CONTRIBUTION OF TOTAL PRODUCTIVE MAINTENACE STRATEGY TO THE COMPETITIVE ADVANTAGE OF UNILEVER KENYA LIMITED

BY

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DECLARATION

This research project is my original work and has not been submitted for an award of degree in any other institution.

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D61/61525/2010

The research project has been submitted with my approval as the appointed supervisor.

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Mr. Jeremiah Kagwe

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DEDICATION

This work is dedicated to my loving family, friends and to my former colleagues at Unilever Kenya Limited.

ABBREVIATIONS AND ACRONYMS

AM: Autonomous Maintenance

EM: Equipment Management

FI: Focussed Improvement

FM: Focussed Maintenance

FMCG: Fast Moving Consumer Goods

JIT: Just-in-Time

JIPM: Japan Institute of Plant Maintenance

MI: Maintainability Improvement

MP: Maintenance Prevention

NSD: Non-Soapy Detergents

OEE: Overall Equipment Effectiveness

CM: Corrective Maintenance

TPM: Total Productive Maintenance

TQM: Total Quality Management

UKL: Unilever Kenya Limited

ABSTRACT

The objective of this study was to establish the contribution of Total Productive Maintenance strategy on Unilever Kenya's competitive advantage. This research adopted a qualitative research design. Three senior managers (TPM manager, Foods manager and Home & Personal Care manager) at Unilever Kenya Limited were selected as the respondents. The study was a case study and used a semi-structured interview guide as a data collection tool. In order to describe the data, the study adopted qualitative relational content analysis of the variables. The findings revealed that the most significant goal of TPM was to bring world class standards to Unilever. The other goals that became significantly eminent were Unilever taking up TPM to; improve profit margins, improve equipment efficiency and availability, empower the machine operators to carry out autonomous maintenance, improve the quality of products, reduce its environmental footprint and improve safety standards in the factories. In establishing the contributions of TPM to competitive advantage of UKL, the findings indicated that; increased profit margins, reduced accidents in the factory, reduced customer complaints resulting from better quality products, reduced machine breakdown, reduction in maintenance costs and maintenance workforce costs through reduction of overtime labor cost, better planning and scheduling, improved equipment efficiency and availability, employee recognition and empowerment through improved capabilities and competencies, better relationships between operators and maintenance personnel and better competitive edge in global arena were the contributions that Total Productive Maintenance strategy has brought to UKL. The major conclusions indicate that the most significant goals of TPM were to bring world class standards to Unilever. The study recommends that Unilever should continuously implement TPM so as to bring world class value, improve equipment efficiency and availability, empower the machine operators to carry out autonomous maintenance, improve safety and environmental standards in factories, increase profit margin, reduce Unilever's environmental footprint and improve interdepartmental co-operation. Therefore, TPM requires the organization to make plans for funding by top management involvement as well as training. TPM has not been implemented by most manufacturing firms, the study recommends that future researchers should investigate on implementation obstacles.

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CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

Recent trends indicate that, in general, many systems in use are not performing as intended, so far as cost effectiveness in terms of their operation and support is concerned. Particularly in manufacturing systems, some of them often operate at less than full capacity, with low productivity, and the costs of producing products are high (Chan *et al*., 2005). Mobley (1990) reported that 15% to 40% (average 28%) of total production cost is attributed to maintenance activities in the factory. In fact, these costs are associated with maintenance labour and materials and are likely to go even higher in the future with the addition of factory automation through the development of new technologies. The importance of maintenance function has increased due to its role in keeping and improving the availability, product quality, safety requirements, and plant cost effectiveness levels as maintenance costs constitute an important part of the operating budget of manufacturing firms (Al-Najjar *et al*., 2003).

The global competitive battles have demonstrated the need to understand how competitive advantage is gained and held. A number of companies appear to have followed a 'resource-based view' of accumulating valuable technology assets, often guarded by an aggressive intellectual property stance. However, winners in the global marketplace have been firms that can demonstrate timely responsiveness, rapid and flexible product innovation, coupled with the management capability to effectively coordinate and redeploy internal and external competences. This source of competitive advantage is termed as dynamic capability and focuses attention on the firm’s ability to renew its resources in line with changes in its environment.

Unilever is a manufacturer of some of the world's leading foods, home and personal care products such as Blue band margarine, Knorr, Royco, Lipton tea, Omo, Lux, Dove, Lifebuoy, Geisha, Sunlight, Vaseline, Lady gay, Close up among many other products (Unilever East and Southern Africa, 2011). Unilever's main international competitors include Nestle and Procter & Gamble. They also face competition in local markets of product ranges from companies such as ConAgra, Danone, General Mills, Henkel, Kraft Foods, Mars Inc., PepsiCo, Reckitt Benckiser, Sara Lee and S.C. Johnson & Son (Unilever East and Southern Africa, 2011). Unilever as a global company adopted TPM in the 1990s to increase its manufacturing efficiencies therefore making its products competitive in the market (Johnson & Scholes, 2007). TPM was adopted by Unilever Kenya Limited (UKL) in 1999 with the aim of improving operational efficiencies at a lower cost of production and giving UKL a competitive advantage over the other manufacturers.

1.1.1 Total Productive Maintenance Strategy

In response to the maintenance and support problems encountered in manufacturing environments, the Japanese developed and introduced the concept of Total Productive Maintenance (TPM), initially in 1971. TPM is a maintenance system defined by Nakajima (1988) in Japan, which covers the entire life of equipment in every division including planning, manufacturing, and maintenance. It describes a synergistic relationship among all organizational functions, but particularly between production and maintenance, for continuous improvement of product quality, operational efficiency, capacity assurance and safety. According to the Nakajima (1988), the word 'total' in TPM has three meanings: Total effectiveness, total maintenance system and total participation.

The total effectiveness indicates TPM's pursuit of economic efficiency and profitability. The total maintenance system includes Maintenance Prevention (MP) and Maintainability Improvement (MI), as well as Performance Maintenance (PM). Basically, this refers to ''maintenance-free'' design through the incorporation of reliability, maintainability, and supportability characteristics into the equipment design. The total participation of all employees includes Autonomous Maintenance (AM) by operators through small group activities. Essentially, maintenance is accomplished through a 'team' effort, with the operator being held responsible for the ultimate care of his/her equipment.

1.1.2 Competitive Advantage

Competitive advantage is the ability gained by a firm through attributes and resources, to perform at a higher level than its competitors in the same industry or market allowing it to generate greater sales or margins and/or retain more customers than its competition (Christensen and Fahey 1984, Kay 1994, Porter 1980 cited by Chacarbaghi and Lynch 1999, p. 45). A firm is said to have a competitive advantage when it is implementing a value creating strategy not simultaneously being implemented by any current or potential player (Barney 1991 cited by Clulow et al.2003, p. 221).

To gain competitive advantage a business strategy of a firm manipulates the various resources over which it has direct control and these resources have the ability to generate competitive advantage (Reed and Fillippi 1990 cited by Rijamampianina 2003, p. 362). The more sustainable the competitive advantage of a company, the more difficult it is for competitors to neutralize the advantage giving the company an

edge over its rivals and an ability to generate greater value for the firm and its shareholders. Competitive advantages of a firm may be recognised in many forms which include higher efficiency, better quality product/services, more innovation, larger market share, turnover and margin growth and faster customer response and is a key determinant of superior performance and it will ensure survival and prominent placing in the market.

1.1.3 Contributions of Total Productive Maintenance Strategy to Competitive Advantage

TPM aims to increase the availability/effectiveness of existing equipment in a given situation, through the effort of minimizing input (improving and maintaining equipment at optimal level to reduce its life cycle cost) and the investment in human resources which results in better hardware utilization and increased profitability.

The quality of maintenance significantly affects business profitability. The factors involved include safety and customer service, not just plant costs and availability. Increased downtime affects adversely the capability of physical systems by reducing their average rate such as the speed of the output, so increasing the operating costs and lowering the average customer's satisfaction with the service (Wireman, 1990). With system availability becoming critical, issues such as reducing operating costs as well as the strategic importance of employing better and, if feasible, optimal maintenance schedules need to be more universally recognised and implemented (Pintelon *et al*, 1999). TPM if well implemented will increase the competitive advantage of a firm through increase turnover, margins and market share.

1.1.4 Fast Moving Consumer Goods Industry

Fast Moving Consumer Goods are the products that are sold quickly at relatively low cost. FMCG is one of the biggest industries in the world and is behind the biggest brands in the world with products which everyone recognizes. Though the absolute profit made on FMCG products is relatively small, they generally sell in large quantities, so the cumulative profit on such products can be large. Examples of FMCG generally include a wide range of frequently purchased consumer products such as toiletries, soap, cosmetics, teeth cleaning products, shaving products and detergents, as well as other non-durables such as glassware, light bulbs, batteries, paper products and plastic. FMCG products are generally replaced or fully used up over a short period, usually a few days or weeks, or months, but within one year. This contrasts with durable goods or major appliances such as kitchen appliances, which are generally replaced over a period of several years.

The FMCG industry changes fast and is constantly evolving, from the pace at which goods leave the shelves to the rate of product innovation, things move quickly. The brands themselves are changing just as quickly, old brands are replaced by new ones. This industry has also proved itself very resilient to recession – with the majority of companies in the sector weathering the financial storm in a way that very few others have managed. Why? Well, consumers will always need to buy the products created by FMCG companies. They may not buy big items like refrigerators or cars in a recession, but floors still need to be cleaned, clothes need to be laundered and aches and pains still need to be soothed.

Some of the best known examples of Fast Moving Consumer Goods companies include Procter & Gamble, MillerCoors, HERO Group, Anheuser-Busch, Clorox, Colgate-Palmolive, General Mills, H. J. Heinz, Cadbury's, Reckitt Benckiser, Sara Lee, Nestlé, Unilever, Coca-Cola, Carlsberg, Kimberly-Clark, Kraft, Pepsi, Warburtons, Wilkinson, Wipro Consumer Care, Barilla Group and Mars.

1.1.5 Unilever Kenya Limited

Unilever was founded in 1930 out of a merger between Lever Brothers (UK) and Uni-margarine (Netherlands), Unilever is today one of the world's leading Fast Moving Consumer Goods (FMCG) companies with a worldwide turnover of more than 4.3 billion Euros. Unilever has a strong presence in over 100 countries worldwide with corporate offices in London and Rotterdam. It is a manufacturer of some of the world's leading foods, home and personal care products such as Blue band margarine, Knorr, Royco, Lipton tea, Omo, Lux, Dove, Lifebuoy, Geisha, Sunlight, Vaseline, Lady gay, Close up among many other products (Unilever East and Southern Africa, 2011). In addition Unilever is involved in the growing, buying, manufacturing and marketing of tea. This is done alongside, fuel wood production, sustainable agriculture, research and development.

Unilever Kenya Limited is a Unilever Subsidiary operating in Kenya. Unilever operates two businesses in Kenya, the consumer business dealing with FMCG and the tea plantations business. The plantations business is the biggest employer in Unilever with a workforce of 25,000. The consumer business employs over 1,500 people directly and thousands as contract manufacturers, growers, suppliers, distributors and service providers. Unilever's main international competitors include Nestle and

Procter & Gamble. They also face competition in local markets or product ranges from companies such as ConAgra, Danone, General Mills, Henkel, Kraft Foods, Mars Inc., PepsiCo, Reckitt Benckiser, Sara Lee and S.C. Johnson & Son (Unilever East and Southern Africa, 2011).

Unilever Kenya Limited is one of the largest commercial enterprises in Kenya comprising of two factories; the foods and home and personal care, producing Blue band, Royco, Geisha and Sunlight Soap, Omo, Sunlight, Vaseline and Lady gay brands. Its contribution to the economy as a foreign exchange earner has increased from Kes. 0.25 million in 1972 to Kes. 5.5 billion in 2011 through the export of tea. The consumer business dealing with FMCG has a turnover worth Kes. 12 billion. The company spends 2.5% of its turnover on research and development and 1.5% on Corporate Social Responsibility.

Unilever as a global company adopted TPM in the 1990s to increase its manufacturing efficiencies therefore making its products competitive in the market (Johnson & Scholes, 2007). TPM was adopted by Unilever Kenya Limited (UKL) in 1999 with the aim of lowering cost of production and giving UKL a competitive advantage over the other manufacturers.

1.2 Research Problem

The turn of the 20th century saw a rise in competition in the manufacturing industry. With advancements in technology, a more informed consumer and a greater emphasis on skilled and motivated manpower, it was becoming heavily expensive for

manufacturer's to keep up with the changing market. Most resorted to various manufacturing strategies to improve their efficiencies hence lower their manufacturing/operating costs (Coates, 2000). One of these strategies is Total Productive Maintenance (TPM).

TPM is a maintenance system defined by Nakajima (1988) in Japan, which covers the entire life of equipment in every division including planning, manufacturing, and maintenance. It builds a close relationship between Maintenance and Productivity, showing how good care and up-keep of equipment will result in higher productivity. Today, the competition has increased dramatically, customers focus on product quality, delivery time and cost of product. Because of these, modern manufacturing requires that the organizations that want to be successful and to achieve world-class manufacturing, must possess both effective and efficient maintenance. One approach to improve the performance of maintenance activities is to implement a Total Productive Maintenance system (Hermann, 2000). TPM is a methodology that aims to increase the availability of existing equipment, hence reducing the need for further capital investment.

According to Unilever East and Southern Africa (2010), TPM was adopted in the 1990s as machinery that would propel it to the top of the market within a few years. Unilever borrowed the strategy from giant car manufacturer, Toyota and expected to attain the highest operational efficiencies possible for an FMCG manufacturer in all its global sites by implementing TPM globally, in phases, by the year 2000. The main role of TPM was to elevate machine efficiencies to enable Unilever to produce the highest quality products at the lowest cost. Other roles included to lower overhead

costs, motivate the workforce, harmonize global operations, ensuring highest standards in safety and reducing impact of operations on the environment. Unilever Kenya Limited (UKL) adopted TPM in 1999, aiming at growth in turnover and profit margins within a period of two years.

There are many studies conducted on TPM strategy, competitive advantage, FMCG and Unilever Kenya Limited but it is difficult to find a single company, which is experienced in the implementation of TPM especially in Kenya to share the experience for Total Productive Maintenance development program. Hence, the companies are persuaded to rely on the literature and the experience of Japanese company, Toyota. Examples of some of the studies are: Productivity increase in the FMCG sector (Cook, T.A.), E-business strategy development: an FMCG sector case study (Webster, M., Beach, R. and Fouweather, I.), a comparative study of the tea sector in Kenya: a case study of Unilever Tea Kenya limited and James Finlay Kenya Limited (KHRC,2006) and Total Productive Maintenance in the operating room – A Case Study at Kadlec Regional Medical Center (Ahuja, D. MD., Gullekson, R., and Kim, A.) among others.

Unilever Kenya Limited was among the first companies to implement TPM in Kenya and therefore studies conducted on the company would be very helpful to other companies in the industry. I have not come across any study on TPM in Unilever Kenya Limited and I attribute it to the relatively newness of the concept in Kenya. With the market uncertainty and entry of new competitors into the Kenyan market, companies have been forced to adopt TPM strategy despite the scanty implementation

knowledge. This research will definitely go a long way into demystifying TPM through knowledge enhancement as it sought to answer the question; what is the contribution of Total Productive Maintenance strategy to the competitive advantage of Unilever Kenya Limited?

1.3 Research Objectives

The research was guided by the following research objectives:

i.) To establish the goals of Total Productive Maintenance strategy at Unilever Kenya Limited.

ii.) To establish the contribution of Total Productive Maintenance strategy to the competitive advantage of Unilever Kenya Limited.

1.4 Value of the Study

This research established the contribution of TPM strategy in UKL as an effective tool in manufacturing implemented to achieve higher profitability through increase in machine efficiency, reliability and improving employee skills in by examining the strategy in depth and its key, observable contributions.

This research will assist manufacturers looking to improve their manufacturing efficiencies to give them high returns in the country particularly in food processing, chemical processing, brewing, soaps and detergents manufacturing. In terms of research institutes and academicians, the study will add to the knowledge creation upon which further research can be undertaken.

The research goes a long way in enhancing and adding value to the dynamic capabilities theory. The findings of this study show how UKL has been able to leverage TPM strategy to gain a competitive advantage in FMCG industry by focusing on cost cutting, increasing productivity levels, quality and guaranteeing deliveries in order to satisfy customers. The findings of the study are therefore in line with the dynamic capabilities theory that focuses on the degree of fit over time between an organisation's changing external environment and its changing portfolio of activities and capabilities.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter reviews literature on the research questions looking at the theoretical foundation, concept of strategy, concept of Total Productive Maintenance, goals of Total Productive Maintenance strategy, competitive advantage and finally the contributions of Total Productive Maintenance strategy to the competitive advantage.

2.2 Theoretical Foundation

The resource-based view (RBV) as a basis for a competitive advantage of a firm lies primarily in the application of the bundle of resources at the firm's disposal (Mwailu & Mercer, 1983 p142). To transform a short-run competitive advantage into a sustained competitive advantage requires that these resources are heterogeneous in nature and not perfectly mobile (Peteraf, 1993, p180). Effectively, this translates into valuable resources that are neither perfectly imitable nor substitutable without great effort (Barney, 1991; p117). If these conditions hold, the bundle of resources can sustain the firm's above average returns.

Firms resorting to ‘resource-based strategy’ attempt to accumulate valuable technology assets and employ an aggressive intellectual property stance. However, winners in the global marketplace have been firms demonstrating timely responsiveness and rapid and flexible product innovation, along with the management capability to effectively coordinate and redeploy internal and external competences. This source of competitive advantage is termed as dynamic capability. The dynamic

capability approach focuses attention on the firm's ability to renew its resources in line with changes in its environment. Dynamic capabilities refer to the firm's ability to alter the resource base by creating, integrating, recombining and releasing resources (Eisenhardt & Martin, 2000).

The dynamic capabilities central focus is on the degree of 'fit' over time between an organisation's changing external environment and its changing portfolio of activities and capabilities (Porter, 1996). The competitive advantage of firms is seen as resting on distinctive processes shaped by the firm's (specific) asset positions and the evolution path it has adopted or inherited. Whether and how a firm's competitive advantage is eroded depends on the stability of market demand, and the ease of replicability (expanding internally) and imitatability (replication by competitors).

The basic assumption of the dynamic capabilities framework is that core competencies should be used to modify short-term competitive positions that can be used to build longer-term competitive advantage. Three dynamic capabilities are necessary in order to meet new challenges; organizations and their employees need the capability to learn quickly and to build strategic assets, new strategic assets such as capability, technology and customer feedback have to be integrated within the company and existing strategic assets have to be transformed or reconfigured (Teece et al., 1997). Teece's concept of dynamic capabilities essentially says that what matters for business is corporate agility: "the capacity to sense and shape opportunities and threats, to seize opportunities, and to maintain competitiveness through enhancing, combining, protecting, and, when necessary, reconfiguring the business enterprise's intangible and tangible assets."

Total productive maintenance's competitive advantage of firms stems from dynamic capabilities rooted in high performance routines operating inside the firm, embedded in the firm's processes. The manufacturing industry has experienced an unprecedented degree of change in the last three decades, involving drastic changes in management approaches, product and process technologies, customer expectations, supplier attitudes as well as competitive behaviour (Ahuja et al., 2006). The rapidly changing global marketplace calls for improvements in a company's performance by focusing on cost cutting, increasing productivity levels, quality and guaranteeing deliveries in order to satisfy customers (Raouf, 1994). With increased global competition, attention has been shifted from increasing efficiency by means of economies of scale and internal specialization to meeting market conditions in terms of flexibility, delivery performance and quality (Yamashina, 1995). The rapidly changing needs of modern manufacturing and the ever increasing global competition has emphasized upon the re-examination of the role of improved maintenance management towards enhancing organization's competitiveness (Riis et al., 1997).

2.3 Concept of Strategy

A strategy is a high level, long term plan of action designed to achieve one or more goals under conditions of uncertainty. Strategy is important because the resources available to achieve these goals are usually limited. Strategy is also about attaining and maintaining a position of advantage over competitors through the successive exploitation of known or emergent possibilities rather than committing to any specific fixed plan designed at the outset. Henry Mintzberg defined strategy as "a pattern in a stream of decisions" to contrast with a view of strategy as planning while Max

McKeown (2011) argues that "strategy is about shaping the future" and is the human attempt to get to "desirable ends with available means". Basically, strategy is about two things: deciding where you want your business to go, and deciding how to get there.

There are three types of strategies that are essential to every firm: corporate, business and functional. Corporate strategy deals with the overall firm and involves identifying the strengths and weaknesses of the firm, scrutinizing the firm's mission, the segmentation of its businesses and the integration of those businesses. Business strategy on the other hand focuses on competitive positioning (where to compete and how) in order to create an advantage over competitors. At the ground level, the functional strategies of Finance, HR, IT and Marketing carry out the objectives and mission set at the corporate and business strategy levels. This is achieved by creating action plans and setting budgets (Porter, 1996). If sincerely executed, the strategic planning process generates broad participation, a wealth of ideas, consensus and clarity moving forward. Everyone knows what to do, when to do it and why he or she is doing it.

2.4 Total Productive Maintenance Strategy

TPM seeks to maximize equipment effectiveness throughout the lifetime of the equipment. It strives to maintain the equipment in optimum condition in order to prevent unexpected breakdown, speed losses, and quality defects occurring from process activities. There are three ultimate goals of TPM: zero defects, zero accident, and zero breakdowns (Nakajima, 1988; Willmott, 1994; Noon et al., 2000). Nakajima suggests that equipments should be operated at 100 percent capacity 100 percent of

the time (Nakajima, 1988). Benchmarking on overall equipment effectiveness (OEE), productivity (P), quality (Q), cost (C), delivery (D), safety (S) and morale (M) etc. can facilitate an organization to realization of zero breakdown, zero defect, zero machine stoppage, zero accidents, zero pollution, which serve as the ultimate objective of TPM. TPM has been envisioned as a comprehensive manufacturing strategy to improve equipment productivity (Nakajima, 1988). The strategy elements include cross-functional teams to eliminate barriers to machine uptime, rigorous preventive maintenance programs, improved maintenance operations management efficiency, equipment maintenance training to the lowest level, and information systems to support the development of imported equipment with lower cost and higher reliability.

The basic practices of TPM are often called the pillars or elements of TPM. The entire edifice of TPM is built and stands, on eight pillars (Sangameshwran and Jagannathan, 2002). TPM paves way for excellent planning, organizing, monitoring and controlling practices through its unique eight-pillar methodology. TPM initiatives, as suggested and promoted by Japan Institute of Plant Maintenance (JIPM), involve an eight pillar implementation plan that results in substantial increase in labour productivity through controlled maintenance, reduction in maintenance costs, and reduced production stoppages and downtimes. The core TPM initiatives classified into eight TPM pillars or activities for accomplishing the manufacturing performance improvements include Autonomous Maintenance; Focused Maintenance; Planned Maintenance; Quality Maintenance; Education and Training; Office TPM; Development Management; and Safety, Health and Environment (Ireland and Dale, 2001; Shamsuddin et al., 2005; Rodrigues and Hatakeyama, 2006).

TPM uses the following tools to analyze and solve the equipment and process related problems: Pareto Analysis, Statistical Process Control (SPC – Control Charts, etc.) Problem Solving Techniques (Brainstorming, Cause-Effect Diagrams and 5-M Approach) Team Based Problem Solving, Poka-Yoke Systems, Autonomous Maintenance, Continuous Improvement, 5S, Setup Time Reduction, Waste Minimization, Bottleneck Analysis, Recognition and Reward Program and Simulation (Jostes and Helms, 1994).

TPM provides a comprehensive, life cycle approach, to equipment management that minimizes equipment failures, production defects, and accidents. It involves everyone in the organization, from top-level management to production mechanics, and production support groups to outside suppliers. The objective is to continuously improve the availability and prevent the degradation of equipment to achieve maximum effectiveness (Ravishankar et al., 1992). These objectives require strong management support as well as continuous use of work teams and small group activities to achieve incremental improvements.

2.5 Goals of Total Productive Maintenance Strategy

Manufacturers have realized the need to continuously improve their operations to compete successfully. In an effort to increase organizational capabilities, companies have made investments in programs such as Just-in-Time (JIT) and Total Quality Management (TQM). However, benefits from these programs have often been limited because of unreliable or inflexible equipment (Garwood, 1990; Tajiri and Gotoh, 1992). Therefore, many companies, including Procter and Gamble, Dupont, Ford and Eastman Chemical, have looked toward Total Productive Maintenance (TPM) to

augment their JIT and TQM programs in a drive for continual improvement. TPM addresses equipment maintenance through a comprehensive productive-maintenance delivery system covering the entire life of the equipment and involving all employees from production and maintenance personnel to top management.

The goals of TPM are zero breakdowns, zero accidents and zero defects. TPM is more about performance improvement, employee interaction, and positive reinforcement than maintenance-specific technology. TPM works toward elimination of nine formidable obstacles to equipment effectiveness: downtime, equipment failure from breakdown, setup and adjustment, speed losses, idling and minor stoppages due to abnormal operation of sensors and the blockages of chutes, reduced speed due to discrepancies between designed and actual speed of equipment, reduction of defects, process defects such as scrap, downgrades, rejects, returns, and so forth, reduced yields from all resources such as raw materials, packaging, energy, and labor (Tajiri and Gotoh, 1992).

Through TPM implementation, group activities are promoted throughout the organization to gain greater equipment effectiveness. Operators are trained to share with maintenance personnel the responsibility for routine maintenance. This is referred to as autonomous maintenance (Yamashina, 1995). Routine maintenance normally includes: housekeeping, equipment cleaning, protection of components from dirt, lubrication by operators, equipment inspection by operators and maintenance, setups and adjustments (Swanson, 2001). The autonomous maintenance may also include minor equipment repairs.

TPM aims at equipment management which is pursued through autonomous, small group (team) activity comprising operators, engineers, and technicians (Yamashina, 1995). The aim of team efforts is to optimize overall equipment effectiveness and eliminate breakdowns through a thorough system of maintenance throughout equipment's entire life span. Through involvement, operators develop ownership of and an affinity for "their equipment" (Schippers, 2001). Team members involved in problem solving develop a strong urge to see the problem fixed. They therefore participate in equipment management activities to make sure the problem does not recur. They take pride in their accomplishments. The organization trains, solves problems, and works as teams. Peer support is important. Team competition is healthy and encouraged (Raouf, 1994).

TPM also seeks to eliminate major equipment effectiveness losses, because this is where the largest gains can be realized in the shortest time. The 11 major areas of loss fall within four broad categories: planned shutdown losses, downtime losses, performance efficiency losses and quality losses (Lawrence, 1999). Valuable operating time is lost when no production is planned.

2.6 Competitive Advantage

Competitive advantage is the ability gained by a firm through attributes and resources, to perform at a higher level than its competitors in the same industry or market allowing it to generate greater sales or margins and/or retain more customers than its competition (Christensen and Fahey 1984, Kay 1994, Porter 1980 cited by Chacarbaghi and Lynch 1999, p. 45). Competitive advantage grows out of value a firm is able to create for its buyers that exceeds the firm's cost of creating it. Value is

what buyers are willing to pay, and superior value stems from offering lower prices than competitors for equivalent benefits or providing unique benefits that more than offset a higher price (Michael Porter, Competitive Advantage, 1985, p.3).

There are two main types of competitive advantages: comparative advantage and differential advantage. Comparative advantage, or cost leadership, is a firm's ability to produce a good or service at a lower cost than its competitors, which gives the firm the ability to sell its goods or services at a lower price than its competition or to generate a larger margin on sales. A differential advantage is created when a firm's products or services differ from its competitors and are seen as better than a competitor's products by customers (Porter, 1990).

Porter claims, "The ultimate aim of competitive strategy is to cope with and, ideally, to change those rules in the firm's behaviour." (1985, p. 4). To gain competitive advantage a business strategy of a firm manipulates the various resources over which it has direct control and these resources have the ability to generate competitive advantage (Reed and Fillippi 1990 cited by Rijamampianina 2003, p. 362). Superior performance outcomes and superiority in production resources reflects competitive advantage (Day and Wesley 1988 cited by Lau 2002, p. 125).

At the most fundamental level, firms create competitive advantage by perceiving or discovering new and better ways to compete in an industry and bringing them to market, which is ultimately an act of innovation (Porter, 1990). Innovations shift competitive advantage when rivals either fail to perceive the new way of competing or are unwilling or unable to respond. There can be significant advantages to early

movers responding to innovations, particularly in industries with significant economies of scale or when customers are more concerned about switching suppliers. The most typical causes of innovations that shift competitive advantage are the following: new technologies, new or shifting buyer needs, the emergence of a new industry segment, shifting input costs or availability, changes in government regulations.

Besides watching industry trends, at the level of strategy implementation, competitive advantage grows out of the way firms perform discrete activities - conceiving new ways to conduct activities, employing new procedures, new technologies, or different inputs (Porter, 1990). The "fit" of different strategic activities is also vital to lock out imitators. Porters "Value Chain" and "Activity Mapping" concepts help us think about how activities build competitive advantage. A firm gains competitive advantage by performing the strategically important activities in the value chain more cheaply or better than its competitors.

Porter (1990) outlines three conditions for the sustainability of competitive advantage: First is hierarchy of source (durability and imitability) - lower-order advantages such as low labour cost may be easily imitated, while higher order advantages like proprietary technology, brand reputation, or customer relationships require sustained and cumulative investment and are more difficult to imitate. Second is number of distinct sources - many are harder to imitate than few and thirdly, constant improvement and upgrading - a firm must be "running scared," creating new advantages at least as fast as competitors replicate old ones.

Competitive advantage gives a company an edge over its rivals and an ability to generate greater value for the firm and its shareholders (Porter, 1990). Competitive advantages of a firm may be recognised in many forms which include higher efficiency, better quality product/services, more innovation, larger market share, turnover and margin growth and faster customer response. Competitive advantage is a key determinant of superior performance and it will ensure survival and prominent placing in the market.

2.7 Contributions of Total Productive Maintenance Strategy to Competitive Advantage

Maintenance is undertaken to preserve the proper functioning of a physical system, so that it will continue to do what it was designed to do. Its function and performance characteristics not only take account of output, unit costs and effectiveness of using energy, but also such factors as end-product quality, process control, achieved comfort and protection of the employed personnel, compliance with environmental protection regulations, structural integrity and even the physical appearance of the productive system (Yamashina, 1995).

The quality of maintenance significantly affects business profitability. The factors involved include safety and customer service, not just plant costs and availability. Increased downtime affects adversely the capability of physical systems by reducing their average rate such as the speed of the output, so increasing the operating costs and lowering the average customer's satisfaction with the service (Wireman, 1990).

With system availability becoming critical, issues such as reducing operating costs as well as the strategic importance of employing better and, if feasible, optimal maintenance schedules need to be more universally recognised and implemented (Pintelon, Nagarur and Van, 1999).

The technology of maintenance is about finding and applying cost-effective ways of avoiding or overcoming performance deterioration. Failure-management techniques include predictive and preventive actions, failure-finding, run-to-failure and changes to the design of the physical asset or the way it is operated. Each category includes a host of options, some of which are far more effective than others (Raouf, 1994). Maintenance staffs not only need to be aware of what these options are, but they also have to decide which are appropriate to their circumstances. Making a wise choice should improve the asset's performance, as well as reduce overall costs. However, making a wrong choice could create new problems, while existing ones may worsen (Swanson, 2001). TPM builds on the concepts of just-in-time (JIT), lean management, total quality management (TQM) and design to achieve minimum life-cycle cost (Chan, Lau, Chan and Kong, 2005).

TPM focuses on optimizing planning and scheduling. Availability, performance and yield (i.e. acceptable quality-rate) are other factors that affect productivity. Availability losses result from breakdowns and change-overs such as the situation in which the line is not running when it should be (Mobley, 1990). Performance deteriorations arise from speed losses and small stops or idling or empty positions. In this case, the line may be running, but it is not producing the quantity it should. Yield losses consist of losses due to rejects and poor start-up behaviour in the line producing

the products (Al-Najjar and Alsyouf, 2003). These losses lead to low values of the overall equipment's effectiveness (OEE), which provides an indication of how successful the production process is (Wireman, 1990).

TPM helps to raise the value of the OEE by supplying a structure to facilitate the assessment of those losses, and subsequently giving priority to dealing with the more serious offenders (Schippers, 2001). The application of TPM also leads to both short- and long-term improvements in planning and scheduling which entail having a leaner organizational structure with fewer managers as well as delegating power and responsibility to individual members of the team. TPM enhances multi-skilled workforce and provides rigorous reappraisal of the way things are done now, so that desirable improvements can be introduced, often resulting in simplification, standardization and harmonization (Swanson, 2001).

The goal of TPM is to maximise equipment effectiveness, and it is used to identify losses that may disrupt operation maintenance, equipment management, and available resources (Waeyenbergh and Pintelon, 2002). Nakajima (1988) defined the losses into six major categories as follows: breakdown losses, set-up and adjustment losses, minor or idling stoppage losses, reduced speed losses, defect losses and start-up losses. Breakdown losses are losses due to sporadic/chronic failures (Nakajima, 1988); they are accompanied by time losses (output decline) and volume losses (occurrence of defects). Set-up and adjustment losses refer to time losses from the end of the production of the previous item through product-change adjustment to the point where the production of the new item is completely satisfactory (Ben-Daya, 2000). Minor and idling stoppage occurs when production is interrupted by a temporary

malfunction or when a machine is idling while reduced speed losses occur because the equipment speed is slow due to a difference between the design speed and the actual speed (Lawrence, 1999). Defect or rework losses are defined as volume losses due to defects and rework, and time losses required to repair defective products to turn them into excellent products. The breakdown losses and set-up and adjustment losses are defined as time losses, which are used for calculating the availability of equipment. These losses directly affect the quality rate of equipment (Yamashina, 1995).

Chan, et al. (2005) findings on TPM implementation at an electronic manufacturing firm established that there was about 83% improvement in equipment productivity improvement after TPM implementation. Also, the equipment stoppage rate was reduced from 517 to 89 times. This tremendous improvement enhanced the equipment in both efficiency and quality in product produced. In addition, the employees were empowered as this caused the development of a bright, cheerful and relaxed workplace for production people. Growth of work habits, technical skill development and promotion of cross-functional team created an enthusiastic workforce to enhance the company in both competitive power and image.

There are intangible benefits of implementing TPM as reported by supervisors and they include: Recognition and acceptance of individual responsibility for equipment, development of “Can-Do” attitude and ownership for members, establishing a sense of importance for maintaining basic equipment conditions and the development of problem solving skills for team members (Schippers, 2001). In the past, the production department had played an exclusively supervisory role, concentrating on production and leaving maintenance to specialists, however, with the implementation

of TPM employees feel recognized and there is acceptance of individual responsibility for equipment conditions and act as thinking contributors in company affairs (Waeyenbergh and Pintelon, 2002).

Through the TPM implementation, numerous amounts of equipment defects and breakdowns are tackled dramatically. Team members can taste the thrill and satisfaction of successful improvement through the development of teamwork and individual achievement (Lungberg, 1998). A positive attitude, ownership and concern are developed. As a result of TPM activities that involve general inspection, cleaning and lubrication, team members can understand the importance of basic equipment conditions maintenance for equipment, even for very complicated equipment. In the series of TPM steps implementation, team members have to handle simple maintenance and repairs of equipment. This builds up skills, teamwork and a sense of problem solving (Chan *et al.*, 2005).

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This chapter highlights the various methods that were adopted in conducting the study in order to answer the research questions raised in the first chapter. The chapter is organized in the following structure: the research design, data collection methods and data analysis methods.

3.2 Research Design

This research is a case study and it adopted a qualitative research design. A qualitative research is concerned with providing the findings of who, what, where, when or how using data in the form of words rather than numbers (Kumar, 2005).

Design is the deliberately planned arrangement of conditions for analysis and collection of data in a manner that aims to combine relevance to the research purpose with economy of procedure (Selltiz and Wrightsman, 1981). A qualitative research has an ultimate goal of improving practice by identifying and providing evidence to support the fact that certain variables exist and have construct validity.

3.3 Data Collection

To ensure the targeted research questions were addressed and well interpreted, this research adopted a research interview as the primary data collection method. The choice of the method was influenced by the data collection strategy, the type of variable, the accuracy required and the collection point.

The purpose of the research interview is to explore the views, experiences, beliefs and/or motivations of individuals on specific matters. This research used a paper based semi-structured interview guide to collect data, because it allows the interviewer to pursue an idea or response in more detail for elaboration of information, The interview guide questions were prepared based on the literature review of the two research objectives stated in chapter one and administered through scheduled interviews with three senior managers (TPM manager, Foods manager and Home & Personal Care manager) at Unilever Kenya Limited. To avoid biased response in seeking to answer the research question, each of the managers was interviewed individually.

3.4 Data Analysis

Qualitative data analysis ideally occurs concurrently with data collection so that investigators can generate an emerging understanding about research questions. This study used qualitative content analysis methodology to analyse the data. Content analysis may be defined as a systematic analysis of the content rather than the structure of a communication, such as a written work, speech, or film, including the study of thematic and symbolic elements to determine the objective or meaning of the communication.

There are two general categories of content analysis: conceptual analysis and relational analysis. There are many techniques of relational analysis available and this flexibility makes for its popularity. Researchers can devise their own procedures according to the nature of their project and based on this, this research adopted qualitative relational content analysis to analyse the data collected from the interviews.

CHAPTER FOUR

DATA ANALYSIS, RESULTS AND DISCUSSION

4.1 Introduction

This chapter presents the results and findings from data analysis. The study sought to establish the contribution of Total Productive Maintenance to the competitive advantage of Unilever Kenya. The findings are outlined according to specific objectives of the study. The findings are based on the responses from the interview guide used and information gathered on the research questions. The respondents were three senior managers (TPM manager, Foods manager and Home & Personal Care manager) at Unilever Kenya Limited. A discussion on the findings of the research as compared to the findings in the literature review is also provided in this chapter.

4.2 Respondents Background Information

The respondents background information is organized in the following areas: position in organizational structure, work experience and department.

4.2.1 Position in Organizational Structure

The research sought to analyze the position in organizational structure of the respondents involved in the study. The findings established that all of the respondents were senior managers (TPM manager, Foods manager and Home & Personal Care manager) at Unilever Kenya Limited and would thus understand well TPM at UKL.

4.2.2 Work Experience

The research sought to determine the level of work experience within Unilever Kenya Limited among the respondents involved in the study. It was revealed that the respondents had between 13 to 23 years of work experience within UKL. The findings indicate that the respondents were relatively experienced and might have knowledge on Total Productive Maintenance.

4.2.3 Department of Respondents

The research sought to determine the department of the respondents involved in the study. It was revealed that the respondents were from Engineering, Foods and Home & Personal Care departments at Unilever Kenya Limited. This indicated that all production departments at UKL were well represented.

4.3 Findings of the Study

This section highlights the findings of the study in relation to the two objectives of this study.

4.3.1 The goals of Total Productive Maintenance strategy at Unilever Kenya Limited

The findings indicated that UKL implemented TPM in all its plants in the year 2000, all the respondents participated in its implementation and gave improved efficiency, reduction of production costs and reduction of wastages and unnecessary costs as what prompted Unilever Kenya Limited to adopt TPM strategy. They also indicated that Total Productive Maintenance was necessary. This shows that TPM was well internalized in the organization.

The researcher sought to find out the total productive maintenance goals at Unilever Kenya Limited from the target respondents in the study. The findings revealed that the most significant goal of TPM was to bring world class standards to Unilever. The other goals that became significantly eminent were Unilever taking up TPM to improve profit margins, Unilever taking up TPM to improve equipment efficiency and availability, Unilever adopting TPM to empower the machine operators to carry out autonomous maintenance, Unilever adopting TPM to improve the quality of products, Unilever adopting TPM to reduce its environmental footprint and Unilever adopted TPM to improve safety standards in the factories. The findings also revealed that the goal of TPM improving interdepartmental co-operation appeared least significant in the decision of implementing TPM.

The findings indicated that there is a significant relationship between the two variables; implementation of TPM strategy and the TPM goals. The findings indicate that world class standards, improved equipment efficiency and availability, empowering of machine operators to carry out autonomous maintenance, improved quality of products, increased profit margin and improved safety standards in the factories are determined by implementation of total productive maintenance. It also reveals that the implementation of Total Productive Maintenance at Unilever Kenya Limited most important goal was to bring the company to world class standards by producing quality products with zero defects at the lowest cost and with zero losses and zero accidents.

4.3.2 Contributions of Total Productive Maintenance strategy to the competitive advantage of Unilever Kenya Limited

The research sought to establish the contribution of Total Productive Maintenance strategy to the competitive advantage of Unilever Kenya Limited from the respondents in the study. The findings indicated that all of the respondents claimed that the profit margins of Unilever Kenya Limited have gone up by about 10% since TPM was implemented. The finding also revealed that there have been reduced accidents in the factory evident from the reduced lost time accidents (LTA) and reduced accident compensations, reduced customer complaints resulting from better quality products, reduced machine breakdown evident from the longer mean time before failure, reduction in maintenance costs and maintenance workforce costs through reduction of overtime labor cost. The research further indicated better planning and scheduling, improved equipment efficiency and availability, employee recognition and empowerment through improved capabilities and competencies, better relationships between operators and maintenance personnel and better competitive edge in global arena as the contributions that Total Productive Maintenance strategy has brought to Unilever Kenya Limited.

The findings indicated that there is a significant relationship between the two variables; implementation of TPM strategy at UKL and Competitive advantage of UKL. The implementation of TPM in UKL has resulted in; 10% increase in profit margins, reduction in the number of accidents in the factories, reduced customer complaints, reduction in equipment breakdowns, reduction in maintenance costs and maintenance personnel labor costs, improved planning and scheduling. The

implementation has also further resulted in; improved overall equipment efficiency, availability and yield, improved employee capabilities and competences and better employee recognition and acceptance. This implies that the competitive advantage of UKL is contributed by the implementation of TPM strategy that has resulted in reduced accidents, reduced operational costs, reduced product quality defect and reduced wastages thus increasing UKL's profit margins and market share.

4.4 Discussion

The conclusion compares the findings of the study to other findings in the literature review. It first compares the findings of the goals of TPM at UKL to the literature review findings then finally compares the contributions of TPM to competitive advantage of UKL to literature review.

4.4.1 Total Productive Maintenance Goals at Unilever Kenya Limited

TPM seeks to eliminate major equipment effectiveness losses within the shortest time. Unilever took up TPM to improve equipment efficiency and availability. The importance of TPM in the maintenance function increases its role due to keeping and improving the availability, product quality, safety requirements, and plant cost effectiveness levels as maintenance costs constitute an important part of the operating budget of manufacturing firms (Al-Najjar and Alsyouf, 2003).

The findings were similar to Maggard and Rhyne (1992) study that the main objectives that a company may seek from TPM include improvement of equipment efficiency. Blanchard (1997) also describes TPM to be a synergistic relationship among all organizational functions that includes production and maintenance,

continuous improvement of product quality, operational efficiency, capacity assurance and safety. Also, Nakajima (1988) concurs that the concept of TPM is to maximize equipment effectiveness (overall efficiency).

TPM improves safety standards in factories. Unilever adopted TPM to improve safety standards in factories. This objective is consistent with Maggard and Rhyne (1992) findings that established that TPM implementation is similar with high levels of safety and quality while reducing negative impact on the environment. In addition, TPM reduced Unilever's environmental footprint. Thus, at Unilever TPM has reduced the company’s environmental footprint.

The quality of maintenance significantly affects business profitability. TPM has enabled Unilever to increase profit margin. Increase in profit margins was a significant goal of TPM implementation at Unilever that is closely driven by improved quality of products that are world class. Therefore, the overall aims for TPM are to achieve zero losses in accidents, zero defects and zero failures, create a corporate system to maximize efficiency of the process, involve all sectors including production, development and administration, involve all employees from senior management to operators and clerical staff and develop small group activities (Unilever East and Southern African, 2000).

Through TPM implementation, each company decides how autonomous maintenance is to be. Unilever adopted TPM to empower the machine operators to carry out autonomous maintenance. This is referred to as autonomous maintenance (Yamashina, 1995). Machine operators are trained to share with maintenance

personnel the responsibility for routine maintenance. Operators receive a large amount of skills training and are certified as they progress through various skill levels. As operators become trained, an organized transfer of tasks takes place (Wireman, 1990). Thus, the goal of TPM is to reduce and to control the variation in a process (Swanson, 2001).

TPM permanently improves and maintains the overall effectiveness of equipment through active involvement of operators and all other members of the organization. Group activities are promoted throughout the organization to gain greater equipment effectiveness. At Unilever, TPM was implemented with little or no intention to improve interdepartmental co-operation. This is in contrast to Nakajima (1989) findings which established that TPM leads to the improvement on the company's operations through inter-departmental co-ordination as well as subsequent financial returns by increasing the profit margins. Further, Schippers (2001) states that TPM is an aggressive strategy that focus on actually improving the function and design of the production equipment.

4.4.2 Contribution of Total Productive Maintenance to Competitive Advantage of Unilever Kenya Limited

TPM is a maintenance cost-reduction program that increases productivity and quality, optimizes equipment life cycle cost. At Unilever, the profit margins have gone up by 10%. The relationship is extended to the reduction in equipment breakdowns, reduction in maintenance costs and maintenance personnel labor. Nakajima (1988) explains those breakdowns are losses due to sporadic/chronic failures, they are accompanied by time losses (output decline) and volume losses (occurrence of

defects). Sporadic failures arise when changes occur in some conditions (jigs/tools, work methods, and equipment's state), represents a restoration issue, requiring measures to revert the condition to the original level. Chronic failures occur when there are some hidden defects in machinery equipment. Thus, TPM seeks to eliminate major equipment effectiveness losses, because this is where the largest gains can be realized in the shortest time

Maintenance is undertaken to preserve the proper functioning of a physical system. At Unilever, maintenance costs have reduced. TPM application overcomes performance deterioration. According to Nakajima (1989), TPM seeks to reduce breakdowns, set-ups, speed losses, minor stoppages, lack of material and defects and use the overall equipment effectiveness to reduce these losses. There was also an update of weekly performance and improved capabilities and competencies of human resources. Unilever Kenya Limited had just undergone a major restructuring, where it retrenched 30% of its employees in the factories (Unilever East and Southern Africa, 2001). This meant that there was less manpower for the same equipment and there was a shortfall of shift manpower to stand in for each other when attending TPM training.

The overall aims for TPM were to achieve zero losses in accidents, defects and failures. Accidents at Unilever have reduced. There was a significant relationship between TPM bringing world class value and reduction of accidents. As mentioned earlier, the overall aims for TPM were to achieve zero losses in accidents. Zero losses refer to the reduction of time losses from the end of the production of the previous item through product-change adjustment to the point where the production of the new item is completely satisfactory (Johnson and Lesshammar, 1999).

Availability losses result from breakdowns and change-overs (Mobley, 1990). Performance deteriorations arise from speed losses and small stops or idling or empty positions. In this case, the bbreakdown maintenance was reduced and overall equipment efficiency and availability improved. The goal of TPM is to maximise equipment effectiveness, and it is used to identify losses that may disrupt operation maintenance, equipment management, and available resources (Waeyenbergh and Pintelon, 2002). Nakajima (1988) defined the losses into six major categories as follows: breakdown losses, set-up and adjustment losses, minor or idling stoppage losses, reduced speed losses, defect losses and start-up losses.

TPM implementation led to the improvement of relations between the maintenance personnel and the machine operators. At Unilever, TPM implementation improved capabilities and competencies of human resources and improved operator maintenance personnel relationship. Ireland and Dale (2001) mention that the strategic objectives of TPM is to introduce effective and efficient team working, make empowered team structures, improve flexibility and reaction time to customer needs and improve competitiveness, quality, performance and cost.

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

In this section, the researcher provides a summary of the findings of the study and recommendations for further improvement on identifying the measures to be taken in enhancing Total Productive Maintenance. The research is concluded on the basis of the conclusions drawn from the research objectives.

5.2 Summary

The findings revealed that the most significant goal of TPM was to bring world class standards to Unilever. The other goals that became significantly eminent were Unilever taking up TPM to improve profit margins, Unilever taking up TPM to improve equipment efficiency and availability, Unilever adopting TPM to empower the machine operators to carry out autonomous maintenance, Unilever adopting TPM to improve the quality of products, Unilever adopting TPM to reduce its environmental footprint and Unilever adopted TPM to improve safety standards in the factories. The findings also revealed that the goal of TPM improving interdepartmental co-operation appeared least significant in the decision of implementing TPM.

In establishing the contributions of TPM to competitive advantage of UKL, the findings indicated that the respondents claimed that; increased profit margins, reduced accidents in the factory, reduced customer complaints resulting from better quality products, reduced machine breakdown, reduction in maintenance costs and

maintenance workforce costs through reduction of overtime labor cost, better planning and scheduling, improved equipment efficiency and availability, employee recognition and empowerment through improved capabilities and competencies, better relationships between operators and maintenance personnel and better competitive edge in global arena were the contributions that Total Productive Maintenance strategy has brought to UKL

5.3 Conclusion

In this section, the conclusions of the findings of the study are provided in relation to the two objectives of the research project.

5.3.1 Total Productive Maintenance Goals at Unilever Kenya Limited

The study found out that TPM's key goal is to eliminate major equipment effectiveness losses within the shortest time. TPM has a synergistic relationship among all organizational functions that includes production and maintenance, continuous improvement of product quality, operational efficiency, capacity assurance and safety. TPM improves safety and environmental standards in factories.

The TPM goals at Unilever Kenya Limited were found to be; increase profit margins, improve equipment efficiency and availability, enhance teamwork, improve safety and quality of products, reduce environmental footprint and empower the machine operators to carry out autonomous maintenance. Therefore, TPM permanently improves and maintains the overall effectiveness of equipment through active involvement of operators and all other members of the organization. It brings a company to world class standards of manufacturing.

5.3.2 Contributions of Total Productive Maintenance Strategy to Competitive Advantage of Unilever Kenya Limited

TPM is a maintenance cost-reduction program that increases productivity and quality, optimizes equipment life cycle cost. The study revealed that at Unilever Kenya Limited, TPM strategy contributes to the competitive advantage of the company through increased profit margins (about 10% increase) resulting from; reduced machine breakdown, reduction in maintenance costs and maintenance workforce costs through reduction of overtime labor cost, better planning and scheduling, improved equipment efficiency and availability and better relationships between operators and maintenance personnel. Reduced accidents in the factory, reduced customer complaints resulting from better quality products, employee recognition and empowerment through improved capabilities and competencies resulting from TPM implementation have also contributed to a better competitive edge for Unilever Kenya Limited in the global arena.

5.4 Recommendations for Policy and Practice

The study recommends that Unilever should continuously apply TPM so as to bring world class value, improve equipment efficiency and availability, empower the machine operators to carry out autonomous maintenance, improve safety and environmental standards in factories, increase profit margin, reduce Unilever's environmental footprint and improve interdepartmental co-operation. For sustainable competitive leadership, TPM strategy must be applied continuously

It is also recommended that since implementing TPM provides positive outcomes such as reduction of accidents in the factory, elimination of machine breakdown, reduction of maintenance costs, improvement in relations between maintenance personnel and machine operators and reduction of customer complaints, organisations should strive to implement TPM.

TPM requires the organization to make plans for funding as it is an expensive venture and make provisions for training personnel for them to appreciate TPM and for effective and successful implementation of TPM. Top management should be involved in presenting the first step towards more efficient maintenance. Also, training of the maintenance personnel is important to run the machines well and be responsible for checking deterioration so as to reduce sporadic breakdowns.

5.5 Limitations of Study

This research project was a case study hence has the limitation of lack of generalization. The Study was conducted on Unilever Kenya Limited thus the results only tell us about one organization. The results are therefore hard to generalize to any other organization, as it's not certain that any other organization would present the same results.

5.6 Area for Further Research

The number of companies successfully implementing a TPM program is considered relatively small; Unilever Kenya Limited is among the few companies that have implemented TPM in Kenya. This study recommends that future researchers should investigate on TPM implementation obstacles and possibly conduct a survey of the

few companies that have already implemented TPM. Some of the companies Implementing TPM currently in Kenya are; Unga Limited, Diageo Limited and Kenya Airways. It would also be worthy to conduct a research of TPM implementation in non-manufacturing or service firms.

5.7 Implications of the Study on Policy, Theory and Practice

This study provides the much-needed impetus for the manufacturing organizations to improve the maintenance policy and affect continuous improvements in the manufacturing systems. It shows that, TPM offers a measurement tool to evaluate equipment corrective action methods and ensure permanent productivity improvement this enhances the theories and policies of TPM.

In the study, correlations between various TPM implementation dimensions and manufacturing performance improvements have been evaluated and validated, it has been established that focused TPM implementation over a reasonable time period can strategically contribute towards realization of significant manufacturing performance enhancements and result in competitive advantage, this is in line with and enhances the policies, theories and practice of TPM and strategy.

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APPENDICES

APPENDIX A: INTRODUCTORY LETTER

To Whom It May Concern

Dear Sir/Madam,

I am pleased to inform you that am a postgraduate student at University of Nairobi pursuing a degree in Master of Business Administration. As partial fulfilment of the requirements for the award of the degree, I am conducting a research on the Contribution of Total Productive Maintenance Strategy to the competitive advantage of Unilever Kenya Limited.

I kindly request your participation in an oral interview to discuss Total Productive Maintenance as a competitive strategy, its goals and contributions to the competitive advantage of Unilever Kenya Limited. Please note that any information you give will be treated with confidentiality and at no instance will it be used for any other purpose other than for this project. Your assistance will be highly appreciated. I look forward to your prompt response.

Yours Faithfully,

Harriet Matuga

APPENDIX B: INTERVIEW GUIDE

TOPIC: CONTRIBUTION OF TOTAL PRODUCTIVE MAINTENACE STRATEGY TO THE COMPETITIVE ADVANTAGE OF UNILEVER KENYA LIMITED.

PART A: GENERAL INFORMATION

(i) What is your position in the Organizational Structure?

_____

_____

_____

(ii) For how long have you worked in Unilever?

_____

_____

_____

(iii) Which factory do you work for in the organization?

_____

_____

_____

(iv) When did UKL implement Total Productive Maintenance?

_____

_____

_____

(v) Did UKL implement TPM in all its plants?

_____

_____

_____

(vi) Have you participated in the implementation of Total Productive Maintenance?

_____

_____

_____

(vii) In your opinion, what prompted Unilever Kenya Limited to adopt TPM strategy?

_____

_____

_____

PART B: THE GOALS OF TPM STRATEGY AT UNILEVER KENYA LIMITED

Unilever Kenya Limited implemented TPM with some goals in mind; the following questions seek to identify these goals to the best knowledge of the identified respondents.

1. In your opinion, is TPM about bringing Unilever to world class?

   _____

   _____

   _____

2. Did Unilever adopt TPM with the intension of increasing its profit margins?

   _____

   _____

   _____

3. Do you think Unilever took up TPM to improve its equipment efficiency and availability?

   _____

   _____

   _____

4. Do you think TPM was implemented in Unilever to improve inter-departmental co-operation and team work?

   _____

   _____

   _____

5. Would you say, Unilever adopted TPM to improve safety standards in the factories?

_____

_____

_____

6. Do you think Unilever adopt TPM to improve the quality of products?

_____

_____

_____

7. Do you think Unilever implemented TPM to help it reduced its environmental footprint?

_____

_____

_____

8. Can you say Unilever adopted TPM to empower the machine operators to carry out preventive maintenance?

_____

_____

_____

_____

PART C: CONTRIBUTIONS OF TPM STRATEGY TO THE COMPETITIVE ADVANTAGE OF UNILEVER KENYA LIMITED.

1. Have the profit margins of the company gone up since TPM was implemented? If possible quantify.

   _____

   _____

2. Have you seen the number of accidents in the factories change since the implementation of TPM?

   _____

   _____

3. How would you describe the customer complaints trend since the implementation of TPM?

   _____

   _____

4. Has there been any change in the mean time before failure of machines with TPM implementation?

   _____

   _____

5. Have the maintenance costs in the various departments reduced?

_____

_____

6. Would you say the maintenance workforce in the departments have reduced since the implementation of TPM?

_____

_____

7. How would you describe the impact of TPM on planning and scheduling?

_____

_____

8. Has the Overall equipment efficiency and availability improved since TPM implementation?

_____

_____

9. Has TPM improved the capabilities and competencies of the employees?

_____

_____

10. Would you say TPM has improved the relationships between the operators and maintenance personnel? Please explain.

_____

_____

11. Does TPM contribute in any way to employee recognition and acceptance? Kindly elaborate.

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12. In your opinion would you say TPM successfully helped Unilever Kenya Limited have a competitive edge over its competitors?

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13. Do you have anything else you may want to add on TPM strategy at UKL?

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