Assessment of the status of lean implementation at selected South African Revenue
Service branch offices

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DECLARATION

I, Thandile Samela, declare that

- This work has not been previously accepted in substance for any degree and is not being concurrently submitted in candidature for any other degree;

- This dissertation is being submitted in partial fulfilment of the requirements for the degree of Masters in Business Administration; and

- The dissertation is the result of my independent work/investigation, except where otherwise stated. Other sources are acknowledged by referencing and a reference list is attached

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ABSTRACT

Governments around the world want to deliver better education, better health care, better pensions and better transportation services. They know that impatient electorates want to see change, and fast. But, the funds required to meet such expectations are enormous, particularly in the many developed economies where populations are aging and the public sector's productivity has not kept pace with that of the private sector. The need to get value for money from governments at all levels is therefore under the spotlight as never before. However, cost-cutting programmes that seek savings of 1 to 3% per year will not be sufficient and, in some cases, may even weaken the quality of service (Bhatia & Drew, 2006). .

One of the key innovative means to improve productivity, and do more with less, is through the implementation of lean initiatives. The purpose of this study is to conduct an 'Assessment of the status of lean implementation at selected SARS (South African Revenue Service) branch offices'.

Literature review was conducted to investigate the origins of lean and how the service industry tapped from this philosophy, which was initially developed for the manufacturing sector. The lean philosophy has now been widely adopted in various service industries, from government agencies such as the South African Revenue Service to financial institutions such as ABSA bank, including the healthcare industry.

The findings of the research indicated that even though the organisation has made a strategic decision to implement lean, this has not been entirely successful as there is a lack of understanding of lean among managers and team leaders. There are some

pockets of excellence though. The researcher recommends that a comprehensive roadmap be developed to guide the organisation into a sustainable lean implementation.

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1. RESEARCH PROBLEM

1.1 INTRODUCTION

Governments around the world want to deliver better education, better health care, better pensions and better transportation services. They know that impatient electorates want to see change, and fast. But the funds required to meet such expectations are enormous, particularly in the many developed economies where populations are aging and the public sector's productivity has not kept pace with that of the private sector. The need to get value for money from governments at all levels is therefore under the spotlight as never before. However, cost-cutting programmes that seek savings of 1 to 3% per year will not be enough and in some cases may even weaken the quality of service (Bhatia & Drew, 2006).

The above statement is not only true of the developed economies as the authors suggest, but also true of emerging economies such as South Africa. As the economies strive to attract foreign direct investment, they need to improve their infrastructure such as roads, schools, energy supply and telecommunication. South Africa has spent billions of rands improving its infrastructure.

The South African Revenue Service (SARS) was established by legislation to collect revenue and ensure compliance with tax law. The organisation's vision is to establish an innovative revenue and customs agency that enhances economic growth and social development, and supports South Africa's integration into the global economy in a manner that benefits all citizens. The

South African Revenue Service is an autonomous administrative organ of the state that resides outside the public service, but within the public administration (South African Revenue Service Act 37 of 1997). The South African Revenue Service aims to provide an enhanced, transparent and client oriented service to ensure optimum and equitable collection of revenue.

Its main functions are to:

- collect and administer all national taxes, duties and levies;
- collect revenue that may be imposed under any other legislation, as agreed on between the South African Revenue Service and an organ of state or institution entitled to the revenue;
- provide protection against the illegal importation and exportation of goods;
- facilitate trade; and
- advise the Minister of Finance on all revenue matters.

In 2007, the South African Revenue Service's executive management team resolved to establish a continuous improvement department. The mission of the Continuous Improvement (CI) Department is to assist the Operations Division of the South African Revenue Service in its quality-focused improvement efforts through education, consultation, information sharing, networking, and technical advice. Among the key objectives of this department is the desire to implement lean tools such as 5S, visual management, and value stream mapping in the Operations Division.

Pilot sites were selected in late 2007 for the implementation of 5S and visual management. The two areas that were selected were the Pretoria processing and service centres and the Alberton processing centre. Some activities also took place at the Durban centre in relation to 5S and visual management. Evidence indicates that even before the Continuous Improvement Department was formed, some form of lean intervention was practised in offices such as the Port Elizabeth customs.

In 2009 the Branch Operations Division executive management team adjudicated to implement lean. Twelve branch offices were selected as pilot sites where lean will be implemented and, based on the success of this pilot, a national implementation throughout the South African Revenue Service branch offices would then be conducted.

1.2   PROBLEM STATEMENT

Literature suggests that the key to the successful implementation of lean methodology is the total commitment on the part of everyone in the organisation. This means from team members to the executive members of the organisation. This commitment is even more imperative at the top level of the organisation where decision-making takes place. This year, the executive management of the Branch Operations Division resolved to implement lean tools, specifically 5S and visual management, in seven branches across the country. These branches were selected as pilots from each of the seven regions in which the South African Revenue Service operates. This research paper will seek to address the following research problem:

- **The status of lean implementation at selected South African Revenue Service branch offices**

Top management should not only demonstrate commitment and leadership, it must also cultivate and create interest in the implementation and communicate the change to everyone within the organisation (Boyer & Sovilla, 2003, as cited in Doolen & Worley, 2006). If employees feel that the executive team does not respect their efforts, discouragement may take hold and the lean manufacturing effort will fail (Doolen & Sovilla, 2006) These authors further argued that even "though it is often desirable to drive change from the factory floor, it is important that a transition to lean manufacturing be driven by the executive management team" (Doolen & Sovilla, 2006)

1.3 Sub-Problem Statement

To facilitate finding the answer to the problem statement, sub-problems were formulated. The following sub-problems will thus be investigated in the research:

- What is the strategic role played by senior management in lean implementation?
- What is the role of line managers (team leaders) in lean implementation?
- What is the role of the team members in lean implementation? (The understanding and buy-in from the shop floor).

1.4 Objectives of the Research

The objectives of this research are to:

- Investigate the role of management support in lean implementation;
- To evaluate the level of management's understanding of lean concepts; and
- The general perception of lean initiatives by management.

These objectives are also applicable to the team leaders that will be surveyed in the research.

1.5   Limitations of the Research

The research will focus only on the branch operations and exclude other divisions, such as centralised processing, assurance audit, enforcement audit and others.

Only twelve of the 48 branches will be selected for this survey as these branches were used as pilots in lean implementation. The research will only focus on the management and exclude the team members. The reasoning behind this exclusion is the fact that the questions are web-based and team members do not have access to Internet. It is necessary to have a web-based survey as opposed to a manual survey for the following reasons:

- The questionnaires have to be sent to 12 different branch offices across the country. Utilising the web-based survey proves to be a cost-effective method as there were no deliveries to be made;

- There is no risk of the questionnaires getting lost in the process;

- Promoting the 'green' environment by not printing on paper; and

- Ensuring the anonymity of the respondents.

1.6   Definition of Key Concepts

To create and facilitate a better understanding of this study, it is important that certain key concepts are defined.

1.6.1 Lean Manufacturing

The term 'lean production' was coined by John Krafick because of the system's characteristic to use less of everything compared to mass production

– 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 and half the time. It furthermore requires keeping far less than half the needed inventory on site, resulting in fewer defects, and producing a bigger and ever growing variety of products (Womack, Jones & Roos, 1990)

The goal of lean manufacturing, according to Hobbs (2004) is "to establish and design a manufacturing line capable of producing multiple products, one at a time, using only the amount of time required to actually build a product".

1.6.2 5S

Liker (2004) views 5S as a tool that is utilised to support the smooth flow to takt time, to help make problems visible and, if used in a sophisticated way, can be part of the process of visual control in a well-planned lean system.

5S originated in Japan and the wording is in Japanese. It has been translated into English to suit different organisations, but the meaning is still the same. The table below summarises the translation of the S's in the 5S philosophy.

Table 1.

	Japanese	Translation	S-word
1	Seiri	Proper Arrangement	Sort
2	Seiton	Orderliness	Straighten
3	Seiso	Cleanliness	Sweep
4	Seiketsu	Cleaned up	Schedule
5	Shitsuke	Discipline	Sustain

Source: Pieterse *et al* (2010)

The principles of 5S are discussed in detail in Chapter 2.

5S was implemented at the South African Revenue Service as part of the pilot exercise. Regular audits are conducted by 5S champions to ensure that the offices adhere to the 5S principles and that they do not fall back to their 'old ways'.

1.6.3 Visual Management

Visual control is any communication device used in the work environment to tell, at a glance, how work should be done and whether it is deviating from the set standard. It assists employees who want to do a good job to immediately review how they are doing (Liker, 2004).

At the South African Revenue Service, visual management is used to visually display the structure of the team (i.e. who they are as a team), the key performance indicators and actions taken to address the abnormalities or underperformance (what they are doing and how they are doing), and the morale of the team (looking at improvement ideas submitted by the teams, attendance charts, individual star performers, etc.)

1.6.4 Value Stream Mapping

Value stream mapping is a lean tool that can be used to expose and eliminate waste normally associated with manufacturing and service systems (Pieterse, Lourens, Louw, Murray & Van der Merwe 2010:151). It is a tool that highlights where value is being added to the product (Pieterse, 2007)

The value stream is largely used at the South African Revenue Service to conduct an analysis of the current state of a specific process, identify the non-

value adding steps in the process, and propose the future state with a view to improve the process.

1.7   Limitations of the Research

The research only focused on the branch operations and excluded other business divisions, such as enforcement audit, centralising process, assurance audit, etc. Only twelve branches were selected for the study. These are the branches that were utilised as pilot sites in the initial rollout.

The initial focus included branch managers, team leaders and team members. However, due to team members' lack of access to the Internet, the team members had to be excluded. This implied that the views of the team members, who are mainly affected and can, make or break the successful implementation of lean philosophy, were not taken into consideration in this research.

1.8   Significance of the research

The research is expected to provide the following benefits to the South African Revenue Service:

- provide data for future planning of lean initiatives;
- Understand the critical success factors for lean implementation;
- Gauge the level of management understanding and support of lean initiatives; and
- Identify gaps and improvement initiatives in lean implementation and sustainability.

1.9   Research Methodology

Lancaster (2005) defines research methodology as "the general category of research approach being used in a research/consultancy study and which relates particularly to the approach to data collection". This study comprises of the literature study and the empirical study.

1.9.1 Literature Study

The literature study was conducted to investigate the:

- origins of lean manufacturing;
- the meaning of lean production;
- definition of key concepts and lean tools;
- lean leadership; and
- evolution of lean from a manufacturing concept to the service industry.

Examples of service organisations that have successfully implemented lean are provided. These organisations include;

- His Majesty Revenue and Customs (HMRC), United Kingdom equivalent of the South African Revenue Service); and
- Internal Revenue Service (IRS, United States equivalent of the South African Revenue Service).

The literature also shares some successes of lean in the health care sector.

1.9.2 Empirical Study

The web-based questionnaire was developed and sent to the potential respondents. The questionnaire was based on the LESAT assessment, developed by the Massachusetts Institute of Technology.

The questionnaire is divided into five categories for branch managers and four categories for the team leaders. The objective of the questionnaire was to establish the status of lean implementation at the branch offices.

1.10   Text Layout

The study is divided into five chapters and can be listed as follows:

Chapter 1 – Introduction and problem statement: this section of the study explains the background of the research study and posits the problem statement and the sub-problems. It also provides a brief description of the lean concepts, limitations and the significance of the research;

Chapter 2 – Literature Review: in this chapter the literature is discussed in addition to how this literature is applied at the South African Revenue Service and other service sectors;

Chapter 3 – Research Methodology: the research methodology theory is discoursed. It is then formulated into how this theory is utilised to develop a methodology for this study;

Chapter 4 – Empirical Results: the data collected from the questionnaire is presented in this chapter in a descriptive statistical and graphical format; and

Chapter 5 – Conclusions and Recommendations: this chapter states the summary of findings draws conclusions and makes recommendations. It further discusses opportunities for future research.

1.11 Summary

The purpose of this chapter was to introduce the reader to the contents of the study. It summarises all the chapters contained in the research report and seeks to provide the reader with an overview of the research conducted.

Chapter 2

2. LITERATURE REVIEW

2.1 Origins of Lean Production

Lean principles were originally developed as a set of industrial tools and practices that managers and workers could use to eliminate waste and inefficiency from production systems – reducing costs, improving reliability and quality, and speeding up cycle times. Toyota Motors pioneered lean practices and much of their success stems from the fact that the phenomenal performance of this automaker, in one of the most competitive sectors, rest to a considerable extent, on its ability to perfect these practices over the past five decades (Corbett, 2007).

In the 1880s, the focus was on craftsmanship which evolved into mass production around 1915, when craft production encountered problems it could not surmount. After World War ll, the 'lean methodology' was born in Japan through improving the existing mass production concepts.

The craft producer uses highly skilled workers and a simple, but flexible, tool to manufacture exactly what the customer asks for, one item at a time (Womack et. al 1990). According to Womack et. al (1990) there were a number of challenges or shortcomings associated with craftsmanship. Chief amongst them was the cost involved in producing via this method. As much as people admire craftsmanship, the cost involved becomes prohibitive as craft products cost too much for most people to afford. The second shortcoming was that the manufacturer could not produce two, much less

200 000, identical cars, even if these were built according to the same blueprints. The reasons were that contractors did not use a standard gauging system, and the machine tools of the 1890s could not cut hardened steel.

When craftsmanship became unsustainable due to a number of reasons such as production costs, affordability, reliability of the product and so forth, Henry Ford discovered a way to overcome these problems inherent in craft production. His technique became known as mass production.

Womack et. al (1990) describe mass production as the use of narrowly skilled professionals to design products manufactured by unskilled or semi-skilled workers tending expensive, single purpose machines. These churn out standardised products at a very high volume. Because the machinery costs so much and is intolerant to disruption, the mass producer adds many buffers - extra supplies, extra workers, and extra space to assure smooth production. The shortcoming of this process is that the consumer does not have variety.

The origins of lean manufacturing began post World War II, with Eiji Toyoda's visit to Ford's Rouge plant in Detroit. Eiji studied the Ford production process in detail and brought back this knowledge to Japan. Through discussion with the chief production engineer of Toyota, Taichi Ohno, it was soon realised that mass production would never succeed in Japan. However, it was through this visit to Rouge that the origins of the Toyota Production System, and eventually lean production, were realised (Womack et. al, 1990).

It can be argued that lean owes its existence to a certain degree to Henry Ford's mass production.

According to Womack et. al (1990) the term 'lean production' was coined by John Krafick because of the system's ability to use less of everything compared to mass production – 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, and half the time. It also requires keeping far less than half the required inventory on site, resulting in fewer defects, and producing a bigger and ever growing variety of products.

Womack et. al (1990) further states that the lean producer combines the advantages of craft and mass production, while avoiding the high cost of the craftsmanship and the rigidity of mass production. Evidence of this is visible in the Panhard et Levassor in the 1890s, and Ford's plants in the early 1900s.

One can argue that lean is not an original product of Toyota, but an improved mass production and craftsmanship process. Toyota perfected a system that existed, but having too many flaws which the West did not know how to improve. This argument is supported in the discussion by Womack & Jones (1996) about the rise of lean production. In their book the authors explain how Taiichi Ohno took an existing system of die change, which was a complicated, long, time consuming, and costly process, and set about to improve it. This he achieved by painstakingly performing trial and error to develop a simple die changing technique to be able to change the dies frequently and fast. His idea was to be able to change dies every two to three hours, as opposed to the two to three months which was the case in manufacturing plants.

Ohno also improved Ford's system of final assembly, wherein the Ford's system assumed that assembly line workers would perform one or two simple tasks repetitively, hoping they will not complain. The foreman did not perform the assembly tasks himself but instead ensured that line workers followed instructions. These orders or instructions were devised by the industrial

engineer, who was responsible for coming up with ways to improve the process (Womack et. al, 1990).

Ohno, after several visits to Ford's plant in Detroit, thought this whole system was rife with muda (meaning waste in Japanese). He believed that assembly workers could probably perform most of the functions of the specialists, and do them much better, because of their direct acquaintance with conditions on the line. He experimented by grouping workers into teams with a team leader, rather than a foreman. The teams were given assembly steps and the team leader would perform assembly tasks, as well as coordinate the team, and in particular, would fill in for any absent worker. They were made to be responsible for housekeeping, minor tool repair and quality checking, functions that belonged to specialists in mass production (Womack et. al, 1990).

The Japanese system, according Schonberger (1982), consists of essentially two steps for procedure and techniques, i.e. productivity and quality, having its cultural roots in the products of the unique Japanese environment.

Other concepts, such as supply chain, product development and engineering, changing consumer demand, and dealing with the customer, were taken by Ohno from Ford, improving them to suit the Japanese culture. These were subsequently adopted throughout the manufacturing industry and later in the service industry (Womack et. al, 1990). This is also supported by Liker (2004:20), stating that the Toyota Production System borrowed many of its ideas from the United States.

It is important to note though, that Toyota did not simply copy the American concept of mass production, but instead learned the techniques, and by using

their own research and creativity, developed a method that suits their situation (Hallam, 2003).

A school of thought exists among other authors that the 'lean concept' originated long before the Toyota Motor Company. To understand lean, Womack & Jones (1996) suggest that it is important to go much farther back in time, in fact back to the origins of the motor industry at the end of the nineteenth century, and studying how manufacturing evolved into the 21st century.

Among these authors, Hobbs (2004) states that the origins of lean date back to the period of industrial revolution in the 1860 when the challenge was to manage a machine with enormous product output. He notes that in 1885, Fredrick Taylor suggested that work should be broken down to individual tasks. Some fifty years later, in the 1930's, the manufacturing challenge was product variety when consumers were the drivers of change in a product life cycle. Finally a different manufacturing model was developed in the Far East, and more particularly in Japan.

According to Hobbs (2004), the change in the Far East was led by the Toyota Motor Company when they argued that the standard thinking of 'Cost + Profit = Sales Price' was incorrect, and suggested that 'Profit = Sales Price – Cost'. This is the view from which Toyota commenced to create a manufacturing system that concentrated on the management of costs, translated to waste, with the key areas targeted being work-on-progress inventory and safety stock.

Toyota first caught the world's attention in the 1980s when it became clear that there was something special about Japanese quality and efficiency.

Japanese cars were lasting longer than American cars and required much less repair. By the 1990s it became apparent that there was something even more special about Toyota compared to other automakers in Japan (Womack, Roos & Jones (1991) as cited by Liker, 2004:3).

2.2   The meaning of lean production

A lean manufacturing implementation should be like a good novel – long enough to cover the subject, but short enough to be interesting (Hobbs, 2004).

Thus, the goal of lean manufacturing is to establish and design a manufacturing line capable of producing multiple products, one at a time, using only the amount of time required to actually build a product. The techniques of lean manufacturing seek to reduce the non-value adding wait, scheduling, and queue time to zero. This resulting, often significant, reduction in manufacturing lead time is the basis for all the associated benefits of lean manufacturing (Hobbs, 2004).

Baudin (1999), as cited by Hallam (2003), describes lean as the pursuit of concurrent improvement in all measures of manufacturing performance by eliminating waste through projects that change the physical organisation on the shop floor, logistics, and production control throughout the supply chain, and also the way human effort is applied in both production and support tasks.

Both Baudin's (1999) and Hobbs' (2003) descriptions of lean manufacturing are specific in that lean aspires to eliminate waste or non-value added processes while striving for improvement.

This argument is further strengthened by Womack (2004) when he states that we are all in search of a perfect process. He further posits that the perfect process has some simple, but challenging attributes. It creates precisely the right value for the customer. According to Womack (2004), each step in a process must be:

- Valuable;
- Capable (six sigma);
- Available (Total Productive Maintenance);
- Adequate (Theory of constraints and Toyota Production System or TPS); and
- Flexible (Toyota Production System).

The steps in the perfect process must be linked by:

- Flow (Toyota Production System);
- Pull (Toyota Production System); and
- Levelled demand from the pacemaker (Toyota Production System).

Pieterse (2007:15) states that "in a perfect factory, products would be made only when requested by the customer; the customer would not have to wait for delivery and every product may be different, according to each customer's differing requirements".

This author also supports Hobbs (2004) and Baudin's (1999,) suggestion that an underlying factor in lean implementation is the elimination of waste. This view is also underlined by Schonberger (1982:2), when he makes comparisons between how Japanese systems work in a 'Just-in-Time'

philosophy and the West's idea of building inventory. He further highlights the waste (such as quality defects) that comes with building inventory.

By eliminating the seven (some authors have eight) types of waste, all those unnecessary actions which do not add value to the product or service, are eradicated, thereby shortening lead time. The seven types of waste are discussed later in the chapter.

By using the lean methodology or tools, organisations are able to achieve the culture of continuous improvement and dramatic improvements in productivity and quality.

According to Ohno (1988) the Toyota Production System is about absolute elimination of waste. He argues that two points must be kept in mind when thinking about the elimination of waste:

    i. Improving efficiency only makes sense when tied to cost reduction. To achieve this only the things needed must be produced, using minimum manpower; and

   ii. Look at the efficiency of each operator of each line, then look at operators as a group, and then at the efficiency of the entire plant. The efficiency must be improved at each step and at the same time for the entire plant.

Ohno (1988) identified seven types of waste that must be eliminated or removed from the production activity:

    i. Overproduction;

   ii. Movement;

iii. Idling;

iv. Transportation;

v. Inventory;

vi. Defects; and

vii. Unnecessary processing.

Hines and Taylor (2000), as cited by Hallam (2003), describe lean as "a consumer focused approach to the provision of effective solutions involving consumption of minimum resources".

2.3   Lean Production Tools

To work towards achieving the perfect factory, Pieterse (2007:16) suggests that "a few changes must be made to the existing mass production methods. Processes will have to be moved so that steps in consecutive order are right next to each other".

This process can be achieved by applying several tools that have been developed mostly at Toyota Motor Corporation over a period of time.

2.3.1 5S

5S represents a simple, sound, structured, synchronous, serviceable housekeeping (Feld, 2001).

Liker (2004:150) views 5S as a tool that is used to support smooth flow to takt time, assisting in making problems visible, and if used in a sophisticated way, can be part of the process of visual control in a well-planned lean system. According to Feld (2001), the idea is for everything to have a place and everything in its place.

5S originates from Japan and the words are all Japanese. The words have been translated into English to suit different organisations, but the meaning is still the same. These words were coined by Toyota.

The first 'S' of 5S is:

- **Seiri**: it deals with clearing the area of those items that are not being used on a regular basis (Feld, 2001) and according to Liker (2004:150), this means sorting through items and keep only what is needed.

The above authors, and others such as Pieterse (2007) and Hobbs (2004), agree that Seiri simply means sorting out the work area.

The second 'S' of 5S is:

- **Seiton**: it deals with identifying and arranging items that belong in the area. These items should all be sorted and labelled as belonging in that area (Feld, 2001). Liker (2004:150) sees this step as about orderliness where everything is stored in its own place.

The third principle of 5S is:

- **Seiso**: simply translated into English, it means cleaning/sweeping according to Feld (2001) and shine, according to Liker (2004:150). This step focuses on ensuring that the place is kept clean at all times. Liker (2004:150) argues that the cleaning process often acts as a form of inspection that exposes abnormal and pre-failure conditions that could hurt quality or cause machine failure".

The fourth principle of 5S is:

- **Seiketsu**: it deals with standardisation, i.e. develop systems and procedures to maintain and monitor the first three S's. This stage is concerned with management discipline to enforce the standard activity. If the housekeeping activity does not become institutionalised within the operation, the area will not stay clean and employees will revert back to the old ways very quickly (Feld, 2001).

The last principle of 5S is:

- **Shitsuke**: it means maintaining a stabilised workplace is an ongoing process of continuous improvement. At this stage regular management audits are conducted to stay disciplined. (Liker, 2004:150).

The underneath table summarises the translation of the S's in the 5S philosophy:

Table 1.

	Japanese	Translation	S-word
1	Seiri	Proper Arrangement	Sort
2	Seiton	Orderliness	Straighten
3	Seiso	Cleanliness	Sweep
4	Seiketsu	Cleaned up	Schedule
5	Shitsuke	Discipline	Sustain

Source: Pieterse *et al* (2010)

People will pay attention to what management does, rather than what they say. Management must proclaim that housekeeping is important, clarify expectations, walk the shop floor, reward those who are performing, and constructively discipline those who are not (Feld, 2001).

2.3.2 Visual Management/Control

Visual control is any communication device used in the work environment that tells at a glance how work should be done and whether it is deviating from the standard. It helps employees wishing to do a good job to immediately see how they are doing (Liker, 2004:152).

Feld (2001) describes it as such concepts as line of site management, or the ability to walk onto the shop floor and in a manner of minutes know the status of the operation (what might be abnormal, how the material is flowing, what job is in work, and what job is next to go in work (Feld, 2001).

According to Brain (2007), as cited by Vazi (2008:22), "visual management is a tool that makes use of charts, diagrams, tags, colour coding or anything that gives immediate visual feedback of the current state in the workplace. It is a tool used to communicate the current state to the whole team."

The visual management board can therefore be viewed as a tool that describes who the team is, what their goals are, and the performance in relation to the goals and the actions taken to address the abnormalities. These are normally displayed in the form of charts and graphs. In some instances, the teams will include the team structure, their vision and mission, and other team activities such as star performers, attendance chart, birthdays,

etc. A manager or any person should be able to walk onto the shop floor, look at the visual management board, and understand every important aspect about the specific team without asking questions.

A good example of visual management is the scoreboard in a cricket match. One is able to tell which team is batting and which team is fielding. One can also tell the current score and the target of the batting team if they are the second team to bat. The scoreboard gives information about the people batting, the runs they have scored, and 'overs' remaining. When arriving at a cricket match, one does not have to ask about the proceedings as all the necessary information is displayed on the scoreboard.

2.3.3 Kanban

Kanban methodology is a material presentation method designed to simplify material handling and inventory management. Instead of materials being staged in 'kits' and issued to production to follow the routing, materials are physically placed at the point of usage on the line and replenished only when a 'kanban' or 'signal' is generated by their consumption into the product .The system began at Toyota and was used to ensure the flow and production of materials in a just-in-time production system. Taichi Ohno needed a way to signal that the assembly line had used the parts and needed more. He developed simple signals such as cards, empty bins, and empty carts called kanban (Liker, 2004).

The most particular feature of a Kanban system is that it short-circuits normal operating procedures: as supplies of a kanban controlled material are used up, new supplies are requested simply by releasing a re-order card which is sent directly to the supply point. (Pieterse *et al*, 2010:70).

According to Pieterse *et al* (2010:71), there are many variants of the kanban system:

- **The 2 card kanban**: the card released by the user authorises the stores to 'move' a replenishment supply to the user. When they do so, a second card, which is found on the pallet they are about to supply, is removed and sent to the component supplier as authority to 'produce' another standard quantity;

- **The 1 card Kanban**: similar to the 2-card system, but a single card acts as both 'move' and 'produce' authority. This method is typically used where the supply point is close to the user point, so that the supply and the user operatives move the empty and full pallets between the two work centres themselves without the intervention of a stores function;

- **The container - based kanban**: this variant uses a predetermined number of containers or pallets in the system, all uniquely identified to a particular part number or component. If a maker of a part has an empty container waiting, he or she fills it. If there is no empty container waiting, then the operator must stop producing the part;

- **The shelf-space kanban**: shelf spaces are marked with the part number/description of different parts. Someone is given the task of ensuring that empty shelves are filled. When all spaces are filled, production of that component stops;

- **The floor grid kanban**: exactly the same as the shelf space kanban, but typically used for bulky or heavy components which are unsuitable for putting on shelves; and

- **Look - see kanban**: this variant uses visual markings or signs that tell the operator at a glance when to replenish the item. The marks are typically green when there are enough; yellow to signal a need to replenish, and the red mark indicates that immediate action is required.

2.3.4 Value Stream Mapping

Value stream mapping is a lean tool that can be used to expose and eliminate waste normally associated with manufacturing and service systems (Pieterse *et al* 2010:151). It is a tool that highlights where value is being added to the product (Pieterse, 2007:72).

Hobbs (2004) describes value as what the customer would be willing to pay for the time required to perform that element of work. Liker (2004:27) bases his definition of 'value' on what the customer (both internal and external) wants from a process.

Ohno (1988) divided waste into seven types and Pieterse *et al* (2010:2) describe these types of waste as follows:

- **Overproduction:** producing more than necessary for the next process is the biggest source of waste. It is any product that requires storage before further work is done on it. Symptoms of overproduction waste are when smooth flow of goods is difficult, when there are piles of work-in-process (WIP), and excessive lead and storage times;

- **Waiting:** the amount of waiting time for materials, disguised by operators who are kept busy producing work-in-progress which is not needed at the time, is a waste;

- **Transport:** moving materials around the plant, together with the double and triple handling of work in process, does not add value. Symptoms of transport waste are stacking and un-stacking of components;

- **Inappropriate processing:** the process itself may be a source of waste. Some operations may only exist because of poor component design, the present state of technology, or poor maintenance. These can be eliminated;

- **Inventory:** symptoms of inventory waste are dusty, deteriorating material, stacks of containers for work-in-progress, and a sophisticated stores system;

- **Motion:** an operator may look busy, but sometimes no value is being added by the work. Symptoms of motion waste are when components and controls are outside easy reach, double handling, widely spaced equipment, operators bending, long walking distances, and centralised facilities; and

- **Defective goods:** quality waste is often very significant in operations, even if actual measures of quality are limited. Symptoms of defect waste are accumulation of work in scrap bins, high inspection levels, difficult assembly, a large rework area, and high customer complaints.

According to Radnor, Walley, Stephens and Bucci (2006), as cited by Vazi (2008:), value stream mapping is a process analysis tool that is used to

identify key process characteristics such as the sequence of activities in a process, their speed or cycle time, as well as judging whether or not an activity is adding value to the customer. Current maps are used for capturing the existing processes and are then adapted to the future state maps in order to suggest how the process could be improved.

Pieterse (2007) states that "it outlines the current and future states of a production system in a picture that shows the users where they currently are and what wasteful steps should be eliminated. Using this picture as a basis, the user can then apply lean manufacturing principles to reach the desired future state." Pieterse *et al* (2010) also state that the ultimate aim of the value stream mapping exercise is to improve flow, create pull, and eliminate waste on an ongoing basis.

Pieterse *et al* (2010:152) list the general phases of completing a value stream mapping exercise as follows:

- Select a product family;
- Map the current state;
- Analyse the flow and apply lean guidelines;
- Map the future state;
- Create and implement an action plan; and
- Repeat the procedure.

2.4 Evolution of Lean Manufacturing into Lean Service

Service operations now comprise more than 80% of the gross domestic product (GDP) in the United States and are rapidly growing around the world. Even within manufacturing companies, it is common to have only 20% of product prices driven by direct manufacturing labour. The remaining 80% comes from costs that are designed into the product or costs associated with support and design functions (finance, human resources, product development, purchasing, engineering, etc. (George, 2003).

In South Africa, in 2008, the real annual gross domestic product increased by 3.1% compared to 2007. The main contributors to this growth were the service sector (finance, real estate, and business service industries) at 1.0%, as opposed to manufacturing, which contributed 0.2% (STATSA, 2008).

This growth in the service industry indicates how times have changed from when economies were driven by manufacturing and mineral resources. The service industry has grown immensely, evidenced by its contribution to the United States' gross domestic product and its continued growth in South Africa.

Whilst this is the case, Piercy and Rich (2007) argue that even though the service industry is the majority employer and contributor to the developed economies, the level of service delivered by the vast majority of these organisations are not at an acceptable level for their customers. It is perhaps for this reason that Womack and Jones (1996) proposed a major role for lean improvement in the service sector. Many researchers and practitioners have echoed their call for lean adoption and Bowen and Youngdahl (1998) agree with them when they say that services could significantly improve its performance on both cost, largely through improved efficiency, as well as

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quality. Services could achieve this by looking at manufacturing and borrowing some of the thinking, exemplified by one of the founders of mass production, Henry Ford.

Sellito, Borchardt and Perreira (2003) suggest that processes involving services are much less structured, more complicated, and less predictable than most manufacturing or based on high technology processes. An important attribute that can distinguish better service organisations, is the nature of the interaction between employees and customers. This interaction must be flexible, but strongly focused on techniques of customer relationship management.   In this regard, lean thinking begins by identifying how customers perceive value. The concept of lean thinking in Toyota's Production System too, has been adapted from manufacturing to technological processes, recognising the importance of demands from customers

Lean principles were originally developed in industrial operations as a set of tools and practices that managers and workers could use to eliminate waste and inefficiency from production systems, reducing costs, improving quality and reliability, and speeding up cycle times (Corbett, 2007)

Corbett (2007) states that "Recently, lean techniques have moved from manufacturing plants to operations of all kinds, everywhere: insurance companies, hospitals, government agencies, airline maintenance organisations, high tech product development units, oil production facilities, IT operations, retail buying groups, and publishing companies, to name just a few. In each case the goal is to improve the organisation's performance on the operating metrics that make a competitive difference, by drawing employees into the hunt to eliminate unneeded activities and other forms of operational waste."

Currently there are a number of 'lean thinking' examples that have occurred within the United Kingdom healthcare services (Fillingham, 2007 as cited by Grove, Meredith, MacIntyre, Angelis, & Neailey 2010). National Health System Doncaster re-designed its transient ischemic attack (TIA) pathway by introducing a rapid access one-stop transient ischemic attack clinic. This has removed between 21 and 41 days from the old transient ischemic attack pathway of care. Patients requiring vascular surgery are now seen within 48 hours from onset of symptoms – a process that previously took between 50 to 70 days (Fillingham, 2007 & Tuck, 2009, as cited by Grove et. al 2010).

In addition to the above, there have been a number of successful lean implementations in the service industry, especially in the United States and the United Kingdom. Among these is Taco Bell's lean production line to service enabled minimisation of performance tradeoffs. K-Minus inverted the restaurant space from 70% kitchen and 30% seating, to 30% kitchen and 70% (Bowen and Youngdahl, 1998).

The healthcare system has greatly improved through lean initiatives. The greater body of research has focused on the movement of patients through the treatment process. This research has treated patients as products, being moved through a transformation (treatment) process inside the healthcare system. Similar to a product progressing through an assembly line, patients (materials) are regarded as entering the operation, having operational activities performed on them (such as admission, initial assessment, and treatment regime) with an output being produced (a person cured or otherwise).

Lean initiatives have also improved processes in financial institutions, such as reducing the number of defects in issuing of new insurance and reduction of information requests (De Koning, Does and Bisgaard, 2008). A research

conducted at His Majesty Revenue and Customs (HMRC), a tax collection agency in the United Kingdom, found that capability delivery through lean has impacted upon tools, structure, practices and behaviours. This has improved quality and productivity, made processes and practices clearer and led to new ways of working (Radnor & Bucci, 2007).

There is not much information available on how lean has been implemented in tax collecting agencies around the world, with the exception of the United States' Internal Revenue Service (IRS) and His Majesty Revenue and Customs (HMRC) in the United Kingdom. The researcher was unable to uncover more information.

His Majesty Revenue and Customs (HMRC) piloted and implemented lean in 2004 as part of their Capability Delivery Projects which aimed to achieve £5 million of efficiency gains by March 2008. Lean was implemented in all large processing sites and lean experts were appointed for each site. External consultants also worked with local lean experts.

The implementation focused on addressing the following issues in all processing centres:

- Improving efficiency and customer service by delivering a 30% increase in productivity;
- Reducing backlogs and the level of inconsistency across processing; and
- Ensuring that His Majesty Revenue and Customs (HMRC) becomes the United Kingdom government's 'processor of choice'.

His Majesty Revenue and Customs (HMRC) "is the closest of any public service organization to date in implementing the complete Lean philosophy" (Radnor & Bucci, 2008, cited by Carter, Danford, Howcroft, Richardson, Taylor & Smith, 2011:).

In the face of well-documented and well-publicised quality problems, the Internal Revenue Service in the United States introduced a quality improvement program in 1986, reaffirming its commitment to quality with 'A Plan for Improving Quality, Customer Service, and Organizational Performance in 1991 (Chen & Sawyers , 1994:)

Three major goals were identified in implementing total quality management (TQM) at the United States' Internal Revenue Service:

- Enhancing quality and productivity through its business processes;
- reducing the taxpayer burden; and
- and improving voluntary compliance.

These goals were to be achieved through quality improvement initiatives and modernisation efforts, including:

- Increasing the quality of services provided to taxpayers through employee empowerment - equipping workers with appropriate skills, resources, and authority to do the job right;
- Adhering to the highest standards of professional and ethical conduct through active leadership that both clarifies and communicates expectations for ethical behaviour and also fosters a climate supporting and demonstrating a commitment to such behaviour; and
- Embracing and managing diversity to capitalise on the different experiences, values, perspectives, and concerns in the work force.

In South Africa, the South African Revenue Service is following the same approach that has been adopted by the above two agencies. The South African Revenue Service is currently modernising its service offerings. These

modifications can be evidenced from the change of the manual tax return which was reduced from twelve pages in 2007, to only three pages currently. The introduction of electronic tax return submission via an e-filing channel has revolutionised the manner in which taxpayers submit their tax returns.

Modernisation is concerned with innovation, while continuous improvement is concerned with incremental improvement. The South African Revenue Service has modernised most of it processes, mostly driven by huge technological advances, especially the Information Technology infrastructure.

The introduction of e-filing does not only make it easy for taxpayers to submit their tax returns from the comfort of their own homes or offices, but also reduces the number of people visiting The South African Revenue Service, thereby reducing queuing times.

The South African Revenue Service has also just like His Majesty Revenue and Customs, established the 'lean experts' department known as the 'Continuous Improvement Unit'. The experts are placed in all major South African Revenue Service centres and offices.

These initiatives have seen an increase in compliance from the taxpayers and the South African Revenue Service has won numerous accolades as the leading public sector agency.

The continuous improvement unit is tasked with implementing lean tools and ensuring that while modernisation is key to achieving the strategic objective of becoming a world class revenue agency; this is done with a view of satisfying

the client. Lean assists the South African Revenue Service employees in not losing this focus.

To this extent, the continuous improvement unit has implemented a number of lean tools such as 5S, visual management and value stream mapping.

Several researchers have noted the extension of lean into pure service; administrative areas as an extension of shop-floor level manufacturing change. These include office systems such as order-receipt, quotation, sales processing, accounting or human resources, all of which has been found to be possible to improve with the application of the same lean principles and basic tools as in manufacturing (Piercy & Rich, 2007).

2.5   Requirements for successful implementation of Lean (Lean Leadership)

2.5.1 Role of Management

In order for a lean production system to run effectively, lean management principles must be practised. The management needs to be focused on the integration of the organisation's vision, culture, and strategy to ensure that its customers' needs for high quality, low product cost, and short product delivery times are met (Popoola, 1996).

Prior to the 19th century, most organisations were owner-run and owner-managed. As the 19th century unfolded, organisations emerged as local powerhouses or complex entities where the single owner/manager concept paved the way for the creation of middle-management as a liaison to the owner. This organisational innovation exploded in the 20th century where firms built enormous hierarchical structures to manage the increasingly

cumbersome, capital intensive and geographically distributed companies. The early 1920's to the 1960's was a time when business learned to "routinize" processes (as developed and driven by Frederick Taylor and his Taylorism methodologies), and where the only true competition came from within one's own geographic area (Lucansky, Burke & Potapchuk, 2002).

Today, leaders are under pressure to create 'mega-enterprises' with the ability to react intuitively, and where creativity, learning, and collaboration are the cornerstones for enhancing the staying power of growth organisations (Lucansky *et al*, 2002).

In order to implement the concept of lean manufacturing successfully, many researchers emphasise commitment by top management. The companies should utilise strong leadership capable of exhibiting excellent project management styles. In essence, these qualities would facilitate the integration of all infrastructures within an organisation through strong leadership and management vision and strategy (Taleghani, 2010).

Doolen and Worley (2006) argue in their research paper on the role of management, that management that fails to embrace the implementation may intentionally or unintentionally sabotage the effort. They further emphasise that management should not only demonstrate commitment and leadership, it must also work to create interest in the implementation and communicate the change to everyone within the organisation.

In essence, they must create an environment where the lean philosophy becomes a culture. Popoola (2000) suggests that managers must create a lean culture where people are not seen as problems, but as problem solvers,

where everyone understands that it is okay to make legitimate mistakes, and problems are welcome as they present an opportunity for improvement.

Too often, company leaders lack the total commitment to, and understanding of, the Toyota Production System (TPS), that is essential to its adoption, and are unwilling to be involved in its day-to-day implementation and application. The total production system is not simply a set of concepts, techniques, and methods which can be implemented by command and control. Rather, it is a fully integrated management and manufacturing philosophy and approach which must be practiced throughout the organisation from top to bottom and consistently applied and 'kaizened' day in and day out (Convis, 2001).

Another common reason total production system implementation fail is that managers try to implement individual elements instead of the entire total production system approach. Since the elements of the total production system are integrated and interdependent, any attempt to implement it only partially, is bound to produce very unsatisfactory results. Each element of the total production system will only fully blossom if grown in an environment that contains and nourishes the philosophies and managerial practices needed to support it (Convis, 2001).

It requires a fundamental, philosophical and cultural change of how your organisation does business. It requires senior management and front line leaders to insist, while leading by example, that lean principles permeate every activity, every decision, and every movement. In most organisations, especially those that have not focused on this before, that is major change that requires a huge undertaking to achieve (Richardson, 2001).

The true lean leader is one who can detach himself from the team to allow empowerment to flourish where the team provides itself with such services as peer reviews, rewards, and even team recruitment. These leaders delegate responsibilities and coach others in ways that nurture their growth, bring out their best and inspire support for the organisation's goals (Lucansky *et al*, 2002).

Good leadership ultimately promotes effective skills and knowledge enhancement amongst a workforce and minimises the non-value activities in order to eliminate the wastes. The manager should also work to create interest in the implementation and communicate the change to everyone within the organisation specifically; the needed information related worker on the shop floor should be updated respectfully (Taleghani, 2010).

The skills of a lean leader, as explained by Lucansky *et al* (2002), include that he must be more strategic in his own actions, distribute leadership tasks amongst a wide range of other potential leaders, and must have a high level of commitment to the cause.

2.5.2 Teamwork

A team is a mature group of individuals within which leadership is shared, accountability is both individual and collective, the members have developed their own purpose, problem solving is a way of life, and effectiveness is measured by collective outcomes (Pieterse *et al*, 2010). The teamwork culture is a means to face the present unstable situations and to create an organisation that achieves high performances in the midst of continuing change (Reinders, 2010).

Teamwork is of immense importance in lean manufacturing. Many initiatives are best taken through teams. The process of continuous improvement benefits if the collective brainpower and skills of the whole group are utilised (Pieterse, 2007).

According to Pieterse (2007) and Liker (2004:185), teamwork provides motivation, better coordination, more effective problem solving, and better decision making. It is an important part of the lean culture (Pieterse *et al*, 2010:15).

Liker (2004:194) summarises Toyota's approach to the five most prominent motivation theories. The underneath table provides a summary of the theories and how they relate to Toyota in building teamwork:

Table: 2

Internal Motivation theories	Concept	Toyota Approach
Maslow's Need Hierarchy	Satisfy lower level needs and move employees up the hierarchy towards self actualisation	Job security, good pay, and safe working conditions satisfy lower level needs. Culture of continuous improvement supports growth toward self actualisation
Herzberg's Enrichment Theory	Eliminate 'dissatisfiers' (hygiene factors) and design work to create positive satisfiers	5S, ergonomics programmes, visual management, and human resource policies

	(motivators)	address hygiene factors. Continuous improvement, job rotation, and built in feedback support motivators
External Motivation Theories		
Taylor's Scientific Management	Scientifically select and design standardised jobs, train, and reward with money. Performance relative to standards	All scientific management followed, but at the group level rather than individual level, and based on employee involvement
Behaviour Modification	Reinforce behaviour on the spot when the behaviour naturally occurs	Continuous flow and andon- creates short lead times for rapid feedback. Leaders constantly on the floor and providing reinforcement
Goal setting	Set specific, measurable, achievable challenging goals and measure progress	Sets goals that meet these criteria through 'hoshin kanri' (policy deployment). Continuous measurements relative to targets

Source: Liker (2004)

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2.5.3 Lean Culture

The lean manufacturing systems as well as the emerging lean enterprise structures develop towards the simple co-ordination of the basic business processes in the chain from the suppliers to the customers, as opposed to the existing complex structures of the functionally differentiated hierarchies. The driving force behind lean manufacturing follows the general direction of self-organisation: towards the "simplicity of the original structure" (Smeds, 1994).

Taleghani (2010) lists two requirements in order to achieve a lean culture:

2.5.3.1 Inter-Organisational Improvements

- Developing a learning environment and training the employee, can provide an approximate efficiency, making the sense of learning more, and encouraging the organisation's departments pursuing lean;
- Ensure that there is a strategy of change whereby the organisation should understand and adapt its actions through the changes, and communicates how the goals will be achieved. The managers, through making an effort to maximise stability in a changing environment, should reduce schedule changes, program restructures' and procurement quantity changes;
- Assign responsibilities within the pilot program initially and ultimately within the whole organisation whereby it is also evident who is championing the program;
- Make decisions at the lowest level, assessed by the number of organisation levels, promote lean leadership at all levels, and evolution by the number of lean metrics; and
- Control the conflicts and assess the fraction of an organisation's employ operating under lean conditions.

2.5.3.2 Intra Organisational Improvements

- Develop supplier relationship based on mutual trust and commitment;
- Systematically and continuously focus on the customer; one could receive a signal of this via the percentage of projects in which the customer was involved;
- Maintain the challenge of existing processes through, e.g. the number of repeat problems and customer assistance to suppliers; and
- Lean requires a long-term commitment. A medium sized company pursuing the lean philosophy would need a minimum of three to five years to star.

Bhasin and Burcher (2004) list ten requirements in changing corporate culture:

- Make decisions at the lowest level assessed by the number of organisation levels;
- Forward a definite clarity of vision; an indication of what the organisation believes it will look like once the transformation is complete;
- Ensure that there is a strategy of change whereby the organisation communicates how the goals will be achieved;
- Assign responsibilities within the pilot programme initially and ultimately within the whole organisation whereby it is also evident who is championing the programme;
- Develop supplier relationships based on mutual trust and commitment; this could be assessed by the number of years a relationship has existed with a supplier; and the percentage of procurement purchased under long-term supplier agreements;

- Nurture a learning environment for which indices such as training hours/employee hours can provide an approximate barometer;

- Systematically and continuously focus on the customer; one could receive a signal of this via the percentage of projects in which the customer was involved;

- Promote lean leadership at all levels observed by the number of lean metrics at all levels;

- Maintain the challenge of existing processes through e.g. the number of repeat problems and customer assistance to suppliers; and

- Make a conscientious effort to maximise stability in a changing environment whereby an attempt is made to reduce.

2.5.4 Communication

The variables that will affect the success rate of a lean manufacturing implementation are important to understand, but it is equally important to realise how the organisation may be impacted on by the lean manufacturing implementation. A lean manufacturing implementation may not only provide economic benefits to the organisation, but other less tangible benefits as well. A key example of such a benefit is increased communication. .Lean manufacturing requires clear communication, not only between shifts, but also between all value streams (Dolen & Worley 2006)

Communication is an important aspect of lean implementation. According to Furterer & Elshennawy, (2005), this communication can include formal project kick-off meetings where the mission, vision, and goals of the lean program and projects are discussed. At the beginning of the program and projects, it is critical to identify and communicate the mission, vision, values, goals, roles, and responsibilities of the projects and project teams. Throughout the projects, it is important to provide a continuous status of the projects through

periodic status meetings and reports, so that the organisation is aware of the successes and learns from the projects.

Good communication prevents conflicts from occurring or escalating. Communicating well means that the body language fits with the verbal message; issues are not personalised, and actions, behaviours or situations are criticised, rather than the individuals (Pieterse, 2007:48).

In the evaluation of the lean approach to business management in the public sector by Radnor *et al,* (2006), they observed the following pertaining to communication:

- "Although internal communication in relation to the change programme had been good, respondents felt that there had been little or no external communication;
- Communication was seen to be a big issue – it was felt that there had not been sufficient internal communications;
- All this is supported by wider communication…this aspect was seen as a weakness by one of the Kaizen team, amongst others."

Radnor *et al* (2006) further state that "In a poorly communicated Lean implementation, the initial enthusiasm for Lean may quickly fall, while other staff not directly involved in the implementation may remain disengaged, resulting in a reduction in improvement activity and a consequent lack of sustainability of the changes made."

2.6   Summary

In this chapter the literature on lean philosophy is discussed in detail. The researcher shows how lean has evolved from being a Toyota Production System into a globally accepted production philosophy. This universally accepted philosophy further proves its importance and usefulness by not only being restricted to the manufacturing sector, but evolving into the service industry.

This chapter demonstrates how lean has evolved and how government departments and various service organisations have successfully transformed themselves into lean organisations with tremendous success. These include organisations such as Taco Bell, His Majesty's Revenue and Customs (United Kingdom equivalent of the South African Revenue Service), Internal Revenue Service (United States equivalent of the South African Revenue Service) and the South African Revenue Service.

The key requirements of lean implementation were discussed and it is clear from the literature that leadership plays a crucial role in the success of lean implementation. Further on in the research, the survey of this research will focus on the manager's role in lean implementation.

Chapter 3

3. RESEARCH DESIGN AND RESEARCH METHODOLOGY

3.1 Research Design

The starting point in research design is to determine the research paradigm. A research paradigm is a framework that guides how research should be conducted (Collis & Hussey, 2009). These authors list two main paradigms:

- Positivism - underpinned by the belief that reality is independent of us and the goal is the discovery of theories based on empirical research. Knowledge is derived from 'positive information' and because 'every rationally justifiable assertion can be scientifically verified or is capable of mathematical proof'; and

- Interpretivism – underpinned by the belief that social reality is not objective, but highly subjective because it is shaped by our perceptions. The researcher interacts with that being researched, because it is impossible to separate what exists in the social world from what is in the researcher's mind. Therefore, the act of investigating social reality has an effect on it.

The way in which researchers develop research designs is fundamentally affected by whether the research question is descriptive or explanatory. It affects what information is collected. For example, if we want to explain why some people are more likely to be apprehended and convicted of crimes, we need to have hunches about why this is so. We may have many possibly incompatible hunches and will need to collect information that enables us to

see which hunches work best empirically (De Vous, 2001). This is supported by Ghauri and Gronhaug (2002), as cited by Ndlovu (2008) where he explains that exploratory research is used where the problem has not been clearly defined, and a literature review and interviews are typically relied upon to give insight into a situation.

Research design can be defined as the science of planning procedures for conducting studies so as to get the most valid findings (Collis & Hussey, 2009:), and its function is to ensure that the evidence obtained enables one to answer the initial question as unambiguously as possible (De Vous, 2001).

When designing research, a researcher has to begin with an end in mind, or answering a question about "what evidence do I need to collect?"

De Vous (2001) further states that explanatory research focuses on 'why' questions, while descriptive research focuses on the 'what' aspect.

Gerber (MBA research notes, 2011) lists eleven questions that must be answered towards the research design:

- The conceptual framework related to the problem issue;
- The researcher's cosmological, ontological and epistemological standpoint / position;
- The overall research approach (qualitative/quantitative/mixed mode);
- The research methodology(ies) related to the solving of the problem with a justification for the/their relevance;
- The research paradigm embedded in the research methodology;
- The kinds of data the researcher will need to collect;

- The data collection tools that will be used;
- The data analysis and interpretation approaches that will be involved;
- The ways in which data will be justified as evidence;
- The ways evidence will be validated as learning/knowledge; and
- The ways learning/knowledge will be communicated.

3.2   Research Methodology

Lancaster (2005) defines research methodology as "the general category of research approach being used in a research/consultancy study and which relates particularly to the approach to data collection." Collis and Hussey (2009) define methodology as "an approach to the process of the research, encompassing the body of methods."

Both definitions have similarities in that they emphasise that methodology relates to an approach when conducting a research. A particular methodical approach has to be followed when conducting research.

According to Ghauri and Gronhaug, (2002) as cited by Ndlovu (2008), the research method is essentially a systematic, focused and organised gathering of data for the purpose of extracting information that would in turn answer or solve the research problems or questions.

As mentioned earlier during the discussion on research design, the starting point in research is identifying the research paradigm. Once the research paradigm has been identified, a researcher can start thinking about the research strategy (Collis & Hussey, 2009).

Two distinct research approaches exist, i.e. qualitative and quantitative research. The below table list the differences between the two approaches:

Table 3.1 Qualitative versus quantitative research

Qualitative Paradigm	Quantitative Paradigm
Concerned with understanding behaviour from actors' own frames of reference	Seek the facts/causes of social phenomenon
Naturalistic and uncontrolled observation	Obtrusive and controlled measurement
Subjective	Objective
Close to the data: 'the insider perspective'	Removed from the data: 'the outsider perspective'
Grounded, discovery oriented, exploratory, expansionist, descriptive, inductive	Ungrounded, verification oriented, reductionist, hypothetico – deductive
Process oriented	Outcome oriented
Valid: real, rich, deep data	Reliable: hard and replicable data
Ungeneralised: single case studies	Generalisation: multiple case studies
Holistic	Particularistic
Assume a dynamic reality	Assume a stable reality

Source: Oakley, A. (1999)

Collis and Hussey (2009) put it simply that "qualitative data are nominal form, whereas quantitative data are numerical".

Although there are a number of differences between the methodologies, similarities are also found between them:

Table 3.2 Similarities between qualitative and quantitative research

- While quantitative research may be mostly used for testing theory, it can also be used for exploring an area and generating hypotheses and theory
- Similarly, quantitative research can be used for testing hypothesis and theories even though it is mostly used for theory generation
- Qualitative data often include quantification (e.g. statements such as more than, less than, most, as well as specific numbers)
- Quantitative approaches (e.g. large scale surveys) can collect qualitative (non-numeric) data through open ended questions
- The underlying philosophical positions are not necessarily as distinct as the stereotypes suggest

Source: Blaxter et al. (2001:65)

The choice of a research approach/methodology will be influenced by the nature of one's research project as well as one's own philosophical preferences (Collis & Hussey, 2009).

A commonly held assumption is that researchers end up choosing a qualitative approach because a survey is not possible to implement or, because they have not mastered statistical techniques (Collis & Hussey, 2009, Pekkarie & Welch, 2004:).

According to Creswell (2002), as cited by Gerber (2008), "Qualitative research is an inquiry approach useful for exploring and understanding a central phenomenon. To learn about this phenomenon, the inquirer asks participants broad, general questions, collects the detailed views of participants in the form of images or words, and analyses the information for description and themes. From this data, the researcher interprets the meaning of the information drawing on personal reflections and past research. The structure

of the final report is flexible, and it displays the researcher's biases and thoughts".

The research methodology chosen for this treatise is the qualitative technique. The underneath table provides direction as to how the methodology will be followed:

Question	Answer according to my problem question
What is the central question my research wishes to address?	Is the South African Revenue Service ready for lean implementation or has it followed acceptable standards in implementing lean?
What is the purpose of my research?	Assessing the current state of lean implementation in selected pilot branches of the South African Revenue Service
What will the nature of my research process be?	Research will be qualitative in nature
What kinds of data do I need to collect? Will it be about people, theories, models, frameworks, in the form of words or numbers?	Questionnaire will be derived from theories discussed in the literature review section
How will I have to collect my data? (What are the methods of data collection?)	Data will be collected through questionnaire, if necessary interviews will be conducted

How will I analyse and interpret my data? (What are the methods of data analysis?)	Descriptive statistics and interpretation of graphs will be used to analyse data
How will I communicate my findings?	A report will be compiled and presented to the South African Revenue Service management with recommendations.

Adapted from Dr Gerber: Research Methodology Selection (2011)

3.3   Sample Size

Collis and Hussey (2009) state that "a sample is a subset of a population and is taken to ensure that the sample is unbiased in the way it represents the phenomena under study."

A sample is part of the population and is generally chosen so that it reflects the characteristics of the population (Lancaster, 2005).

It is generally acceptable that the bigger the sample, the more accurate the results can be.

The pilot implementation of lean was done in twelve branches countrywide representing the seven South African Revenue Service regions (Port Elizabeth, Polokwane, Pretoria Central, Durban, Bellville, Alberton, East London, Rissik Street, Rustenburg, Pretoria Head Office, Port Shepstone, Randfontein and Bloemfontein). Branch managers (12) and team leaders will be targeted. A sample will then be taken for the team members.

Blumberg, Cooper and Schindler (2005) summarise the answer to the question of what size sample is needed, as follows:

- A sample size must be large or it is not representative; and
- A sample should bear some proportional relationship to the size of the population from which it is drawn.

They further list some principles that influence the sample size:

- The greater the dispersion or variance within the population, the larger the sample must be to provide estimation precision;
- The greater the desired precision of the estimate, the larger the sample must be;
- The narrower the interval range, the larger the sample must be;
- The greater the number of sub-groups of interest within a sample, the greater the sample size must be, as each sub-group must meet minimum sample size requirements; and
- If the calculated sample size exceeds 5% of the population, sample size may be reduced without sacrificing precision.

3.4   Criteria for effective data: data quality

According to Lancaster (2005), overall, effective data provides the basis for the information required to meet the objectives of the research project. Of particular importance with regard to dimensions or criteria of data quality, are the dimensions of what researchers refer to as:

- Reliability;
- Validity; and
- Generalisability.

3.4.1 Reliability

Reliability is concerned with the findings of the research and is one aspect of the credibility of the findings. For the research result to be reliable, a repeat study should produce the same results (Collis & Hussey, 2009). Lancaster (2005) agrees, but he further adds that this is assuming that there are no real changes in what is to be measured or the circumstances of such measurement.

To ensure reliability of the findings, this research will not only focus on one branch office or one region, but will be spread throughout the country to ensure representation. The South African Revenue Service has seven regions and a minimum of one office from each region will be selected for the survey.

3.4.2 Validity

Validity is the extent to which a construct measures what it is supposed to measure (Hair, Money & Samouel, 2003) or to which the research findings accurately reflect the phenomenon under study (Collis & Hussey, 2009).

According to Hair et. al., (2003), an easy measure of validity would be to compare observed measurements with the true measurement. They suggest using one or more of the following approaches:

- Content validity: also known as face validity. A scale involves a systematic but subjective assessment of a scale's ability to measure what is supposed to measure;
- Construct validity: assesses what the construct (concept) or scale is, in fact, measuring. To assess construct validity you must understand the theoretical rationale underlying the measurements you obtain; and

- Criterion validity: assesses whether a construct performs as expected relative to other variables identified as meaningful criteria. For example, theory suggests that employees who are highly committed to a company would exhibit high job satisfaction. Thus, correlations between measures of employee commitment and job satisfaction should be positive and significant.

3.4.3 Generalisability

Generalisability is essentially another dimension of validity quality in data and relates to the extent to which results from data can be generalised to other situations (Lancaster, 2005).

Questions of reliability, validity and generalisability in deductive versus inductive research methods, are provided below:

	Deductive Research	Inductive Research
Validity	Does an instrument measure what it is supposed to measure?	Has the researcher gained full access to the knowledge and meanings of informants?
Reliability	Will the measure yield the same results on different occasions (assuming no real change in what is measured)	Will similar observations be made by different researchers on different occasions?
Generalisability	What is the probability that patterns observed in a sample will also be	How likely is it that ideas and theories generated in one setting will also

	present in the wider population from which the sample is drawn?	apply in other settings?

Source: **Adapted from Lancaster (2005:73)**

3.5 Data Collection Instruments

Blumberg, Cooper & Schindler (2005) define data as the facts presented to the researcher from the study's environment. It may be characterised further by their abstractness, verifiability, elusiveness, and closeness to the phenomenon.

Although there are several facets to the design and categorisation of research methodologies, a major distinguishing feature between different research methodologies is indeed the different approaches to data collection (Lancaster, 2005:68). Lancaster (2005) further states that when it comes to types of research approaches for data collection, several models or taxonomies of classifying the various research methodologies exist. He lists the following as the major research methods pertaining to data collection:

- Secondary data collection;
- Case studies;
- Experimentation;
- Observation/ethnographic;
- Interviews and surveys; and
- Action research.

Once data is obtained, it is then analysed and becomes the basis for informed decision-making, which in turn assists in reducing the risk of making costly

errors (Hair *et al*, 2003:123). This data must be well planned and managed if the researcher is not to become hopelessly overwhelmed and the data become a barrier, rather than an aid to the research project (Lancaster, 2005).

Hair *et al* (2005:124), in addition to Collis and Hussey (2009), refer to methodologies such as interviews, observation, focus groups, and surveys as qualitative approaches, whereas quantitative data is obtained through the use of various matric scales.

Qualitative data are normally transient, understood only within the context, and are associated with an interpretive methodology that usually results in findings with a high degree of validity. In contrast, quantitative data are normally precise, can be captured at various points in time and in different contexts, and are associated with a positivist methodology that usually results in findings with a high degree of reliability (Collis & Hussey, 2009).

The researcher, in this treatise, will use surveys/questionnaires as the means of data collection.

3.5.1 Surveys and Question Design

A survey methodology is designed to collect primary or secondary data from a sample, with a view to analysing them statistically and generalising the result to a population (Collis & Hussey, 2009). Lancaster (2005) expands on this, stating that it is an approach to data collection that involves collecting data from large numbers of respondents.

Question design is concerned with the type of questions, their wording, the order in which they are presented, and the reliability and validity of the

responses. It is essential to pilot or test the questionnaire as fully as possible before distributing it (Collis & Hussey, 2009).

Surveys can take all sorts of forms encompassing, for example, full scale censuses using highly structured questionnaires and essentially looking for descriptive data, or, alternatively, relatively small scale surveys exploring relationships between variables through structured questioning and essentially looking for analytical data (Lancaster, 2005).

It is the latter part that explains how this research will conduct the surveys. A sample of executive managers, branch managers, team leaders, and team members will be selected to conduct the surveys.

I. Branch Managers

The executive and branch managers are the strategic leaders of the organisation. They are the employees that set the tone for change in the South African Revenue Service branches. The questions directed at them will test the following key issues related to their role, as explained in Chapter 2:

- Enterprise strategic planning: The decision to pursue lean is strategic in nature. Its impact throughout the enterprise is profound and pervasive, affecting all business practices and processes. This part of the questionnaire will seek to establish the extent to which strategic planning involves lean implementation;

- Adopt lean paradigm: Transitioning to lean requires a significant modification to the strategic plan of the enterprise. It is imperative that the enterprise leadership understands and buys

into the lean paradigm as they will be required to create a vision for doing business, behaving, and seeing value in fundamentally different ways. This category will seek to establish to which degree management understands the lean paradigm;

- Management Commitment and Lean Enterprise Vision: Management's commitment to, and leadership for, quality are considered to be one of the foundations of total quality management (TQM) and lean production. This part of the questionnaire will measure the commitment of management to provide lean leadership;

- Develop Lean Structure and Behaviour: Organisational structure, incentives, policies, business systems, and processes must be aligned and coordinated to elicit the behaviour required for successful implementation of lean principles and practices. This category will look at whether the mentioned behaviour exists within the enterprise/division; and

- Focus on Continuous Improvement: Successful execution of a lean implementation plan forms the basis for further improvement. The improvement process is monitored and nurtured, lessons learned are captured, and improved performance becomes a strong driving force for strategic future planning by enterprise/division leaders. The questions in this category will establish whether the focus has been placed on continuous improvement for a successful lean journey.

The questionnaire used here was adapted from the Lean Enterprise Self Assessment Tool (LESAT). The tool is organised into three assessment sections: lean transformation/leadership, life cycle processes, and enabling infrastructure. The first section contains lean practices pertinent to the lean

transformation process with an emphasis on enterprise leadership and change management. The second section contains lean practices related to the 'life cycle processes' of an enterprise, i.e. those processes involved in product realisation. The third section contains lean practices applicable to infrastructure support units. (http://lean.mit.edu/products/lean-enterprise-self-assessment-tool-lesat.html).

For the purpose of this research, only lean transformation/leadership was used for assessment.

The LESAT was jointly developed by a team from aerospace industry, government, and academia under the auspices of the Massachusetts Institute of Technology (MIT), with the aim of developing a Transition to Lean roadmap for the aerospace industry. The tool allows for the rank ordering of the lean enterprise practices (Hallam, 2003).

II.   Team Leaders

The reasoning behind choosing the team leaders is because they are expected by management to be the lean leaders, and they have to ensure that they meet their mandate as they are direct line managers and all issues from the teams will first come to them. As direct line managers, team leaders are the first people to experience the reaction of the team members with regards to change or any effect felt by the team members.

At the South African Revenue Service, team leaders are regarded as part of management, but their role differs from that of the executive or branch manager because it is not strategic in nature. It is for this reason that questions posed to team leaders are the same as those posed to managers, with the exclusion of strategic planning, as they are not involved in this activity.

III. Team Members

It is this group of people that will be highly impacted upon by lean transition. Lean transition brings about change to any organisation, and the success of that transition is dependent on as much to the team members as it is to the leadership. Leadership has a responsibility of ensuring that they get the buy-in of employees for a successful lean implementation.

Questionnaires sent to employees were divided into the following categories:

- Communication: Lean journey requires communication throughout all value streams. All connections within the organisation must have a direct connection and there must be a clear method of sending and receiving responses to problems. The questions in this category will seek to establish the extent to which information is conveyed throughout the value chain;

- Continuous Improvement: Continuous improvement on getting everyone to participate in driving the lean culture in the organisation. Appropriate support and encouragement is provided to all participants in lean implementation. This part of the questionnaire will seek to establish the extent to which team members are involved in continuous improvement;

- Change Management: Significant organisational change has a powerful impact on people. Change creates a tension between the past and the future, between stability and the unknown. This category will seek to establish how the organisation has managed employees' anxieties and fears during times of change; and

- Training and Empowerment: Training and empowerment are important aspects for the successful lean implementation. Lean participants are to be empowered on the meaning of lean transformation and what it means to the organisation. The training must be in line with the environment they are accustomed to. The questions in this category will measure how well the South African Revenue Service trains and empowers its employees to fully understand the lean journey the organisation is undertaking.

The questionnaire posed to team members were either adapted from the LESAT, previous research, or views of the researcher.

3.5.2. Questionnaire Structure

The question structure for all respondents will contain three types of measurement:

I.   Biographical information questions – these questions will not be used to form an opinion on the outcomes of the survey. They are merely used to study patterns within the data and will give an indication of possible errors;

II. Work related information questions - these questions will not be used to form an opinion on the outcomes of the survey. They are merely used to study patterns within the data and will give an indication of possible errors; and

III. Target questions – these address the investigative questions of the study.

3.6   Summary

In this chapter, the research methodology is discussed in detail. The population to be surveyed is discoursed and the methodology used to collect data is discussed. Different methodologies of research are hashed out and arguments for the chosen methodology are made.

The assessment tool used is briefly outlined and the categories of the questionnaire are discussed in detail to provide the reader with an understanding of what the researcher seeks to establish by the questions in the questionnaire. The researcher initially intended to survey the managers, team leaders, and team members; however, as will be discussed in Chapter 5, team members eventually had to be excluded from the study.

Chapter 4

4.   PRESENTATION OF RESEARCH FINDINGS AND ANALYSIS

4.1   Introduction

Chapter 3 discussed the methodology followed in this research to gather the data required to answer the problem statement. This chapter presents the findings of the survey conducted. It also interprets the findings of the study.

The survey was adapted from the Lean Enterprise Self Assessment Tool (LESAT), developed by the Massachusetts Institute of Technology (MIT). The composition is discussed in Chapter 3. The questionnaire was sent to twelve South African Revenue Service branch offices, including the head office. The targeted respondents were the executive managers, branch managers and team leaders. The team members were excluded from the research as they did not have access to the Internet which was required to access the web-based questionnaire.

The questionnaire was sent to the branch managers of the selected branches and two team leaders from each branch. A total of 75% (nine managers) of the questionnaires sent to managers were completed, and 71% (seventeen team leaders) sent to team leaders were completed. Various reasons exist for the non-completion by others, ranging from absence from work to computers not working at the time of the survey.

4.2   Biographical and Work related analysis

Table 4.2.1: Sample breakdown by gender

Gender	Managers		Team Leaders		Total	
Male	5	56%	4	24%	9	35%
Female	4	44%	13	76%	17	65%
Total	9	100%	17	100%	26	100%

The above table indicates that there are more male managers that took part in the study than their female counterparts, whereas the opposite was observed with the team leaders.

Table 4.2.2: Sample breakdown by race

Race	Managers		Team Leaders		Total	
African	8	89%	5	29%	13	50%
Coloured	0	0%	2	12%	2	8%
Indian/Asian	0	0%	0	0%	0	0%
White	1	11%	10	59%	11	42%
Total	9	100%	17	100%	26	100%

Table 4.2.3: Sample breakdown by age

Age	Managers		Team Leaders		Total	
26- 35	3	33%	4	24%	7	27%
36 – 45	5	56%	7	41%	12	46%
46 – 55	1	11%	5	29%	6	23%
56 – 65	0	0%	1	6%	1	4%
Total	9	100%	17	100%	26	100%

Table 4.2.4: Sample breakdown by qualification

Highest Qualification	Managers		Team Leaders		Total	
Matric	0	0%	7	41%	7	27%
National Certificate	2	22%	1	6%	3	12%
National Diploma	3	33%	3	18%	6	23%
Degree	2	22%	2	12%	4	15%
Post Degree	1	11%	4	24%	5	19%
Other (unspecified)	1	11%	0	0%	1	4%
Total	9	100%	17	100%	26	100%

The results indicate that 88% of managers that responded to the survey had a post matric qualification with 11% unspecified. The level of academic achievement could play a key role in understanding the implementation of lean. The same can be said with regards to team leaders, as 41% completed matric and 60% completed a post matric qualification.

Table 4.2.5: Sample breakdown by region

Region	Managers		Team Leaders		Total	
Eastern Cape	1	11%	3	18%	4	15%
Western Cape	1	11%	1	6%	2	8%
Kwazulu Natal	1	11%	1	6%	2	8%
Free State/Northern Cape	1	11%	3	18%	4	15%
Mpumalanga/Limpopo/North West	0	0%	3	18%	3	12%
Gauteng East	3	33%	1	6%	4	15%
Gauteng West	2	22%	5	29%	7	27%
Total	9	100%	17	100%	26	100%

Gauteng had the most responses from managers, 33% and 22% for East and West respectively. Gauteng West also had the most respondents from the team leaders group. The high percentage in Gauteng does in no way reflect that they are more interested than other regions. It is simply because there were more offices in Gauteng than in other regions.

4.3   Management Analysis

Table 4.3.1: Descriptive Statistics - Enterprise Strategic Planning (n = 9)

	Strongly Agree		2		3		4		Strongly Disagree	
3. 1 I am fully aware of the potential opportunities that can be realised within the organisation as a result of transitioning to lean	3	33%	2	22%	2	22%	2	22%	0	0%
3. 5 Customer value influence the strategic direction	3	33%	1	11%	2	22%	3	33%	0	0%
3. 4 Strategic planning makes allowance for anticipated gains from lean improvements	2	22%	2	22%	3	33%	2	22%	0	0%
3. 2 A suitable strategy for value delivery has been identified to utilise	1	11%	2	22%	4	44%	2	22%	0	0%
3. 8 The current education and training programme adequately support the strategic direction(s) and lean transformation	0	0%	3	33%	5	56%	1	11%	0	0%
3. 3 Lean implementation is included explicitly in the division strategic plan	0	0%	3	33%	3	33%	2	22%	1	11%
3. 7 Adequate resources have been provided to facilitate lean transformation	0	0%	2	22%	4	44%	3	33%	0	0%
3. 6 The division level lean transformation plan is prioritised and aligned with strategic objectives	0	0%	0	0%	4	44%	5	56%	0	0%

The above table indicates that managers are fully aware of the opportunities present, and believe that customer value influences strategic direction. They, however, do not believe that the lean transformation plan is aligned with the strategic objectives of the organisation. It is also concerning that 56% of managers are undecided about whether the current education and training

programme support, adequately supports the strategic direction and lean transformation of the organisation.

Figure 4.3.1: Graphical Representation – Enterprise Strategic Planning
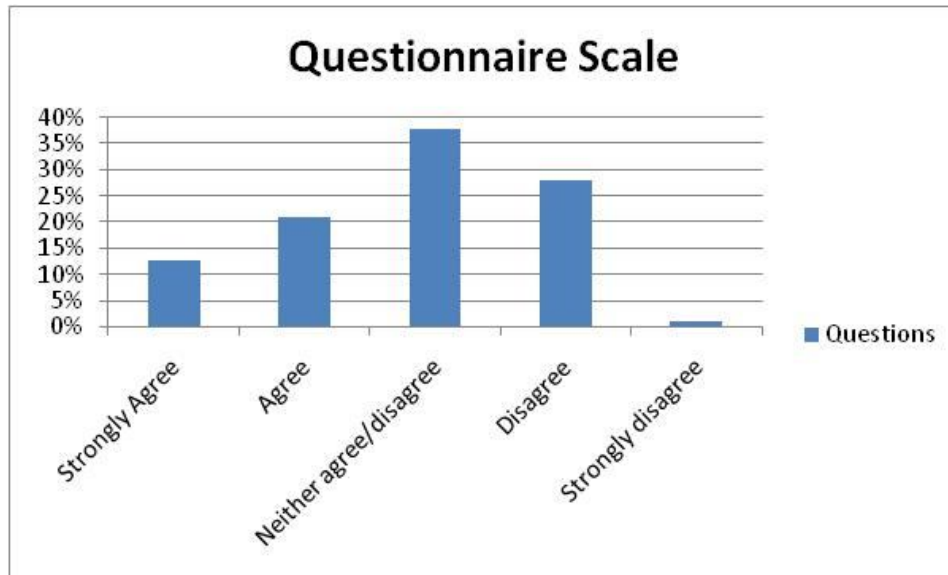
Figure 4.3.1 indicates that 1% of the respondents strongly disagree pertaining to the strategic planning involving lean thinking, compared to 13% that strongly agree and 21% that agree.

The branch managers at the South African Revenue Service have a different viewpoint on whether lean forms parts of enterprise strategic planning. In their case, 38% neither agreed nor disagreed, suggesting that they are probably not aware of what lean is, or how it is incorporated into the organisation's strategic plan. This is not encouraging, considering that the organisation is spending time and effort into implementing lean initiatives such as 5s and visual management.

The question that needs answering is whether an environment that enables successful lean implementation, has been created by integrating lean philosophy or lean thinking into the organisation's strategy.

Table 4.3.2 Descriptive Statistics - Adopting lean paradigm (n = 9)

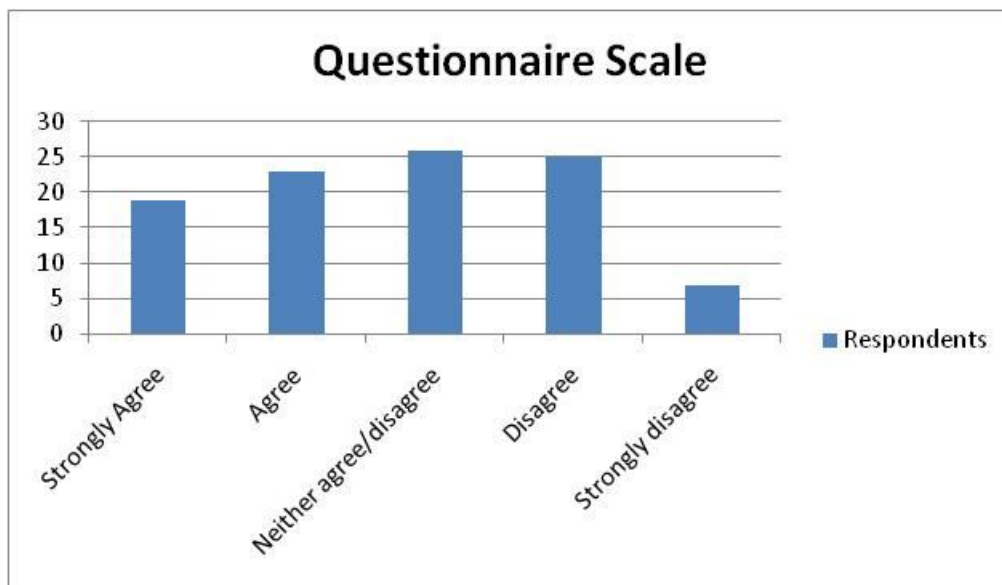|	Strongly Agree		2		3		4		Strongly Disagree	
4. 3 I support enthusiastically a transformation to lean	5	56%	1	11%	3	33%	0	0%	0	0%
4. 2 I fully understand the meaning of a lean enterprise/organisation	4	44%	1	11%	3	33%	1	11%	0	0%
4. 8 I regularly apply and use lessons learned in lean	2	22%	2	22%	0	0%	5	56%	0	0%
4. 1 I understand the lean paradigm at enterprise and divisional level	2	22%	0	0%	4	44%	3	33%	0	0%
4. 6 A formal lean education process has been established and I have attended	1	11%	4	44%	1	11%	1	11%	2	22%
4. 4 I have communicated a common vision of lean throughout my area of responsibility	1	11%	2	22%	5	56%	1	11%	0	0%
4. 7 My direct reports (subordinates) have received significant exposure and education in lean principles,practices and behaviour	0	0%	4	44%	1	11%	2	22%	2	22%
4. 5 A compelling case has been developed for the lean transformation	0	0%	3	33%	2	22%	4	44%	0	0%
4. 9 Lean initiatives are co-ordinated and tracked, with the individual results `rolled up` and assessed against divisional level milestones and targets	0	0%	2	22%	2	22%	3	33%	2	22%

There seems to be support for transformation to lean by the managers. Only 33% of the managers neither agree nor disagree, and the focus must be placed on this group to ensure that they fully support the transformation for the organisation to successfully implement lean. The researcher believes a compelling strategy has not been developed for the lean transformation and this could be the reason that 56% of managers are undecided on whether they have communicated the vision throughout their areas of responsibility.

The indication in this category is that as much as managers support lean transformation, more still needs to be done to ensure that this can be adopted by everyone in the organisation.

Fig. 4.3.2: Graphical Representation – Adopt Lean Paradigm

The above graph indicates that 25% of the respondents are undecided, compared to 19% that strongly agree, and 7% that strongly disagree that the organisation has adopted the lean paradigm.

The results in this section are somewhat positive. It will be important to establish why the 25% is undecided. It should be a matter of concern that these are people that hold senior positions in the organisation and that the successful lean implementation should be driven by them. This could be a question of a lack of understanding of the lean paradigm or, alternatively, they were simply not interested in the survey or the lean paradigm.

Table 4.3.3: Descriptive Statistics - Management commitment and Lean Enterprise Vision (n = 9)

	Strongly Agree		2		3		4		Strongly Disagree	
5. 2 I provide support and recognition for positive actions regarding lean initiatives such as 5S	2	22%	5	56%	1	11%	0	0%	1	11%
5. 3 I am a champion in lean transformation and lead by example within my team in initiatives such as 5S	2	22%	3	33%	2	22%	2	22%	0	0%
5. 4 The role that lean plays in achieving the division's vision is clearly defined	1	11%	2	22%	4	44%	1	11%	1	11%
5. 7 Lean transformation progress is integral to leadership discussions and events	1	11%	2	22%	3	33%	1	11%	2	22%
5. 5 The vision has been communicated at all levels and has extensive buy-in by most employees	0	0%	2	22%	4	44%	1	11%	2	22%
5. 6 The vision incorporates a new mental model of how the organisation would act and behave according to lean principles and practices	0	0%	2	22%	4	44%	2	22%	1	11%
5. 1 There is a consensus among all divisional leadership to support lean	0	0%	2	22%	2	22%	4	44%	1	11%

A total of 78% of the respondents provide support and recognition for positive actions regarding lean initiatives and 55% are champions of lean in their teams. A further 55% feel that there is no consensus among all divisional leadership to support lean. The total of 44% of the respondents disagree that there is consensus among all divisional leadership to support lean.

Fig. 4.3.3: Graphical Representation – Management Commitment and Lean Enterprise Vision
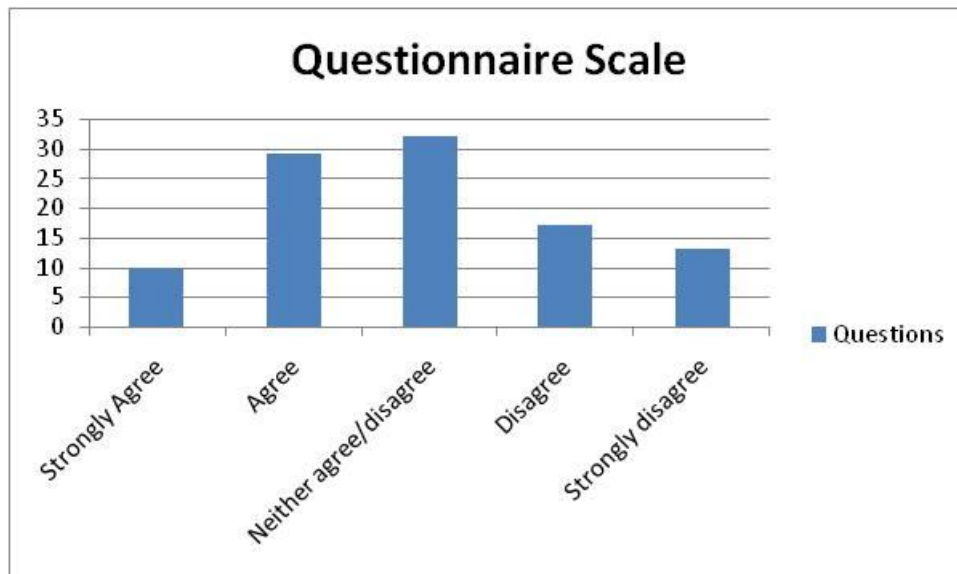
The above graph indicates that 29% of the respondents agree with the statements compared to 17% that disagree.

The managers indicated that they are committed to lean and support the lean enterprise vision. This contradicts the previous section of questions regarding the lean paradigm where there was indecision. It is confusing that managers would not adopt the lean paradigm and yet commit to the lean enterprise vision. Again, the question could be whether it is a matter of planning or not, delivering from the side of management.

Table 4.3.4: Descriptive Statistics - Develop Lean structure and behaviour (n = 9)

	Strongly Agree		2		3		4		Strongly Disagree	
6. 3 Lean change agents are positioned and empowered to provide guidance and leadership for the lean transformation	1	11%	3	33%	2	22%	0	0%	3	33%
6. 4 Open and timely communications (i.e. regular meetings with employees) exists.	1	11%	2	22%	4	44%	0	0%	2	22%
6. 2 Incentives (reward and recognition) have been developed which are consistent with the behaviour desired	1	11%	2	22%	1	11%	2	22%	3	33%
6. 5 Employee input is valued and plays a key part in decision making	1	11%	1	11%	4	44%	1	11%	2	22%
6. 10 There is a process for suggestions and it has been streamlined and gives clear visibility of the progress for each suggestion	1	11%	1	11%	3	33%	4	44%	0	0%
6. 8 Incentives are based on performance measures that encouraged lean activity	0	0%	3	33%	4	44%	1	11%	1	11%
6. 7 The extent and types of empowerment are tailored to match the environment and people empowered	0	0%	3	33%	3	33%	2	22%	1	11%
6. 1 Policies and procedures have been developed to promote lean behaviour	0	0%	3	33%	2	22%	2	22%	2	22%
6. 6 Managers and Team leaders serve as mentors and educators, promoting lower level decision making	0	0%	2	22%	4	44%	2	22%	1	11%
6. 9 Incentives encourage local improvements that will benefit multiple processes or value stream performance	0	0%	2	22%	4	44%	2	22%	1	11%

Respondents were either undecided in this category or disagreed with the statements. The results show a split in opinion by the respondents regarding the lean structure and behaviour. However, it is clear that they do not feel strongly that this behaviour exist in the organisation. Only five of the eleven questions in this category had a respondent that felt strongly, and the respondents represented only 11% of the total population.

Fig. 4.3.4: Graphical Representation – Develop Lean Structure and Behaviour
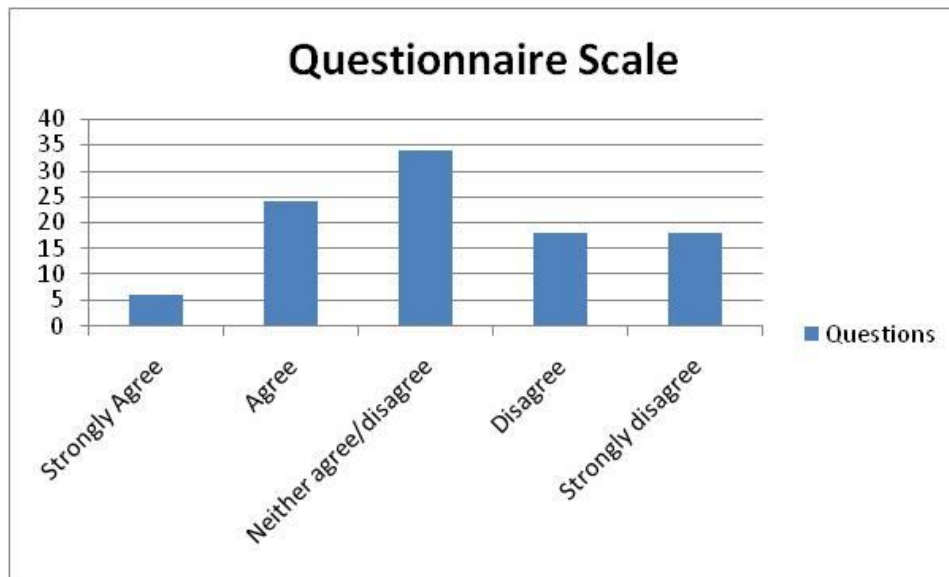

The above graph indicates that 24 of the respondents agree that there is a system in place to develop a lean structure and behaviour. A total of 18% disagreed. A further 34% of the respondents neither agree nor disagree with the statements.

Table 4.3.5: Descriptive Statistics - Focus on Continuous Improvement (n = 9)

	Strongly Agree		2		3		4		Strongly Disagree	
7. 1 I am actively involved in monitoring progress of lean implementation at all levels	1	11%	3	33%	2	22%	1	11%	2	22%
7. 2 I provide appropriate support and ecouragement to all participants in lean implementatiion	1	11%	3	33%	2	22%	2	22%	1	11%
7. 3 Continuous improvement, Kaizen projects/events are structured, planned and implemented. Successes are recognized and expanded throughout the facility.	0	0%	4	44%	3	33%	1	11%	1	11%
7. 6 There is a formal suggestion process in place to solicit ideas for improvements from all employees and to recognize their participation.	0	0%	3	33%	2	22%	2	22%	2	22%
7. 4 Most improvements made throughout the division are made daily and involve little or no expense to implement.	0	0%	2	22%	4	44%	2	22%	1	11%
7. 5 Employees know the seven wastes, are actively involved in identifying wastes in their processes/areas and are empowered to work to reduce and eliminate the waste.	0	0%	1	11%	2	22%	4	44%	2	22%

Only two questions have respondents that felt strongly in this category and the respondents represented only 11% of the population. However, a positive trend can be seen as most respondents agree that there is focus on continuous improvement.

Fig. 4.3.5: Graphical Representation - Focus on Continuous Improvement
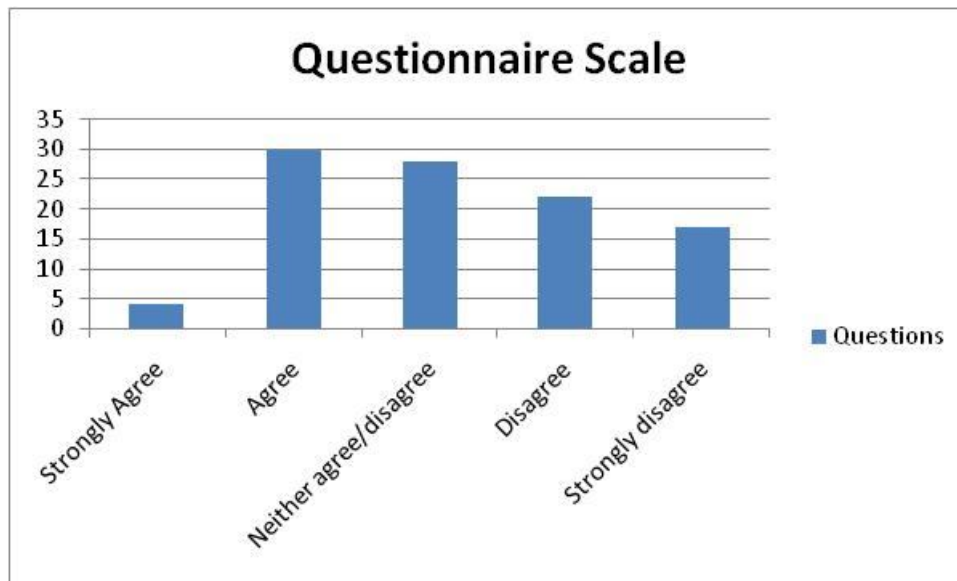
A total of 30% of the managers agree that focus is placed on continuous improvement, compared to 22% that disagree, and 28% that are undecided.

The positive trend in this category is encouraging. There is a commitment and focus on continuous improvement in the organisation. There is, however, concerns as none of the managers felt strongly about questions 7.4 to 7.6.

4.4   Team Leader Analysis

The second set of questionnaires focused on the team leaders. The questions were the same, with the exception of the 'Enterprise Strategic Planning' questionnaire, from which the team leaders were excluded. The reason for this exclusion is that team leaders do not directly take part in strategic planning. Their contribution is in the form of surveys that are conducted annually, and the results form part of the organisational strategy.

Table 4.4.1: Descriptive Analysis –Adopting Lean Paradigm (n = 17)

	Strongly Agree		2		3		4		Strongly Disagree	
4. 4 I have communicated a common vision of lean throughout my area of responsibility	2	12%	3	18%	8	47%	1	6%	3	18%
4. 1 I understand the lean paradigm at enterprise and divisional level	2	12%	3	18%	6	35%	3	18%	3	18%
4. 2 I fully understand the meaning of a lean enterprise/organisation	2	12%	3	18%	5	29%	3	18%	4	24%
4. 3 I support enthusiastically a transformation to lean	1	6%	4	24%	8	47%	2	12%	2	12%
4. 6 A formal lean education process has been established and I have attended	0	0%	3	18%	5	29%	5	29%	4	24%
4. 7 My direct reports (subordinates) have received significant exposure and education in lean principles,practices and behaviour	0	0%	3	18%	5	29%	5	29%	4	24%
4. 9 Lean initiatives are co-ordinated and tracked, with the individual results `rolled up` and assessed against divisional level milestones and targets	0	0%	2	12%	8	47%	3	18%	4	24%
4. 5 A compelling case has been developed for the lean transformation	0	0%	1	6%	11	65%	1	6%	4	24%
4. 8 I regularly apply and use lessons learned in lean	0	0%	1	6%	7	41%	5	29%	4	24%

This category shows that team leaders either strongly disagree with the statements, or are undecided or do not have an opinion on the matter. This is not entirely contradicting the findings in the same category from the branch managers. The findings in the management group were not very positive, and this reflects in the team leader findings.

**Fig. 4.4.1: Graphical Representation – Adopt Lean Paradigm**
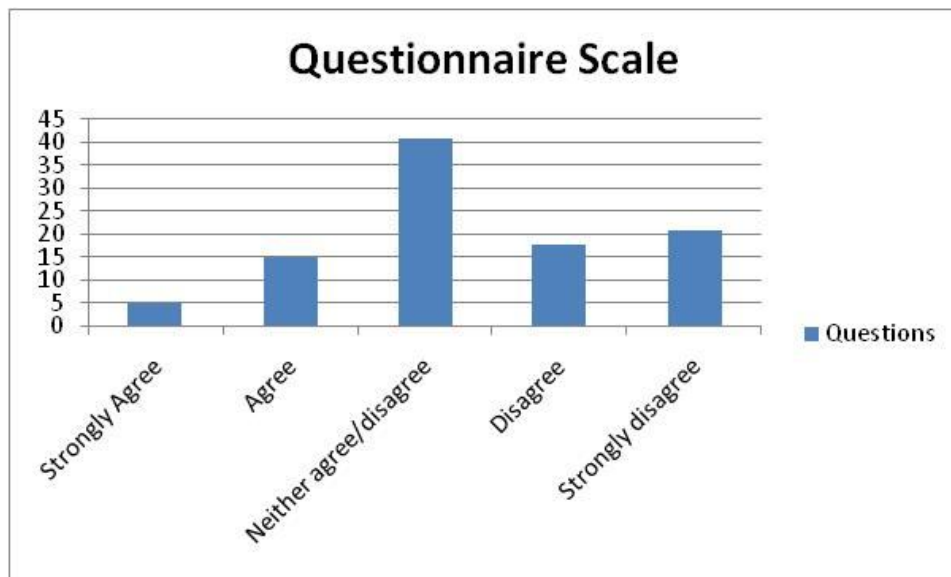
The above graph indicates that more than 40% of the respondents are undecided, whereas 39% disagree that an environment to adopt a lean paradigm has been created.

Table 4.4.2: Descriptive Analysis –Management Commitment enterprise vision and lean (n = 17)

	Strongly Agree		2		3		4		Strongly Disagree	
5. 2 I provide support and recognition for positive actions regarding lean initiatives such as 5S	2	12%	3	18%	7	41%	2	12%	3	18%
5. 4 The role that lean plays in achieving the division's vision is clearly defined	1	6%	4	24%	5	29%	4	24%	3	18%
5. 3 I am a champion in lean transformation and lead by example within my team in initiatives such as 5S	1	6%	3	18%	7	41%	4	24%	2	12%
5. 1 There is a consensus among all divisional leadership to support lean	1	6%	1	6%	8	47%	4	24%	3	18%
5. 5 The vision has been communicated at all levels and has extensive buy-in by most employees	0	0%	4	24%	5	29%	5	29%	3	18%
5. 6 The vision incorporates a new mental model of how the organisation would act and behave according to lean principles and practices	0	0%	3	18%	6	35%	5	29%	3	18%
5. 7 Lean transformation progress is integral to leadership discussions and events	0	0%	2	12%	7	41%	4	24%	4	24%

Again, in this category team leaders have shown to be undecided on disagreeing with the statements on management commitment to a lean enterprise vision. Team leaders seem to feel differently from their managers in this category.

Fig. 4.4.2: Graphical Representation – Management Commitment and Lean Enterprise Vision
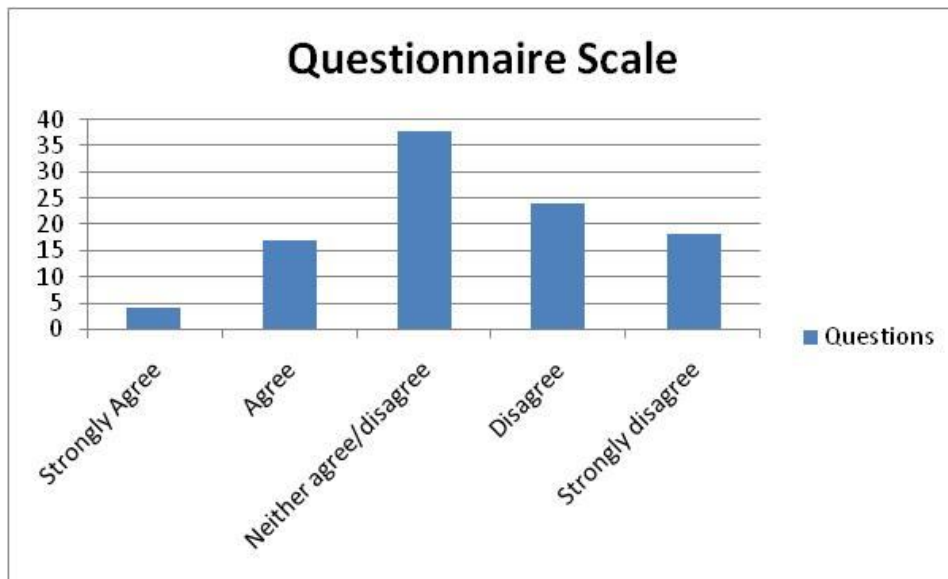

The above graphical representation indicates that 42% of the team leaders disagree that there is commitment from them, compared to 38% that are undecided.

Table 4.4.3: Descriptive Statistics - Develop Lean structure and behaviour (n = 17)

	Strongly Agree		2		3		4		Strongly Disagree	
6. 1 Policies and procedures have been developed to promote lean behaviour	2	12%	4	24%	5	29%	2	12%	4	24%
6. 2 Incentives (reward and recognition) have been developed which are consistent with the behaviour desired	1	6%	1	6%	6	35%	5	29%	4	24%
6. 9 Incentives encourage local improvements that will benefit multiple processes or value stream performance	1	6%	0	0%	7	41%	3	18%	6	35%
6. 6 Managers and Team leaders serve as mentors and educators, promoting lower level decision making	0	0%	4	24%	7	41%	4	24%	2	12%
6. 5 Employee input is valued and plays a key part in decision making	0	0%	3	18%	8	47%	1	6%	5	29%
6. 7 The extent and types of empowerment are tailored to match the environment and people empowered	0	0%	3	18%	6	35%	4	24%	4	24%
6. 3 Lean change agents are positioned and empowered to provide guidance and leadership for the lean transformation	0	0%	3	18%	5	29%	3	18%	6	35%
6. 8 Incentives are based on performance measures that encouraged lean activity	0	0%	3	18%	5	29%	4	24%	5	29%
6. 4 Open and timely communications (i.e. regular meetings with employees) exists.	0	0%	1	6%	9	53%	2	12%	5	29%
6. 10 There is a process for suggestions and it has been streamlined and gives clear visibility of the progress for each suggestion	0	0%	1	6%	7	41%	2	12%	7	41%

The trend of being undecided continues in this category of questions. The team leaders seem unwilling to make a decision and this makes it difficult to determine their level of understanding or commitment to the lean structure, paradigm or behaviour.

**Fig. 4.4.3: Graphical Representation – Develop Lean Structure and Behaviour**
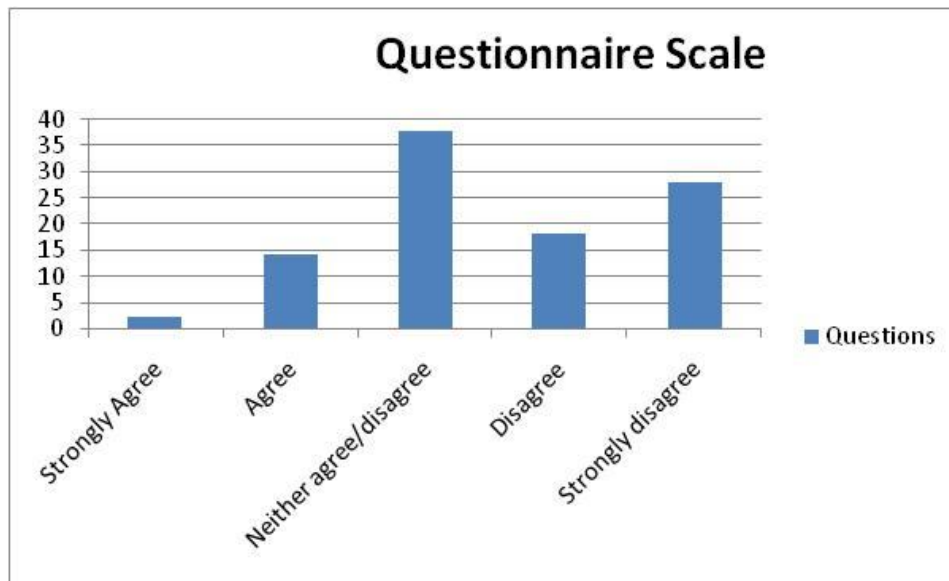
The above graph indicates that more team leaders disagree with the statements compared to those that agree. Only 2% strongly agree compared to 28% that strongly disagree.

Table 4.4.5: Descriptive Statistics - Focus on Continuous Improvement (n =17)

	Strongly Agree		2		3		4		Strongly Disagree	
7. 2 I provide appropriate support and ecouragement to all participants in lean implementatiion	1	6%	4	24%	6	35%	3	18%	3	18%
7. 1 I am actively involved in monitoring progress of lean implementation at all levels	1	6%	4	24%	4	24%	5	29%	3	18%
7. 3 Continuous improvement, Kaizen projects/events are structured, planned and implemented. Successes are recognized and expanded throughout the facility.	1	6%	0	0%	10	59%	2	12%	4	24%
7. 4 Most improvements made throughout the division are made daily and involve little or no expense to implement.	1	6%	0	0%	7	41%	6	35%	3	18%
7. 5 Employees know the seven wastes, are actively involved in identifying wastes in their processes/areas and are empowered to work to reduce and eliminate the waste.	0	0%	2	12%	4	24%	7	41%	4	24%
7. 6 There is a formal suggestion process in place to solicit ideas for improvements from all employees and to recognize their participation.	0	0%	1	6%	7	41%	5	29%	4	24%

The same trend as above continues here. There seems to be no evidence that focus is placed on continuous improvement. This is in contrast with the managers who have indicated that focus is placed on continuous improvement.

Fig. 4.4.4: Graphical Representation - Focus on Continuous Improvement
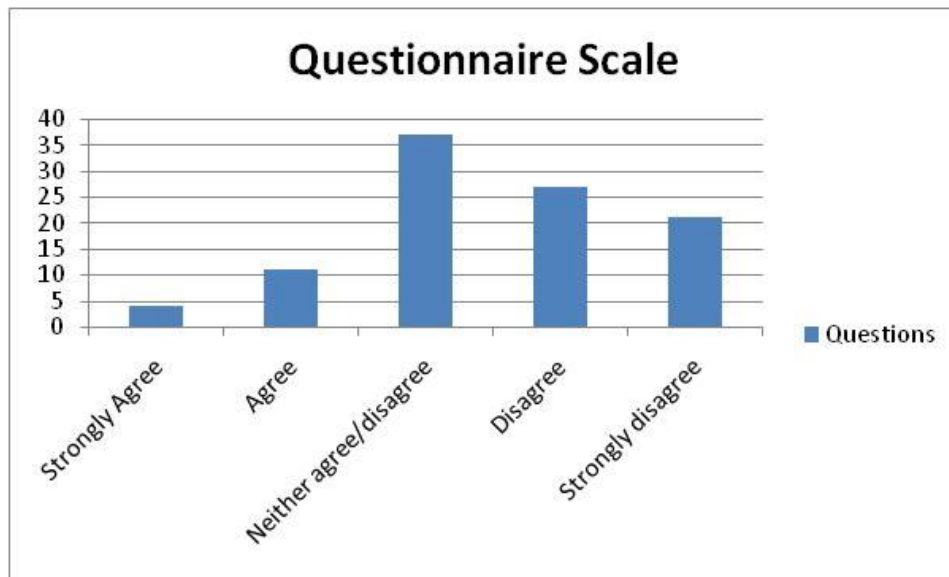
The above graph indicates that 49% of the team leaders do not place focus on continuous improvement compared to only 15% that do. A total of 37% is undecided whether they do or not.

4.5   Summary

In this chapter the researcher seeks to present the findings of the survey. The respondents were divided into two groups, i.e. Managers and Team Leaders.

The findings indicated that there is still a lack of knowledge of the lean principles among the managers; this is even more pronounced in the team leaders. The majority of answers reflected that the team leaders or managers could not make a decision; hence they chose 'neither agree nor disagree'.

In all sections/categories team leaders have not provided positive results. This is not surprising considering the findings from the management survey. The indication here is that either the team leaders are not aware of the lean

initiatives that are going on in the organisation, do not support them, or were simply not interested in the survey and just ticked the boxes.

This is supported by the fact that the majority of the respondents chose 'neither agree nor disagree', which means they were undecided.

In the next chapter, the researcher will discuss the findings, conclusions and make recommendations that will address the negative aspects of the findings. The researcher will furthermore posit what is required for the organisation to become a lean thinking organisation.

Chapter 5

5.   CONCLUSIONS AND RECOMMENDATIONS

5.1   Introduction

In this chapter the researcher will present the summary of findings of the research as discussed in Chapter 4. The purpose of the research was to 'Analyse the status of lean implementation at selected South African Revenue Service branch offices', and the findings will seek to establish to what extent lean is understood and implemented at these offices.

The limitations of the research will also be discussed, and the problems experienced during the research as well as areas for future research will be highlighted. Lastly, conclusions will be drawn based on the findings and on the literature discussed in Chapter 2. Recommendations will then be made on how to get the organisation to the required level as per the LESAT methodology.

5.2   Summary of Findings

Before discussing the summary of findings, it is important to first state the problem statement and sub-problem of the research.

The research problem statement is 'What is the status of lean implementation in a selection of South African Revenue Service offices?' In order to respond to the problem statement, sub-questions were formulated, viz.:

- What is the strategic role played by senior management in lean implementation?

- What is the role of line managers (team leaders) in lean implementation?; and

- What is the role of the Team members? (The understanding and buy-in from the shop floor).

To answer the question raised by the problem statement, a questionnaire, with the following categories/sections, was developed for both the managers and the team leaders. These are discussed in detail in Chapter 3:

- Enterprise strategic planning;

- Adopt lean paradigm;

- Management Commitment and Lean Enterprise Vision;

- Develop lean structure and Behaviour; and

- Focus on Continuous Improvement.

Questionnaires were also sent to team members, and they focused on the following categories/sections:

- Communication;

- Continuous Improvement;

- Change Management; and

- Training and Empowerment.

The team members had to be excluded from the survey. The reasons for this exclusion are provided in point 5.3 below.

As mentioned earlier in this chapter, the findings based on the problem statement and the sub-problems, can be summarised as follows:

5.2.1 What is the strategic role played by management?

The findings show that even though management fully support the lean transformation, they still believe that this is not prioritised and not aligned to the strategic objectives of the organisation. There is also an indication that some managers are not very clear about the lean philosophy. This is indicated by the high percentage of managers who could not give definite answers to the question and chose 'neither agree nor disagree'.

The study also found that managers lack knowledge of basic lean concepts, such as the seven wastes. There is a lack of a formal suggestion scheme which is proven by the lack of small improvements coming from the teams. However, it is important to note that improvements made are recognised, and that the organisation has some form of recognition at local level. Nationally there is an 'annual gala' to recognise employees who have contributed immensely or excelled in their roles.

It is furthermore important to note the concern that the organisation has taken a decision to adopt lean philosophy, and yet some managers have shown little understanding of the lean philosophy.

The study provides evidence that, as much as the organisation has made a decision to adopt lean philosophy (the establishment of the continuous improvement and appointment of lean experts is proof that the organisation is committed to lean transformation), this should be indicated at strategic level;

it is currently lacking. This can be deducted from the findings on the team leaders that, if a strategy indeed exists, then there is lack of support of such a strategy by the team leaders. The study was unable to establish the reasons for this, but it can be assumed that a lack of communication between management and team leaders with regards to the implementation of lean philosophy at the South African Revenue Service could be attributed to this.

5.2.2 The role of line managers

The findings on the team leader survey indicate that team leaders disagree with managers in most aspects on their views of lean implementation. They either strongly disagree on many statements, or are undecided. The team leaders also indicated that an environment to develop lean structure and behaviour has not been created, and they believe emphasis is not placed on continuous improvement.

5.3 Limitations of Research

The following depict some of the difficulties that the researcher encountered:

- The survey was conducted during a busy period of the year at the South African Revenue Service (tax return filing period). This has made it difficult for the researcher to conduct interviews as planned, because people were not available to spend time on interviews; and
- Questionnaires were web-based and team members have restricted access to the Internet. Therefore, they could not take part in the survey. Due to the geographical dispersion of the respondents, it was not possible to send manual questionnaires to team members.

5.4   Concluding Remarks

The role of management is discussed in detail in the literature and according to Taleghani (2010), managers should work to create interest in the implementation of lean and communicate the change to everyone in the organisation. In this instance, there is little evidence that this has been the case if one regards the findings of the team leader survey, and the number of questions where managers were undecided.

Evidence gathered from the research suggests that the organisation is still a long way from being able to consider itself as a lean thinking organisation. The lean philosophy is not completely embedded to the managers and there is a worrying lack of understanding of the lean concepts among both managers and team leaders.

It has also been observed that in some branch offices where lean was implemented, it has failed to be sustained. Where 5S or visual management was implemented with the support of lean experts, this was not sustained after the lean experts have handed over to managers. This can be linked to earlier findings that there is a lack of support from the line managers (team leaders), resulting in the failure of these initiatives.

Furthermore, it can also be concluded that there is little evidence that lean philosophy is discussed at strategic level, even though the organisation has a unit dedicated to lean philosophy. The researcher was unable to establish the level of cooperation between the 'lean unit' and the rest of the organisation. This relationship is very important and clear responsibilities must be drawn. The organisation is on the right track, but there are many gaps that need to be closed.

5.5   Recommendation

The organisation has shown willingness to transform. The establishment of the continuous improvement unit was a very important strategic decision towards achieving this goal. A conceptual framework for lean transformation must, however, be developed. The framework should be used as a roadmap with specific milestones and timelines. The framework should include the following aspects adapted from the LESAT assessment method (http://lean.mit.edu/products/lean-enterprise-self-assessment-tool-lesat.html).

5.5.1 Strategic Cycle

In this case the organisation must determine strategic imperative by:

- Articulating business case for transformation;
- Focus on stakeholder value; and
- Leverage transformation gains.

The second step of the strategic cycle is to engage leadership in transformation. This can be achieved by:

- Conveying urgency;
- Fostering enterprise thinking;
- Obtaining executive buy-in; and
- Establishing an executive transformation team.

These elements will assist in pursuing and sustaining transformation as these will form part of the strategic direction of the organisation, and will be driven from the executive level.

5.5.2 Planning Cycle

This requires a committed leadership team and planning must include:

Understanding the current state. This can be achieved by:

- Performing stakeholder analysis;
- Analyse process and interaction;
- Perform enterprise maturity assessment; and
- Assess current performance measurement system.

The second step of the planning phase is to identify capabilities and deficiencies. This can be achieved through envisioning and designing the future enterprise by:

- Creating a vision for future state;
- Designing 'to be' enterprise value stream; and
- Performing a gap analysis between current state and future state.

The third step in the planning phase is enterprise vision which will align enterprise infrastructure. The following needs to be done:

- Rationalise systems and policies;
- Align performance management system;
- Align incentives; and
- Empower change agents.

The last step of the planning phase is to create a transformation plan. The following can be done when creating this plan:

- Identify improvement for focus areas;
- Determine impact on enterprise performance;
- Prioritise, select and sequence project areas; and
- Publish communication plan.

5.5.3 Execution Cycle

The last phase of the framework is the execution cycle, and this involves implementing and coordinating the transformation plan. The following will have to be done at this stage:

- Develop detailed project implementation plans;

- Synchronise detailed plans;

- Provide education and training;

- Implement projects and track progress; and

- Commit resources.

The last stage of the execution cycle is to nurture, process and embed lean enterprise thinking. This can be achieved by:

- Monitoring and measuring the outcomes;

- Nurturing, processing, and embedding lean culture;

- Capturing and diffusing lessons learned; and

- Synchronising strategic long-term and short-term cycles.

The organisation can benefit immensely by using the Lean Enterprise Self Assessment Tool which was developed at the Massachusetts Institute of Technology (MIT), under the auspices of the Lean Aerospace Initiative (LAI). A number of successful organisations such as Siemens, Boeing, and BAE Systems, have made use of this tool to successfully transform.

5.6 Opportunities for further research

This research provided insight into the gaps in lean implementation at the South African Revenue Service, focusing especially on the lack of understanding of lean concepts by managers and team leaders. It can,

however, be argued that this research was not truly representative of the South African Revenue Service population, as only 12 branches were surveyed out of 48 branches countywide. This can, however, be countered by the fact that none of the excluded branches had experiences of lean implementation. There was also no contribution from the team members.

This presents an opportunity for further research in the form of a case study. The research should focus on the effectiveness and success of the LESAT tool. All the components of the LESAT tool as discussed in point 5.5 above, should be taken into consideration.

The role of the continuous improvement team and the skill level required for this team to successfully implement lean at the South African Revenue Service should form part of the research problem.

5.7   Summary

This research has provided insight into the role that managers are required to play in order to transform organisations into a lean thinking organisation. The gaps or weakness in the South African Revenue Service strategy with regards to lean, were identified.

The recommendations offered, will go a long way into assisting the organisation. It is important to note that management must understand that using the LESAT tool is not a shortcut, but will require a few years before the South African Revenue Service can be truly transformed, considering the size of the organisation. The research also showed that, without the will from the top management, lean transformation is doomed from the beginning. This has been proven in offices where lean was implemented, but due to lack of management support, it fell through.

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APPENDIX I – Correspondence to respondents

Dear Team,

I am currently conducting research for my MBA thesis. The topic of the research is '*An Assessment of the status of lean implementation at selected SARS branch offices'.* As your office has had a pilot implementation, I have selected you to take part in this survey to determine how lean has impacted on you and your work environment. The survey is completely anonymous and will take about fifteen minutes of your time.

Please note that you are not obliged or compelled to take part in this survey and your participation is completely voluntary.

The questionnaire consists of the following categories:

- Biological Information
- Work related information
- Communication
- Continuous Improvement
- Change Management
- Training and Empowerment

The survey runs until the 15th July 2011. The findings of the survey will be made available to you and may be used to develop a roadmap for further lean implementation throughout the enterprise.

Please click on the below link to participate in the survey:

http://www.nmmu.ac.za/websurvey/q.asp?sid=341&k=phbfngknrl

Your participation in this survey is highly appreciated.

Thandile Samela

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APPENDIX II – Web Questionnaire

LEAN TRANSFORMATION QUESTIONNAIRE: MANAGEMENT					
The information below is required for statistical purpose only. It will in no way form basis for an opinion of this study.					
1. BIOGRAPHICAL INFORMATION					
Please select the most appropriate answer from the dropdown list					
1.1	Gender				
1.2	Marital Status				
1.3	Race				
1.4	Age				
1.5	Highest Qualification				
1.6	If other please specify				
The information below is required for statistical purpose only. It will in no way form basis for an opinion of this study.					
2. WORK RELATED INFORMATION					
Please select the most appropriate answer from the dropdown list					
2.1	Region				
2.2	Office				
2.3	Division				
2.3	Position in organisation				
2.4	Years in Organisation				

3. ENTERPRISE STRATEGIC PLANNING

The decision to pursue lean transformation is strategic in nature. Its impact throughout the enterprise is profound and pervasive, affecting all business practices and processes. The lean enterprise will behave in a fundamentally new manner, significantly eliminating waste and enhancing relationships with all stakeholders. The following are diagnostic questions seek to establish the extent to which strategic planning involves lean implementation.

Please show the extent to which you agree with the following statements		Strongly disagree	disagree	neither agree or disagree	agree	Strongly agree
3.1	I am fully aware of the potential opportunities that can be be realised within the organisation as a result of transitioning to lean	1	2	3	4	5
3.2	A suitable strategy for value delivery has been identified to utilise resources freed up by improvement	1	2	3	4	5
3.3	Lean implementation is included explicitly in the division strategic plan	1	2	3	4	5
3.4	Strategic planning makes allowance for anticipated gains from lean improvements	1	2	3	4	5
3.5	Customer value influence the strategic direction	1	2	3	4	5
3.6	The division level lean transformation plan is prioritised and aligned with strategic objectives	1	2	3	4	5
3.7	Adequate resources have been provided to facilitate lean transformation	1	2	3	4	5
3.8	The current education and training programme adequately support the strategic direction(s) and lean transformation	1	2	3	4	5

4. ADOPT LEAN PARADIGM

Transitioning to lean requires a significant modification to the strategic plan of the enterprise. It is imperative that the enterprise leadership understands and buys into the lean paradigm as they will be required to create a vision for doing business, behaving, and seeing value in fundamentally different ways. The following are diagnostic questions to establish how management understand lean paradigm at enterprise/division level.

Please show the extent to which you agree with the following statements		Strongly disagree	disagree	neither agree or disagree	agree	Strongly agree
4.1	I understand the lean paradigm at enterprise and divisional level	1	2	3	4	5
4.2	I fully understand the meaning of a lean enterprise/organisation	1	2	3	4	5
4.3	I support enthusiastically a transformation to lean	1	2	3	4	5
4.4	I have communicated a common vision of lean throughout my area of responsibility	1	2	3	4	5
4.5	A compelling case has been developed for the lean transformation	1	2	3	4	5
4.6	A formal lean education process has been established and I have attended	1	2	3	4	5
4.7	My direct reports (subordinates) have received significant exposure and education in lean principles,practices and behaviour	1	2	3	4	5
4.8	I regularly apply and use lessons learned in lean	1	2	3	4	5
4.9	Lean initiatives are co-ordinated and tracked, with the individual results "rolled up" and assessed against divisional level milestones and targets	1	2	3	4	5

5. MANAGEMENT COMMITMENT and LEAN ENTERPRISE VISION

Management commitment to and leadership for quality are considered to be one of the foundations of TQM and lean production. The following are diagnostic questions to measure the commitment to providing lean leadership commitment.

Please show the extent to which you agree with the following statements	Strongly disagree	disagree	neither agree or disagree	agree	Strongly agree
5.1 There is a consensus among all divisional leadership to support lean	1	2	3	4	5
5.2 I provide support and recognition for positive actions regarding lean initiatives such as 5S	1	2	3	4	5
5.3 I am a champion in lean transformation and lead by example within my team in initiatives such as 5S	1	2	3	4	5
5.4 The role that lean plays in achieving the division's vision is clearly defined	1	2	3	4	5
5.5 The vision has been communicated at all levels and has extensive buy-in by most employees	1	2	3	4	5
5.6 The vision incorporates a new mental model of how the organisation would act and behave according to lean principles and practices	1	2	3	4	5
5.7 Lean transformation progress is integral to leadership discussions and events	1	2	3	4	5

6. DEVELOP LEAN STRUCTURE AND BEHAVIOUR

Organisational structure, incentives, policies, business systems and processes must be aligned and coordinated to elicit the behaviour required for successful implementation of lean principles and practices. The following are diagnostic questions to establish presence of such structure and behaviour.

Please show the extent to which you agree with the following statements	Strongly disagree	disagree	neither agree or disagree	agree	Strongly agree
6.1 Policies and procedures have been developed to promote lean behaviour	1	2	3	4	5
6.2 Incentives (reward and recognition) have been developed which are consistent with the behaviour desired	1	2	3	4	5
6.3 Lean change agents are positioned and empowered to provide guidance and leadership for the lean transformation	1	2	3	4	5
6.4 Open and timely communications (i.e. regular meetings with employees) exists.	1	2	3	4	5
6.5 Employee input is valued and plays a key part in decision making	1	2	3	4	5
6.6 Managers and Team leaders serve as mentors and educators, promoting lower level decision making	1	2	3	4	5
6.7 The extent and types of empowerment are tailored to match the environment and people empowered	1	2	3	4	5
6.8 Incentives are based on performance measures that encouraged lean activity	1	2	3	4	5
6.9 Incentives encourage local improvements that will benefit multiple processes or value stream performance	1	2	3	4	5
6.10 There is a process for suggestions and it has been streamlined and gives clear visibility of the progress for each suggestion	1	2	3	4	5

7.FOCUS ON CONTINUOUS IMPROVEMENT

Successful execution of lean implementation plan forms the basis for further improvement. The improvement process is monitored and nurtured, lessons learned are captured, and improved performance becomes a strong driving force for strategic future planning by enterprise/division leaders. The follow are diagnostic questions to establish whether a focus has been placed on continuous improvement to for successful lean transformation.

Please show the extent to which you agree with the following statements	Strongly disagree	disagree	neither agree or disagree	agree	Strongly agree
7.1 I am actively involved in monitoring progress of lean implementation at all levels	1	2	3	4	5
7.2 I provide appropriate support and ecouragement to all participants in lean implementatiion	1	2	3	4	5
7.3 Continuous improvement, Kaizen projects/events are structured, planned and implemented. Successes are recognized and expanded throughout the facility.	1	2	3	4	5
7.4 Most improvements made throughout the division are made daily and involve little or no expense to implement.	1	2	3	4	5
7.5 Employees know the eight wastes, are actively involved in identifying wastes in their processes/areas and are empowered to work to reduce and eliminate the waste.	1	2	3	4	5
7.6 There is a formal suggestion process in place to solicit ideas for improvements from all employees and to recognize their participation.	1	2	3	4	5

LEAN TRANSFORMATION QUESTIONNAIRE: TEAM LEADER

The information below is required for statistical purpose only. It will in no way form basis for an opinion of this study.

1. BIOGRAPHICAL INFORMATION

Please select the most appropriate answer from the dropdown list

1.1	Gender	
1.2	Marital Status	
1.3	Race	
1.4	Age	
1.5	Highest Qualification	
1.6	If other please specify	

The information below is required for statistical purpose only. It will in no way form basis for an opinion of this study.

2. WORK RELATED INFORMATION

Please select the most appropriate answer from the dropdown list

2.1	Region	
2.2	Office	
2.3	Division	
2.3	Position in organisation	
2.4	Years in Organisation	

3. ADOPT LEAN PARADIGM

Transitioning to lean requires a significant modification to the strategic plan of the enterprise. It is imperative that the enterprise leadership understands and buys into the lean paradigm as they will be required to create a vision for doing business, behaving, and seeing value in fundamentally different ways. The following are diagnostic questions to establish how management understand lean paradigm at enterprise/division level.

Please show the extent to which you agree with the following statements		Strongly disagree	disagree	neither agree or disagree	agree	Strongly agree
3.1	I understand the lean paradigm at enterprise and divisional level	1	2	3	4	5
3.2	I fully understand the meaning of a lean enterprise/organisation	1	2	3	4	5
3.3	I support enthusiastically a transformation to lean	1	2	3	4	5
3.4	I have communicated a common vision of lean throughout my area of responsibility	1	2	3	4	5
3.5	A compelling case has been developed for the lean transformation	1	2	3	4	5
3.6	A formal lean education process has been established and I have attended	1	2	3	4	5
3.7	Majority of my direct reports (subordinates) have received significant exposure and education in lean principles,practices and behaviour	1	2	3	4	5
3.8	I regularly apply and use lessons learned in lean	1	2	3	4	5
3.9	Lean initiatives are co-ordinated and tracked, with the individual results "rolled up" and assessed against divisional level milestones and targets	1	2	3	4	5

4. MANAGEMENT COMMITMENT and LEAN ENTERPRISE VISION

Management commitment to and leadership for quality are considered to be one of the foundations of TQM and lean production. The following are diagnostic questions to measure the commitment to providing lean leadership.

Please show the extent to which you agree with the following statements	Strongly disagree	disagree	neither agree or disagree	agree	Strongly agree
4.1 There is a consensus among all branch leadership to support lean	1	2	3	4	5
4.2 I provide support and recognition for positive lean behaviour such as 5S adherence	1	2	3	4	5
4.3 I am a champion in lean transformation and lead by example in my team in initiatives such as 5S	1	2	3	4	5
4.4 The role that lean plays in achieving the branch's vision is clearly defined	1	2	3	4	5
4.5 The vision has been communicated at all levels and has extensive buy-in by most employees	1	2	3	4	5
4.6 The vision incorporates a new mental model of how the organisation would act and behave according to lean principles and practices	1	2	3	4	5
4.7 Lean transformation progress is integral to leadership discussions and events	1	2	3	4	5

5. DEVELOP LEAN STRUCTURE AND BEHAVIOUR

Organisational structure, incentives, policies, business systems and processes must be aligned and coordinated to elicit the behaviour required for successful implementation of lean principles and practices. The following are diagnostic questions to establish presence of such structure and behaviour.

Please show the extent to which you agree with the following statements	Strongly disagree	disagree	neither agree or disagree	agree	Strongly agree
5.1 Policies and procedures have been developed to promote lean behaviour	1	2	3	4	5
5.2 Incentives (reward and recognition) have been developed which are consistent with the behaviour desired	1	2	3	4	5
5.3 Lean change agents are positioned and empowered to provide guidance and leadership for the lean transformation	1	2	3	4	5
5.4 Open and timely communications (i.e. regular meetings with employees) exists among stakeholders	1	2	3	4	5
5.5 Employee input is valued and plays a key part in decision making	1	2	3	4	5
5.6 Team leaders serve as mentors and educators, promoting lower level decision making	1	2	3	4	5
5.7 The extent and types of empowerment are tailored to match the environment and people empowered	1	2	3	4	5
5.8 Incentives are based on performance measures that encouraged lean activity	1	2	3	4	5
5.9 Incentives encourage local improvements that will benefit multiple processes or value stream performance	1	2	3	4	5
5.10 There is a process for suggestions and it has been streamlined and gives clear visibility of the progress for each suggestion	1	2	3	4	5

6. FOCUS ON CONTINUOUS IMPROVEMENT

Successful execution of lean implementation plan forms the basis for further improvement. The improvement process is monitored and nurtured, lessons learned are captured, and improved performance becomes a strong driving force for strategic future planning by enterprise/division leaders. The follow are diagnostic questions to establish whether a focus has been placed on continuous improvement for successful lean transformation.

Please show the extent to which you agree with the following statements	Strongly disagree	disagree	neither agree or disagree	agree	Strongly agree
6.1 I am actively involved in monitoring progress of lean implementation at all levels	1	2	3	4	5
6.2 I provide appropriate support and ecouragement to all participants in lean implementatiion	1	2	3	4	5
6.3 Continuous improvement, Kaizen projects/events are structured, planned and implemented. Successes are recognized and expanded throughout the facility.	1	2	3	4	5
6.4 Most improvements made throughout the division are made daily and involve little or no expense to implement.	1	2	3	4	5
6.5 Employees know the eight wastes, are actively involved in identifying wastes in their processes/areas and are empowered to work to reduce and eliminate the waste.	1	2	3	4	5
6.6 There is a formal suggestion process in place to solicit ideas for improvements from all employees and to recognize their participation.	1	2	3	4	5