradicate Waste, Discrepancy, Fatigue of workforce increase safety awareness and team work etc. The Lean 7s Methodology application consists of seven stages, sort and discard, set in order, deep cleaning and Shine, Standardise, Sustain, Safety and Spirit (team spirit). Respective stages constantly enhance the Key performance indicators of an organization by diminishing excesses time of searching for tools or items, waiting, transportation, motion, work in progress inventory, fostering the spirit of together we can do more and so on.

The author [18] further elaborates that the Lean 7s Methodology helps to reduce processing times, quantitatively and qualitatively contributes towards morale and drive of the workforce. [16] describes the quantifiable elements as searching, movement, idle time, processing time, delivery time, production frequency, throughput, quality, revenue

and client network and the qualitative elements as cleaner working environment, improved communiqué and high morale of the workforce.

<i>7S Pillars</i>			
Concepts	Appearance	Action required	Expected outcome
Sort	Sorting between unwanted or non-value-added items	Identify areas that require 7S to be implemented. Take photos of before the implementation	Improved work flow, increased floor space and avoiding unnecessary clutter
Set in order	Organizing and setting items for quick and easy access	Arranging and identifying items for easy retrieval	Easy access and error proofing, reduction in idle time, safe working space
Shine	Cleaning and removing dirt, stains, dust, etc. with the use of cleaning machines and materials	Take photos before implementation, clean and tidy up the designated area. Take photos after implementation.	Avoid accidents, cleaner and healthier working environment.
Standardize	Regulating and making it an organizational culture for arranging and instilling cleanliness habits and maintaining it	Formulating the 7S methodology as standard operating procedure for all employees.	Work will be simplified with less errors. Standardization of work tasks.
Sustain	This requires self-discipline with an assurance to maintain orderliness	Check and evaluate processes initiated during the 4S phase. Evaluated the effectiveness and continual improvement.	Conformance to workplace policies and procedures.
Safety	Keeping and maintaining a safe working environment, free from hazards visible risks	Safety instructions and safety signage. Identification of hazards and risks. Safety training for employees.	A decline in accidents and incidents. Safer working environment.
Spirit/Support	Team work is the willingness to cooperate as part of a team	Supports to develop team work. Establishment of 7S team. Develop a spirited working environment.	Improved communication. Enhanced self-confidence. Top management commitment.

Source: Joshi 2015, Sukdeo 2017

e. Evolution Lean 7S methodology: Lean 5S to Lean 7S methodology

The 5S methodology was pioneered at the start of the 20th century by Takasi Osaka, with the objective to create a working environment of total quality and cleanliness, which included 5 pillars (sort, set in order, shine, standardize and sustain). Consequently, the five pillars of a visual workplace inspection were established [18]. The objective for enhancing productivity and efficiency is continual project for most companies. [18] established, that the 5S practices had obtained significant consideration in industrialist companies subsequently contributing to the unwanted materials and deficiencies eradication, eradicating workplace risks and hazards, thus enhanced productivity and efficiency.

6S methodology is the advanced extension, of the 5S methodology, invented and intended primarily for diminishing counts of accidents and injuries, waste eradication and optimize throughput production lines, to remove scrap and deficiencies as well. The lean 6S methodology is an unsophisticated technique intended at attaining an ergonomically sound working environment for workers. Thus, 6S applies the five pillars 5S methodology with added a sixth pillar for safety. 6S methodology has been deemed an underpinning action for discipline and seek involvement of senior personnel for it to be effective; it encourages a culture of continuous improvement and productivity states [18].

The 5S framework includes five phases which is; sort, set in order, shine, standardise and sustain. Safety formed the 6S phase and focused attention on safety throughout the previous five phases. Spirit forms the 7S phase wherein top management and employees cooperate as a team in order to promote a culture of continual improvement of the previous six phases. [17] Echoes that as leaders know the impact and influence of company culture and the significance of respect for employees, the need for 7th S becomes clear and makes sense, as it is important for overall Organisational performance. While most organizations have successfully implemented the traditional 5S and 6S method, several are recently opting to add Spirit the 7th S as an additional part to make clear the reliance on the people factor and the need to continually keep it in mind as other steps are undertaken. *Figure 1 shows the evolution from 5S to 7S.*

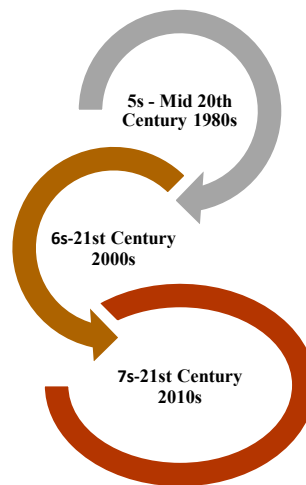


Figure 1. Source: Researcher, 2019

IV CONCLUSION.

With ever increasingly evolving business environment, intensified awareness and concerns of work environmental issues has prompted organisations to use various efficiency improvement tools. From the prior read publication works it is clear that one of the lean methodology tools does have significant positive impacts on organisations performance when effectively implemented. By understanding the results of the lean 5s and 6s in clear that the new Lean 7S Methodology can have positive outcome the organisation performance.

It is noticeable that the goal of 7S function is broad and diverse. When successfully applied, the work environment improves reduce waste in different forms, organize work areas, promotes hygiene as well as team cohesion, the complete gains of 7S cannot be envisioned in firms, if the obstructions related, completely understood, addressed and removed. The lean 7s methodology has become the base for any lean method to be applied. 7S methodology is a continuous improvement tool and should be constantly monitored and evaluated.

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Biography

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A senior lecturer and Head of Department at the University of Johannesburg. She obtained a Masters in Quality from the Durban University of Technology and a PhD in Engineering Management from the University of Johannesburg. She is an upcoming young researcher in the field of total quality management and operations management. Her field of expertise also include quantitative analysis, quality management systems, quality auditing and risk assessment. She is a qualified Lead Auditor, proficient in ISO standards and certification. She is chairperson and director of the Society for Operations Management in Africa (SOMA), a senior member of the South African Society for Quality (SASQ) as well as the executive board member of the South African Quality Institute (SAQI).

K Mahlaha

Quality Control and Production Supervisor at Automa Multi Styrene Pty (Ltd), Mr Mahlaha Holds a Baccalaureus Technology Degree in Operations Management from University of South Africa (UNISA) and an ISO9001:2015 Certificate from South African Quality Institute (SAQI), He has professional background in Quality and Production. The specific industries He has been exposed to, are Beverage Packaging in High Speed bottling Environment production lines, Plastic industry for a ball point manufacturing FMCG company, in an Injection moulding and High batch Production Assembly lines, He currently works in polystyrene product manufacturing company, Manufacturing a wide variety of packaging products for different industries, such as food and beverage, Medical and pharmaceutical, automotive and electronics as well as agriculture and household products.

V Mofokeng

Quality Management Lecturer at the University of Johannesburg, he is also an Operations Management Doctoral candidate. Mr Mofokeng has accumulated many years of experience in various roles as a small medium enterprises (SME) quality specialist in local economic development (LED) projects in the mining, manufacturing and construction sector. He has been responsible for overseeing SME's quality management systems in community development

projects by service providers within the required framework. His community engagement projects include coaching existing SMEs in his home town Virginia, on customer research and customer engagement and also linking them to the Free State Department of Small Business and Tourism for opportunities and training workshops.