Evaluating Employee Responses to the Lean Enterprise System at a Manufacturing Company in Cape Town, South Africa

By

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DECLARATION

I, Yan, Bing Wen, herby declare

that the work contained in the research project titled ***Evaluating Employee Responses to the Lean Enterprise System at a Manufacturing Company in Cape Town, South Africa***, submitted for examination at the University of the Western Cape is my own work. All the sources I have used or quoted have been acknowledged as complete references. This research was supervised by Professor Linda De Vries.

Signed at Cape Town 18th May 2006.

Signature: 

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LIST OF ABBREVIATIONS

AFI	Area For Improvement
ATQPS	Arvin Total Quality Production System
BE	Business Excellence
CI	Continuous Improvement
EI	Employee Involvement
GKN	GKN Sinter Metals—Cape Town
JIT	Just-In-Time
LE	Lean Enterprise
PE	People Excellence
SMC	Sinter Metal Components
TPS	Toyota Production System
VSM	Value Stream Map
WP	Western Cape Province
WPCS	Work Place Challenge System

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ABSTRACT

There is usually much reaction amongst employees when a new system is introduced in an organization. These changes are intended to improve performance but sometimes cause considerable controversy amongst the employees and management.

This study examines the implementation of LE and it attempts to analyse the reactions of employees in a manufacturing company in South Africa—GKN Sinter Metals (GKN), Cape Town. The LE method is designed to achieve business excellence. Specifically, it targets production excellence in order to identify and remove waste and sustain continuous improvements in the production processes and associated activities. At GKN, the LE method was introduced because of its popularity and success in Japan and elsewhere in the world with improving production processes. The literature states that if LE is implemented, then operational performance will improve. According to the literature review, the implementation of the LE can play a significant role in improving company's performance.

Some of the questions that were asked in the research include the following: What benefits did employees perceive by the introduction of LE? How did employees respond to the implementation of the LE at GKN (in other words, did they welcome it or not)?

A semi-structured questionnaire was utilized as a quantitative instrument in this research. The survey instrument was a self-administered questionnaire to determine the responses of employees with respect to the benefits of these innovative approaches of production with specific reference to LE.

The finding of this study indicates that LE plays a significant role in a company's performance. Other benefits of the implementation included the following: enhancing the company's competitiveness; a reduction of inventories; a shortened lead time; elimination of defects and rework; reduction of costs; and improved product quality. An unexpected finding of the research (which emerged from the employees' responses) showed that work intensity and stress did not increase as a result of the implementation of LE in the company.

CHAPTER ONE: INTRODUCTION

1. 1 Introduction

Companies routinely introduce new systems to enhance efficiency. In most cases employees, especially those at the lower levels of the organisation, are not consulted about such changes. They are seen and treated as mere receptacles that have to implement what is put before them. In some cases innovations are well received; but often they are not, and rebellion follows. Those employees who embrace the innovation can reap great benefits, including reduced cost, raised productivity, and short lead times. Those who rebel can sometimes cause great damage, which often results in work stoppages and lost time. In other words, the human factor—the people involved, those who will drive the activity—is often ignored.

Industry must realise that the people who lead major enterprises have to be considered when any change, especially drastic change, considered. In these times, when technology has seemingly begun to overshadow human beings, it is especially important to remember that people are still the developers of machines.

Toffler (1970) in his book *Future Shock* envisages a future in which technology features prominently. He refers to subterranean cities and vacations on planets. He also suggests that the day when a bride will get to church for her wedding, dressed in a paper dress is not far off. Toffler foresees the advantages of such a dress: after the wedding the bride will be able to use the paper from her dress in the kitchen. So, although Toffler is quite

optimistic about the future, one should be careful that technology does not overtake the human spirit. In other words, the machine should not overtake the human being: the machine cannot become a monster. The human being should always be in control.

The theme of the Olympic Games stresses the superiority of the human spirit over technology. Furthermore, though a satellite on its way into space is driven by the command of a computer, all of these activities cannot function without the control of human beings. Finally, the researcher believes that the human factor will always play a significant role in any organisation.

1. 2 Background of the Study

The researcher became interested in the problem that he wants to analyse in this study, namely, the responses and reflections of employees to the introduction of new systems, while working as an accountant in China and Japan. He routinely saw how managers introduced new systems without informing employees properly. The researcher noticed that such transformation, changes or innovations were often received with mixed emotions: while some loathed them, others welcomed them. The former often led to much acrimony and conflict. He concluded that taking the human factor into consideration is vital in the introduction of new systems. The researcher concedes that management or a company has the full right to introduce whatever innovations the company wants to introduce. He believes, however, that they should be cognizant of the fact that it is crucial for employees to be properly consulted, informed or cultivated for any change.

With the above thoughts in mind, the researcher endeavored to elucidate what the employees' responses were in a particular company that introduced a new management system. He learned about this particular company, GKN Sinter Metals Cape Town, through a class assignment (MAN747—Management of Information Technology) at the University of the Western Cape. The researcher spoke to the key persons, the manufacturing manager and financial director, in this company and they agreed to assist in his research. They had not thought about this issue before and were therefore keen to discover what their employees' responses were, and whether or on what level the employees accepted the new system.

1. 3 Problem Statement and Research Questions

Employee responses and reflections to the implementation of Lean Enterprise (LE) had not been previously analysed at GKN. With the implementation of new operating systems within the company, employees might feel unappreciated and marginalized if not consulted about the implementation. According to Koo *et al* (1998: 312), too often both management and consultants hurry to get the job done and may undermine the importance of understanding employee feelings and attitudes. The feelings and attitudes of employees may influence the course of the LE implementation. While employees' high zeal can assist the implementation of LE, employees with lower morale may interfere with the process of LE implementation. The employees sometimes react indifferently, or do not give full cooperation when they are not properly informed about pending innovations in companies.

Was the LE method welcomed by employees at GKN? What benefits did employees perceive through the introduction of LE? How did employees respond to the implementation of LE at GKN? This issue was analysed by looking at the case of LE as employed by GKN Sinter Metals Cape Town (GKN).

There are studies that focus on the implementation of LE, such as Sohal *et al* (1994: 51), which indicate that managers must be actively involved in the improvement initiatives and the strongest leader must drive change processes. Smeds (1994) mentions that when lean manufacturing is implemented as an innovation process, and social stimulation games are applied, the resulting new systems are both economic and organisational successes. Furthermore, Beachum (2005: 20) believes that many companies who have implemented Lean practices have realized substantial improvements in the productivity of both workers and equipment. Most research, however, has not addressed how employees and management responded to the implementation of LE. Therefore, in the light of this problem statement, this study is driven by the following research questions:

- What benefits did the employees perceive that they received through the introduction of LE?
- How did employees respond to the implementation of LE at GKN?

1. 4 Aim and Objectives

This study aims to discover employees' responses and reflections with regard to the implementation of a new manufacturing system. The objectives of this research are to

determine the benefits that employees perceived by the introduction of LE, and how they responded to the LE implementation at GKN. It also seeks to identify what employees' responses are regarding the improvements, benefits, and problems associated with the implementation of LE.

1. 5 Significance of Research

This study is important for several reasons. Firstly, the organisation being researched will be able to evaluate the efficiency of LE for their operations. Anecdotal evidence indicates that at present GKN is the only company in South Africa using LE. Secondly, the researcher has a personal interest in this research, as LE consulting is a growing focal area for international companies and likely to become so locally as well. Thirdly, this research study hopes that other manufacturing companies will use LE in their operations as a result of the research findings.

1. 6 Structure of Research Project

This thesis consists of six chapters. Chapter One has introduced the following: the background to the study; the motivation for the research; the problem statement; the research questions; the research aims and objectives; and the significance of the research.

Chapter Two is an extensive literature review on the important constructs related to LE. There were many definitions and views of "Lean" and "Lean Enterprise", and the views of some authors shown in this chapter.

Chapter Three shows the overall context of general industry in the Western Cape at large in which GKN operates, including human resource development, employment, skills development, worker attitudes, policies, and the situation of the metal industry.

Chapter Four deals with the research design and method, specifically, reflecting on the research instrument, the sample of the study, procedure, and data analysis. The quantitative method associated with a questionnaire using the survey method and more specifically based on a case-study approach, was employed.

Chapter Five provides a description of GKN Sinter Metals Cape Town, with specific reference to the implementation of LE on the shop floor. It presents an analysis of the case study using the LE model developed in Chapter Two.

Chapter Six presents the main conclusions and recommendations of this study.

1. 7 Summary

This chapter has introduced the reader to the research study. It has provided the background to and orientation for the research. It has also provided an insight into the problem statement from which the research questions emanate, and it has contextualised the research. Moreover, the chapter serves as an impetus and theoretical backdrop to facilitate the attainment of the research objectives.

CHAPTER TWO: LITERATURE REVIEW

2. 1 Introduction

As stated in Chapter 1 above, human factors can play a significant role in an organisation. Various perspectives emerge from the literature review on hoe human factors influence the Lean process. Sawhney and Chason (2005: 76-79) concur with the postulate of several authors, *inter alia*:

> Drew *et al* (2004) point out that Lean is a knowledge-intensive process and as such relies heavily on the skills of the people and how they respond to changes. Forrester (1995) and Womack *et al* (1990) discovered that the dependability and reliability of the workforce become more important because Lean introduces fragility into the system by stretching it and removing contingencies. Further, Lean calls for a feeling of ownership of the process, and Lean implementation is based on the implicit belief that the workforce "naturally wants to work" (Forza, 1996: 43). Moreover, in the context of the Lean philosophy of minimizing waste of any kind, it is important not only to eliminate material waste, but also waste caused by human behavior. Behavioral productivity is as important as manufacturing productivity (Emiliani, 1998). Lean also calls for flexibility and involvement of the workforce since it introduces more interdependencies between all "actors involved in the production process." (Biazzo and Panizzolo, 2000: 7).

Based on the above, Sawhney and Chason (2005: 76-79) maintain that human factors influence Lean implementation.

As part of the overall JIT production process, and as an innovative system, the LE components were introduced at a manufacturing company in Cape Town. This chapter will revolve around three questions relating to LE. These three questions will underpin this study and act as the "steering wheels". The first research question explores the

meaning of Lean and LE. Secondly, what are the benefits of the Lean implementation? Thirdly, what are the employees' responses when a new system is introduced in a company, such as a Just In Time (JIT) system?

2. 2 Definition and Concepts of Lean and Lean Enterprise (LE)

There is a plethora of concepts and views of Lean and LE. The various perspectives are listed below.

2. 2. 1 Lean

The term "Lean" was first coined by Womack, Jones and Roos in *The Machine that Changed the World* (Womack *et al,* 1990). It was also introduced by Krafcik (Womack *et al*, 1990: 13), who refers to a manufacturing approach:

> . . .compared to mass production it uses less of everything-half the human effort in the factory, half the manufacturing space, half the investment in tools, half the engineering hours to develop a new product in half the time. Also it requires keeping far less than half the needed inventory on site, results in many fewer defects, and produces a greater and ever growing variety of product.

The origins of Lean thinking can be traced to the shop floors of Japanese manufacturers, in particular to innovations at Toyota Motor Corporation (Shingo, 1981, 1988; Monden, 1983; Ohno, 1988, cited in Hines *et al*, 2004:994). These innovations result from a scarcity of resources and intense domestic competition in the Japanese market for automobiles, including the Just-In-Time (JIT) production system, the Kanban method of

pull production, respect for employees, and high levels of employee problem solving/automated mistake proofing (Hines *et al*, 2004:994). Lean thinking consists of a body of best practice whose primary aim is to reduce waste and focus only on those activities that add value for the customer (Jones *et al*, 1999: 15).

Lucansky and Burke (2003) highlighted that Lean principles may be applied to any organisational type and can be applied to all areas within the business. In addition to this, Lucansky and Burke (2003) reveal that Lean is a three-pronged approach incorporating a belief in quality, waste elimination and employee involvement, supported by a structured management system (See Figure 1).

Figure 1: Structured Management System

Source: Lucansky and Burke, 2003. http://www.supplychainplanet.com

2. 2. 2 Lean Enterprise (LE)

From these initial concepts mentioned above, an array of researchers, academics, companies, and industries have developed an expanded vision of the values, behaviours

and practices within enterprises that constitute a new and emerging expression of what it means to be an "LE" (Womack *et al*, 1996). A commonly held definition of LE was described by Lucansky and Burke (2003) as: "a group of individuals, functions, and sometimes legally separate but operationally synchronized organisations."

The LE model, which has been implemented since 1999 and was developed by GKN plc in 2003, uses a system of tools and measures to facilitate and track continuous improvement throughout the GKN Sinter Metals organisation. According to the SINTERNOTES—the magazine of GKN Sinter Metals Group Company, edited by Godlew (2005: 15), it is designed to achieve production excellence, business process excellence, people excellence, and business excellence. The related concepts of LE were cited in the [CD-ROM: Lean Enterprise Model (2005)] and the researcher concluded as follows:

- Production excellence is an approach to identify and remove waste, and sustain improvements in the production processes and associated activities;
- Business process excellence is an approach to identify and remove waste, and sustain improvement throughout the entire value chain;
- People excellence aims to unlock the talents of people in order to create a culture where Continuous Improvement (CI) is inherent in 'the way that things are done'.
- Business Excellence is implemented as a repeating cycle of self-assessment, developing/researching solutions, drawing up an improvement plan, and implementation, involving performance and supporting review;

The main types of waste in LE at GKN are inventory, over-production of goods, fixing defects, processing, motion, and waiting.

Sohal and Egglestone (1994: 39) assert that both JIT and the Kanban production control system are fundamental elements of a Lean production system. The LE components are part of the overall JIT production system, and LE can be improved through the JIT production process. The researcher believes that the production excellence component of LE is closely related to the activities on the shop floor.

2. 3 The Benefits and Problems of the Lean Implementation

An article titled "*The Lean Enterprise*" by Jones *et al* (1999:21) addresses manufacturing companies that have embraced Lean practices and have reaped the benefits of increased customer and employee satisfaction, shorter lead times, reduced inventories, fewer defects, shorter time to market, and lower operating costs. Pullin (2000:43) purports that Lean manufacturing is the art of raising quality, lowering costs, improving delivery, generally becoming competitive by removing waste, and concentrating on activities that add value for the customer. Womack *et al* (1990) proffer the view that the Toyota Motor Company is broadly recognized for developing and successfully implementing many of the original concepts that underlie the Lean framework.

Heumans (2002: 31) believes that once Lean manufacturing is introduced to the company, the immediate results are: reduced cycle time, fewer material handling errors, and improved labour productivity (see Table 1).

Table 1: Lean improvements lead to strategic benefits

LEAN IMPROVEMENT	IMMEDIATE RESULT	BUSINESS BENEFIT
One-piece flow work cells	Reduced production cycle time	On-time delivery
Improved flow between operations through internal JIT	Reduced work-in-process	Less space required
Kanban systems	Fewer material handling errors	On-time delivery
External supplier JIT	Reliable material sourcing	On-time delivery to manufacturing
Setup and changeover reduction	Shorter production runs possible	Reduced raw materials quantities
Total productive maintenance	Less production downtime	Greater production flexibility
First-time quality	Inspection eliminated	Quality to customers assured
Employee involvement	Improved labor productivity	Improved quality of product

Source: Heumans (2002: 31). Leading the Lean Enterprise. *Industrial Management.*

For many managers, Lean manufacturing is something that appears beneficial on paper and sounds wonderful in theory, but they prefer proof that it really works in their ever-changing manufacturing environment (Fretty, 2005). According to Emiliani *et al* (2005: 371), senior managers become interested in adopting Lean principles and practices because they result in many benefits, such as higher quality products and services, higher productivity, better customer focus, faster responses, and higher asset efficiency.

The evidence can be found in many regions: Trico Australia is an excellent example of a Lean manufacturer that has adopted a variety of Lean production concepts. Their productivity has improved every year in almost every part of the company (Sohal, 1996: 91). In mid 1995, after Trico Australia had learned a number of important lessons over the years 1985-1989 and had truly changed its culture on the shop floor, it was accepted by management that shop floor employees would be involved in day-to-day problem solving and be consulted on issues relating to process improvements (Sohal, 1996:91). Smeds (1994: 66-82) asserts that the LE was an innovation, and the employees contributed to the design of a plant with innovative ideas. The plant followed the Lean principles and is now characterized by high competitiveness, productivity and work satisfaction. Smeds (1994: 66-82) further concluded that the positive attitude towards development and innovation has been preserved in the plant, and "Lean" ideas are spreading further in the company, which amplifies the transition to a Lean enterprise.

According to recent research by Beachum (2005: 20), many companies that have adopted Lean manufacturing principles modelled after the Toyota Production System (TPS), have been able to enhance their competitive position. In addition, research findings indicate that those companies that have implemented Lean practices realized substantial improvement in the productivity of both employees and equipment. Additional benefits derived by these companies have been higher product quality, reduced lead times, and increased profitability (Beachum, 2005: 20).

However, not all the perceptions of Lean production are positive. Hines *et al* (2004: 998)

revealed that Lean production systems could be viewed through a Marxist lens as being exploitative and inducing high pressure on the shop floor workers. Williams *et al* (1992) suggest that Lean production is de-humanising and exploitative, and Forza (1996: 42-62) maintains that JIT could lead to higher work intensity and stress levels among line operators. Klein (1989: 60-66) corroborates this by indicating that Lean production practices can underline work intensity and increase stress (cited in Forza, 1996: 42-62). These viewpoints motivated the researcher to include the employees' work intensity and increasing stress as part of the questionnaire. The aim was to find out whether these drawbacks arose out of the implementation of LE at GKN.

2. 4 The Employees' Responses to the JIT System

This study looks at the LE components as part of the overall JIT production process, and attempts to evaluate the responses and reflections of employees in one manufacturing company in South Africa—GKN Sinter Metals (GKN), Cape Town, which introduced the LE method six years ago, in 1999. This study of the employees' responses to the JIT system explores how they respond to LE at GKN. Firstly, the researcher starts from some concepts and perspectives of the JIT system, and later focuses on the importance of human factors and some of the employees' responses to the JIT system.

JIT production system

According to Chandra *et al* (1998: 314-323), the JIT production system is a highly integrated production, sales and distribution system leading to continuous flow through the whole supply chain. They revealed that JIT is reducing waste and improving quality

in all business operations (Allan, 1992, cited in Chandra *et al,* 1998: 314-323).

Bates *et al* (2005: 209) described JIT as a system of production planning in which all the details are planned very accurately at the beginning of the production process so that just the resources needed for each stage of production are allowed. Groebner and Merz (1994: 26-37) believe that JIT manufacturing is one of the latest Japanese management techniques to be adopted and implemented by Western companies. JIT manufacturing systems consist of systematic allocation and reduction of wasteful practices at all levels of any organisation (Rawabdeh, 2005). Miltenburg (2001: 201-214) addressed the issue that the purpose of JIT is to improve product quality and reduce cost by eliminating all waste in the production system (cited in Rawabdeh, 2005). In the JIT philosophy, the principal focal point is the elimination of all waste within a system (Daugherty *et al*., 1994: 20-26). Canel *et al* (2000) defined waste as anything other than the minimum amount of equipment, materials, parts, space, and workers' time. Minimising waste is absolutely essential in order to add value to the product or service. From a practical perspective, waste can be categorized into seven categories: overproduction; inefficient processing; poor inventory management; inefficient transporting; producing defects; long waiting time; and motion waste (Shingo, 1992; Imai, 1997; Emiliani, 2001; Flinchbaugh, 2001, cited in Rawabdeh, 2005: 801-802).

What are the employees' responses when a new system such as JIT is introduced in a company?

Gupta *et al* (2000: 29) state that the implementation of any new program in an

organisation requires support from most departments in the company. They point out that the implementation of a JIT system requires complete support and understanding from every operational division in the organisation, especially human resources. They further concluded that human resources are the backbone of any successful JIT system (Gupta *et al* (2000: 29).

According to Groebner and Merz (1994: 26-37), employees like the JIT environment better than the batch-processing environment, and management can successfully make organisational changes necessary to implement JIT without negatively affecting employee attitudes. For example, in a batch-processing environment, an employee's primary responsibility is to achieve a high output on a single task, employees have the security of knowing what their job is each day and seeing all the work-in-process sitting around indicates there is work to be done; under JIT, not only is work-in-process greatly reduced, but also employees do not know what they will be doing each day (Groebner and Merz, 1994: 26-37). In Mullarkey *et al* (1995: 62-79), they examined the effects of a two-phase introduction of JIT manufacturing practices on job characteristics and psychological wellbeing. This shows that the employees saw themselves as having greater control related to the timing or pacing of their tasks and the methods used to carry them out. Gupta *et al* (2000: 29-33) claim that employees should be encouraged to view JIT as an opportunity to improve the company's competitive position as well as an opportunity to secure greater job security for themselves.

By reviewing the literature regarding the benefits of Lean implementation and the

employees' response to the JIT system, the researcher learned that the human factor certainly plays a significant role in any organisation, specifically in a manufacturing company. The understanding of the researcher with regard to JIT and Lean manufacturing is as follows: Simply put, JIT is a comprehensive management system placing emphasis on eliminating waste, reducing cost, and enhancing a firm's competitiveness; Lean manufacturing focuses on reducing inventories and using the exact amount of resources, such as space, inventory and employees required to achieve high performance. It urged the researcher to explore the main research question of the study—how did employees respond to the implementation of the LE at GKN? This is discussed in a later chapter.

2. 5 Summary

This chapter dealt with a review of the literature revolving around the three research questions. The first research question identified that LE is designed to achieve production excellence, business process excellence, people excellence and business excellence. The second research question explored the benefits and problem of Lean implementation. The third question discussed how employees responded to the implementation of other manufacturing systems, such as a JIT production system. The researcher evaluated the various authors' perspectives related to the LE method. The conclusion is that this method can potentially assist companies to eliminate unnecessary waste, reduce inventory, shorten lead times, reduce cost, raise product quality, improve productivity, improve employees' work skills, and enhance a company's competitive advantage. On the whole, if LE is implemented effectively, it can improve a company's performance.

CHAPTER THREE: WESTERN CAPE PROVINCE, THE CONTEXT WITHIN WHICH GKN OPERATES

3. 1 Introduction

This chapter attempts to explore the industrial situation within the Western Cape Province (WP). This is the context within which the GKN Company operates because it is located in the northern suburbs of Cape Town. This chapter starts by giving an overview of the economic growth in South Africa since 1994, followed by Human Resource Development, employment, work skills and policies. The next section briefly introduces the situations of the automotive components industry within the WP. Finally, there was a comparative discussion between the metals and textiles industries and the automotive components industry.

3. 2 Overview of Economic Growth in WP since 1994

According to De Vries (2002: 4), South Africa, with a combination of third world and first world characteristics, provides a variety of economic and entrepreneurial experiences for the people of the country. De Vries notes that the economy transformed rapidly between 1998 and 2000. For instance, during this period the growth in total gross domestic product (GDP) started to show a recovery, and the economic growth rate increased to 4.5%.

In the modern, highly competitive world of today, important sources of wealth and

economic development are knowledge, learning and innovation (Committee of Technikon Principals 2003). If people are not involved, all of these sources cannot be used independently. Likewise, if individuals want to be successful in their work, they will have to develop adequate skills to fit in. For this reason, they also need to expand the range of available resources, in order to motivate people to become more skilled.

For the WP to formulate and implement successful, well-targeted policies on economic development it needs to identify the projects that contribute to economic development, the skills involved, labour market development and job creation, employment factors and poverty reduction (Wyngaard, 2006). The WP has out-performed the national economy over the period 1999 to 2003. Real GDPR growth for the WP economy averaged 3.9 percent over the period, compared to the national average of 3.1 percent (Western Cape Provincial Economic Review & Outlook, 2005: 6).

3. 3 Human Resource Development

According to the *Department of Economic Affairs, Agriculture and Tourism* (2001), compared to South Africa's other provinces, the WP might be tempted to feel satisfied with its levels of human development. It has the highest score of any province in terms of the UN's human development index (which ranks countries according to life expectancy, education and basic purchasing power), with 0.83 compared to South Africa's average rating of 0.67. As Table 2 demonstrates, it also compares favorably to most of the country's other provinces in terms of indicators such as poverty, unemployment, and adult literacy. In terms of infant mortality rates it is far ahead of the other provinces.

Table 2: Provincial Development Indicators

	% OF SA POPULATION	% IN POVERTY	ADULT LITERACY (%)	UNEMPLOYED (%)	INFANT MORTALITY (Per 1000)
Eastern Cape	15.6	62	61	41.4	57
Free State	6.6	45	62	26.1	45
Gauteng	19.0	21	83	20.9	33
KwaZulu-Natal	20.4	49	60	33.1	-
Mpumalanga	6.9	43	57	33.4	40
North-West	7.9	41	57	32.8	41
Northern Cape	1.9	46	67	27.2	30
Northern Province	10.8	68	55	41.0	55
Western Cape	10.9	18	76	18.7	25
RSA	**100.0**	**43**	**65**	**30.6**	**42**

Source: WESGRO (1998), based on 1995-96 information from the DBSA, HSRC and CSS

Although the province is relatively wealthy compared to other parts of the country, its riches are distributed very unevenly between the different population groups. According to the *Analysis of Poverty in the WP as Enumerated in the 1996 Census*, carried out by the Provincial Department of Health and Social Services (November 1999), less than 50% of black households have an annual income in excess of R12000, while more than 50% of white households have an annual income in excess of R54000. More than 85% of black households earn less than the poorest 25% of white households. Using a household income of R1500 per month as a poverty line, the Provincial Department of Health and Social Services calculates that 41.8% of households in the province are living below the poverty line, a figure much higher than that cited in Table 3. It shows figures for African, Coloured, Indian /Asian and White households of 73.4%, 44.8%, 24.5% and 15.5% respectively. Other indicators of inequalities and imbalances between the various population groups at the individual and household level are also indicated in Table 3.

Table 3: Selected Human Development Indicators by Population Group

INDICATOR	W CAPE AVERAGE	AFRICANS	COLOUREDS	INDIANS	WHITES
Household income less than R1500 per month	41.8%	73.4%	44.8%	24.5%	15.5%
Unemployment	18.7%	31.0%	18.0%	-	7.0%
Medical services within 15 minutes	59.1%	37.6%	51.3%	44.4%	82.2%
Formal dwelling on separate site	70.3%	35.1%	72.6%	66.7%	87.9%
Flush toilet in dwelling	70.8%	29.6%	68.2%	94.5%	97.6%
Electricity in dwelling	79.9%	53.9%	78.9%	91.8%	96.8%
Running tap water in dwelling	76.6%	36.9%	76.7%	100.0%	98.9%

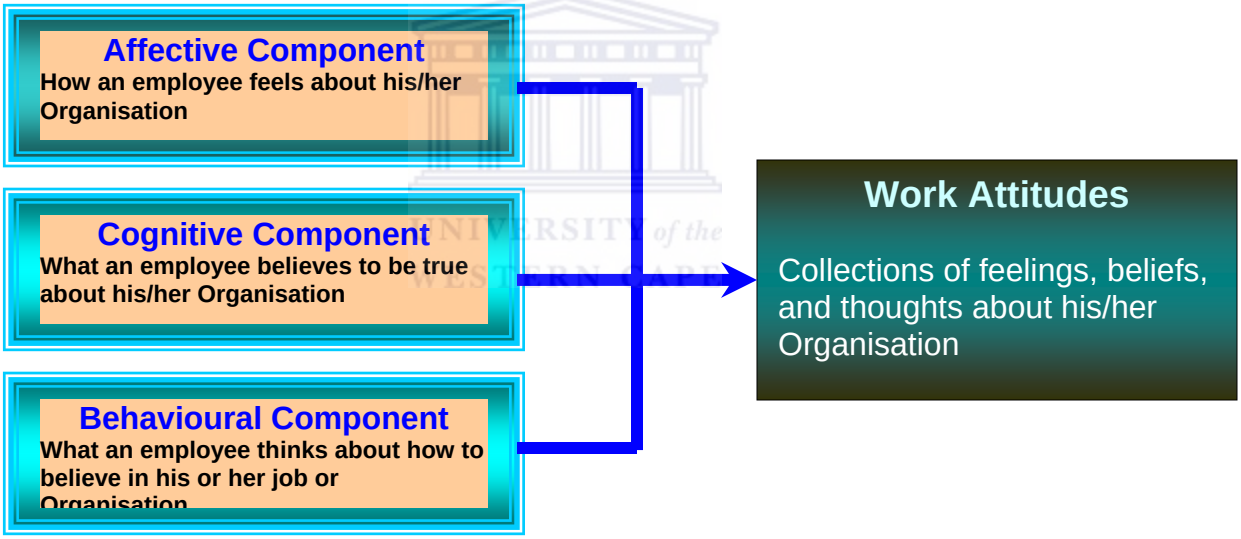
Source: Genesis Analytics, *An Economic Vision for the Western Cape* (1999); Western Cape. Department of Health and Social Services, *Poverty in the Western Cape* (1999).

The rate of female unemployment (21.5%) is also significantly higher than the rate for men (14.3%). Because of the "colored preference policy" in the WP, the rate of unemployment amongst African women has historically been very high. Women, particularly black women, are also disproportionately represented in low-paid employment (for example as domestic workers, farm workers or in low-paid jobs in the textile industry). Levels of illiteracy are also significantly higher amongst women than men. Regarding the educational level of the WP population one notices that the Coloureds, although the largest group within the province, lag behind the Whites. This is also the case at GKN. The few Whites there have far better academic qualifications than the Coloureds and the Blacks.

3. 4 Attitudes

Oppenheim (1992: 174) defines an attitude as "a mental state of readiness, organised through experience, exerting an influence upon an individual's response to an object and the situations with which it is related." George and Jones (2005: 74) assert that attitudes are collections of feelings, benefits, and thoughts about how to behave that people currently hold about their jobs and organisations. According to Figure 2, attitudes are reinforced by beliefs (the cognitive component) and often attractive feelings (affective component) that may lead to particular behavioural intents (behavioural component).

Figure 2: Work Attitudes



Source: George and Jones (2005: 76). Components of Work Attitudes.

Porter and Steers have advocated the need to consider both individual and organisational factors in making predictions about employee attitudes and related behaviour. Furthermore, according to Tosi *et al* (1994), it would make sense to understand people in terms of their attitudes, because strong attitudes are very likely to affect behaviour.

3. 5 Employment

Wyngaard (2006) reported that employment growth in the WP between 2000 and 2003 has been relatively rapid but has not been high enough to absorb all new labour market entrants. Employment growth has been most rapid amongst Africans, females and older age-groups (36 to 55 years), although Coloureds, males and older individuals filled most jobs (Wyngaard, 2006). In addition, Wyngaard (2006) claims that the Province is experiencing a clear trend towards a more educated workforce: two-thirds of net employment expansion is occurring amongst holders of matric certificates, and the share and levels of employment of individuals with no education, or incomplete or complete primary education are declining.

In spite of this trend, an analysis of the employment situation in South Africa by De Vries (2002: 4) claims that unemployment remains one of South Africa's key problems. De Vries further points out that the government is focusing on the formal sector and entrepreneurship development to create more jobs. Finally, she concludes that people are therefore significant role players in these developments.

According to the *Department of Economic Affairs, Agriculture and Tourism* (2001), the employment situation as indicated in Table 4 shows that the labour force of the province is 1.77 million, of which 66.4% are formally employed, 14.9% are active in the informal sector, and 18.7% are unemployed. Although the average unemployment rate in the WP is significantly lower than the national average (30.6%), it is still very high and conceals important imbalances in terms of race and gender. Whilst only 7% of Whites are

unemployed, the percentage figures for Coloureds and Africans are 18% and 31% respectively (Genesis Analytics, 1999). The rate of female unemployment (21.5%) is also significantly higher than the rate for men (14.3%). To address the problems of unemployment and meet the expectations of the new annual entrants to the labour market, WESGRO has set a minimum annual job creation target of 54,000 (WESGRO, 2000). This would require growth of about 3% per annum in employment.

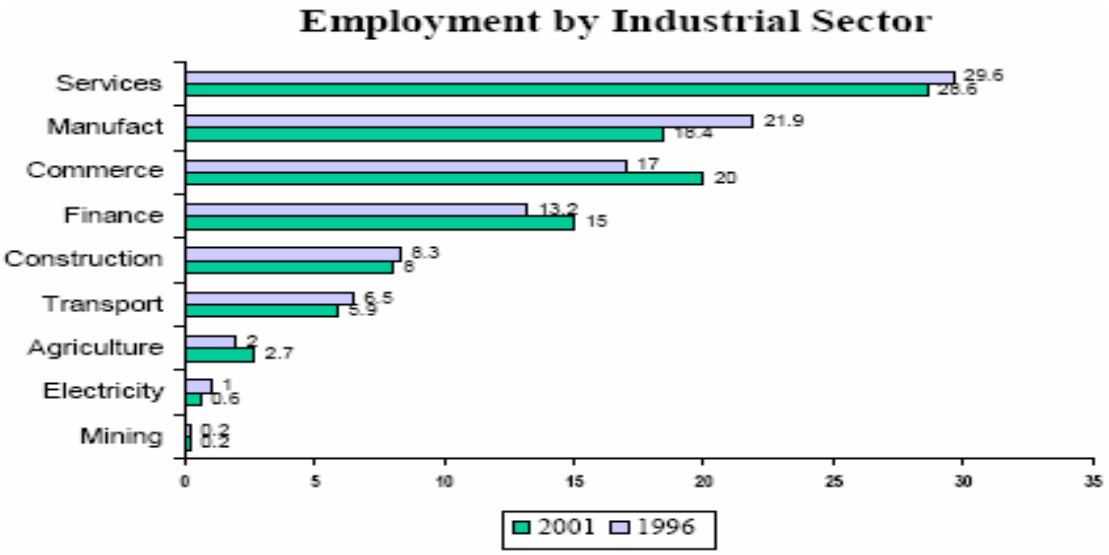
Table 4: Estimates of Labour and Employment in the WP, 1999

	Number	%
Economically active age groups (15-64 years)	2 967 000	
Labour Force	1 768 000	100.0
Formally Employed	1 172 200	66.4
Active in the informal sector	263 400	14.9
Unemployed	332 400	18.7

Source: WESGRO, *Business Prospects 2001* (2000)

Manufacturing as an employment sector showed the strongest drop, with the proportion of workers employed in this sector dropping from 21.9% to 18.4 % between 1996 and 2001 (see Figure 3).

Figure 3: Employment by Industry Sector



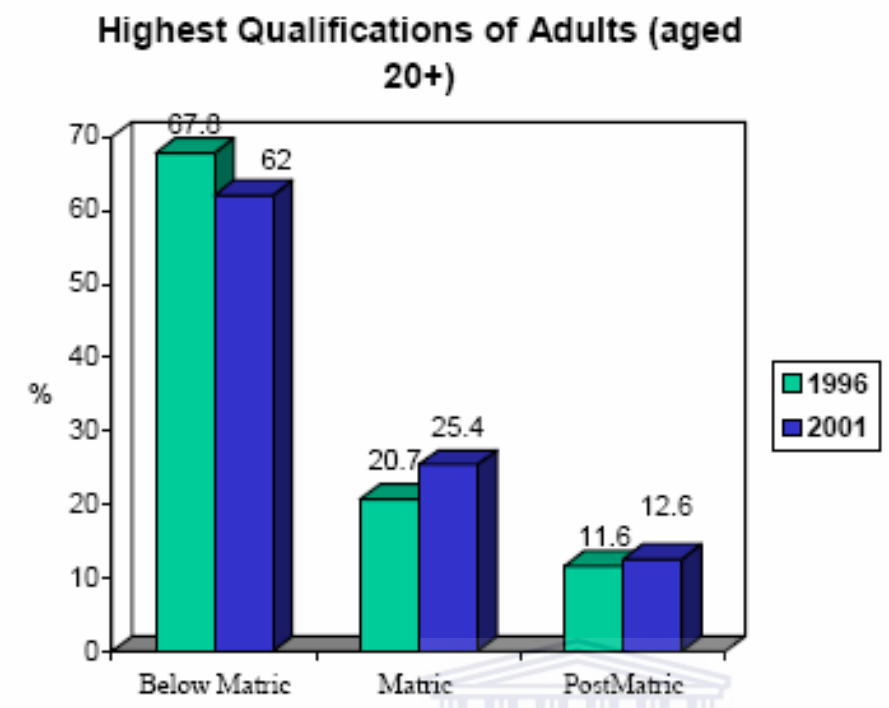
Source: Smith (2005). The Status of Cape Town. www.isandla.org.za.

3. 6 Skills Development

Owing to today's increasing development of new equipment and technology, such as the IT boom, labour productivity is growing slowly, and skills are becoming more important than ever. It is thus vital that employees learn new skills to meet these developments.

GKN is located in Bellville, a suburb in Cape Town, South Africa. Most of the employees are locals. According to Smith (2005: 24), the skills levels in Cape Town improved between 1996 and 2001, but they remain very low. Figure 4 indicates that the proportion of adults (aged 20+) with a highest educational level below Matric dropped from 67.8% in 1996 to 62% in 2001. The proportion with a Matric qualification increased from 20.7% to 25.4 %, whereas there was only a slight increase in the proportion of adults (aged 20+) having a post-matric diploma or degree.

Figure 4: Highest Educational Qualification of Adults, 1996 and 2001



Source: Smith (2005). The Status of Cape Town. (www.isandla.org.za).

The skills can also be influenced by national law. There is a national law that governs skills – the Skills Development Act 97 of 1998 (SDA). And according to Swanepoel *et al* (2000: 480-481), the purpose of the Act is:

- to develop the skills of the South African workforce;
- to increase the levels of investment in education and training in the labour market and to improve the return on investment;
- to use the workplace as an active learning environment;
- to provide employees with the opportunities to acquire new skills; to provide opportunities for new entrants to the labour market to gain work experience;
- to employ persons who find it difficult to become employed;

- to encourage workers to participate in leadership and other training programmes;
- to improve the employment prospects of persons previously disadvantaged through training and education;
- to ensure the quality of education and training in and for the workplace;
- to assist work-seekers to find work, retrenched workers to re-enter the labour market and employers to find qualified employees; and
- to provide and regulate employment services.

3. 7 Labour Policy

The South African Minister of Labour has stated that "...we live in a rapidly changing world and in order to ensure that our labour market policies continue to address the real issues facing the people, it is essential that our understanding of the labour market is accurate." (Department of Labour: Labour Market Review, 2004).

According to the *Annual Report of the Department of Labour (1 April 2004 to 31 March 2005),* labour policy and labour market programmes are responsible for creating an equitable and sound labour relations environment, including international labour relations, through research, analysis and evaluation of labour policy and through providing statistics on the labour market:

- Labour Relations promotes the establishment of an equitable and peaceful labour relations environment, including support for the Commission for Conciliation, Mediation and Arbitration.

- Labour Policy encompasses research, analysis, evaluation and development of labour policy, providing statistical information on the labour market. The main aim is to support policy formulation and the drafting of legislation both in the Department and in Government in general.
- International Labour Matters represents Government at the International Labour Organisation, the African Union and the African Regional Labour Administration Centre.
- NEDLAC promotes economic growth, participation in economic decision-making, and social equity by seeking consensus and making agreements on social and economic policy and all proposed labour legislation between community organisations, labour, business and Government.
- Sheltered Employment is responsible for the administrative, production and financial control of the work centres for people with disabilities, subsidising operating losses and capital expenditure of work centres for people with disabilities, and subsidising workshops for the blind in accordance with approved standards.

In the WP, job creation is the biggest challenge facing government and is a key instrument for poverty alleviation. The Department of Labour formulates labour market policies that provide an enabling environment for job-creation. By setting and enforcing norms and standards, the Department seeks to ensure that existing and new jobs do not jeopardise workers' health and safety.

3. 8 Automotive Components Industry

The automotive components industry plays a significant part of South Africa's manufacturing industry. According to WESGRO (2000), the WP automotive components industry has enjoyed substantial foreign investment in recent years and is developing rapidly, having achieved strong international competitive advantages within export niche markets. From 1994 to 1998, exports of automotive components more than tripled, reaching a value of R7.9 billion in 1998. In addition, with its traditions in skilled metal work and precision engineering activities, an efficient infrastructure, an investor friendly climate and attractive living conditions, the region offers a competitive base for the manufacture of niche products targeting the high volume export market (WESGRO 2000).

WP companies have contributed strongly to this development, not least as a result of the region's high value-added production, e.g. components for catalytic converters (WESGRO, 2000). The WP has a competitive advantage as a location for component producers manufacturing for the high-volume niche export market, which is a strong growth sector (WESGRO, 2000).

As far as the researcher knows, GKN is one of the subsidiaries of a UK-based automotive components manufacturer that plays a vital role in the industry all over the world. The company makes intricate and complex parts through a process of powder metallurgy, such as gears, bearings, and pulleys, primarily for use in engines, transmissions, power tool, and aerospace appliance industries.

3. 9 Other Industries

Apart from the automotive components industry there are also others within the WP, such as the metals and engineering, textile, wine and beer industries, etc. The following study will examine briefly the metals and engineering, and textile industries.

3. 9. 1 Metals and Engineering

The basic metals industry in the WP is dominated by primary steel production, of both long and flat steel products (Department of Economic Development and Tourism—Metals and Engineering, 2005: 2). In the WP, the growth of the metals industry has been improving rapidly during the last decade. Sintered metals manufacturing companies, such as GKN and Powdermet, with their high technology and advanced processes, are especially talented, differentiating themselves from the rest of the metals industry.

The tooling industry and foundries in the WP have a long history of successful small to medium-sized enterprises, which are well-adapted to demanding niches and top-quality output. The yacht-building industry is viewed as a great success as well (Wyngaard, 2006).

Considering the above-mentioned situation, the researcher believes that high technology and advanced production processes require skilled employees. In spite of the current circumstances, the number of professional and highly skilled employees, is growing at the middle and lower end of the skills level spectrum. According to Wyngaard (2006), the tertiary sector has been the main driver of employment expansion in the province,

accounting for more than two-thirds of the provincial total increase, with internal trade and community, social and personal services the key factors. At the same time, employment in the Province has become more formal as the informal sector shed jobs and the formal sector employment grew rapidly. WESGRO (2000) noted that there were approximately 1.7million people in the labour force in 1999, of which 81.7% were employed, and 18.3% unemployed.

3. 9. 2 The Textile Industry

In South Africa, both the liberalisation of trade as well as the labour market (complex and inflexible labour legislation together with high labour costs) have caused the textile and clothing firms great difficulties. This situation has affected the textile industry enormously in various ways, both positive and negative. Many firms in the WP have been unable to respond adequately to trade liberalisation and increased competition. Twenty-four textiles companies have closed since July 2002 and several others have been threatened with liquidation. Closures have been particularly widespread in the spinning and fabric knitting sectors (they produce fairly standardised products and thus have many competitors) and in the clothing sector, where Chinese imports have proven to be formidable competition. An example is the Rex Trueform plant in Salt River, Cape Town, the symbol of the WP textile industry, which mainly tailored suits, jackets and trousers. Rex Trueform has warned that it may have to close its Salt River plant, as the industry continues to be hit by the strong rand and cheap Chinese imports.

However, compared to the other provinces, the WP clothing and textiles sector is

impressive and has a solid foundation. The WP makes the third-highest contribution to the country's GDP. With over 170 000 people employed in the clothing and textile industry, this sector is the single most significant industrial source of employment in the WP.

According to Wyngaard (2006), the textile sector is traditionally far more capital intensive and automated in relation to the clothing industry. The textile sector consiss of spinning, weaving and/or knitting and finishing, and often these functions are undertaken in integrated plants. In other provinces, the lead times in the textile industry are generally quite long and the capital-intensive nature results in large minimum quantities and less flexibility.

3. 10 Summary

This chapter has provided an overview of the context in the WP within which GKN operates, in terms of the economy, range of industries, human resource development, employment, and other factors. This will enable and assist the researcher to seek an appropriate research method to direct and guide the research process.

In particular, this chapter highlighted the status of the automotive industry, which GKN is part of. Links were made to human resource development, work attitudes, employment data, skills development, labour policy, and the circumstances of other industries within the WP, as the researcher believes that employees' perceptions can be affected by these factors.

Chapter 3 has also shown the evolution of the automotive components industry and discussed some of the critical issues that are influencing the textile, metals and engineering industries. It has been perceived that the human factor can play a significant role in an organization.

CHAPTER FOUR: RESEARCH METHOD

4. 1 Introduction

This chapter describes the research design and method that were explored. As already stated, the objective of this case study research project was to discover employees' responses to the implementation of LE at GKN. Specifically, the quantitative method associated with a survey instrument was utilised. The survey instrument was conducted as a self-administered questionnaire, with the procedure followed to collect the data as well as the final data analysis being introduced.

4. 2 Case Study

This case study utilized a quantitative research approach. Yin (2003: 13) defined that a case study is an empirical phenomenon within its real-life context, especially when the boundaries between phenomenon and context are clearly evident. Creswell (1994) and Jennings (2001) assert that the quantitative research approach is grounded in the positivist social sciences paradigm, which primarily reflects the scientific method of the natural sciences. Numerous authors have found both advantages and disadvantages in doing a case study. Some of the advantages of doing a case study research are:

- The contemporary phenomenon can be studied in its real-life context (Yin, 2003:13).
- Meaningful questions of why and how can be asked. Through case study research, theories can be modified and explanations of the empirical findings can go beyond

the stipulated theory (McCutcheon and Meredith, 1993).

- The method is well suited for exploratory research where the variables are unknown and the phenomena not well understood yet (Meredith, 1998).

Despite the above advantages, there are also some disadvantages, principally the following:

- Cost and time requirements
- The need for multiple methods and tools
- Lack of controls
- Complication of context and temporal dynamics (Meredith, 1998)

4. 3 Research Site and Sampling

The research site was GKN Sinter Metals Cape Town. This company is located a few kilometres from the UWC campus and therefore easily accessible to the researcher. As the researcher obtained permission to do research in GKN Sinter Metals from their top management, he was able to collect the required information. Access to the company was gained primarily through personal contact, and the data collection was done by the end of January 2006.

The researcher administered the final questionnaire during the period 16 January 2006 to 31 January 2006. When he arrived at GKN he found only 82 employees. The total was lower than the 2005 figure of 115 employees. When he queried the reduced number, the

manufacturing manager, Mr. Edu Aggenbach, informed him that the company had reduced the number of shop-floor employees. The rationale was that at the beginning of the year the company does not have large order demands from customers. As orders increase during the year GKN usually hires more employees. Therefore, the researcher chose all 82 employees at GKN as the sample for this research.

4. 4 Measuring Instrument

There were 82 employees in GKN at the beginning of the 2006. All of them received the same questionnaire during January 2006. The questionnaire consisted of two major parts: a personal profile of the respondent and questions relating to their decision-making mechanisms (based on a Likert scales). Regarding the personal profile, the respondents completed information about their gender, age, years of work at GKN, educational qualification and job title. The decision-making part consisted of several questions to which the respondent had to reply with a numerical figure ranking from 1 to 5. The scores signified the following: 1—agree strongly, 2—agree, 3—do not know, 4—do not agree, and 5—strongly disagree. These numerical figures were in separate boxes, and respondents indicated their choice by an "X" in the selected box. There was a space for comments below these boxes.

Survey questionnaires were given to all 82 employees at GKN, including shop-floor workers, staff and senior managers. Each person receiving the same survey. Research instruments such as observations and the self-administered questionnaire were used in this research study to collect the data from the top manager, 4 senior managers, 12 office

staff, and 65 shop-floor workers in four workshops at GKN during January 2006. These four main workshops are: the Sintering Furnaces workshop, the Compacting Presses workshop, Tool Room and the Packaging workshop.

The researcher followed the Likert scale style in designing the questionnaire. The research variables were measured on a 5-points Likert style scale, with a score of 1 representing “strongly agree” and a score of 5 representing “strongly disagree”. In such scales no judges are used to rank the scale statements: it is assumed that all subjects will perceive “strongly agree” as expressing greater favour towards the attitude statements than “moderately agree” and “strongly disagree” (Likert, 1967; Lankford 1994). The method was listed as follows:

- The fact that the method is based entirely on empirical data regarding subjects’ responses rather than the subjective opinions of judges;
- The fact that this method produces more homogeneous scales and increases the probability of a unitary attitude being measured; as a result, validity (construct and concurrent) and reliability are reasonably high; and
- Greater ease of preparation.

The Likert scale instrument was therefore developed, for the purposes of this study, to assess the employees’ responses to and reflections on the implementation of LE at GKN. The questionnaire contained questions that identified what employees thought about LE, and it used the item-total correlation-formulation to calculate each index, for example

mean, range, and standard deviation.

4. 5 Data Analysis

The researcher gathered data three weeks after the distribution of the questionnaire. Once the information had been collected, the researcher was faced with the decision of how to analyse the data. Mouton (2001) advised that to satisfy the information needs of any study or research project, an appropriate methodology has to be selected and suitable tools for data (and data analysis) have to be chosen.

The quantitative data collected was initially coded into numerical representations, such as gender, age, years of work, job titles, qualifications, and racial classification. For analysis purposes, the respondents were asked to rank their responses to the questions according to the Likert scale format. These responses were then turned into a series of numbers for capture using the Statistical Package for Social Sciences (SPSS), version 13.0. The data analysis through SPSS generated the results of descriptive statistics such as frequency, mean, standard deviation, etc. These distributions showed the frequencies of employees' responses and percentages for each of the items in the questionnaire with regard to the LE implementation at GKN. In addition, Kruskal-Wallis Tests and Chi-Square were used to test for significant differences (Alpha level = 0.05).

The full results of the study are reported in the next chapter.

4. 6 Ethics Appraisal

Participants were informed of the purpose of the study and were given the option to refuse to answer any questions if they felt uncomfortable. They were given an opportunity to ask the researcher any questions to clarify any vague or unclear issues. The questionnaire and analysis were kept confidential, and anonymity of participants was maintained throughout the presentation of the research. The respondents' information has only been used for research purposes.

CHAPTER FIVE: CASE DESCRIPTION—LE AT GKN

5. 1 Introduction

This chapter started with an introduction of the GKN Company. It examines the history of GKN and explores various developments within GKN. It also analyses the factors leading to the adoption of LE by GKN. Furthermore, the researcher introduces the LE method in detail. A series of research activities at GKN is then discussed. This is concluded with a report on the results of this research project.

5. 2 GKN Sinter Metals Cape Town (GKN)

5. 2. 1 Original GKN Sinter Metals

The original GKN background has been taken from the website http://www.gknplc.com (2005) and summarised as follows:

GKN plc, was incorporated as Guest, Keen and Co Limited on the 9th of July 1900 as a part of the merger of the Dowlais Iron Company with Arthur Keen's Patent Nut and Bolt Company, a business which had been set up in 1856 in Smethwick, England. In 1902 the company acquired Nettlefolds Limited, one of the world's leading manufacturers of screws and fasteners, a business that had also been set up at Smethwick in 1854. After the acquisition of Nettlefolds, the company changed its name to Guest, Keen and Nettlefolds Limited. At that time Guest, Keen and Nettlefolds was one of the largest manufacturing businesses in the world, involved in various processes from coal and ore

extraction to iron and steel making, and, finally, to finished products including the nuts, bolts, screws and fasteners for which it was then renowned. In the early 1980s, GKN decided that the time was right to exit steel. GKN also shed its businesses and exited from the nuts and bolts and screws and fasteners companies that had once made it famous.

5. 2. 2 Various developments within GKN

The background of the company on various developments within GKN Sinter Metals Cape Town (GKN) was also cited in the website http://www.gknplc.com (2005) along the following lines:

The story of GKN Sinter Metals started in 1963 when the Simasco (a private engineering company) was incorporated in Parow, South Africa. In 1977, Dorbyl purchased the company. The name was changed to Sintered Metal Components (Pty) Ltd and 26% of the shares went to Sintermetallwerke Krebsöge in a technical assistance agreement. In 1988, GKN (Pty) acquired all the shares of Sintermetallwerke Krebsöge. Times were difficult at the beginning of 1998. The company, known as Sinter Metal Components (SMC) prior to being acquired by GKN Sinter Metals, was experiencing a period of low orders and short workweeks. Employees were well aware that the company was struggling to survive. In fact, a sister plant nearby had already closed its doors. In 1999, GKN Sinter Metals purchased the remaining 74% shareholding from Dorbyl (http://www.gknplc.com, 2005). Currently it is a 100%-owned subsidiary of GKN Sinter Metals and is situated in Cape Town. Therefore it is called GKN Sinter Metals Cape

Town. Shocks, Sprockets, Bearings and armaments are the main manufactured products of the company.

Despite the various developments within GKN Sinter Metals Cape Town, GKN also faced threats from its competitors. GKN's main competitor in South Africa is called Powdermet, which is located in Atlantis, Cape Town. The external competitors are from other countries such as Italy, Spain, United States, and Germany.

5. 2. 3 Factors leading to the adoption of LE by GKN

Over the last ten years, the economic environment for manufacturing enterprises in South Africa has changed drastically. Low costs and high quality are already taken for granted as essential to competitive success, and increasing attention is now being paid to the element of time. Faster product development and shorter lead times in procurement, production and distribution are the critical competitive factors of today (Stalk *et al*, 1990). For this reason, various economic systems are being employed to address this issue. More specifically, it is argued that the reorganisation of manufacturing according to lean principles can trigger a radical techno-organisational change towards a lean enterprise. This implies a new structure, strategy and culture with positive effects on profitability. This system is currently been used by GKN Sinter Metals in Cape Town.

The researcher had a conversation with the Manufacturing Manager, Mr. Edu Aggenbach, in September 2005. Mr. Aggenbach explained that since 1998 management had realised that drastic changes were needed in the manufacturing arena and had been

considering ways to improve productivity and profits. GKN's new general manager met with the company's managers of manufacturing, finance, engineering, sales and marketing.

After an analysis of the current situation, a strategy was established to address profitability. First, the top management investigated and analysed the factors influencing the company's profitability. Secondly, in order to intensify employees' work skills, GKN organised training for employees with regard to their knowledge of profitability. Thirdly, GKN received support from government for a training project, which was called the Arvin Total Quality Production System (ATQPS) Training Session. The government sent a consultant to train employees the skills needed to implement this system. Fourthly, GKN developed a Work Place Challenge System (WPCS) to enhance the company's sustainability and to help the company's growth. According to (Hilliard & Godlew, 2002: 7), "WPCS Steering Committee was established consisting of employee-elected representatives, management and a training consultant. The Committee identified the need for training in quality techniques, team building and workshop practice, and their recommendations were immediately implemented".

However, both WPCS and ATQPS have limitations for profitability improvement when one considers their original performance with regard to continuously enhancing profitability. GKN leadership has been developing a new system since 1999, called Lean Enterprise (LE).

5. 2. 4 Introduction of LE at GKN

The LE has been implemented at GKN since 1999. The LE model was developed in 2003 by GKN plc as a structured way to improve company performance (Godlew, 2005: 15). Sustaining and expanding lean benefits requires a supportive system, a framework to "focus" the lean principles to be followed. The support is required until LE has been internalised by the organisation and become self-sustaining (cited from [CD-ROM]: Lean Enterprise Model, 2005). Godlew (2005: 15) pointed out that the LE model at GKN focuses the company's vision, production excellence, business process excellence, people excellence, and business excellence (see figure 5).

Figure 5: Lean Enterprise Model

Source: GKN Sinter Metals. 2003. *Lean Enterprise*. http://www.gknsintermetals.com.

GKN's Vision

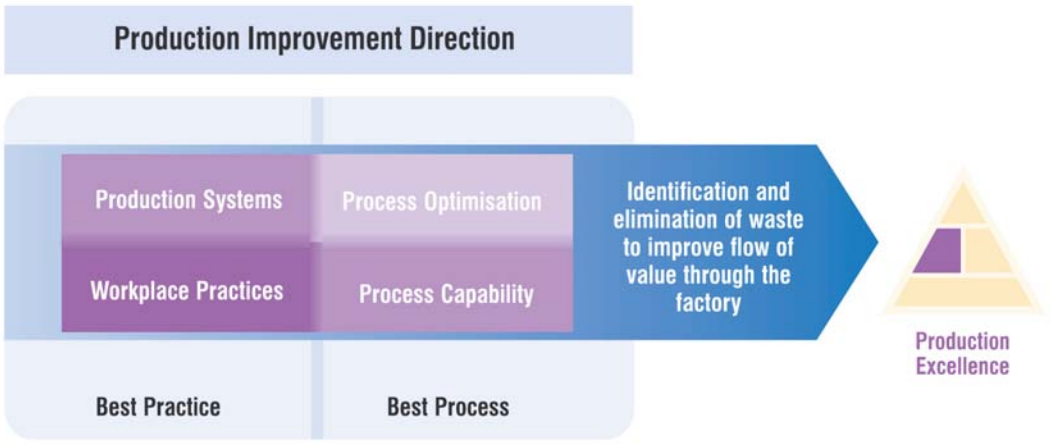
GKN's vision can be found on its website: www.gknplc.com (GKN Plc, 2005). The researcher cited it as follows:

- *All areas of excellence lead towards the GKN Driveline Vision –* ***to be number one and expect more***
- *Technology and engineering from GKN is at the heart of the vehicles and aircraft produced by the world's leading automotive and aerospace manufacturers.*
- *Everyone involved with a great company should expect nothing less. But those with a stake in the performance of GKN should expect more.*

Production Excellence

According to Godlew (2005: 15), the aim of production excellence is an approach to identifying waste, removing waste and sustaining improvements in the production processes and associated activities (see figure 6).

Figure 6: Production Improvement Direction



Source: GKN Sinter Metals, 2005. *Lean Enterprise Model*. [CD-ROM].

Business Excellence (BE)

Business Excellence is implemented as a repeating cycle of self-assessment, develop/research solutions, improvement plan, and implement of improvements. It also involves a performance and supporting review (Godlew, 2005: 15). Figure 7 indicates the process of BE implementation.

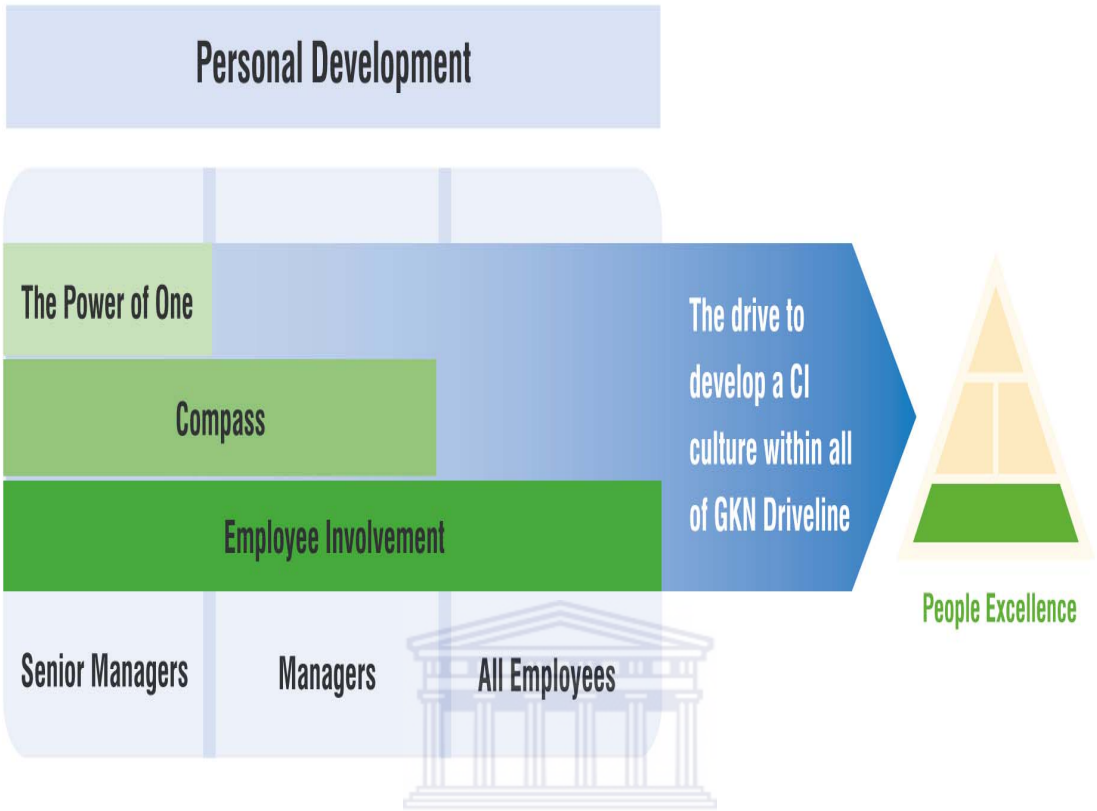
Figure 7: Business Excellence Implementation

Source: GKN Sinter Metals, 2005. *Lean Enterprise Model*. [CD-ROM].

People Excellence

According to Godlew (2005: 15), the aim of People Excellence is to create an enterprise culture where continuous improvement (CI) is inherent in 'the way that the things can be done' (see figure 8)

Figure 8: People Excellence



Source: GKN Sinter Metals, 2005. *Lean Enterprise Model*. [CD-ROM].

At GKN, training is a vital component of the Human Resource program (see photo 1) and an important part of People Excellence. It plays a significant role in the company. The management team (see photo 2) believes that employees must have detailed training in every aspect of their jobs and working environment in order to succeed—from the organisational structure of the company to the operation of the sintering furnaces. The belief is that employee success leads to the company's success.

Photo 1: Training

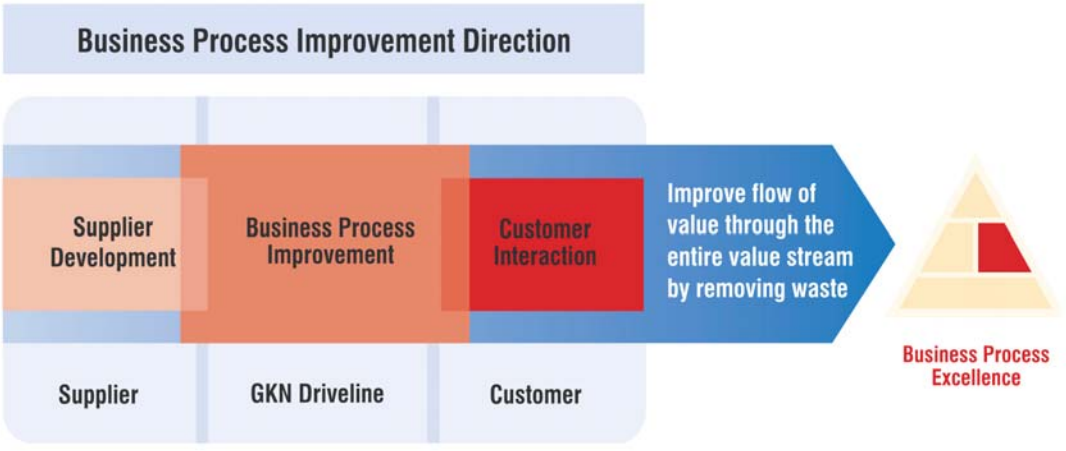
Photo 2: Teamwork

Source: GKN Sinter Metals, 2005. *Lean Enterprise Model*. [CD-ROM].

Business Process Excellence

The aim of Business Process Excellence is to identify and remove waste, and sustain improvement throughout the entire value chain, as shown in the following diagram (Godlew, 2005: 15) (see figure 9).

Figure 9: Business Process Excellence



Source: GKN Sinter Metals, 2005. *Lean Enterprise Model*. [CD-ROM].

5. 3 Research Activities at GKN

5. 3. 1 Various visits to GKN

The researcher visited GKN for the first time on 7 May 2004. The purpose of the visit was to do group work for the module MAN747 (Management Information System & Technology) and observe the Lean Enterprise in action. A further visit followed on 18 July 2005. He specifically observed the operations of the shop floor.

The layout of the shop floor was impressive. It was organised as a "U" shape. There were more than 40 main machines and they were in different colours. Some of them were blue, others orange or grey (see photos 3 and 4). The employees at these machines were dressed according to the colour of the machine that they were operating. On the researcher's question regarding the layout, a foreman responded: "It is designed to be followed by the requirements of the Lean implementation principles."

Photo 3: Blue Cell

Photo 4: Orange Cell

Source: GKN Sinter Metals, 2005. *Lean Enterprise Model*. [CD-ROM].

On 8 September 2005, the researcher went to GKN's shop-floor to do more observation about the LE. He had a conversation with one of the operators during his break and learnt that the LE has been greatly facilitating GKN to achieve significant performance during the past few years. The achievements included reducing inventory, enhancing product quality, eliminating waste, shortening lead times, and improving work efficiency.

On 19 September 2005, the researcher visited GKN again, to capture some information about the implementation of LE on the shop-floor. He observed the following as he entered the shop-floor. He noticed the Kanban cards, daily procedure sheets, monthly production results, monthly and annual production objectives. He also saw that achievement certificates were displayed on the work procedure board.

For the purpose of preparing the questionnaire, the researcher again visited GKN's shop floor on 18 October 2005. He learnt that most of the employees are Afrikaans speaking and many of them had an educational level below Grade Nine. He therefore decided to make the wording of the questionnaire as simple as possible to make it easier for the shop-floor employees.

5. 3. 2 Meetings with management

The researcher met with the financial director, Mr. Ernest Michelle, for the first time on 7 May 2004 during his first visit to GKN. Mr. Michelle at this time briefly introduced the researcher to GKN's advanced information technology. This assisted the researcher to design his class assignment for the course MAN747 (Management Information System &

Technology).

During the researcher's visit on 8 September 2005, he met Mr. Edu Aggenbach (the manufacturing manager). Mr. Aggenbach explained the situation of GKN in detail. It included the history of GKN, the entire structure of the company, the main products, and the LE working procedure. Finally, to make it easier for the researcher's study, Mr. Aggenbach presented a CD (that came from the GKN headquarters: London) of LE to the researcher.

5. 3. 3 Preparation for the Questionnaire

On 18 October 2005, the researcher visited Mr. Aggenbach to begin his preparation of the questionnaire. They discussed the questions concerning LE. The information gained from this conversation assisted with the designing of the questionnaire.

On 28 November 2005, the researcher took the pilot questionnaire (see Appendix 1) to GKN. He was assisted by an office staff member to distribute and explain the questionnaire to the two senior managers, three staff members and five other employees. The samples were selected randomly. The researcher collected the questionnaires immediately after they were completed by the respondents. The results of the pilot questionnaire were as follows:

Question 1. Overall, LE has been good for the company.

7 respondents agreed, 1 participant strongly agreed, 1 participant did not know, and 1 participant disagreed.

Question 2. GKN's development of LE greatly motivated you to suggest improvements in work methods.

2 respondents agreed, 1 participant strongly agreed, 3 respondents did not know, and 4 respondents disagreed.

Question 3. Employees' involvement in LE brings costs down.

5 respondents agreed, 2 respondents strongly agreed, and 3 respondents did not know.

Question 4. Product quality has improved because LE was implemented in GKN.

5 respondents agreed, 2 respondents strongly agreed, and 3 respondents did not know.

Question 5. LE reduces lead times in GKN.

6 respondents agreed, 1 participant strongly agreed, 1 participant did not know, and 1 participant disagreed.

Question 6. LE guides you to achieve high performance in all your work.

6 respondents agreed, 1 participant strongly agreed, 2 respondents did not know, and 1 participant disagreed.

Question 7. GKN's senior management is serious about LE.

1 participant agreed, 4 respondents strongly agreed, 3 respondents did not know, 1 participant disagreed, and 1 participant strongly disagreed.

Question 8. All GKN’s employees have been helped to understand the LE over the past six years.

6 respondents agreed, 3 respondents strongly agreed, and 1 participant did not know.

Question 9. Employees' work has become easier due to LE.

4 respondents agreed, 2 respondents strongly agreed, 3 respondents did not know, and 1 participant disagreed.

Question 10. LE has improved safety in GKN.

5 participants agreed, 2 participants strongly agreed, 2 participants did not know, and 1 participant disagreed.

Question 11. LE has improved your work efficiency at GKN.

4 respondents agreed, 2 respondents strongly agreed, and 4 respondents did not know.

Question 12. The LE is an improvement over the previous work.

5 respondents agreed, 2 respondents strongly agreed, 2 respondents did not know, and 1 participant disagreed.

Question 13. LE has created more stress for the employees in the working process at GKN.

4 respondents agreed, 3 respondents did not know, and 3 respondents disagreed.

Question 14. LE facilitates you to enhance your work ability.

6 respondents agreed, 1 participant strongly agreed, 2 respondents did not know, and 1 participant disagreed.

Question 15. LE is helping GKN to be more competitive.

6 respondents agreed, 1 participant strongly agreed, and 3 respondents did not know.

5. 3. 4 The Questionnaire

The researcher found there were some problems with vagueness in the pilot questionnaire. He made the changes as follows:

1. He subsequently requested all employees to complete the comments section because it would form part of the qualitative analysis. In the pilot questionnaire the researcher requested only permanent staff members and managers to complete the comments column. His rationale was that these persons had a better educational background compared to floor workers.

2. The researcher also divided the final questionnaire into two parts, Part one was the general responses regarding the implementation of LE; and Part Two contained the personal responses regarding LE. See the Appendices for the final questionnaire.

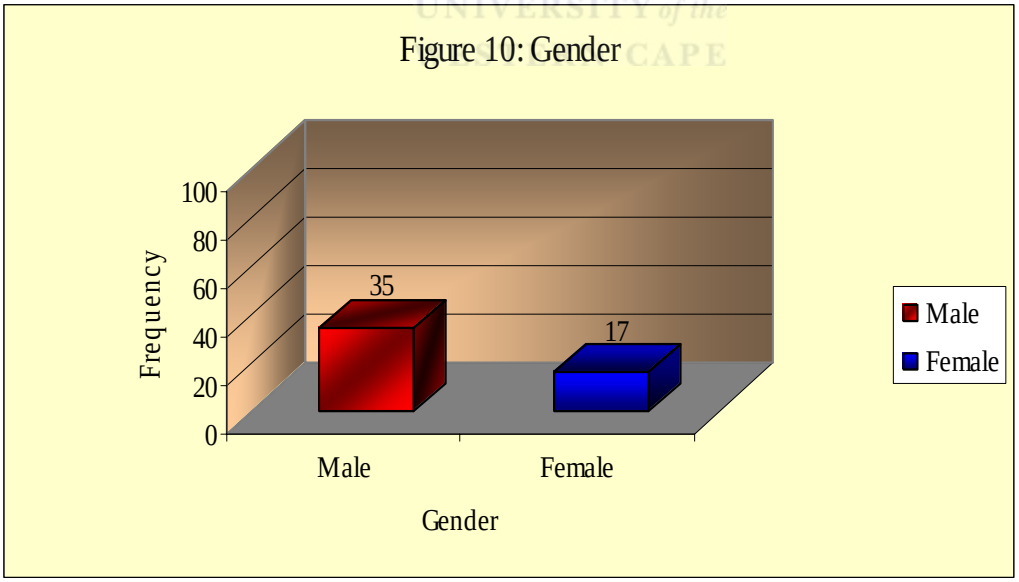
5. 4 Results

From the beginning of this study in 2005, the researcher started making notes regarding his observations on the shop-floor. He also recorded the conversations with various employees during the visits to GKN. The researcher handed out 82 questionnaires and received back 54 completed questionnaires (66% response rate). It took almost three weeks to collect the questionnaires. The final number of respondents was 54. Two of these were unusable because they were totally spoilt. Thus only 52 questionnaires were analysed in this research. The response results are given below:

5. 4. 1 Descriptive statistics for sample

The biographical characteristics of the respondents are presented in graphical format below.

Figure 10: Gender



Results depicted in Figure 10 indicate that 67% (n = 35) of the sample was male, while only 33% (n = 17) was female.

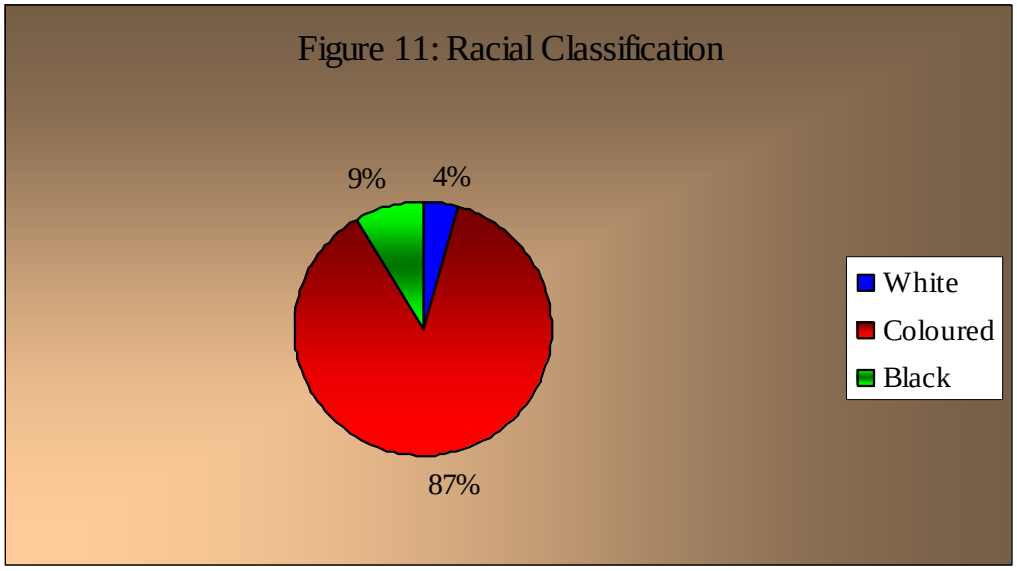
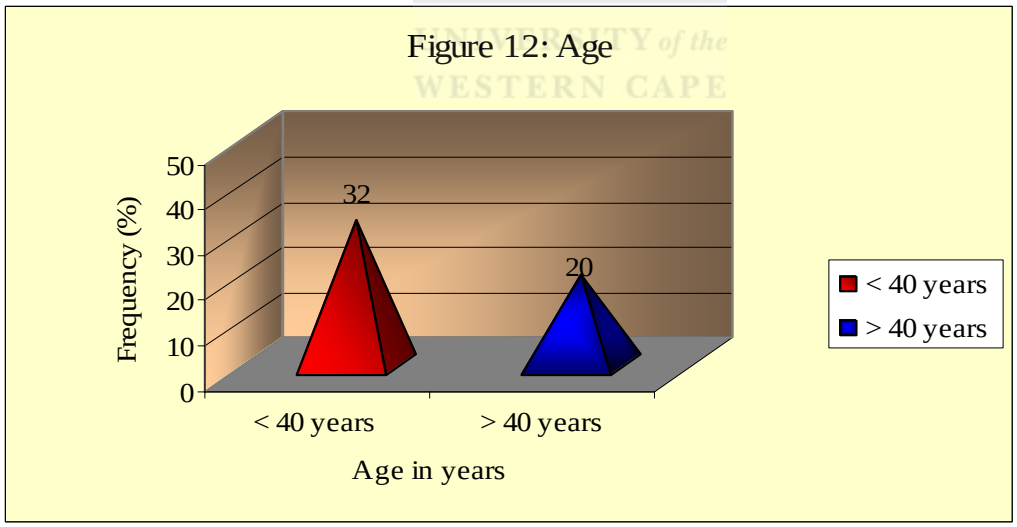
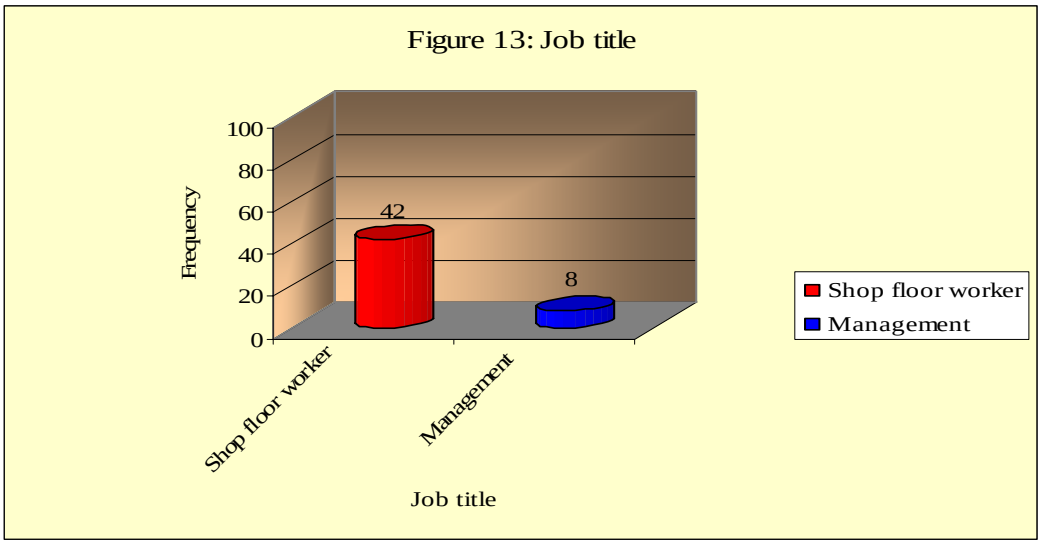


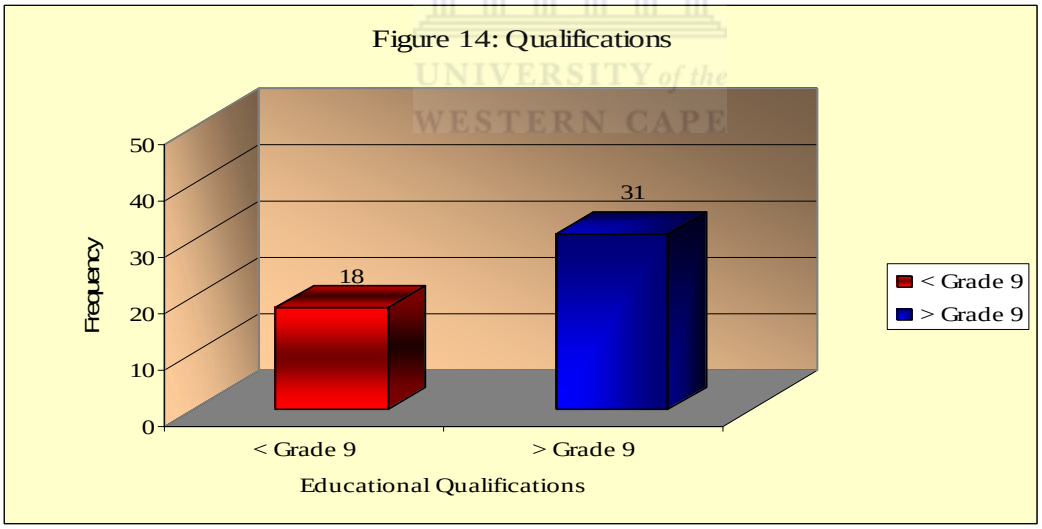
Figure 11 provides an overview of the race of the sample. It is evident that the majority of the respondents, that is 87% (n = 40) were Coloured, while 9% (n = 4) were Black and only 2 respondents, that is, 4%, were White.



From Figure 12 it can be inferred that the majority of the respondents, that is 62% are younger than 40 years of age, while a further 20 respondents (38%) are older than 40 years of age.



Results in Figure 13 indicate that the majority of the respondents, that is 81% (n = 42) were shop-floor employees, while management comprised 15% (n= 8) of the respondents. Two respondents, that is 4%, did not indicate their job title.



In terms of Figure 14, respondents with qualifications higher than Grade 9 were in the majority (n = 31, that is 60%), while respondents with lower than Grade 9 qualifications comprised 35% (n = 18) of the sample. Three respondents (5%) did not indicate their highest educational qualification.

5. 4. 2 Descriptive statistics for the self-administered questionnaire

The researcher has chosen to analyse the comments of questionnaire of the employees to the LE at GKN. The responses were divided into two parts. Part one shows the general responses of employees regarding the implementation of LE (see Table 5), Part Two indicated the employees' personal responses regarding LE (see Table 6). Both parts aim to determine how employees perceive benefits through the introduction of LE, and how employees responded to the implementation of the LE at GKN (see Table 7). Responses ranking followed by Likert style scale, that is: 1. Strongly agree, 2. Agree, 3. Do not know, 4. Disagree, and 5. Strongly disagree.

Table 5: Part One—Total Counts of Responses

	Strongly agree	Agree	Do not know	Disagree	Strongly disagree
Count	74	401	86	9	2
Percentage	12.9%	70.1%	15.0%	1.6%	0.3%

Firstly, an evaluation of Part One (general responses regard to the implementation of LE) indicated the following facts:

Overall, total responses of Part One are showing positive responses from question 1 to 11 (see Figure 6). According to the total counts of responses, 70.1% (401) agreed, 12.9% (74) strongly agreed, 15% (86) did not know, 1.6% (9) disagreed, and 0.3% (2) strongly disagreed (Table 5). Table 7 indicated all the frequencies that employees ranked on the questionnaire.

Figure 15: Part One—Total Counts of Responses

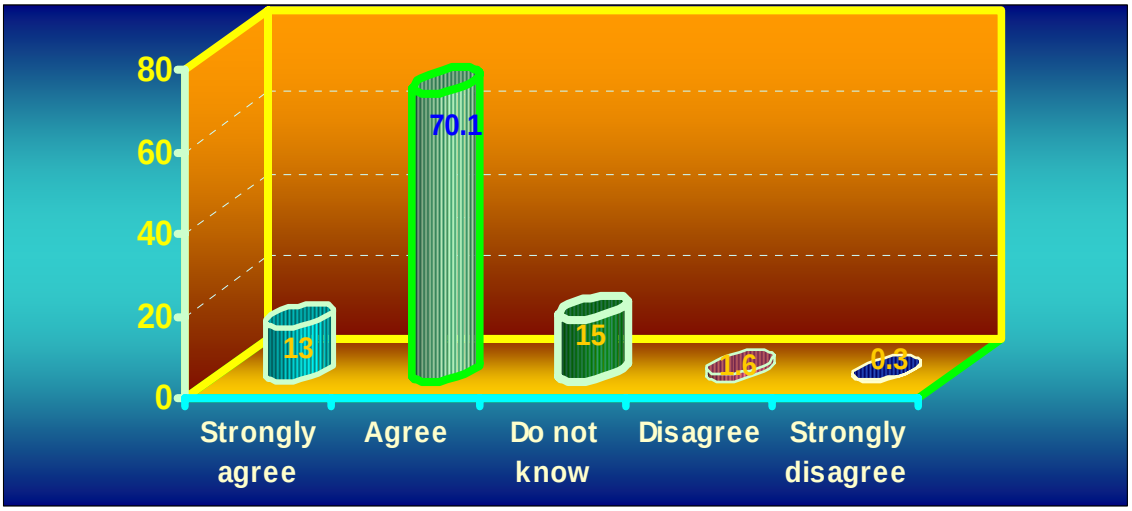


Table 6: Part One—General Responses regarding LE.

	Strongly agree	Agree	Do not know	Disagree	Strongly disagree
Overall, LE is helping GKN to be more competitive.	4	42	6	0	0
The LE is an improvement over the previous work.	10	35	6	0	1
LE has improved operational safety in GKN.	6	40	5	1	0
GKN's senior management is serious about LE.	10	33	7	1	1
Employees' work has become easier due to LE.	4	38	9	1	0
LE reduces inventory in GKN.	4	29	17	2	0
LE makes lead times short in GKN.	9	34	8	1	0
LE facilitates (helps) GKN to bring costs down.	5	34	12	1	0
Defects are greatly getting fewer because LE was implemented in GKN.	12	36	4	0	0
LE raises product quality in GKN.	7	40	5	0	0
LE assists GKN to improve productivity.	3	40	7	2	0

The results above indicate that the majority of the respondents were positive about the contribution of the introduction of LE into their enterprise, with the majority of them responding in the affirmative with respect to improvements in productivity, quality and operational safety. These results are represented individually in graphical and tabular format.

Table 7: Part Two—Personal responses regarding LE

	Strongly agree	Agree	Do not know	Disagree	Strongly disagree
Count	31	199	49	32	1
Percentage	9.9%	63.8%	15.7%	10.3%	0.3%

Figure 16: Part Two—Personal responses regarding LE

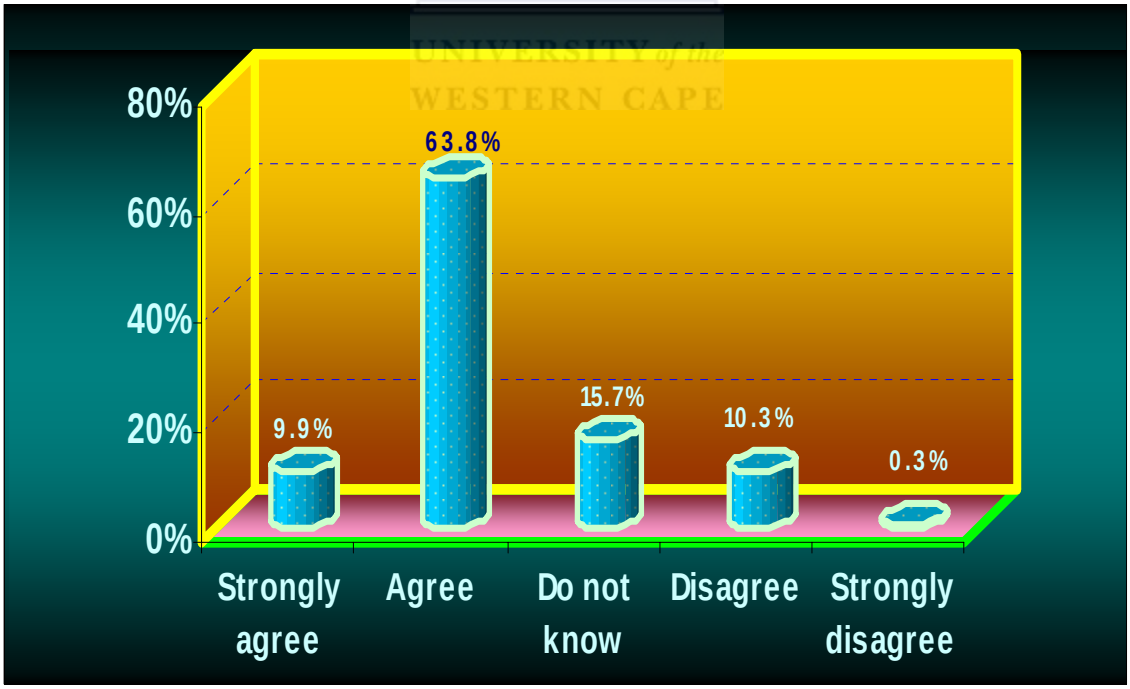
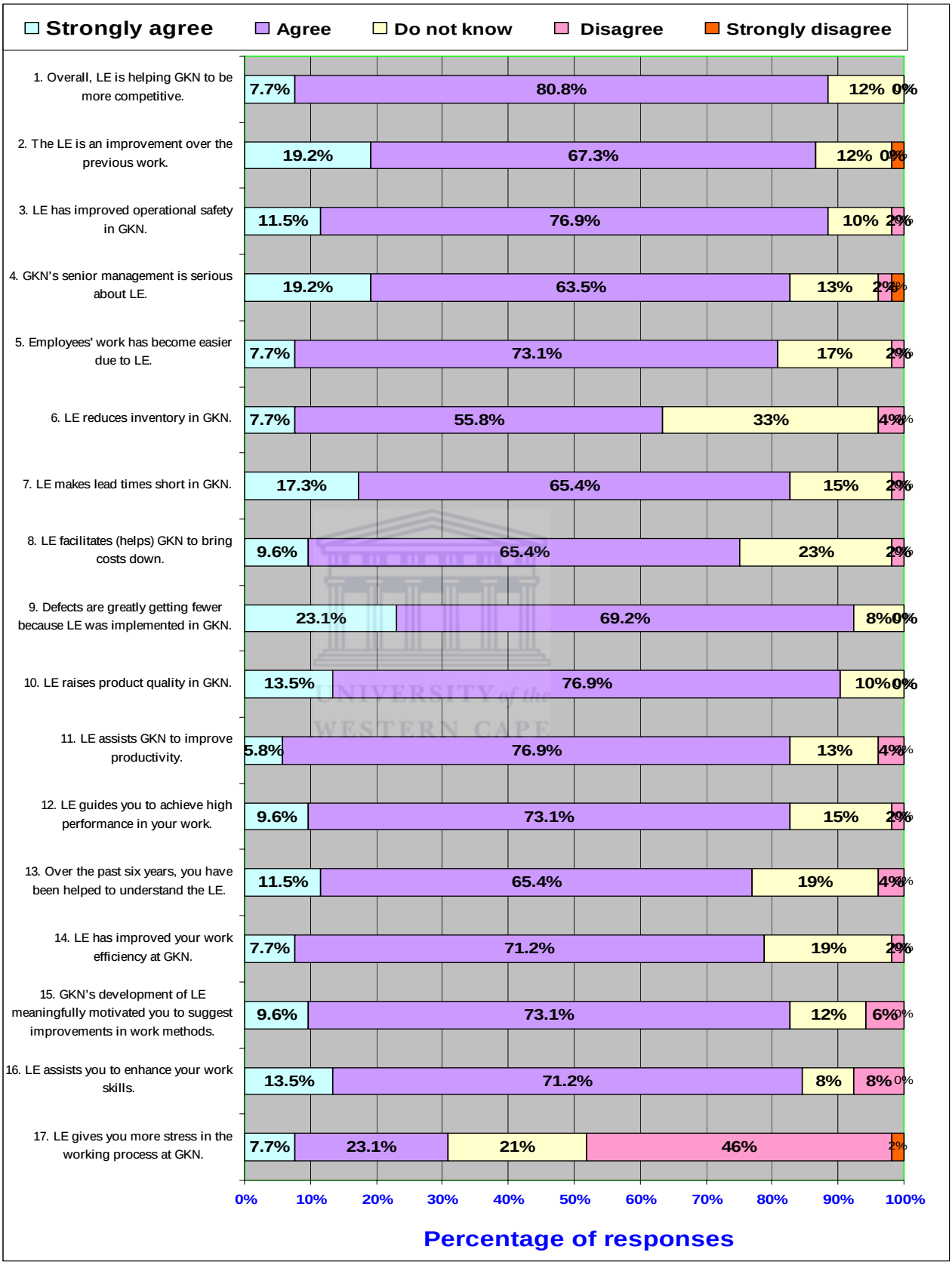


Table 8: Part Two—Personal responses regarding LE

	Strongly agree	Agree	Do not know	Disagree	Strongly disagree
2. 1 LE guides you to achieve high performance in your work.	5	38	8	1	0
2. 2 Over the past six years, you have been helped to understand the LE.	6	34	10	2	0
2. 3 LE has improved your work efficiency at GKN.	4	37	10	1	0
2. 4 GKN's development of LE meaningfully motivated you to suggest improvements in work methods.	5	38	6	3	0
2. 5 LE assists you to enhance your work skills.	7	37	4	4	0
2. 6 LE gives you more stress in the working process at GKN.	4	12	11	24	1

Table 9: Percentage of Responses



According to Table 9, responses to questions 1 to 16 indicated that most of the employees agree that the LE method as a system which reaps significant benefits for the company.

An important part of responses in the questionnaire was where the employees were required to explain why they had chosen a particular score from the numerical ranking 1—5. Once the researcher had gathered all the comments, he concluded the following:

Part One: QUANTITATIVE ANALYSIS: General responses regarding the implementation of LE.

This section uses inferential statistics for the presentation and analyses of the empirical data, with the aid of the Statistical Package for Social Sciences (SPSS) computer programme.

1. 1 Overall, LE is helping GKN to be more competitive.	
Strongly agree	3
Agree	46
Do not know	3

A chi-square test revealed a significant relationship between attitudes/perceptions of LE helping GKN to be more competitive ($X2 = 2.7$, $df = 4$, $p < 0.05$).

1. 2 The LE is an improvement over the previous work.	
Strongly agree	8
Agree	38
Do not know	6

A chi-square test revealed a significant relationship between attitudes/perceptions of LE as improving work ($X2 = 2.3$, $df = 4$, $p < 0.05$).

1. 3 LE has improved operational safety in GKN.	
Strongly agree	4
Agree	45
Do not know	3

A chi-square test revealed a significant relationship between attitudes/perceptions of LE improving operational safety ($X2 = 2.5$, $df = 4$, $p < 0.01$).

1. 4 GKN's senior management is serious about LE.	
Strongly agree	8
Agree	39
Do not know	5

A chi-square test revealed a significant relationship between attitudes/perceptions of management seriousness towards LE ($X2 = 2.2$, $df = 4$, $p < 0.01$).

1. 5 Employees' work has become easier due to LE.	
Strongly agree	3
Agree	44
Do not know	5

A chi-square test revealed a significant relationship between attitudes/perceptions of LE making work easier ($X2 = 2.6$, $df = 4$, $p < 0.01$).

1. 6 LE reduces inventory in GKN.	
Strongly agree	3
Agree	34
Do not know	14
Do not agree	1

A chi-square test revealed a significant relationship between attitudes/perceptions of LE reducing inventory ($X2 = 2.3$, $df = 4$, $p < 0.05$).

1. 7 LE makes lead times short in GKN.	
Strongly agree	6
Agree	37
Do not know	9

A chi-square test revealed a significant relationship between attitudes/perceptions of LE making lead times shorter ($X2 = 2.4$, $df = 4$, $p < 0.05$).

1. 8 LE facilitates (helps) GKN to bring costs down.	
Strongly agree	4
Agree	35
Do not know	10
Disagree	2

A chi-square test revealed a significant relationship between attitudes/perceptions of LE reducing costs ($X2 = 2.6$, $df = 4$, $p < 0.05$).

1. 9 Defects are greatly getting fewer because LE was implemented in GKN.	
Strongly agree	12
Agree	34
Do not know	6

A chi-square test revealed a significant relationship between attitudes/perceptions of LE reducing defects ($X2 = 2.7$, $df = 4$, $p < 0.05$).

1. 10 LE raises product quality in GKN.	
Strongly agree	4
Agree	43
Do not know	5

A chi-square test revealed a significant relationship between attitudes/perceptions of LE raising product quality ($X2 = 2.4$, $df = 4$, $p < 0.01$).

1. 11 LE assists GKN to improve productivity.	
Strongly agree	2
Agree	38
Do not know	11
Disagree	1

A chi-square test revealed a significant relationship between attitudes/perceptions of LE improving productivity ($X2 = 2.2$, $df = 4$, $p < 0.05$).

2. 1 LE guides you to achieve high performance in your work.	
Strongly agree	3
Agree	41
Do not know	8

A chi-square test revealed a significant relationship between attitudes/perceptions of LE assisting employees in achieving high performance ($X2 = 2.6$, $df = 4$, $p < 0.05$).

2. 2 Over the past six years, you have been helped to understand the LE.	
Strongly agree	2
Agree	33
Do not know	15
Disagree	2

A chi-square test revealed a significant improvement in understanding LE ($X2 = 2.7$, $df = 4$, $p < 0.05$).

2. 3 LE has improved your work efficiency at GKN.	
Strongly agree	2
Agree	39
Do not know	10

A chi-square test revealed a significant improvement in work efficiency ($X2 = 2.2$, $df = 4$, $p < 0.01$).

2.4 GKN's development of LE meaningfully motivated you to suggest improvements in work methods.	
Strongly agree	3
Agree	38
Do not know	9
Disagree	2

A chi-square test revealed a significant improvement in motivation to make suggestions for improvements ($X2 = 2.7$, $df = 4$, $p < 0.05$).

2. 5 LE assists you to enhance your work skills.	
Strongly agree	7
Agree	39
Do not know	3
Disagree	3

A chi-square test revealed a significant enhancement in work skills ($X2 = 2.2$, $df = 4$, $p < 0.01$).

2. 6 LE gives you more stress in the working process at GKN.	
Strongly agree	5
Agree	13
Do not know	7
Disagree	26
Strongly disagree	1

A chi-square test revealed no significant increase in stress following the introduction of LE ($X2 = 1.6$, $df = 4$, $p > 0.05$).

Part Two: QUALITATIVE ANALYSIS: General responses regard to the implementation of LE.

1. 1 Overall, LE is helping GKN to be more competitive.

Yes, LE is helping us to be more competitive. Because LE helps us reduce cost of scrap, improves operational efficiency; now, if everyone follows LE completely, our company will be excellent.

LE makes our quality better than the competitor, and LE also makes the quality of the production number one. There are more improvements as in the past. If the condition of the machine is clean and the quality gets monitored, the quality will be much better.

I agree 100%; LE has helped GKN to be more competitive, but we still have not fully utilized the principles of LE; it keeps our production cost low, and makes GKN more competitive; it also creates a closer working relationship with the customer.

1. 2 The LE is an improvement over the previous work.

The LE is truly an improvement over the previous work. There are a lot of things have changed in many ways, especially time and cost cutting. E.g. PPM has improved a lot; LE really makes management easier;

Yes, we greatly reduce our scrap rate; I was assisted to understand the system; LE makes GKN as a better organisation;

There isn't much improvement because some employees still make simple quality mistakes;

1. 3 LE has improved operational safety in GKN.

Safety has always been at the top of the list as a priority and has improved. The factory is cleaner and better organized, and therefore, there is less chance of accidents; we are much more safety-aware;

Yes, LE truly makes us safe in our work; we work in cells; over the last few years, very few accidents happened; because there is more emphasis on safety, safety is improving; because of LE method that we are using now, it is much safer; fewer injuries occur;

I can be more productive because I feel safe; in the past, the safety was very low; LE has improved safety.

Safety is our number one in our minds, we are establishing a safe working environment in GKN, we are more conscious of everyone's safety in the factory and in the offices, and we believe prevention is better than cure;

1. 4 GKN's senior management is serious about LE.

Yes, they are absolutely serious, it is compulsory that every one must follow LE principles as the management is serious about it. E.g. GKN's senior managers commit time and money to LE; and make lots of effort to send people on the conversion applicable to the above.

Management encouraged employees through LE, GKN is truly Lean Enterprising.

1. 5 Employees' work has become easier due to LE.

Yes, better organized, we work smarter now than before, because work in a cell system; LE assists me to improve my skills; workers became more productive and produced better quality;

Working in cells has made work easier in the factory. E.g. time cutting for setup of tooling and operational work.

No, move thinking and more complicated.

1. 6 LE reduces inventory in GKN.

Hardly any WIP on shopfloor; inventories flow faster than before, we thrive to reducing the inventories in the work process;

I do not agree with this as products always have to be upgraded, changed, new thoughts into new products etc.

1. 7 LE makes lead times short in GKN.

Lead time is getting shorter as LE makes us understand better; improvement in on-time delivery; Lead time has reduced from 4 weeks to 2 days; setups go quicker than in the past; the manner in which the

production reach the customer is because of the LE training; I agree that we still are implementing this program;

1. 8 LE facilitates (helps) GKN to bring costs down.

Cost cutting, labour could be major factor in any manufacturing company. LE motivated employees to contribute suggestions to bring cost down; for example, scrap and rework going down, admin cost going up;

As LE truly brings cost down, it will benefit us in the future; scrap reduced, consumables fit manufacturing process. Thanks for LE, as it brings down the cost, helps us to grow and for better prospects and more profits;

More operational cost can be saved if the disciplines of applying LE principles are improved; LE helps us to be efficient, and reduce costs;

1. 9 Defects are greatly getting fewer because LE was implemented in GKN.

Defects reduced from PPM 20 000 to PPM 360. The team leaders and operators have made a lots work for us easier;

PPM is improved; teamwork is important as it helps to reduce defects; we still struggle but we confidently will get there;

With this type of system quality has improved and has always been a top priority at the factory.

1. 10 LE raises product quality in GKN.

Definitely, LE truly raises product quality. We are more alert about QC (Quality Commitment);

LE assists us to produce good quality, less scrap; we aware that it is compulsory improve the quality on a daily basis;

1. 11 LE assists GKN to improve productivity.

It does and has. Every cell is responsible for their production; we make less scrap; meet target more regularly;

LE improves the quality of GKN because it can be monitored; LE assists us to work smart and makes work much easier; all manufacturing cells do not apply LE to its manufacturing processes.

2. 1 LE guides you to achieve high performance in your work.

It is of a greater benefit to health, the employer, employee as well as the customer. It could be done if operations are listed step by step to make it easier next time.

We held EI (Employee Involvement) meeting to discuss problems, and try to solve them; LE guides us to learn better; I am very proud of myself for being so efficient to the best of my ability.

2. 2 Over the past six years, you have been helped to understand the LE.

Yes, the workshop employees had more regular training than the office staff; but we still need more training as it is not enough;

2. 3 LE has improved your work efficiency at GKN.

It has to lead to improvement and better work satisfaction. Not yet in the offices; at this point, cell allowances were given to the employees; LE has improved our work efficiency particularly the admin staff at GKN; it has some combined operations.

2. 4 GKN's development of LE meaningfully motivated you to suggest improvements in work methods.

Yes, LE has motivated us to improve. For example, at Employee Involvement (EI) meeting, everyone gives their input; such as, "we all need to continue cost cutting and saving."

2. 5 LE assists you to enhance your work skills.

I have learnt new skills; Training as the part of LE, and it is really helpful; needs a committee to do the training project with employees; quicker and easier working habits. It does improve work skills and would make one better.

2. 6 LE gives you more stress in the working process at GKN.

> *LE gives me stress as some workers are not co-operative; by working under pressure will increase more stress.*
>
> *Yes, it is true, there is more stress for the team leader and the operator as LE brings additional tasks to do; It gives me stress if I work with someone who does not understand the system;*
>
> *No, I cannot agree. LE makes clearly that what you must do, at what time, in the right way;*
>
> *LE assist us in a better way to understand the process; Less problems to deal with will give you less stress; If this was so, it would serve no purpose to follow LE.*

5. 5 Summary

This chapter analysed the benefits employees perceived from LE. Several LE components are part of the overall JIT production process, and the literature review showed that numerous benefits can be derived from the implementation of Lean. These benefits were affirmed by the employees at GKN.

This demonstrates that, if LE method is used correctly to address production problems, operational performance will improve. In other words, the implementation of the LE can play a significant role in improving a company's performance. The overall benefits to GKN of the implementation of the LE were: a reduction in inventories, a shorter lead time, elimination of defects and rework, reduction of costs, improvement in product quality, and enhanced company competitiveness.

CHAPTER SIX: DISCUSSION, CONCLUSION AND RECOMMENDATIONS

The analyses and presentation of the results have been done under the relevant themes. What follows now is an integrated discussion about the most salient findings emerging from the study.

Jones *et al* (1999:21) argue that companies that have embraced lean practices have reaped the benefits of increased customer and employee satisfaction, shorter lead times, reduced inventories, fewer defects, shorter time to market and lower operating costs. Pullin (2000:43) believes that lean manufacturing is the art of raising quality, lowering costs, improving delivery and generally becoming competitive by removing waste and concentrating on activities that add value for the customer. Employee responses and reflections to the implementation of Lean Enterprise (LE) had not been previously been analysed at GKN. This study therefore endeavoured to elucidate their experiences.

6. 1 Perceptions Regarding the Implementation of LE at GKN

In general, the findings show that most employees' responses to and reflections on, LE are positive. Many of the benefits of the implementation of LE were addressed above, and all of these benefits were described in the literature review. These included: raising competitiveness, a shorter lead time, improving productivity, raising quality, cost cutting and saving, enhancing operational safety, achieving high performance, improving work

skills, raising work efficiency, and motivating employees' initiatives.

For example, in response to question 1, 80.8% employees agreed and 7.7% strongly agreed that LE is assisting GKN to be more competitive, (see Table 9). According to the comments made in response to the questionnaire, a high number of employees believe that LE makes GKN's product quality better than that of their competitors. One of the shopfloor workers responded: "LE makes the quality of the production number one, because LE helps GKN to reduce cost of scrap, improves operational efficiency". Some of the employees believe that if everyone follows LE completely, GKN will be an excellent company. In response to question 2, 67.3% employees agreed the LE is an improvement over the previous work, 19.2% strongly agree, 12% do not know.

Some employees believe that a lot of improvements due to the implementation of LE, such as time and cost cutting. Other employees agree that PPM (the rate of scraps) has improved a lot; staff and managers comment that LE really makes management easier. In response to question 3, 76.9% employees agreed and 11.5% strongly agreed that LE has improved operational safety at GKN. Ten percent did not know, and 2% disagreed. Many employees believe that accidents and injuries have reduced tremendously as LE established a safe environment for the employees.

According to the results mentioned above, LE has gained acceptance among the employees of GKN. Moreover, they have more opportunities to participate in management through LE implementation, such as training and employee involvement

meeting (See Photo 5: Employee Involvement meeting). Since employee satisfaction is one of the key factors in any organisation, organisational decision-making can be influenced by employee involvement. Through being involved, employees are able to generate new ideas and enhance their problem-solving skills, and the level of responsibility of all workers is increased (Gupta *et al*, 2000: 29-33).

Koo *et al* (1998: 312) maintain that too often both management and consultants hurry to get the job done and may undermine the importance of understanding employee feelings and attitudes. The feelings and attitudes of employees may influence the course of the LE implementation. The employees' high zeal can assist the implementation of LE. On the other hand, employees with lower morale may interfere with the process of LE implementation. The employees sometimes react with full cooperation or indifference when they are not properly informed about pending innovations in companies.

Photo 5: Employee Involvement meeting

Source: GKN Sinter Metals, 2005. *Lean Enterprise Model*. [CD-ROM].

Photographs 6 and 7 below depict the different results after the implementation of the LE

at GKN. Some of the employee-respondents believe that cleaner and better organized machines assist them to operate more safely (see the comments from the completed questionnaire). The researcher agrees with their standpoints as he had the same experience while he was working in Japan, and he believes that safety is always the most important element in manufacturing companies.

Photo 6: Immediate results (before LE)

Photo 7: Immediate results (after LE)

Source: GKN Sinter Metals, 2005. *Lean Enterprise Model*. [CD-ROM].

Table 10 indicated the different results compared with before and after the implementation of LE in two products at GKN (see table 10). Employees perceived that this achievement was attributed to the implementation of LE.

Table 10:

	Before	After
Returns (ppm)	74166	25799
Leadtime (hours)	155	8h16m
WIP (hours)	199	7
Returns (ppm)	30305	12146
Leadtime (hours)	143	3h47m
WIP (hours)	160	4

Source: GKN Sinter Metals Presentation notes, 2005.

Some research focuses on the implementation of LE, such as Sohal *et al* (1994: 51), who indicate that managers must be actively involved in the improvement initiatives, and the strongest leader must drive the change process. Smeds (1994) mentions that when lean manufacturing is implemented as an innovation process, and social stimulation games are applied, the resulting new systems are both economic and organisational successes. Moreover, Beachum (2005: 20) surmises that organisations that have implemented lean practices have realized substantial improvements in the productivity of both workers and equipment.

Despite these positive responses, a few comments were made negatively, such as insufficient training, and LE is not fully implemented in all cells. For instance, there are employees who felt that there is no improvement because some employees are still making simple quality mistakes.

Responses to question 17 focused on whether LE resulted in greater work intensity and increased stress. Surprisingly, the comments indicate that 23.1% employees agree, 7.7% strongly agree, 21% do not know, 46% disagree, and 2% strongly disagree. Obviously, the numbers who disagree were much higher than the numbers who agree. However, the literature review gave the opposite viewpoints to the reality expressed above.

Several authors, including Biazzo *et al* (2000: 6-15), Spithoven (2001: 725-741), and Klein (1989: 60-66, cited in Forza, 1996: 42-62, contended that Lean can be an important factor of work intensity and stress, such as). In order to clarify this issue at GKN, the

researcher later utilized the quantitative method to demonstrate the work stress that exists at GKN. Therefore, both positive and negative responses can reflect the employees' original perspectives in different ways due to the LE. It also derives the quantitative components needed to identify and test the results in this research.

6. 2 Conclusion

The study highlights several factors as important determinants of the success of LE in enterprises. Although the responses to most of the questions were largely positive, there are some areas that need to be explored further due to the discrepancies in responses. The finding of this study indicates that LE plays a significant role in company's performance.

The overall benefits from the implementation of the LE included the following: enhanced company competitiveness, reduction in inventories, a shorter lead time, elimination of defects and rework, reduction of costs, and raising of product quality.

Importantly, the researcher found that increased work intensity and stress to which employees referred were not necessarily reflected in their responses to other questions. The employees' work became more regular due to the implementation of the LE, and employees believe that the LE is assisting their work in the correct way at GKN.

Management theory usually predicts that employees will resist change in their work environment (Groebner & Merz, 1994: 35). When the researcher discovered the benefits of the implementation of Lean, he attempted to ascertain the employees' responses to the

LE in relation to these benefits by determining whether LE was welcomed or resisted by employees at GKN. The employees' responses showed that the LE implementation had a generally positive.

6. 3 Recommendations to the Organisation

The organisation should consider establishing an internal monitoring body to evaluate the efficacy of LE. Management support is crucial in this regard, and corporate strategy and written policies underpinning LE play a significant role as well. The process should be strongly aligned to the education and development policy of the organisation.

There is ample evidence that when employee involvement is solicited, commitment to the organisation is enhanced. Thus, employee participation in decision making cannot be underestimated.

It should be noted that the findings pertain specifically to the organisation at which this research was undertaken. This small sample is a consequence of the size of the organisation as well as of the exploratory nature of the study and the restrictions on its nature. The specific recommendations that follow therefore need to be contextualised within these parameters.

6. 3. 1 Employee involvement

The importance of employee involvement is increasingly recognized in organisational

success and effectiveness, as the quality of an organisation's human resources contributes to improved productivity, performance and effectiveness. An uncertain and turbulent environment impacts on fundamental change and poses new challenges for organisations to become responsive to market signals.

6. 3. 2 Linking changes to corporate strategy

Any changes that the organisation explores should be linked to a holistic corporate strategy. The mission statement mirrors the vision and business philosophy of top management, and indicates where the organisation is heading in the future which, in turn, will lend synergy to strategic planning.

6. 3. 3 Importance of internal and external monitoring bodies

Organisations such as GKN should establish their own in-house internal monitoring bodies, which would facilitate networking with external monitoring bodies, strengthen bilateral linkages and encourage best practice standards.

6. 3. 4 Regular communication, feedback and review-top management commitment and involvement

There should be regular feedback with respect to the success or failure of the process. This ensures that changes are appropriately communicated to employees as and when they become necessary. The internal monitoring body should assess changes in external environments, and thereby act as a conduit, relaying information to top levels in order to

expedite decision making with respect to the success and/or failure of LE in the organisation. This requires top management commitment and involvement.

6. 3. 5 Recommendations for future research

The following recommendations for future research are based on the limitations of, as well as experience and insight gained from, conducting the present study. The recommendations are:

Although employees were overwhelmingly positive about the benefits of the introduction of LE at GKN, the stress induced by its introduction warrants further attention, since coping with organisational restructuring, business process re-engineering, and change are important considerations confronting a multitude of organisations. The homogeneity of the sample accessed in the study limits the level of generalization to other organisations. Organisations with larger workforces are generally perceived to be more progressive, which could possibly account for some of the positive responses in the present study. A similar study should be conducted comparing similar industries with each other, involving a larger sample. Finally, a longitudinal analysis of the success of LE needs to be undertaken to ascertain the effect of the programme.

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APPENDICES

Appendix 1: The Pilot Questionnaire

Self Administered Questionnaire Protocol for Research Project

The purpose of this survey is to collect information from employees and management to get your opinion of the **Lean Enterprise (LE)** which has been implemented in **GKN Sinter Metals Cape Town (GKN)**.

If you require further information about this questionnaire, please contact Bingwen Yan on +27 72 6136 286, and also send emails to byan@uwc.ac.za.

Make an "X" next to the appropriate item:

1. Strongly agree 2. Agree 3. Do not know 4. Do not agree 5. Strongly disagree

1. Overall, LE has been good for the company.	1	2	3	4	5
Comments:					
2. GKN's development of LE greatly motivated you to suggest improvements in work methods.	1	2	3	4	5
3. Employees' involvement in LE brings costs down.	1	2	3	4	5
Comments:					
4. Product quality has improved because LE was implemented in GKN.	1	2	3	4	5
Comments:					

5. LE reduces lead times in GKN.	1	2	3	4	5
Comments:					
6. LE guides you to achieve high performance in all your work.	1	2	3	4	5
Comments:					
7. GKN's senior management is serious about LE.	1	2	3	4	5
Comments:					
8. All GKN's employees have been helped to understand the LE over the past six years.	1	2	3	4	5
Comments:					
9. Employees' work has become easier due to LE.	1	2	3	4	5
Comments:					
10. LE has improved safety in GKN.	1	2	3	4	5
Comments:					
11. LE has improved your work efficiency at GKN.	1	2	3	4	5
Comments:					
12. The LE is an improvement over the previous work.	1	2	3	4	5
Comments:					

13. LE has been made more stress to the employees in the working process at GKN.	1	2	3	4	5
Comments:					
14. LE facilitates you to enhance your work ability.	1	2	3	4	5
Comments:					
15. LE is helping GKN to be more competitive.	1	2	3	4	5
Comments:					

Appendix 2: The Questionnaire

Self Administered Questionnaire Protocol for Research Project

The purpose of this survey is to collect information from employees and management to get your opinion of the **Lean Enterprise (LE)** which has been implemented in **GKN Sinter Metals Cape Town (GKN)**.

If you require further information about this questionnaire, please contact Bingwen Yan on +27 72 6136 286, and also send emails to byan@uwc.ac.za.

PERSONAL PROFILE

Make an "X" next to the appropriate item.

1. Gender

1.	Male	
2.	Female	

2. Age

1.	21~30	
2.	31~40	
3.	41~50	
4.	51~60	
5.	60+	

3. Years of work at GKN

1.	Less than 1 year	
2.	2~4	
3.	5~7	
4.	8~10	
5.	Over 10 years	

4. Qualifications

1.	Less than Grade Nine	
2.	More than Grade Nine or Trade	
3.	University (College) BSc/BTech	
4.	Postgrad. MTech/ MA/MSc/PhD	

5. Job Title

1.	Workshop Employee	
2.	Office Staff	
3.	Senior Manager	
4.	General Manager	

DECISION-MAKING

The questionnaire is completely confidential. Your name and work number will not appear in the questionnaire. Please circle your answer in the box (indicated by numbers) and give brief comments under each of the questions in order to support your response.

1. Strongly agree, 2. Agree, 3. Do not know, 4. Do not agree, and 5. Strongly disagree

Part One: General responses regard to the implementation of LE.

1. Overall, LE is helping GKN to be more competitive.	1	2	3	4	5
Comments:					
2. The LE is an improvement over the previous work.	1	2	3	4	5
Comments:					
3. LE has improved operational safety in GKN.	1	2	3	4	5
Comments:					
4. GKN's senior management is serious about LE.	1	2	3	4	5
Comments:					
5. Employees' work has become easier due to LE.	1	2	3	4	5
Comments:					

6. LE reduces inventory in GKN.	1	2	3	4	5
Comments:					
7. LE makes lead times short in GKN.	1	2	3	4	5
Comments:					
8. LE facilitates (helps) GKN to bring costs down.	1	2	3	4	5
Comments:					
9. Defects are greatly getting fewer because LE was implemented in GKN.	1	2	3	4	5
Comments:					
10. LE raises product quality in GKN.	1	2	3	4	5
Comments:					
11. LE assists GKN to improve productivity.	1	2	3	4	5
Comments:					

Part Two: Personal responses regarding LE.

1. LE guides you to achieve high performance in your work.	1	2	3	4	5
Comments:					
2. Over the past six years, you have been helped to understand the LE.	1	2	3	4	5
Comments:					
3. LE has improved your work efficiency at GKN.	1	2	3	4	5
Comments:					
4. GKN's development of LE meaningfully motivated you to suggest improvements in work methods.	1	2	3	4	5
Comments:					
5. LE assists you to enhance your work skills.	1	2	3	4	5
Comments:					
6. LE gives you more stress in the working process at GKN.	1	2	3	4	5
Comments:					

THANK YOU VERY MUCH FOR YOUR PARTICIPATION!
YOUR FEEDBACK IS VALUABLE.