LEAN PRACTICES AND OPERATIONAL PERFORMANCE OF NATION NEWSPAPER PRINTING DIVISION, KENYA

OTHIENO KUDWA JOHNPAUL

A Research Project Report Submitted In Partial Fulfillment of The Requirements For The Award Of The Degree Of Master Of Business Administration, School Of Business, University Of Nairobi

2016

DECLARATION

I declare that this project Proposal is my original work and it has never been submitted to any other university for assessment or award of a degree.

Signature…….Date……..

JOHNPAUL K. OTHIENO
D61/72658/2014

This project proposal is submitted for examination with my approval as the supervisor

Signature…….Date……..

NYAMWANGE S.O.
Lecturer,
Department of Management Science,
School Of Business,
University of Nairobi.

DEDICATION

To my dear family, for always being by my side.

ACKNOWLEDGEMENT

Firstly, I wish to thank my supervisor, Dr. Nyamwange, a lecturer at the University of Nairobi for his valuable and encouraging guidance and commentary when writing my thesis. His academic experience, work and vision, together with our tutorial discussions throughout the academic term have helped me to acquire a better understanding of evaluating lean manufacturing practices adopted by newspaper industries.

And I am indebted to the interviewees for giving their perspectives, time and thoughts.

I am extremely grateful to lectures at the School of Business University of Nairobi, who provided me with conventional background knowledge, which prompted ideas and knowledge that enabled me carry out this research.

Finally, without my family's full support, I would never have got this far. Thank you, Aswani Christine, Alvin Othieno and Aaron Kudwa for being with me.

ABSTRACT

This study was set out to determine the lean practices implemented at Nation Newspaper printing division, Kenya and how operational performance measures are affected by the lean practices implemented by this firm.

Results of the study are based on both primary and secondary data composed through a questionnaire and operational performance measures from the firm's records. Descriptive statistics were used to determine the implemented lean practices and for analyzing the correlation of the lean practices to operational performance, regression analysis done.

The study revealed that new technology, 5S, total quality management, and standard work are the lean practices implemented so far at the firm. It was also found out that most staff are somewhat familiar with lean practices. From 2012 to 2015 a downward trend in the operational performance measures was noted, during this duration the impact of lean practices wasn't significant on the operational measures, there seemed to be a lack of knowledge on how the practices can be of benefit to the firm. Migration to new technology in 2016 has had a big impact on the operational performance measures in a good way.

The study recommends that Nation Newspaper division fully implement lean practices for the firm to be able to gauge if the practices will have an impact that will help the firm remain competitive.

TABLE OF CONTENTS

CHAPTER ONE: INTRODUCTION

1.1 Background of the study

Lean practices denotes the implementation of practices fixated on reduction of waste and non-value adding activities e.g. over processing, defects, or any other factor that can disrupt the smooth flow of products/services through the supply chain from the company's interior functions (Yang, Hong and Modi,2011). Lean Practice implementation has spread widely from the time when Japanese Manufacturing firms started growing globally because of positive results they achieved after implementing these practices. Companies like Toyota succeeded and others were keen on going the Toyota way (Shook, 2008). Wheatley (2005) states that the five factors that make organizations to adopt lean manufacturing practices are; pressure to improve operational performance, need to maintain competitive advantage in price and product, pressure to grow profits, customers demand for shorter order cycle times and customer demand for reduced prices.

The newspaper industry is sensitive, and the timing is crucial. Some of the challenges appearing in the industry are a decline in copies sold, a decline in advertising revenues, changing market forces, demand for improved quality, keeping operation costs down, increased price competition, complicated production, increased need for new competency, and a weak flow of information between departments. Due to the pressure on the newspaper industry, Thompson (2010) observes that print organization need to prove their worth to the audience and the advertisers despite the thriving completion. He notes that one of the areas they can focus on to cut on costs is their operation processes by adopting practices that will help them remain competitive. Implementing Lean practices can help with many of these emerging challenges (Larsen, 2008). Hassan and Mostafab (2015) found that the general performance of a manufacturing firm is a drastic function of the policies applied to its operational function. They point out that old-style policies relied on the principle of economies of scale, which caused in excess of waste and struggle of realignment. Worldwide competition requires formulating efficient and effective models in response to the global economies to progress the overall performance

1.1.1 Lean Practices

The concept of lean was born by Womack and Jones (1996). Lean practices as explained by Chandra (2013) comprises a set of ideologies that lean philosophers use to realize advances in lead-time, productivity and quality by reducing waste through Kaizen. Kaizen is a Japanese word that essentially means “good change” or “change for better” .The objective is to provide the consumer with a flawless service or product timely and in the amount needed at a significantly lower price. Lean practices enables firms to produce quality products/services, productivity and improved customer responsiveness (Womack & Jones, 1996).

Shah & Ward (2007) summarized the lean production practices proposed by other scholars to include cycle time reductions, quick changeover systems, cellular manufacturing, continuous improvement plans, cross-functional work force, fixated factory production, Just in time/Continuous flow, lot size reductions, preventive maintenance, pull system, Total Quality Management and self-directed work teams.

1.1.2 Operational Performance

The very objective of developing operations capabilities is to achieve competitive advantage through operations (Clark, 1996). Voss, Ahlstrom and Blackmon. (1997) state that operational performance is the quantifiable facet of an organizations process, such as reliability, production cycle time, and inventory turns. It affects firm’s performance measures such as customer satisfaction and market share. They suggest that operational performance measures say something significant about our products, services, and methods that produce them, they are tools to help us comprehend, achieve and increase what our organizations do.

Slack, Chambers and Johnston (2006) argue that there are five operational performance intentions; Cost which is the ability to produce at low price. Quality which is the ability to produce with provisions and without error, Speed which is the ability to do things fast in reply to customer demands, Dependability which is the ability to deliver products and services in line with promises made to customers and finally flexibility which is the ability to change jobs.

Hayes, Pisano, Upton & Wheelwright (2005) show that effective operations tactics should be reliable and add to the competitive advantage. They note that the realization of any particular business tactics depends not only on the ability of operations to achieve distinction in the appropriate performance objectives, but importantly on customers valuing the chosen competitive factors on which the business strategy is based. Matching operations distinction to customers' needs lies at the core of any operations based strategy.

1.1.3 Nation Newspaper Printing Division

The newspaper printing industry in Kenya has been dynamic over the last decade because of the liberalization of the economy and increased freedom of expression. The mainstream firms dealing with printing of newspapers include; The Nation Media group, The Standard, Media Max limited and Media Africa group with a combined circulation of about 400,000 copies daily (Sarati, 2012).

Nation Newspaper Printing division does mainly deal with the printing of publications from the Nation Media group but it is also open for other publishers to do their printing at a cost. Nation Media group has three daily publications i.e. The Daily Nation that was established in 1960, Taifa Leo that started in 1958 and The Business daily. One weekly publication known by the title The East African and Mwanaspoti, a sports publication that is printed twice in a week. The Daily Nation with a circulation of 184,000 copies per day (74% market share) is Kenya's most widely sold newspaper today, The paper was first registered in 1959 by Michael Curtis and Hayes Charles who were both newspaper men based in London and Nairobi respectively. It was later bought in 1960 by the spiritual leader of the Ismaili community Aga Khan (Buzz Kenya, 2016).At the beginning of 2016 the firm moved to new plant that incorporates the latest technology in newspaper printing.

1.2 Research Problem

Lean practices includes an assortment of principles, techniques and tools into the business processes to enhance time, assets, human resources and efficiency, while refining the quality level of products and services to their clients(Ronald, 2010). Large organizations in other industries have achieved significant productivity improvement

for decades through lean practices. Newspaper Printing firms too have been employing tools and concepts based on lean Practices (Cooper, Keith and Marco, 2009). Lean practices implemented in a newspaper-printing firm can make the operations more cost effective and efficient, and facilitate change of focus to look for solutions and improvements (Brandy 2008). In the WAN-IFRA (2015) Newspaper trends report, it is points out that newspaper circulation and reach trends show that the newspaper's media industry is far from consistent, and trends vary from place to place and thus the interest to carry out research focusing on lean practices in a newspaper industry in Kenya. Lack of research focusing on Newspaper Printing Industry in the country prompted the desire to address this issue. The research addresses this lack by providing an insight into Lean Practices implemented at Nation and their impact on Nation newspaper printing plant operational performance.

Bodolay (2010) studied the impact of Lean Practices on Printing Companies; the study revealed that implementing lean practices resolve issues within a printing firm providing significant increase in productivity and savings in time and money. Results from five of his responses indicate that firms with a separate lean manager and department bore positive effects, while business without a lean manager were unable to yield positive results. This study focused only on printing firms within the California State, USA.

Locally, a number of researchers have looked at lean practices adoption and its effect on operations performance in various industries; Mwangi (2013) studied lean management practices employed in food manufacturing companies in Nairobi. His findings reveal that organizations employed lean management practices largely and in response they were able to profit from enhanced operational performance. Malonza(2014) studied lean manufacturing and operational performance of Mumias Sugar Company in which he reveals that the company was not fully enjoying the benefits of lean manufacturing operations because of failure to implement them fully, he further recommends other industries to carry out similar studies. The two researchers' associates lean practices positively with operational performance, however their empirical studies are not cohesive in their findings. A possible explanation for the contradiction in the results lies in the contingency theory, it suggest that no universal

set of strategies applies to every firms' situation and that no one strategy is successful in every situation. (Lawrence and Lorsch, 1967).

This research was also informed by the changes that are happening in the information production and consumption field (Newspaper printing). It explores lean practices implemented at the Nation newspaper printing plant and the effect this is having on operational performance. In particular, it focuses on lean techniques that are relevant to this industry. It answers the following questions; what lean practices are implemented at Nation Newspaper Printing division? and What impact the lean practices implemented have on operational performance at Nation Newspaper Printing division?

1.3 The Research Objectives

Objectives of the study were:

i. To establish the lean practices implemented by Nation Newspaper Printing Division
ii. To determine the impact the implemented lean practices have on operational performance at Nation Newspaper Printing Division.

1.4 Value of the Study

This research findings can assist Nation printing division know the extent to which lean practices are influencing operational performance of the printing plant and with this information the firm will be in a position to formulate better operational strategies. Other newspaper firms can gain knowledge on lean operations in Newspaper industry.

The research can also serve, as a useful point of reference for investors in the daily print media industry, be of use to government policy makers academic scholars and key stakeholders in the printing industry.

This research adds to the lean practices body of information and can be used by scholars and researchers who intend to carry out studies in Lean practices and related fields.

CHAPTER TWO: LITERATURE REVIEW

2.1 Introduction

This chapter contains data on research-associated subjects. It will draw on diverse approaches on application of lean practices in a manufacturing environment. It reviews inputs by other authors on lean practices and the impact they have on operational performance.

2.2 Theoretical Foundation

The theory of constraints is among the theoretical views that considerably influence the traditional focus of manufacturing strategy, i.e. competing through manufacturing by aligning manufacturing capabilities with market requirements. (Yang & Johansen, 2010). Both lean and theory of constraint focus on improvement and in most cases have demonstrated dramatic results on implementation.

Goldratt (1992) defines the theory of constraints as a business attitude that strives for the global objective, or goal, of a system by understanding of the underlying cause and effect. It takes a scientific approach to progress; it theorizes that every complex system including manufacturing practices consist of numerous linked activities one of which acts like a limitation upon the entire system. He further states that successful implementation of the theory of constraints has the following benefits; improved capacity, increased profits reduced inventory and reduced lead times.

2.3 Lean Practices

Lean practices target to produce a product/service that is exactly what the consumer wants and at the right time while reducing all wasteful events in the process (Womack & Jones 1994). Lean practices can best be described as eliminating waste in a production process (Womack &Jones 1994).They further state that lean principles can be applied in any industry. Organizations in different sectors have embraced lean practices. There are a number of tools and techniques that lean practicing firms employ to support the lean practices and eliminate waste. They are interconnected in their ability to reduce cost through improved efficiency, which adds effect on operational performance (Shah and Ward, 2007).

Pull System, which according to Christensen (2013) is a blend of kanban inventory skills, just in time and other similar systems. He stresses the point that lean practices are really about reducing waste and delivering what is needed on timely basis. Just in time inventory implies that efforts are dedicated to meeting demand just as it arises. Kanban is the size used to determine the level needed to be on hand. It was first developed to regulate production between processes and implement Just in time manufacturing at Toyota plants in Japan. Kanban size is the stock needed to cover in transit time and a small margin to avoid production downtime. Bednar, Vidova and Belusky (2012) point out that use of Kanban supports decreasing of production batches, which intern means less semi-products in production and minimal space requirement.

Total Productive Maintenance (TPM) is an initiative whose focus is refining the Overall Equipment Effectiveness (OEE), which includes performance, quality and availability. Total Productive Maintenance aids in creating a strategy for making employee ownership of equipment maintenance (autonomous maintenance). The objective of Total productive maintenance program is to increase production while at the same time increasing job satisfaction and morale (Parker 2012).

5S focuses on tidiness to achieve a peaceful environment at the work place. It involves the employees with an assurance to openly device and practice house keeping. In a disorderly work place, problems cannot be clearly seen. Organizing and cleaning the workplace helps the employees to discover problems. 5S is a basis program before the implementation of Total Productive Maintenance. Failure to take up 5S seriously results to 5D (defects, delays, declining profits, dissatisfied customers, and demoralized employees) (Melesse andSingh2012).

Value stream mapping is a graphical presentation of every process for one product group and every fact and action that can alter the timeline will be taken into consideration. Plotting the events will make it simple to identify waste in the entire process and it becomes clearer where to get improvement opportunities (Cooper, Keith, &Macro, 2007). Efforts begin with determining what the customer wants (Value) and planning the process so that value flows (Streams) with least disruptions (Melesse and Singh 2012). Value steam mapping is used to clarify the flow and relationship between work processes and how the raw materials flow through the production process.

Distinguishing value adding activities from non-value adding activities is vital. Value stream emphasizes on how the work in progress is controlled, materials flow and all that occurs between the events that is all events that are required to prepare, to process, and to deliver the product/service to the customer (Cooper et al 2007).

The term kaizen is commonly used in the application of lean practices. It is mainly used as an improvement tool. It is considered as the starting point for all lean initiatives. Kaizen is a team methodology to quickly bring down and rebuild a process layout to work more efficiently, (Ortiz 2006). Kaizen events are short models of the Deming's Cycle (Plan, Do, Check, Act) that are used to make improvements continuously. They rely on the theory that any change will improve performance if studied and developed by those in the work group. kaizen seeks to continuously improve product development and product processes (Womack & Jones 1996). Kaizen events involves cross-working teams being created to identify problems causing waste and then to analyze and to remove the problems (Cooper, et al2007). Having a culture for and a strong focus on improvement strategies helps to address constraints and bottlenecks in any departments.

Mistake Proofing (Poka-Yoke) is a process whose aim is to ensure customers receive higher quality products. It routes for thinking about the design of products/services and production then planning in ways to prevent mistakes (Christensen 2013).He further states that Poka yoke strategies are an excellent manner to show respect for workers. They make the job simple and let workers focus on coming up with improved ways to do their jobs rather than spending their energy trying to avoid mistakes. Poka yoke prevents systems from making errors. Preventing errors evidently increases quality and plays a key role in refining productivity. Production cycle times and lead times become much shorter and of course, faster production with fewer faults means lower costs.

Quick change over is the practice of changing the production line from one type of product to another. It entails planning production to reduce that changeover time and increase production flexibility. Of key interest is to analyze and separate processes internal and external events in changeover so that manufacturing can carry on while change over takes place. Quick change over is a key lean practice. Changeover gives the flexibility to tie the product mix to actual demand and in turn, this prevents the build

up of inventory that can increase cost and considerable amounts of waste to a process (Christensen 2013).

Standardization of work is a key principle in the elimination of waste. It involves the regularization of workers activities. Standardized work ensures that each job is planned and done in the most effective way possible. To standardize work, a tool called Takt time is used. Takt (German for rhythm or beat) time denotes to how often a apart should be produced in a product family based on the actual market demand. (Feld, 2000)

2.4 Operational Performance Measurement

Performance measurement is an essential item in evaluating the competitiveness of a firm. Several management components at all the three levels i.e. strategic level, tactical level and operational level results are affected by the proposed method of performance measurement. Park, Gyusun, Sumin and Sungboum (2014) found that many companies carry out performance measurement for measuring, evaluating and monitoring the operations of their entire activities. A good performance framework has to focus on the customer and measure the right things. It must be intuitive, simple and easy to evaluate the performance. Performance measures are all the time secured to an objective or an objective (the target).For lean practices, the operational performance measures include quality, throughput and downtime.

According to Meek (2006) quality as an operational performance measure is simply put as the ratio of quality parts manufactured divided by total parts produced. It is measured in simple metric by tracking rejected parts. Customer complaints (quality related) is an expression of how many times a customer rejects goods/services based on it being out of specifications. In this research, this will refer to the number of times advertisers ask for a repeat of an advertisement because of poor print quality.

Down time (Availability Metric) refers to the duration when the equipment for production is unavailable due to breakdown or maintenance. Downtime is any time that will reduce the total time in cycle component. Down time is the largest source of lost productivity for most manufacturers. Downtime costs plants a lot of money each year in downgrade, lost production and loss of customers. It is vital that the maintenance

team knows what is causing the downtime and how to use this information to correct the problem, (Meek 2006). The throughput is the average output per unit time. Throughput roughly measures the number of jobs completed per unit time.

2.5 Lean Practices and Operational Performance

Performance of the internal processes is revealed by operational performance measure in terms of cost & waste reduction, delivery performance, product quality improvement, productivity improvement and flexibility (Jeyaraman and Teo, 2010). Operational performance measures can be categorized into five groups i.e. speed, quality, cost, customer satisfaction and overall productivity (Graban,2009).From review of operational performance, literature Hill (1993) argues that every company must determine the criteria upon which it will operate against its competitor. The manner in which a firm safeguards, sets up and uses its assets will define the level to which it can effectively pursue a particular operational performance objective. The main aim of the operations department is to deliver the goods and services needed by the customers whilst managing assets effectively. Operational performance typically measures the success of lean practices (Punnakitikashem 2013).

2.6 Empirical Summary

Engum (2009) studied implementation of lean manufacturing into newspaper production operations. In the research findings, many newspaper printing firms were fairly familiar with the lean Manufacturing concepts, but he notes that there seems to be a lack of knowledge of how these practices can be beneficial for the newspaper printing industry. He also points out that there appears to be a lack of knowledge of areas with opportunities for improvement in process performance when these practices are implemented. Despite there being a high level of knowledge, only 17% of the participants in the study have implemented some form of lean Practices in their operations.

Kanyanya, (2013) studied Lean Manufacturing practices and related them to performance of organizations listed at the Nairobi Securities. She found out that lean practices are significant in the prediction of Organizational Performance. The study confirmed that most manufacturing companies in Kenya had adopted the concept of

lean practices in their operations, she ranked the tools of lean practices from the highly adopted to the least adopted in the following order; Jidoka-Automation, Just In Time, Poka yoke-Error Proofing, Value Stream Mapping,5S, kaizen-Continuous Improvement and Kanban-Information Transparency. She also looked into the challenges facing the implementation of lean practices. She confirmed that lack of top management commitment, poor infrastructure, lack of political good will, lack of interface with existing systems, data inaccuracy, lack of training, government policies, power outages, lack of vendor support, lack of appreciation of resulting benefits, high cost of electricity, employees resistance to change and lack of internal expertise affect organizational performance in that order.

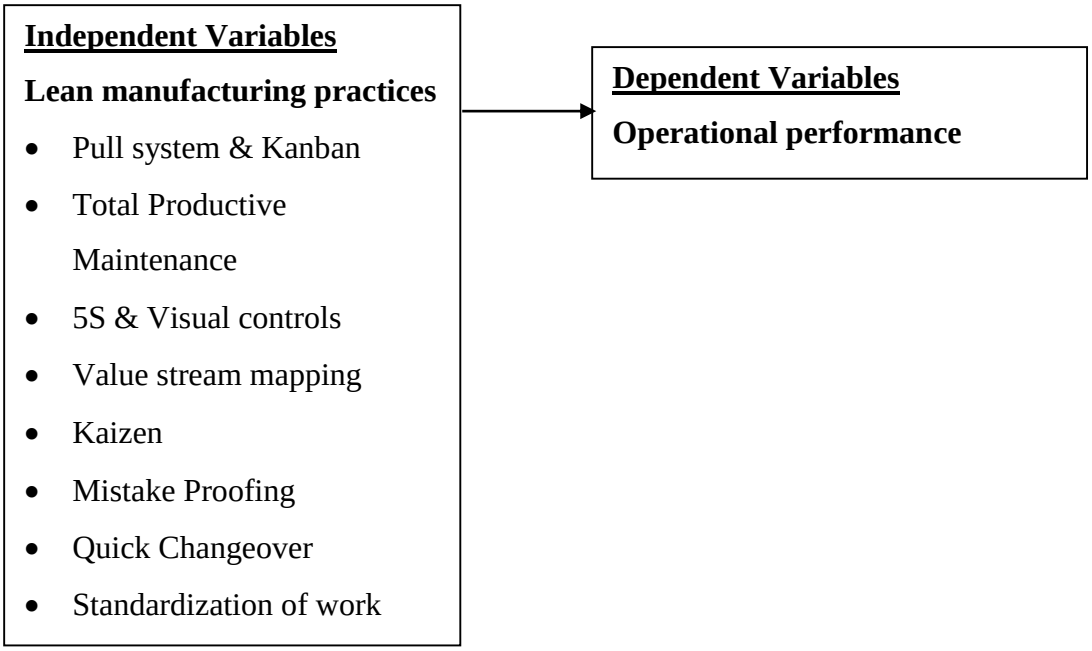
Mwangi (2013) studied lean practices implemented in manufacturing activities focusing on the food industries in Nairobi. His findings show that the level to which the firms employed lean manufacturing practices is mainly by lean practices such as employee involvement, Customer involvement, supplier involvement, pull production, continuous flow and value stream mapping. He reports that the industries in applying the practices were able to cut and eliminate waste in a number of cases and thus refining their production processes. He also points out that most firms have not adhered to strict implementation of lean practices fully and opted to implement some. This has led to a scenario in which they have failed to capitalize on the advantages of total implementation.

Gusman, Kong, Lim and Othman, (2016) did a study titled Lean manufacturing practices in Indonesia Manufacturing firms: Are there business performance effects? The results empirically reveal that comprehensive implementation of lean practices is necessary. In addition, this study unravels that high Business Performance (in terms of profitability, sales and customer satisfaction) is dependent upon the comprehensive implementation of lean manufacturing practices. His findings indicated that, lean practices are not recommended to be implemented as a subset.

2.7 Conceptual framework

In this study, the framework is comprised of lean practices as the independent variables. Operational performance measures are the dependent variables to evaluate forat Nation printing Division.

Fig 2.1 Conceptual model for lean manufacturing at Nation Newspaper Printing division



Source; Author (2016)

CHAPTER THREE: RESEARCH METHODOLOGY

3.1 Introduction

In this chapter, the research method is discussed. It gives an explanation of the research design used, the target population, data collection methods and data analysis techniques used.

3.2 Research Design

The research design adopted was a longitudinal case study. A case study entails a detailed and thorough analysis of a single case, it allows for in depth exploration of issues in a phenomenon, it stress the experience and interpretations of those involved (Yin 2004).A longitudinal study is an observational research method in which data is collected for the same subject recurrently over a period.

3.3 Population

Nation printing division is the unit of study. The study dwells on the newspaper printing division that has Procurement, Production and Dispatch departments.

3.4 Data Collection

The study used primary and secondary data. Circulation of the Questionnaires was to the Operations manager, Production managers, eight electrical and mechanical engineers. The filled questionnaires provided the primary data.

Performance reports and published annual reports provided the needed Secondary data. Performance data was filled in data collection form (see Appendix III).

3.5 Data Analysis

To study the lean practices implemented within Nation Newspaper Printing Division, this research used the methods of descriptive analysis. In establishing the impact of lean practices, regression analysis was used. Regression analysis is a statistical tool for the exploration of relationships between variables upon another (Lord 2010).

Table 3.1 Objectives And Data Analysis Methods Used.

OBJECTIVE	SECTION OF QUESTIONAIRE	ANALYSIS
To establish the lean practices implemented by Nation Newspaper Printing Division	Appendices Part A	Descriptive statistics
To determine the impact of lean practices implemented at Nation Newspaper Printing Division on operational performance.	Appendices Part B	Regression Analysis

Source: Author (2016)

CHAPTER FOUR: DATA ANLYSIS, RESEARCH FINDINGS AND DISCUSSIONS

4.1 Introduction

This chapter covers data analysis and data interpretation. The analysis was both qualitative and quantitative. The objectives of this research was to establish the lean practices implemented by Nation Newspaper Printing Division and to analyze the effect of implemented lean practices on operations performance at Nation Newspaper Printing Division.

4.2 Level of Implementation of Lean Practices at Nation Printing Division

The respondents were asked to state whether they were familiar with the concepts, tools and techniques of lean practices. The level of familiarity of the practices is significant within the firm having more than half the technical staff being familiar with the lean practices.

Table 4.1: Familiarity

		Frequency	Average
Valid	Yes	6	
	Somewhat familiar	4	5
	Total	10	

Out of the respondents who are familiar with the practices, only 20% were offered formal training on the practices by the firm this clearly; show the lack of commitment from the management to enforce full implementation of the lean practices. The results give an almost similar picture to Engum's (2009) findings. In his findings out of the population he interviewed 78% had knowledge or were somewhat familiar with lean practices but only 33% of the group had been given training on lean practices, based on that he observes that a big part of the Newspaper industry has heard about the concepts of Lean Manufacturing.

The study also wanted to find out whether the company had implemented lean practices in any of their operations. The results showed that all the respondents agreed that the company had implemented lean practices in some of the departments. The respondents were further required to specify the level of lean practices implementation in a number

of areas in their organization. Table 4.2 shows that the area in which lean practices had been implemented most was in finished goods inventory where 60% of the respondents agreed. There is some progress of implementation in press hall, mailroom, plate room, planning/scheduling and raw material inventory.

Table 4.2: Level of lean practices implementation

Area	Have Applied (%)	Some Progress (%)	Not Applied (%)	Not Suitable (%)
Press Hall	20	80	-	-
Plate room	25	75	-	-
Waste Management	20	40	40	-
Raw Material Inventory	-	60	40	-
Planning/Scheduling	25	75	-	-
Finished goods Inventory	60	-	20	20
Circulation	-	75	25	-
Mailroom	-	80	20	-

4.3 Lean Tools

The respondents were requested to specify the lean practices applied or were planning to apply to any of the operations. The results in Table 4.3 show that the tools that had been implemented were new technology (100%), 5S (80%), total quality management (80%), and standard work (80%).

Table 4.3: Tools applied in lean operations

Tools	Implemented (%)	Planning to Implement (%)	Not Relevant (%)
5S	80	20	
Visual Management	60	40	
Total quality management	80	20	
Value Stream Mapping		50	50
Just In Time	60	20	20
Standard Work	80	20	
Kanban	40		60
New Technology	100		

The respondents were further asked to state the degree of importance lean practices have for future success in newspaper production operations. The results in Table 4.4 show that 80% rated it as very high and 20% as high.

Table 4.4: Importance and success of lean practices

		Frequency	%	Valid %	Cumulative %
Valid	Very high	8	80.0	80.0	80.0
	High	2	20.0	20.0	100.0
	Total	10	100.0	100.0	

Mwangi (2013) sought to find out how practitioners within the food industry companies in Nairobi valued the effect of lean practices on operations performance. 61.5% of his population agreed that operations performance increases with application of lean practices. This implies that most of these firms' employees believe that Lean practices can definitely affect positively on operational performance measure.

4.4 Lean Manufacturing practices

The respondents were asked to state the level to which some lean practices were practiced at Nation Printing Division. The results in Table 4.5 show that the most common practice was quick changeover (mean = 1.65) followed by standardization of work (mean = 1.88). The least practices were Value stream mapping (mean = 2.75) and 5S & visual controls (mean = 2.70).

Table 4.5: Lean manufacturing practices at Nation Printing Division

	Mean	**Std. Deviation**
Pull System	**2.50**	
Production is done as per the pull from the market	1.20	.42
Production levels are constant from day to day	3.00	1.33
Only materials to be used are available on the floor	2.60	1.07
Suppliers deliver Just In Time	3.20	1.03
Standardization of Work	**1.88**	
Products classified according to similar routing requirements	1.60	.51
Work instructions and procedures are properly documented	2.00	.94
Use of automation in monitoring quality is utilized	2.20	1.03
Reports to document performance are done on daily basis	1.20	.42
Process startups and shut downs are the same	2.40	1.07
5S & Visual Controls	**2.70**	
Items are arranged to permit ease of access to needed materials	2.40	1.43
Disposal area for used material is clearly marked	2.00	1.15
Color coding is used for ease of identification	3.20	.79

Items not needed have been eliminated from the work area	3.20	1.54
Total Productive Maintenance	**2.16**	
Printers/Technicians are involved in solving key production related issues	1.80	1.03
Production equipment are maintained as per the schedule	1.80	.42
Operators are empowered to help maintain their equipment	2.60	1.26
Quality issues are specifically targeted with improvement projects fixated at removing the root cause	2.00	.94
Cross functional teams work in resolving recurring problems	2.60	1.07
Value Stream Mapping	**2.75**	
The firm has a process of determining what customers value	2.00	.94
Customers are involved in value identification	2.80	1.23
Customer satisfaction reviews are regularly done	3.00	1.15
Clear communication of value stream to the employees is done	3.20	1.23
Mistake Proofing	**2.48**	
Full proof systems provide signals to prevent mistakes in process	3.00	.67
Root cause analysis are regularly done	2.80	.42
Root Cause Analysis is about Fact-based problem-solving	2.40	.84
The process is Designed to fail safely	1.80	.79
Mistake detection is Designed into the process	2.40	1.07
Kaizen	**2.60**	
Employees undergo regular training on operations and quality	2.60	.52
The firm strives for long term relationship with suppliers	2.60	1.07
Feedback is given to suppliers on performance of supplied materials	3.20	1.22
The Firm continuously minimizes defects and continuously improve production for customers	2.20	.79
Personnel continuously develop professionally	3.00	.94
Cost reduction strategies result in company profits	2.20	.79
Productivity is improved with ease	2.80	.42
Safe operations are assured	2.20	.79
Quick Changeover	**1.65**	
Less equipment downtime is a result of fast change overs	1.60	.84
More frequent product changes are enabled by fast changeovers	1.40	.52
Low inventory levels are a result of small lot sizes	2.20	1.03
Consistency and quality are improve by standardized changeovers	1.40	.52

Malonza, (2014) reports that Value stream mapping and Poka yoke are highly adopted 5S, Just in Time and Kanban are averagely implemented and Total Quality Management and Kaizen adoption levels are below average at Mumias Sugar Factory. There is no consistence in the level of implementation of the various lean tools between the two researches this could interpreted as being caused by a number of issues including; difference in industry, lack of proper implementation in both cases and lack of knowledge in the benefits that can be achieved on implementing the various lean practices.

4.5 Operational Performance Indicators of Nation Printing Division.

Table 4.6: Operational Performance measures from 2012 to 2016 (Monthly Averages)

Operational Performance	2012	2013	2014	2015	2016
Throughput (Copies/hour)	36343	36410	36085	30955	62498
Press Downtime (Minutes)	4600	4095	4232	5780	1220
Customer Complaints (Production quality related)	10	7	8	13	1

Table 4.6 shows the operational performance of Nation Newspaper Printing Division. The results show that operational performance in terms of throughput has worsened since 2012 as it has moved from an average of 36,343 copies per hour to 30,955 copies per hour in 2015. The results up to September 2016 however show an improvement in throughout to 62,498 copies per hour. This can also be observed from Figure 1.

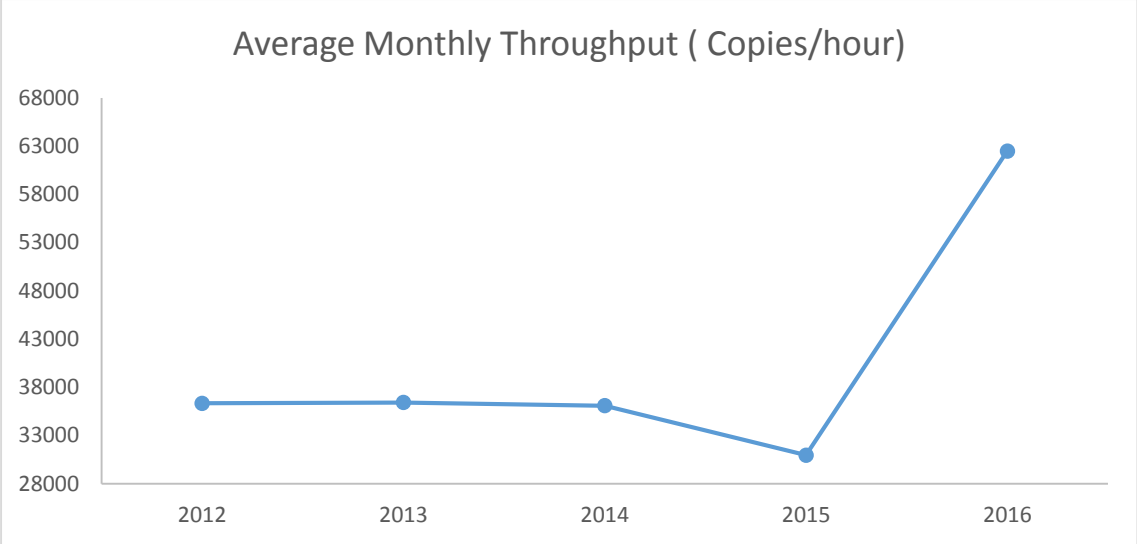


Figure 4.1: Throughput

The results also show that average monthly press downtime has increased from 4,600 minutes in 2012 to 5,780 minutes in 2015. This shows poor performance in terms of downtime. As at September 2016, the figures show that there has been a marked improvement in press downtime, which now stands at 1,220 minutes. This is also depicted in Figure 2.

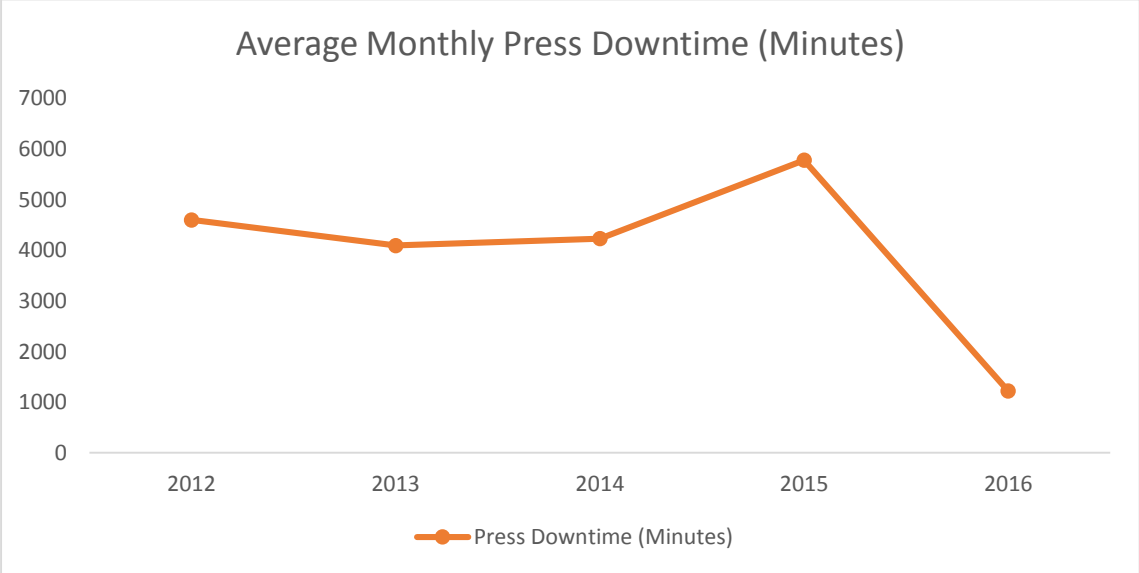


Figure 4.2: Press downtime

The results further show that average monthly customer complaints have also increased from 10 in 2012 to 13 in 2015. However, in 2016 an average of only one complaint is being registered. This shows a marked improvement in terms of customer complaints over the time. This can also be observed from Figure 3.

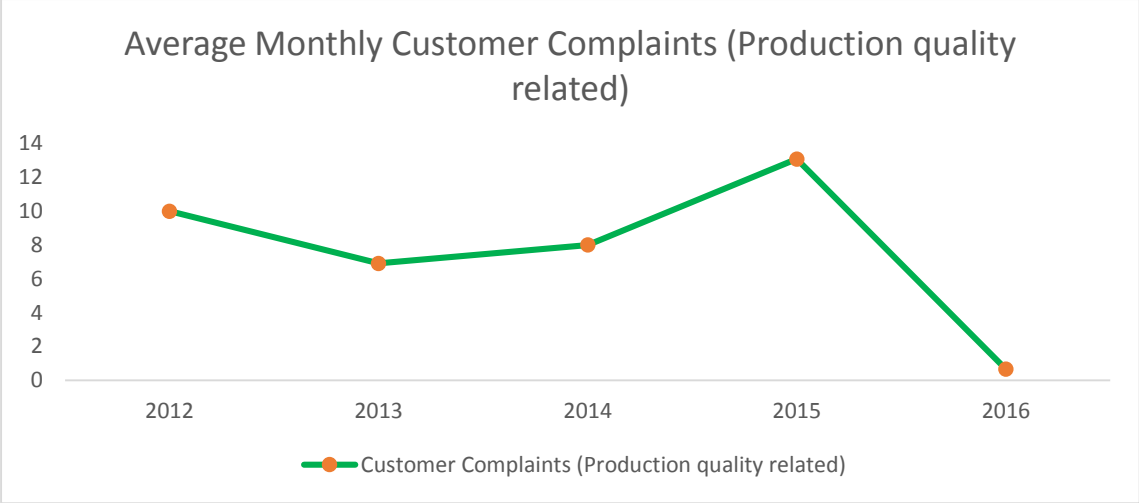


Figure 4.3: Customer complaints

4.6 Impact of Lean Practices on Operational Performance at Nation Printing Division

Table 4.7 shows the correlation between variables in the study. As shown, some of the lean management practices were highly correlated with the rest of others. The problematic variables were pull system, value stream mapping, 5S & visual controls, and standardization of work. Thus, in order to carry out a regression analysis, all the practices were grouped to form one variable for lean practice and then regressed against the operational performance variable.

Table 4.7: Correlation matrix

	Perf	Pull	Standard	Visual	Total	Value	Mistake	Kaizen	Quick
Performance	1								
Pull	-.544	1							
Standardization	.153	.370	1						
Visual	-.551	.700*	.455	1					
Total	-.227	.640*	.782**	.333	1				
Value	-.780**	.886**	.318	.895**	.498	1			
Mistake	-.748*	.271	.285	.381	.538	.531	1		
Kaizen	.020	.805**	.605	.610	.547	.587	-.173	1	
Quick	.480	.261	.482	-.302	.617	-.166	-.251	.494	1

The model summary in Table 4.8 shows that there was a moderate correlation between operational performance and implemented lean practices (r = 0.472). The results also show that the model accounted for 22.3% of the variance in operational performance

($r^2 = 0.223$). Thus, the model did not explain all the variance in operational performance of Nation.

Table 4.8: Model Summary

R	R Square	Adjusted R Square	Std. Error of the Estimate
.472[a]	.223	.126	.39424

Table 4.9 shows the ANOVA results for fitness of the model. As shown, the F statistic of 2.294 was not significant at 5% level of significance (p = 0.168). This means that the model was not fit to test the effect of lean operations on operational performance.

Table 4.9: ANOVA

	Sum of Squares	df	Mean Square	F	Sig.
Regression	.357	1	.357	2.294	.168[b]
Residual	1.243	8	.155		
Total	**1.600**	**9**			

Table 4.10 shows the coefficient of the variable used in the study. As shown, lean operations had a negative impact on the operational performance of the division (β= -0.362). However, this relationship was insignificant at 5% level of significance (p = 0.168). Thus, the effect of implemented lean practices on the operational performance of Nation Printing Division was insignificant.

Table 4.10: Coefficients

	Unstandardized Coefficients		Standardized Coefficients		
	B	Std. Error	Beta	t	Sig.
(Constant)	2.046	.572		3.575	.007
Lean	-.362	.239	-.472	-1.515	.168

CHAPTER FIVE: SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

This Chapter provides a summary of discussions on lean practices implemented at Nation newspaper printing division and the impact they do have on operational performance of the firm. A conclusion on the general findings of the research is given followed by recommendations that are grounded on the findings of the study. Finally, the study limitations and suggestion on areas that can be considered for further research are discussed.

5.2 Summary of Findings

The study sought to establish the lean practices implemented by Nation Newspaper Printing Division. The study also sought to determine the effect of lean practices on operational performance at Nation Newspaper Printing Division. The study revealed that 60% of the respondents agreed that they were familiar with lean practices while 40% were somewhat familiar. The results showed that 25% of the respondents had been trained on lean practices while 75% had not. The results showed that all the respondents agreed that the company had implemented lean operations in some of the departments. The area in which lean practices had been implemented most was in finished goods inventory where 60% of the respondents agreed. There is some progress of implementation in press hall, mailroom, plate room, planning/scheduling, and raw material inventory. The tools that had been implemented were new technology (100%), 5S (80%), total quality management (80%), and standard work (80%). The results further indicated that 80% of the respondents feel that implementing lean practices is key to the future success as they rated it as very high while 20% rated it as high. The results showed that the most common lean practice was quick changeover (mean = 1.65) followed by standardization of work (mean = 1.88). The least practices were value stream mapping (mean = 2.75) and 5S & visual controls (mean = 2.70).

The regression analysis showed that there was a moderate relationship between lean practices and operational performance (r = 0.472). The results also show that the model accounted for 22.3% of the variance in operational performance (r2 = 0.223). The

ANOVA results showed that the F statistic of 2.294 was not significant at 5% level of significance (p = 0.168). This means that the model was not fit to test the impact of lean operations on operational performance. The coefficients showed that lean practices had a negative impact on the operational performance of the division (β= -0.362). However, this relationship was insignificant at 5% level of significance (p = 0.168).

5.3 Conclusion

The study sought to establish the lean practices implemented by Nation Newspaper Printing Division. The results reveal that Nation had implemented lean practices in some of its departments and most of the respondents were aware of the same. This study concludes that the most common lean practices were quick changeover and standardization of work.

Secondly, the study also sought to determine the effect of implemented lean practices on operational performance at Nation Newspaper Printing Division. From the results, lean practices had no significant impact on operational performance of Nation Newspaper Printing Division.

5.4 Recommendations

The study recommends as follows. First, that Nation Media Group should enforce implementation of lean practices further in the organization and especially to the operational departments in order to enhance its performance. While lean practices have been applied in some departments, other departments have not been in focus. This impact on the overall success of lean strategies.

Secondly, while lean practices did not have a major influence the operational performance of the nation newspaper plant, it is worth noting that operational performance has greatly improved in 2016 and this is because of the benefits of investment in lean practices kicking in with the introduction of new technology. Therefore, Nation Media Group should keep implementing the practices and check on the operational performance of the departments in which such practices are implemented as well as in overall performance of the institution.

5.5 Limitation of the Study

The study faced a few limitations. First, the study used primary sources to collect data on lean operational practices. Thus, the study suffers from the limitations of relying on surveys such as biasness in responses. Since the respondents self-rate on a number of issues are practiced in their organization, they may have a tendency to rate themselves better so as not to appear as being unfavorable to their organization.

Secondly, this was a case study of Nation and the results may not be applicable to other institutions other than Nation. Such limits how the present results and recommendations are to be consumed for practice and for policy. This also limits the sample used in the study as one draws from a pool of a small population.

5.6 Suggestion for Further Research

Further studies should expand the scope of this study by focusing on a survey of various institutions other than a case study. This will help provide results and recommendations that can be applied in other institutions. Secondly, there is need to carry out a study to evaluate ways in which lean practices influence operational performance of organizations. This way, it will be easy to better implement lean practices that produce viable results in terms of better operational performance.

REFERENCES

Bednar, R., Vidova H., &Belusky M. (2012). Lean principles application in business logistics. *In Metal 2012: 21. mez. metal*. Conference (Vol. 23, No. 25, p. 5).

Bodolay, J. (2010) Impact of Lean Practices on Printing Companies. Retrieved from http://digitalcommons.calpoly.edu/cgi/viewcontent.cgi?article=1027&context=grcsp

Brady, M. (June 2008). Develop bone-deep understanding of your operations by honing intuitive talents. Journal.fromhttp://www.naa.org/Resources/Publications/Technically-Speaking/Technically-Speaking

Clark, K. (1996). "Competing through manufacturing and the new manufacturing paradigm: is manufacturing strategy passed." Production and Operations Management

Chandra, P. V (2013) Why you should Approach Lean as a System. Retrieved from www.leanmft.blogspot.co.ke/2014/07/why-you-should-approch-lean-as-system.html

Cooper, K., Keith, M. G., & Macro, K. L. (2007). Lean printing: Pathway to success. Pittsburgh: PIA/GATF Press.

Daily Nation Newspaper and facts about Nation Media Group. (2016). Retrieved from. http://buzzKenya.com/

Engum, M. (2009) Implementing Lean Manufacturing into Newspaper Production Operations

Goldratt, E. M., Cox, J., &Whitford, D. (1992). The goal: a process of ongoing improvement (Vol. 2). Great Barrington, MA: North River Press.

Graban M. (2009).Lean Hospitals, Improving, Quality, Patient Safety and Employee Satisfaction. London-New York: CRC Press.

Gusman, N., Kong, T., Lim, S. and Othman, N. (2016) Lean manufacturing practices in Indonesian manufacturing firms, International Journal of Lean Six Sigma, Vol. 7 Iss 2 pp. 149 - 170

Hayes, R., Pisano, G., Upton, D. and Wheelwright, S. (2005) Operations, Strategy and Technology: Pursuing the Competitive Edge, New York: John Wiley.

Hill, T. (1993).Manufacturing Strategy: Text and Cases. Blue Ridge, Ill., Irwin.

Jeyaraman K. and Teo L. K. 2011, A conceptual framework for critical success factors of lean Six Sigma Implementation on the performance of electronic manufacturing service industry, International Journal of Lean Six Sigma, 1(3): 191-215.

Kanyanya, C. (2013). Lean manufacturing practices and performance of organizations listed at the Nairobi's securities exchange.

Larsen, I (2008). More success with standard: Norwegian companies could become leaner. AGI Norsk Grafisk Tidsskrift. 160(May).

Lawrence, P. R., and J. W. Lorsch. 1967. Organization and environment: Managing differentiation and integration. Boston: Harvard Business School Press.

Malonza, A.M. (2014). Lean Manufacturing and Operational Performance of Mumias Sugar Company Limited, Kenya. Unpublished MBA Thesis University of Nairobi.

Melesse W. W. and Singh A. P. (2012) Total Productive Maintenance: A Case Study in Manufacturing Industry, Global journal of research in engineering; industrial engineering; Vol. 12 issue 1

Mostafa S, Dumrak J &Soltan H. (2013). A framework for lean manufacturing implementation, Production & Manufacturing Research. 1- 4464.

Mwangi, K.M (2013) Lean practices employed in manufacturing operations: a case of food manufacturing companies in Nairobi

Parker, J. (2012). 5S and Kaizen for Process Improvement. Business Analysis &Requirements Management Blog.from S-and-Kaizen-for-Process-Improvement.

Punnakitikashem, P. (2013) The Impact of Lean Practices and Organizational Commitment on Operational Performance in Hospitals

Ronald, S. R (2010) Implementing Lean Manufacturing Principles in a Manufacturing environment

Sarati,R. (2012) History of print media in Kenya. Retrieved from https://legendtouch.wordpress.com.

Shah, R. & Ward, P. T. (2003). Lean manufacturing: context, practice bundles, and performance. Journal of Operations Management, 21, 129-149.

Shah, R. & Ward, P.T. (2007). Defining and Developing Measures of Lean Production. Journal of Operation and Management, 25, 785-805.

Slack, N., Chambers, S., and Johnston, R. (2006).Operations and process Management Principles and practices for strategic Impact. Pearson Education

Thompson, C. (2010). The Challenges for the Printing Industry

Voss, C., Ahlstrom, P., and Blackmon, K. (1997). Benchmarking and operational performance: some empirical results. Benchmarking for Quality Management and Technology, 4: 273-285.

Wheatley, M (2005) Think lean for the long term in Manufacturing Business Technology, June 2005. 36 – 38.

Yang, C., & Johansen, J. (2010). Open Manufacturing: Impacts of Resource Based View and Servitisation. In Sixteenth International Working Seminar on Production Economics. Innsbruck

World Association of Newspapers (WAN). (2015). World Press Trends data partners Retrievedfromhttps://www.wanifra.org/sites/default/files/field_message_file/250515%20WPT%202015%20Final.pdf

Womack, J., & Jones, D.T. (1994). From lean production to the lean enterprise. Harvard Business Review, 72, 93-104.

Womak, J.P., & Jones, D.T. (1996). Lean Thinking: Banish waste and create wealth in your corporation. New York: Simon and Schuster.

Womack, J. P., & Jones, D. (2003). Lean thinking. New York: Free Press.

Yang, M. G. M., Hong, P., & Modi, S. B. (2011). Impact of lean manufacturing and environmental management on business performance: An empirical study of manufacturing firms. International Journal of Production Economics, 129(2), 251-261.

Yin, R.K. (2004).Case study research: Design and methods. Newbury Park, CA: Sage.

APPENDICES

APPENDIX I: QUESTIONNAIRE

The data collected shall be used for academic purpose only and it will be accorded the privacy it deserves. The respondents are encouraged to respond to the questions in the most honest and impartial manner possible. Your contribution to the research is highly appreciated.

PART A: To Establish The Lean Manufacturing Practices Implemented By Nation Printing Division

1. Are you conversant with the techniques, concepts and tools of lean practices?
   - ☐ Yes
   - ☐ Somehow familiar
   - ☐ No
2. Have you been trained by your company on lean practices?
   - ☐ Yes
   - ☐ No
3. Has your company implemented lean on any operations?
   - ☐ Yes, Implemented in all departments
   - ☐ Yes, Only implemented in some departments
   - ☐ No, Not implemented in any department

4. Please indicate level of lean practices implementation in the following areas

Area	Have Applied	Some Progress	Planning to Apply	Not Applied	Not Suitable
Press Hall					
Plate room					
Waste Management					
Raw Material Inventory					
Planning/Scheduling					
Finished goods Inventory					
Circulation					
Mailroom					

5. Kindly specify the lean practices that are applied or planning to apply in any of the firms activities. Also indicate the tools you see as most beneficial and the ones you deem not relevant in the Newspapers operations

Tools	Implemented	Planning to Implement	Not Relevant
5S			
Visual Management			
Total quality management			
Value Stream Mapping			
Just In Time			
Standard Work			
Kanban			
New Technology			

6. What degree of importance would you say Lean practices have for future success in newspaper production operations?
   - ☐ Very High
   - ☐ High
   - ☐ Neutral
   - ☐ Low
   - ☐ Very Low

PART B: To Find out The Effect of Lean Practices on Operational Performance At Nation Printing Division.

1. To what extent are the following practices at Nation Printing Division?

Key: 1-Very Great Extend, 2-Great Extend, 3-Moderate Extend, 4-Low extent, 5-Very Low Extent

		Score				
No		**1**	**2**	**3**	**4**	**5**
	PULL SYSTEM					
1	Production is done as per the pull from the market					
2	Production levels are constant from day to day					
3	Only materials to be used are available on the floor					
4	Suppliers deliver Just In Time					
	STANDIZATION OF WORK					
1	Products are classified as according to similar routing requirements					
2	Work instructions and procedures are properly documented					
3	Use of automation in monitoring quality is utilized					
4	Reports to document performance are done on daily basis					
5	Process startups and shut downs are the same					
	5S & VISUAL CONTROLS					
1	Items are arranged to permit ease of access to needed materials					
2	Disposal area for used material is clearly marked					
3	Color coding is used for ease of identification					
4	Items not needed have been eliminated from the work area					
	TOTAL PRODUCTIVE MAINTENANCE					
1	Printers/Technicians are involved in solving key production related issues					
2	Production equipment are maintained as per the schedule					
3	Operators are empowered to help maintain their equipment					
4	Quality issues are specifically targeted with improvement projects fixated at removing root cause					
5	Cross-functional teams work on resolving recurring problems.					
	VALUE STREAM MAPPING					
1	The firm has a process of determining what customers value					
2	Customers are involved in value identification					
3	Customer satisfaction reviews are regularly conducted					
4	Clear communication of the value stream to the employees is done					

		Score				
No		**1**	**2**	**3**	**4**	**5**
	MISTAKE PROOFING					
1	Full proof systems provide signals to prevent mistakes in process					
2	Root cause analysis are regularly done					
3	Root Cause Analysis is about Fact-based problem-solving					
4	The process is Designed to fail safely					
5	Mistake detection is Designed into the process					
	KAIZEN					
1	Employees undergo regular training on operations and quality					
2	The firm strives for long term relationship with suppliers					
3	Feedback is given to suppliers on performance of supplied materials					
4	The Firm continuously minimizes defects and continuously improve production for customers					
5	Personnel continuously develop professionally					
6	Cost reduction strategies result in company profits					
7	Productivity is improved with ease					
8	Safe operations are assured					
	QUICK CHANGEOVER					
1	Less equipment downtime is a result of fast changeovers					
2	More frequent product changes are enabled by faster changer overs					
3	Low inventory levels are a result of small lot sizes					
4	Consistency and quality are improved by standardized changeovers					

APPENDIX II: OPERATIONAL PERFORMANCE INDICATORS DATA

	2012											
Operational Performance Indicator	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
Newsprint Yield												
Newsprint Waste percentage												
Press Downtime												
Production quality related Complaints												

	2013											
Operational Performance Indicator	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
Newsprint Yield												
Newsprint Waste Percentage												
Press Downtime												
Production quality related Complaints												

	2014											
Operational Performance Indicator	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
Newsprint Yield												
Newsprint Waste Percentage												
Press Downtime												
Production quality related Complaints												

	2015											
Operational Performance Indicator	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
Newsprint Yield												
Newsprint Waste Percentage												
Press Downtime												
Production quality related Complaints												

	2016											
Operational Performance Indicator	1	2	3	4	5	6	7	8	9	10	11	12
Newsprint Yield												
Newsprint Waste Percentage												
Press Downtime												
Production quality related Complaints												

APPENDIX II: OPERATIONAL PERFORMANCE INDICATORS DATA

2012												
Operational Performance Indicator	1	2	3	4	5	6	7	8	9	10	11	12
Throughput (Copies/hour)	37682	37387	37337	34280	36255	30581	36680	36644	38832	37031	36391	37009
Press Downtime (Minutes)	3932	4610	5834	5002	4194	5532	5005	5662	4933	3817	3926	2755
Customer Complaints (Production quality related)	1	1	0	0	16	1	25	18	13	19	16	10

2013												
Operational Performance Indicator	1	2	3	4	5	6	7	8	9	10	11	12
Throughput (Copies/hour)	40214	36594	38051	37655	34807	38195	34451	36193	32962	36759	34999	36035
Press Downtime (Minutes)	2811	3340	3837	2309	5413	5574	5356	3.11	5541	5056	4920	4981
Customer Complaints (Production quality related)	8	6	3	3	8	10	13	8	6	4	11	3

2014												
Operational Performance Indicator	1	2	3	4	5	6	7	8	9	10	11	12
Throughput (Copies/hour)	34857	37866	36731	37198	36934	37159	36299	35436	33471	38396	34930	33745
Press Downtime (Minutes)	3443	3348	3704	4257	4189	5274	4586	4613	5456	4093	3878	3942
Customer Complaints (Production quality related)	4	28	9	1	13	4	1	1	10	9	7	9

2015												
Operational Performance Indicator	1	2	3	4	5	6	7	8	9	10	11	12
Throughput (Copies/hour)	33737	31906	29817	33478	31772	30839	32351	32024	26958	30426	18879	39277
Press Downtime (Minutes)	5622	5219	5218	6564	3785	5890	7674	6159	7373	5877	6756	3225
Customer Complaints (Production quality related)	11	9	11	15	13	10	22	15	19	7	17	8

2016												
Operational Performance Indicator	1	2	3	4	5	6	7	8	9	10	11	12
Throughput (Copies/hour)	63967	61073	62417	63434	63662	60017	63145	62379	62387			
Press Downtime (Minutes)	1311	1185	2019	1948	894	793	552	1054	1225			
Customer Complaints (Production quality related)	0	0	0	2	0	0	2	1	1			