Lean Techniques Application to Improve Product Replacement Process in a Manufacturing Organization: Case of a Brandable Company in Johannesburg, South Africa

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Abstract

This article investigates the influence of lean technique in a manufacturing organization, by analyzing the current flow process, identify problem areas implement 5S as one of the lean techniques, and propose a more efficient process flow. The methodology that was followed to gather data of was observation and interview. It was found that the current flowing process of the replacement department was not well structured and consistent with many unnecessary activities. A more efficient and effective flow process was proposed through the implementation of lean techniques which led eradicating unnecessary activities in the process and re-engineering of the process. Furthermore, it was proposed that future research should be based on continues improvement through that application of lean principals.

Keywords: Lean, competitive advantage, manufacturing organization

1. Introduction

Lean manufacturing or lean production is a systematic method for waste reduction within manufacturing production without losing productivity. Thurston and Ulmer (2016) indicates that many authors considered it as a waste reduction technique while maximizing the product value. Lean was originally developed by Toyota with the aim of not only reducing waste by also in improving efficiency in their manufacturing processes, however its principles should be the engraved in all thriving organizations (Sundar, *et al.*, 2014; Soliman, 2017; Thurston and Ulmer, 2016). Lean manufacturing it is a wide-range set of techniques to reduce and eliminate seven wastes, namely: (1) Transport, (2) inventory, (3) motion (4) waiting, (5) over-processing, (6) over-production and (7) defects (Kolberg, *et al.,* 2017). Furthermore, it provides enormous amount of benefits such as improvements in efficiency, cycle time, productivity, material costs, and scrap, all of which leads to lower costs and a better competitive position (Soliman, 2017). It is important to indicate that the achievement of acquiring these advantages is in successful implementation of Lean principles (Sundara, et al 2014)

Lean affords elasticity that permits an easy flow of products through reengineering of operations to reduction of lead time (Chowdary and George, 2011). Today many organizations have tailored lean for fit their organizational needs by integrating and expanding with concepts such as Total Quality Management (TQM), Just-In-Time (JIT), Six Sigma, Total Production Maintenance (TPM) and other practices that aim to enhance the organizational ability to perform (Netland, 2015).

It is imperative to indicate that to be able to survive and meet the challenges in a competitive environment, adopting lean techniques has turn out to be a necessity to improve flexibility and efficiency of the organization, according to Metternich *et al.* (2013), also to reduce or eliminate waste in their processes (Chowdary and George, 2011; Seifermann, *et al*., 2014). However, Netland (2015) argues that many organizations still fail in the attempt to implement lean programs.

1.1 Background, Rationale and Scope of the Study

Many organizations around the world are greatly affected globalization and increased technological advances, which cause a great increase in local, regional and international competition (Chowdary and George, 2011). This have force manufacturing organizations to find ways to reduce cost, improve productivity and strive in the competitive world (Netland, 2015).

Chowdary and George (2011) indicate that manufactures around the world implement lean manufacturing techniques to achieve stability. In the past two decades manufacturing firms have embraced the principles of lean (Fullerton, *et al*., 2014; Rüttimann and Stöckli, 2016). Lean can be divided into two-fold:
(1) lean transformation, which is regarding how to change fast and successfully
(2) lean philosophy, which is consent with what to change and at what to aim for.

Even though many lean techniques focus on soothing individual processes, it can also provide fundamentals for managing an organization (Metternich, *et al*., 2013). However, Rüttimann and Stöckli, (2016) disagrees with the stating that the idea of reducing/eliminate is not such a bad idea, however lean does not necessarily consider the complete situation. Having recognized that lean is one of the key tools for an organization to gain competitive advantage in challenging environment in the manufacturing industries, it was then imperative to examine and conducting this study in a replacement department of a manufacturing company in South Africa, since manufacturing is one of the key industries that contribute the development of country.
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1.2 Aim, Objectives and Value of the Study

The aimed of this study is to improve process efficiency and capacity for a replacement department of the brandable company, operating in South Africa. Through the implementation Lean technique 5S and redesigning of the process flow activities. The study was conducted to determine and eliminate non- value- activities and propose a process work flow that is more efficient and to enable the organization to improve its production processes and performance. Furthermore, the study seek to identify, remedy and contribute positively to the challenges that are faced in the manufacturing industry in the country

2. Literature Review

Lean involves distinguishing and eliminating non-value additional activities throughout the complete price chain to realize quicker client response, reduced inventories, higher quality, and higher human resources (Bartolucci, *et al.,* 2019). Even though, many other consultants began to introduce their ideas from the Lean approach underneath fashionable names such as Process Flow (Netland, 2015). It has continued to expand in dimensions such as continuous improvement, cross-trained staff, versatile and progressively automatic instrumentality, economical machine layout, speedy setup and transmutation, simply in time delivery and programing, realistic work standards, employee direction to perform inspections and take corrective action, provider partnerships, and preventive maintenance (Netland, 2015).

Organizations, mostly automotive organizations, find it difficult to compete in an international competitive market, in turn they go for alternative tools and techniques to survive, such as lean manufacturing, which aims to response to customer demand while reducing waste (Bhamu and Sangwan, 2014). In order for organizations to apply lean techniques, they must be prepared to question their existing work processes, willing to test new ideas to be able to explore enhancement (Ståhl, *et al*., 2014). Some of the crucial benefits of lean in manufacturing is that it improves productivity and quality, and brings about competitive edge (Bhamu and Sangwan, 2014), and it can assist in neutralizing shared challenges faced by many organizations such as increased pressure on inventory, service levels and reduced work in process (Kuo, *et al*., 2012; Yang, *et al*., 2015). This can be achieved by eliminating non-value – adding activities and finding a balance work flow of work stages, from start to the end of a production process (Kuo, *et al*., 2012).

Bhamu and Sangwan, (2014) in their research for that the implementation of Lean in organizations is still problematic and Lean initiative have a very poor success rate. Regardless of the comprehensive knowledge and resources available about Lean organizations still fail to implement appropriately (Rahmana, et al 2013) However, Fullerton *et al.* (2014)

argues that lean strategically fits within an organizational goal and it must be engraved in all levels of operations. Organizations in Asia have applied lean initiatives in an attempt to stay competitive within the global market (Rahani and Muhammad, 2012). Yusof and Aoki (2016) conclude by stating that lean remains one of the top approaches to efficiently and effectively manage any type of an organization, from services to manufacturing organizations around the world.

3. Methodology

The methodology of this study was an intensive observation of the work flow activities over a period of three weeks, to diagnose the problem areas. Each step of each category was analyzed from start to finish, this was followed by an interview with the work study practitioner to have a deeper understanding of the process and asked about any lean manufacturing techniques that they implement.

An improved process was designed and proposed to the company's management. This improved design of the process under investigation was designed based on the findings from the observations (mentioned above) as well as from the data obtained from the interview with the work study practitioner.

4. Results and Discussion

A number of manufacturing organizations that apply the lean approach to improve their operations have increased drastically in the past years (Gündüz, 2015). This include the integration of lean with other related technologies, and management practices and systems that are aimed at increasing quality and productivity, and reduction of cost and waste (Koukoulaki, 2014). The existing work flow process of replacement involves three categories namely (1) production rejects, (2) unpacking shortage and (3) unpacking damaged, each with their own steps as described below and depicted in Figure 1:

4.1 Current Work Flow Replacement Process

The current work flow replacement process under investigation in this study is composed of three categories of sub-processes and their steps are detailed below:

a) Production rejects units
This particular sub-process follows seven steps, starting with Step 1: Production completes the replacement form, Step 2: Give Replacement Clerk the replacement form and the rejected unit, Step 3: Replacement Clerk place the rejected unit in the Rejected box, and fills in the order number, unit description and quantity on the attached excel page, Step 4: Replacement Clerk creates an invoice under Super factory account, Step 5: When the rejected box is full place on the pallet labelled Branded Damaged Units, Step 6: Replacement Clerk captures the Invoice on the replacement worksheet, and Step 7: When pallet is full send it to brandable company warehouse

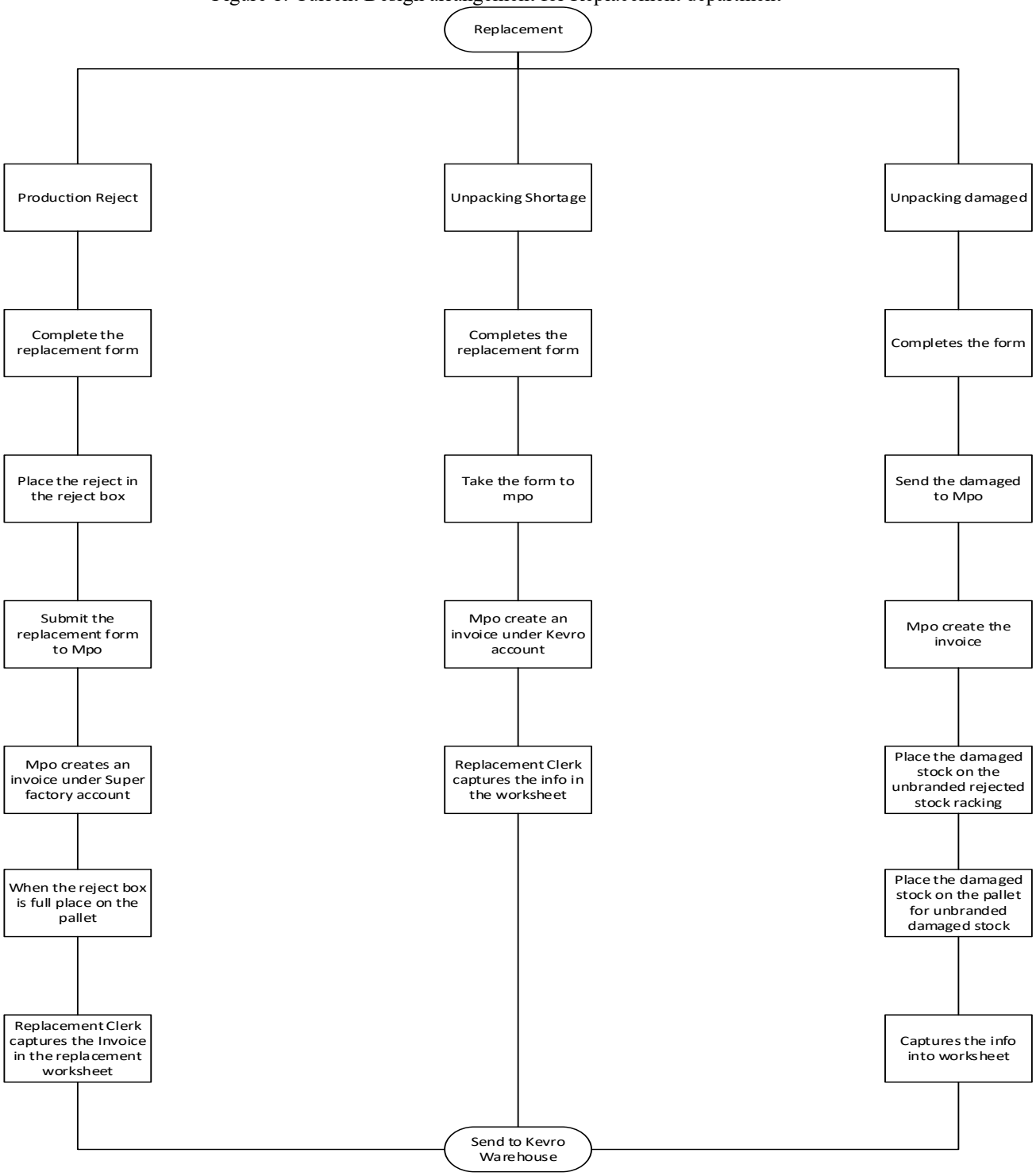
b) Unpacking shortage units
This sub-process starts with Step 1: Unpacking completes the replacement form, Step 2: Give Replacement Clerk the Replacement form, Step 3: Replacement clerk completes the stock replacement sheet, Step 4: Replacement Clerk notify Warehouse via Email about the shortages attach the stock replacement sheet, and finally Step 5: Replacement Clerk captures the Invoice on the replacement worksheet

c) Unpacking damaged units
Step 1: Unpacking completes the replacement form, Step 2: Give Replacement Clerk the Replacement form and the damaged unit, Step 3: Replacement Clerk place the damaged unit in the unbranded damaged box, and fills in the Order number, unit description and quantity on the attached excel page, Step 4: Replacement Clerk creates an invoice under Brandable company account, Step 5: When the unbranded damaged box is full place on the pallet labelled unbranded Damaged Units, Step 6: Replacement Clerk captures the Invoice on the replacement worksheet, and Step 7: When pallet is full send it to Brandable company warehouse

To be able to improve the existing process flow for replacement department 5S technique was implemented: (1) Sort - Figure 1 (current Design arrangement for Replacement department) demonstrates how unorganized is the replacement stores, the first thing that is required to be done is to remove the racking, (2) Straighten - provide a space

where the will be a pallet for branded damaged units, unbranded damaged units and unbranded good units, (3) Shine - clean everything, inside and out, inspecting through cleaning, and prevent dirt and contamination from reoccurring, (4) Standardize - establish guidelines for the team 5-S conditions and the conditions must be maintained and monitored, and lastly (5) Sustain - 5S concept training and communication board, refer to figure 2 for a proposed design arrangement for Replacement department.

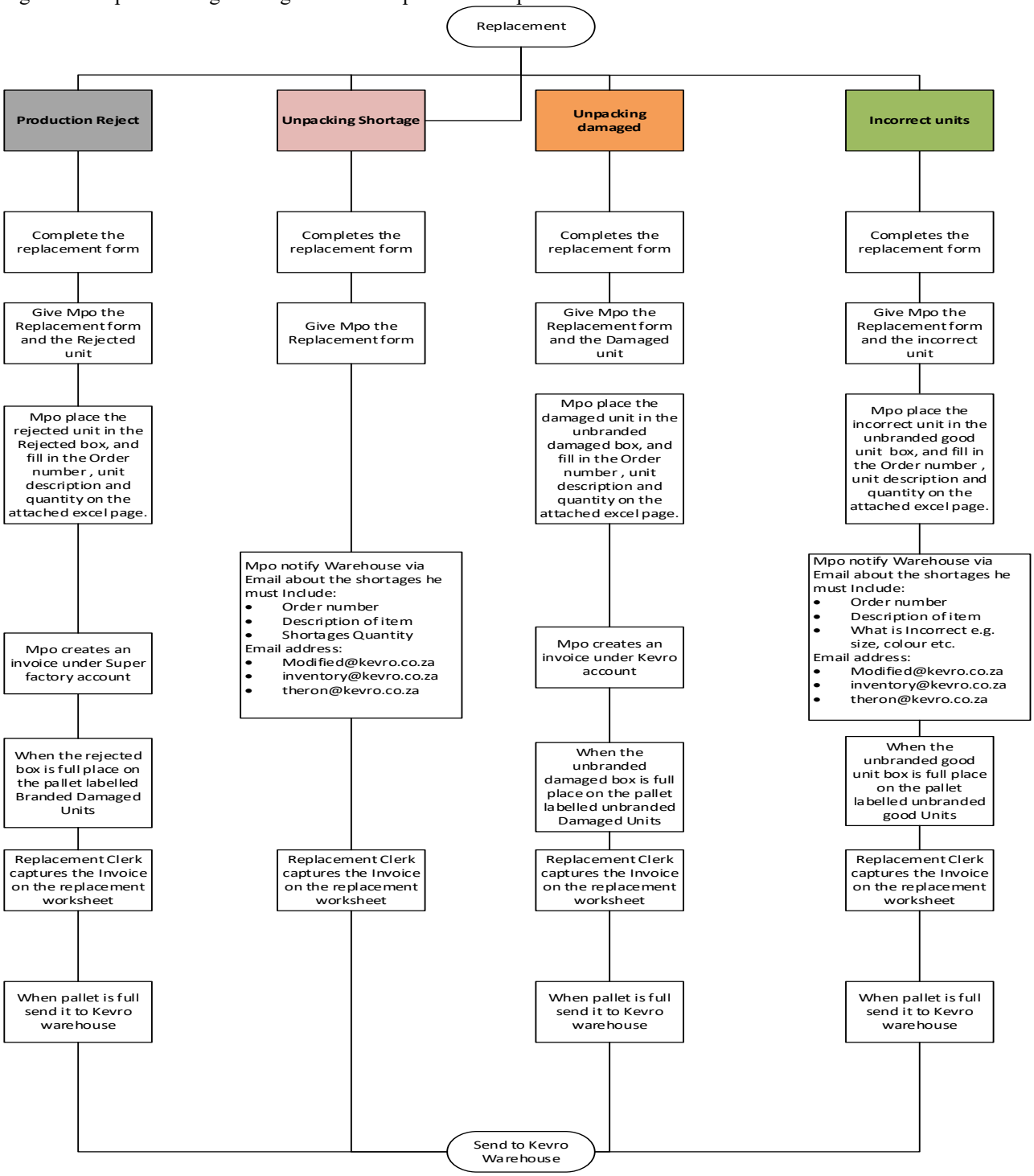
Figure 1: Current Design arrangement for Replacement department



5. Recommendations, Conclusion and the Way Forward

After observations were conducted, the process under investigation was redesigned by applying the 5S methodology and the resulting improved design is depicted in Figure 2 below.

Figure 2: Proposed Design arrangement for Replacement department



Lean tools are an effective way to improve processes with more measurable results (Chiarini, 2014). It is apparent that lean provide flexibly that enable manufacturing organizations to re-engineer their processes to improve efficiency (Koukoulaki, 2013).

Therefore, it is recommended that Brandable company should train their employees to implementing lean techniques in all processes of the organization, this will allow the organization to improve the quality of their processes, eliminate wasteful activities and enhance their customer retention. Lastly future research can be focused on continues improvements through implementing lean techniques in the manufacturing industries.

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Biographies

Sambil C. Mukwakungu is an award-winning academic who has been lecturing Operations Management to first year students, Food Production, and Quality Management at the University of Johannesburg since 2009. His passion for teaching and learning has allowed him to make a difference in at least one student's life every year. He is a young researcher who is still establishing himself in knowledge creation with keen interest in Service Operations Management, Lean Operations, Continuous Improvement, as well as business innovation and innovation in Higher Education. He was awarded Best Track Paper Awards at the 2016 IEOM Conference in Rabat, Morocco, also at the 2018 2nd European Conference in Paris, France, and he is together with his team from the IEOM UJ Student Chapter a recipient of the 2018 IEOM Outstanding Student Chapter Gold Award for exceptional chapter activities and contributions to the field of industrial engineering and operations management.

Matimba Davis Mabasa is a BTech student in Management Services at the University of Johannesburg, has completed short learning programme in Basics in Project Management, Basics in Total Quality Management, Strategic Management and programme in Sales and Marketing with the University of South Africa. A participate of Development Evaluation Training Programme in Africa (DEPTA) hosted by Wits School of Governance – Clear Anglophone Africa. Have two published papers for at IEOM and GBATA 20th Anniversary Annual International Conference 2018, and have two more papers accepted for publication at the IEOM International Conference 2018, Pretoria, South Africa.Whose future prospects is to further do MBA, Master's in Project Management and Operations Management.