*International Journal of Academic Research in Business and Social Sciences*
*October 2014, Vol. 4, No. 10*
*ISSN: 2222-6990*

# Investigation on the Effects of Elimination of Waste Levels in Managing Cost Levels In the Pharmaceutical Industry in Kenya

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DOI: 10.6007/IJARBSS/v4-i10/1232 URL: http://dx.doi.org/10.6007/IJARBSS/v4-i10/1232

**Abstract**

This article investigates the effects of elimination of waste levels in managing cost levels in the pharmaceutical industry in Kenya .Non - probability sampling technique under the category of purposive sampling was used. The population of interest was composed of twenty three pharmaceutical manufacturing firms located in Nairobi, registered in the Kenya Fact book 16th Edition, 2001 & The Kenya Telephone Directory 2004 and nine pharmaceutical companies , 23 employees in manufacturing, finance, procurement, warehousing were selected out of the target population of 28. The research instrument was a questionnaire. Analysis of the data was done using descriptive statistics and inferential statistics .The study affirmed by 84.9% that the elimination of eight elements of waste contributed to managing cost level. The study recommends that pharmaceutical companies in Kenya should fully adopt lean manufacturing in order to manage its cost levels hence give the firm a competitive advantage.

**Key Words:** Waste elimination, cost levels, lean manufacturing, Pharmaceutical companies in Kenya

**Introduction**

Investigation of the effects of elimination of waste levels in managing cost levels in the pharmaceutical industry in Kenya.

Lean manufacturing was conceived as a novel means of cost reduction with the primary features of waste elimination and the organization of production around a demand-pull flow (Chiarini, 2013) . Waste elimination attacks the residual waste inherent in mass production which ends up reducing the effectiveness of the Company (Besterfield, 2011).Demand-pull flow ensures that the companies only manufacture items that are required thereby promoting total efficiency in manufacturing. Lean manufacturing involves never ending efforts to eliminate or reduce 'muda' (Japanese for waste or any activity that consumes resources without adding value) in design, manufacturing, distribution, and customer service processes. Lean Manufacturing which includes the production processes, tools, and techniques inspired by the real life model of the Toyota Production System has been benchmarked worldwide for its ability to do "more with less" through efficient utilization of all resources in manufacturing. According to (Womack, T. M., Jones, & Roos, J., 2007). Toyota's production system has proven to be a successful paradigm shift from traditional mass production in methods of production for mass markets. Lean manufacturing, with its primary focus on the elimination of eight production wastes including: overproduction, over processing, waiting, excess transportation, excess motion, excess inventory, unnecessary movement, defects, and unused employee creativity has been applied successfully in non-automotive industries such as job shop manufacturing, service organizations, supply chain management, home construction, and government agencies (Jeffrey, 2004) Cost of producing a certain product is made up of the sum of costs of all activities that this product passes. Non-value added activities could represent the most of product costs and they have the opportunity to be reduced without affecting the customers' satisfaction. This idea encourages managers to pay more attention to the importance of eliminating non-value added activities (Abdullah, 2003) . In lean manufacturing, the value of a product is defined solely based on what the customer actually requires and is willing to pay for.

With increased globalization and internationalization of firms, Pharmaceutical companies in Kenya are facing several challenges in their production process. International pharmaceutical companies located in technologically efficient countries have now entered the Kenyan pharmaceutical market hence taking the competition levels a notch higher. In order to be competitive in such an environment, it is important that Kenyan Pharmaceutical companies adopt lean manufacturing so as to eliminate unnecessary wastes in its pharmaceutical production process. Local pharmaceutical companies in Kenya face competition on two fronts; they compete with each other and collectively, they face stiff competition from imports. A number of factors have contributed to the flood of imported pharmaceuticals, many of which are substandard, into Kenya, including; Foreign drugs are easy to register with the PPB as Kenya was one of the first countries in the region to reduce its pharmaceutical import tariffs to zero, At the same time, local pharma producers are disadvantaged on a number of fronts; Since they lack WHO pre-qualification, they are excluded from donor-funded procurement, Since many are small firms, they do not have the capacity to participate in large volume tenders, They are facing severe price competition from imports and they are financially strained by delayed reimbursements from the government of duties and VAT already paid (Waithaka, 2005). From

the above discussion, it is evident that the Pharmaceutical companies in Kenya need to adopt lean manufacturing whole heartedly.
In view of the above review the following study was investigated:
The effects of elimination of waste levels in managing cost levels in the pharmaceutical industry in Kenya.

**Methodology**

Non - probability sampling technique under the category of purposive sampling was used. The population of interest was composed of twenty three pharmaceutical manufacturing firms located in Nairobi, registered in the Kenya Fact book 16th Edition, 2001 & The Kenya Telephone Directory 2004 and nine pharmaceutical companies , 23 employees in manufacturing, finance, procurement, warehousing were selected out of the target population of 28. The research instrument was a questionnaire. Analysis of the data was done using descriptive statistics and inferential statistics using Statistical Package for Social Scientists (SPSS) software in analyzing data. Analysis of the data was done using a combination of designs including descriptive statistics, frequencies and percentages. The former included means, standard deviations, and latter entailed Pearson's Chi-square test of association.

**Results and Discussion**

**Assessment of Waste reduction**

In this section the researcher sought to find whether respondent's understood the concept of waste reduction and its implication to cost levels in pharmaceutical industry.

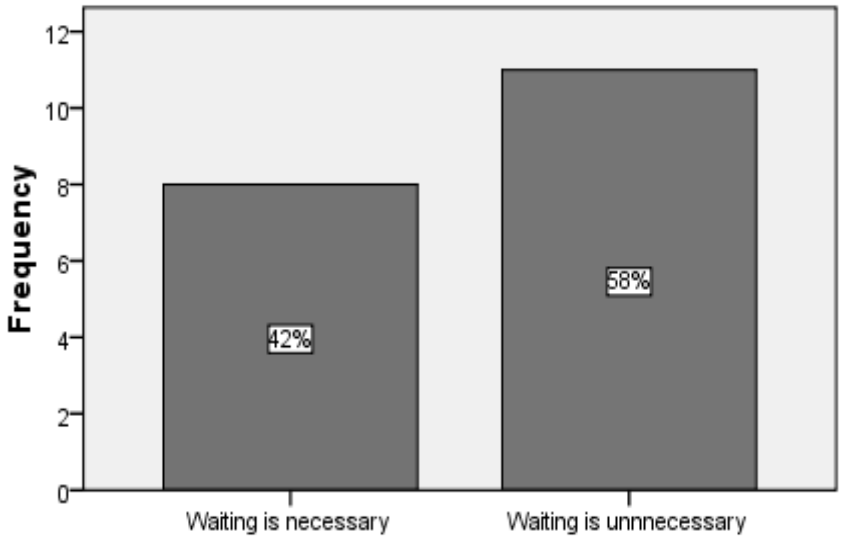


Figure 1: understanding of the concept of waiting

Figure 1 indicates that more respondents 58% felt waiting is unnecessary; while 42% agreed that waiting was necessary.

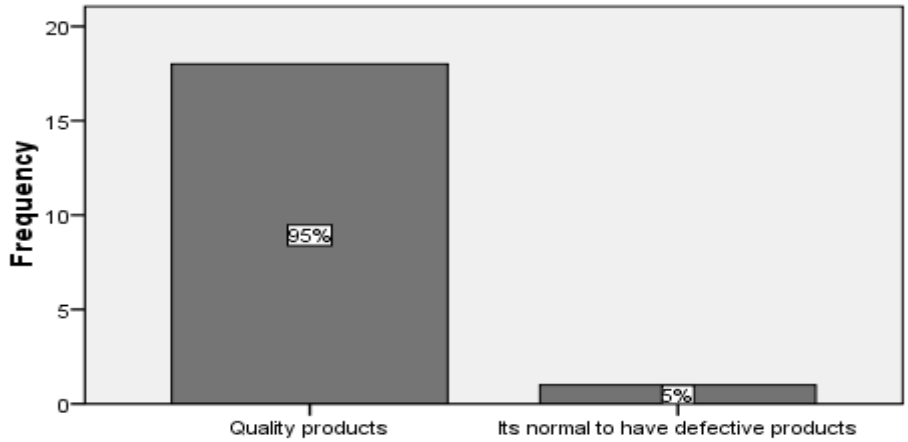


Figure 2: understanding the concept of Zero defects

Figure 2 shows the understanding of the respondent's team on the concept of zero defects. Majority- 95% said quality products while 5% felt it's normal to have defective products.

Table 1: Elements of waste.

| Elements of waste | Frequency | Strongly agree | Agree | Not sure | Disagree | Strongly Disagree |
|---|---|---|---|---|---|---|
| The teams understand the concepts of overproduction | 19 | (32%) | (47%) | (11%) | (11%) | (0%) |
| The teams understand the concepts of waiting | 19 | (32%) | (58%) | (5%) | (5%) | (0%) |
| The teams understand the concepts of inventory / working capital | 19 | (42%) | (47%) | (11%) | (0%) | (0%) |
| The teams understand the concepts of over processing | 19 | (42%) | (42%) | (11%) | (5%) | (0%) |
| The teams understand the concepts of underutilized talent | 19 | (5%) | (53%) | (26%) | (16%) | (0%) |
| The teams are able to measure wastage per batch | 19 | (47%) | (53%) | (0%) | (0%) | (0%) |

| | | | | | | |
|---|---|---|---|---|---|---|
| The teams have a formal wastage review meeting periodically | 19 | (42%) | (42%) | (0%) | (16%) | (0%) |
| The teams have a wastage reduction strategy | 19 | (32%) | (63%) | (0%) | (5%) | (0%) |

Table 1 shows the responses of elements of waste that is their frequencies and percentages. Out of 19 respondents, 32% strongly agreed that the teams understood the concept of overproduction while 47% respondents agreed. 11% respondents were not sure with the statement. Only 11% respondents disagreed. Over-production means high raw material inventory, increases the work-in-process, and requires more storage of equipment and handling tools. Producing more products requires high finished products storage. Due to the higher production rate, the probability of raw materials defects increases. When the operator produces more, less effort will be spent on each unit which leads to less quality and more defects hence 79% agree that overproduction causes wastage.

The teams understand the concepts of waiting as shown by a rating of 80%. When a machine is waiting because its supplier is serving another customer, the machine is forced to produce more just to keep running. Waiting of parts in work-in-process inventory may cause defects due to the surrounding conditions. The teams understand the concepts of inventory / working capital gave a score of 89%. Raw materials inventory for a long time increases defects. Inventory between production processes on the shop floor increases the probability of semi-product damage. Storing of the finished products in warehouse for a long time may cause product damage. The teams understand the concepts of over processing hence a rating of 84% hence insufficient and improper processes lead to produce defects.

The study affirmed by 84.9% that the eight elements of waste contributed to waste reduction and had a statistically significant association with the cost level management hence the relationship between the variables was not due to chance. As seen in the literature, waste reduction positively influences cost level management.

Table 2: Chi Square Test on Element of waste reduction

| Elements of Waste reduction | Pearson Chi-Square value | df (χ2) | Asymp. Sig. (2-sided) |
|---|---|---|---|
| The teams understand the concepts of overproduction | 7.316[a] | 3 | .062 |
| The teams understand the concepts of waiting | 14.474[a] | 3 | **.002** |
| The teams understand the concepts of inventory / working capital | 4.526[b] | 2 | .104 |
| The teams understand the concepts of over processing | 9.000[a] | 3 | **.029** |
| The teams understand the concepts of underutilized talent | 9.421[a] | 3 | **.024** |
| The teams are able to measure wastage per batch | .053[c] | 1 | .819 |
| The teams have a formal wastage review meeting periodically | 2.632[b] | 2 | .268 |
| The teams have a wastage reduction strategy | 9.579[b] | 2 | **.008** |

Only the output from the statistically significant findings was presented in the body of the discussion. The overall relationship between waste reduction and cost level management was statistically significant as shown from the elements of waste which have that the teams understand the concepts of waiting at ($\chi2=14.474$, df =3, $p=0.002$), teams understand the concepts of over processing at ($\chi2=9.000$, df=3, $p=0.029$), and the teams understand the concepts of underutilized talent at ($\chi2=9.421$, df=3, $p=0.024$). Teams have a wastage reduction strategy had statistics at ($\chi2=9.579$, df =2, $p=0.008$). This implies that this association did not occur by chance but rather that there was a conscious effort by the pharmaceutical companies to minimize cost levels through waste reduction.

**Conclusion**

Findings from the study revealed that there was a significant correlation between pharmaceutical company's efforts in reducing the waste levels and cost levels. The overall relationship between waste reduction and cost level management was statistically significant. This implies that this association did not occur by chance but rather that there was a conscious

effort by the pharmaceutical companies to minimize cost levels through waste reduction. It is so clear now that lean manufacturing, which is a systematic approach to identify and eliminate waste (non-value added activities) through continuous improvement by following the product at the pull of the customer in pursuit of perfection, results in a significant cost reduction. However there is lack of a general understanding of lean manufacturing practices and the pharmaceutical companies have not employed a systematic approach in their implementation. Companies have implemented these practices in isolation and have therefore not reaped the full benefits of lean. According to Herron, & Braident, C., (2007) lean tools should not be implemented in isolation; they were developed for a reason, which was to support an overall strategy. They have also suggested that it was better to embrace more lean tools rather than practicing one or two isolated ones.

**Recommendation**

The study recommends that, the feedback received from the respondents who participated in the survey indicated that the Lean manufacturing systems implementation was successful. Lean Manufacturing is based on the Toyota Production System (TPS). Lean Manufacturing implementation is a never ending improvement based on customer focus and waste elimination. There is no single recognized standard for the implementation of Lean. It is dependent on the organization and what the organization has perceived as its value creating activities that will influence the implementation. Lean can be implemented only when there is support from the senior team. If the Chief Executive of the organization does not support it, the progress of the Lean implementation will be limited. It is suggested that the organization first establish senior management support and then communicate this to all, in order to understand the importance of the project. Implementation of lean manufacturing practices should support the company business strategy. The implementation should be in line with the corporate vision, mission, values and plans including communication and evaluation plans to build employee buy-in and communicate results. This will ensure that performance is measured to track actual performance against expectations, new initiatives, budgets including resources needed for new initiatives and current operations for lean projects.

**Acknowledgement**

First and foremost, I would like to thank my supervisor Dr. Agnes Njeru, and Course co-coordinator Juma Dennis, who taught me and for their support and feedback on my work, for the fruitful collaboration on papers, and for always responding to my questions at any time of day or night.
In particular, I also would like to express my gratitude to my superior Clive Ernstzen for his strong support and encouraging me to study and implement Lean Manufacturing.
Last but not least, I would like to express my sincere gratitude to my family for the sacrifice made during my study.

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