

**A critical evaluation of the Lean Six Sigma (LSS)
Programme at Valspar, South Africa**

By

Gayshree Naicker

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APPROVED FOR EXAMINATION

Supervisor: _____

Date: 19/11/08

Peter Raap: MBA

DECLARATION

This work has not previously been accepted for any Master's Degree, and is not being concurrently submitted for any other Master's Degree.

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This submission is the result of my own independent work/investigation, except where otherwise stated. Other sources are acknowledged giving explicit references. A bibliography is appended.

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ABSTRACT

Increasing competitive pressure from global markets and technological developments has resulted in the continual demand for business improvement philosophies and methodologies to address this challenge. The LSS approach to business improvement has emerged in both the practitioner and academic literature as having a significant role in this area.

In 2006, The Valspar Corporation embarked on a LSS initiative as a way to improve the business globally, to achieve sustained profitable growth and to enhance customer value. Valspar (SA) found the implementation of LSS a challenge because the organisation could not afford the appointment of a full-time Black Belt to manage the programme locally. Green Belts were appointed to lead LSS projects part-time. Management wanted to know if they have applied the LSS methodology correctly within the scope of the business, especially since not all organisations were successful in the implementation of LSS.

The objective of this study was to determine the critical factors that affect the successful implementation of LSS at Valspar (SA) and to assess the degree to which these critical factors exist at Valspar (SA). In a census, the researcher used the questionnaire to gain information about the current views of employees on the LSS programme at Valspar (SA).

The research highlighted the critical success factors for LSS implementation and the results of the evaluation revealed both the positive and negative aspects of the LSS programme at Valspar (SA).

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DEDICATION

I dedicate this study to my late dad Doorasamy Kasavan. Dad, I miss your advice, wisdom and support. You have always inspired me and motivated me to be the best that I can be.

For my daughter, Thishalia Naicker, may this study serve as source of inspiration to you.

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ABBREVIATIONS AND ACRONYMS	
CEO	Chief Executive Officer
COPQ	Cost of Poor Quality
CSF	Critical Success Factor
CTQ	Critical To Quality
DPMO	Defects per Million Opportunities
DMAIC	Define-Measure- Analyse- Improve
DFSS	Design for Six Sigma
GE	General Electric
HR	Human Resource
IDOV	Identiy-Design-Optimise-Validate
JIT	Just-In-Time
LSS	Lean Six Sigma
MTO	Make-To-Order
POUS	Point-Of-Use-Storage
QC	Quality Control
QSHE	Quality, Safety, Health and Environment
SA	South Africa
TQM	Total Quality Management
ZQC	Zero-Quality-Control

CHAPTER ONE

INTRODUCTION AND BACKGROUND TO THE STUDY

1.1 INTRODUCTION

To compete in today's business world, every business needs to improve. Improvement can include better design of goods and services, reduction of manufacturing defects and service errors, more streamlined and efficient operations, faster customer response and better employee skills. The improvement of any business performance requires a structured approach, disciplined thinking and the engagement of all employees in the organisation. In 2006, The Valspar Corporation embarked on an integrated Lean Six Sigma (LSS) initiative as a way to improve the business, to achieve sustained profitable growth and to enhance customer value.

In setting the scene for understanding the study, this chapter sets the background to the study, the reasons why this particular study was undertaken, the purpose and key research questions of this study and, finally, the structure of this study.

1.2 BACKGROUND TO THE STUDY

The Valspar Corporation South Africa (SA) is part of Valspar Corporation, one of the largest paint and coatings organisations in the world. The company operates around the world with approximately 10,000 employees. Valspar operates in two major business segments: coatings and paints. Within Packaging Coatings, Valspar is the number one global supplier and in South Africa, Valspar's core business is to provide coatings and inks for the metal packaging industry. LSS at Valspar involves all business processes and is a critical promoter of Valspar's corporate strategy. The Valspar Corporation is investing in people and infrastructure globally to make LSS work. George Group consulting, a leading

global management consulting company, provided coaching and training for the first two waves of LSS deployment.

Snyder and Peters (2004) report that Lean and Six Sigma improvement methodologies evolved separately. Lean principles were used by organisations like Ford and Toyota to optimise automotive manufacturing by creating processes that were faster, cheaper, less variable and less prone to error. The Six Sigma quality initiative started in the manufacturing, semiconductor industry to eliminate defects by reducing variation in processes. Since these two methodologies work so well together, a new integrated Lean Six Sigma approach has been adopted by many organisations. In this way, organisations apply the lean techniques to increase speed and reduce waste, while employing Six Sigma processes to improve quality and focus on the voice of the customer.

LSS has emerged as a popular breakthrough management strategy that focuses on outputs that are critical to customers and justifies improvements by demonstrating a clear financial return for the organisation. As such, LSS can be an important strategic initiative from both a market and financial perspective.

“Simply put, such a lean Six Sigma program is not just about doing things better, it is a way of doing better things. Used effectively it can enhance innovations in products, services, markets and even a company's underlying business model, as well as improve operations”. (Byrne, Lubowe & Blitz, 2007:1)

There is no one right way to implement LSS since all organisations are different and these differences justify varying approaches to implement the LSS change process. In Valspar (SA), senior management want to reap the benefits of LSS and would like the company to utilise the LSS tool set to become more data driven, customer focused and profitable. Senior managers in Valspar (SA) faced challenges in the deployment strategy. They questioned how they could afford to

“lose” a key person to the full-time LSS Black Belt role. They argued that resource allocation was a critical challenge for Valspar (SA). Hence, the company started the LSS programme in 2007 after training five LSS Green Belts. Green Belts that were trained by the George Group and mentored by Black Belts and Master Black Belts , who are located in Europe, are currently leading their first LSS project on a part-time basis. The Master Black Belt, for Europe and Africa, is now tasked with the management of the LSS programme in Valspar (SA) since the local management has not appointed a full-time Black Belt for this role.

1.3 PROBLEM STATEMENT

LSS within Valspar is being driven at a corporate level as a key promoter of the global business strategy. Valspar (SA) is finding the implementation of LSS a challenge because the organisation cannot afford the appointment of a full-time Black Belt to manage the programme locally. Valspar (SA) management and Green Belts, leading LSS projects part-time, are still learning about LSS. They want to ensure that they are applying it correctly within the scope of the business, especially since not all LSS companies can claim to have had the same financial benefits as Motorola, Allied Signal, Citibank and Sony.

“... fewer than 10 per cent of the companies are doing it to the point where it’s going to significantly affect the balance sheet and the share price in any meaningful period of time”. (Coronado & Anthony, 2002:2)

These varied results indicate that Six Sigma implementation is a complex and central process, where the critical success factors (CSFs) in the implementation must be recognised. In the context of Six Sigma project implementation, CSFs represent the essential ingredients without which a project stands little chance of success (Coronado & Anthony, 2002).

The problem is that the factors that affect the success of the LSS programme at Valspar (SA) are not known.

1.4 RESEARCH OBJECTIVES OR QUESTIONS

The objective of the research is to determine the critical factors that affect the successful implementation of LSS at Valspar (SA).

Sub-objective: To assess the degree to which these critical factors exist at Valspar (SA).

1.5 RATIONALE FOR THE STUDY

The potential value of this study is that it will assist significantly in the long-term success of LSS at Valspar (SA). This will benefit the organisation since a successful LSS programme will:

- Assist Valspar (SA) to reduce lead times, reduce the cost of production, increase sales and improve productivity by eliminating non-value-added activities and product waste from all steps in the processes;
- Enhance the organisation's capability to perform routine work since it is a tool to assist the organisation to work better, faster and at the lowest total cost;
- Develop the organisation's future culture which will be used to stimulate progress and benefit customers, suppliers, shareholders and employees alike; and
- Help Valspar (SA) create a common language and improve the organisation's communication with other Valspar sites globally.

1.6 SCOPE OF THE STUDY/DELIMITATIONS

Some limitations that may influence the outcome of this study are:

- Respondents may find it difficult to give honest feedback even though their anonymity is guaranteed; and
- Respondents may feel that negative responses may create the perception of a negative attitude.

Delimitations that will confine the boundary of the research will be:

- The research will only be conducted within Valspar in South Africa. Other Valspar sites will not be approached;
- The research participants will be restricted to only those Valspar (SA) employees that are or will be involved in LSS; and
- There are many variables affecting Valspar (SA) and changes are imminent. This study will, therefore, be applicable until December 2008.

1.7 ORGANISATION OF THE REPORT

This study is presented in six chapters, which are arranged in the following manner:

CHAPTER ONE provides a general background and orientation to this study. The objectives of this study, the key questions, as well as the limitations of this study are presented.

CHAPTER TWO comprises the literature review and the theoretical framework of Six Sigma and Lean Production. The benefits of the LSS methodology are discussed. The infrastructure requirements, the Define-Measure-Analyse-

Improve-Control (DMAIC) methodology and the training needs for LSS are reviewed.

CHAPTER THREE comprises the literature review of the factors that must be considered for the successful implementation of LSS within any organisation. The findings of this research were used to develop the questionnaire to evaluate the LSS programme at Valspar (SA).

CHAPTER FOUR outlines the research design and methodological paradigm (sampling procedures and methods of data collection). A description of the research instrument used as well as the distribution of questionnaires was outlined. This chapter also deals with the reliability and validity of the research methods used and discusses the ethical issues considered during data gathering.

CHAPTER FIVE presents an analysis of the data, collated by the researcher, in response to the critical questions. Data from the questionnaires were analysed using Microsoft software and were summarised graphically.

CHAPTER SIX presents the main findings of the research, conclusions and the pertinent recommendations on the basis of the findings. Conclusions are drawn on the basis of the empirical findings and the relevant recommendations are made.

1.8 SUMMARY

This chapter presented an overview of the research study. This study is located in the LSS programme at Valspar (SA). A background to the concept and the implementation of LSS within organisations was provided, together with a brief

profile of The Valspar Corporation. The broad based problem in Valspar (SA), key questions, as well as the limitations of this study were discussed.

The next chapter reviews past research studies and the body of literature on LSS. It also highlights the conceptual and theoretical framework that underpins LSS as the framework within which this study is undertaken.

CHAPTER TWO

LEAN SIX SIGMA

2.1 INTRODUCTION

The previous chapter outlined the background and orientation to this study. This chapter compares Six Sigma and Lean using available literature, critical analysis and the knowledge and professional experience of the authors. The benefits of the hybrid methodology of Lean and Six Sigma are discussed. The infrastructure requirements, the DMAIC methodology and the training needs for LSS are reviewed.

2.2 OVERVIEW OF SIX SIGMA

Arnheiter and Maleyeff (2005) point out that Six Sigma evolved from two primary sources: Total Quality Management (TQM) and the Six Sigma statistical metric originating at Motorola Corporation. Six Sigma is now considered as a broad long-term decision-making business strategy rather than a narrowly focused quality management programme. Six Sigma inherited the following concepts from TQM:

- Everyone in an organisation is responsible for the quality of goods and services produced by the organisation;
- Focus on customer satisfaction when making management decisions;
- A significant investment in education and training in statistics, root cause analysis, and other problem solving methodologies; and
- Quality is the first priority.

Motorola engineer, William Smith, coined the term Six Sigma in 1988 after using data to prove that products built with fewer defects (i.e., less rework) performed

better over the life of the product. Technically, 'Six Sigma is a measure of variation that represents 3.4 defects out of one million opportunities for defects (DPMO). Sigma is a term used in statistics to represent standard deviation, an indicator of the degree of variation in a set of measurements or in a process' (Brue, 2002: 2).

Bob Galvin, Motorola's chairman, hired Mikal Harry, a consultant, to assist with the integration of the Six Sigma quality methodology into Motorola's operations. Harry set up the Six Sigma Research Institute at Motorola to ensure rapid knowledge transfer which could not occur within the quality department. Harry and Richard Schroeder, an ex-Motorola executive, created the unique combination of change management and data driven methodologies which transformed Six Sigma from a quality measurement tool to a breakthrough business excellence philosophy. They charismatically educated and engaged business leaders like Bob Galvin, Jack Welch of General Electric (GE) and Larry Bossidy of Allied Signal about the benefits of Six Sigma. Harry and Schroeder took Six Sigma from the shop floor to the boardroom because of their drive and innovative ideas around entitlement, breakthrough strategy, sigma levels and the roles for deployment of Black Belts, Master Black Belts and Project Champions (Przekop, 2006).

Six Sigma core philosophies, according to Evans and Lindsay (2005:4), are based on the following key concepts:

- Think in terms of key business processes and customer requirements with a clear focus on overall strategic focus;
- Focus on corporate sponsors responsible for championing projects, support team activities, help to overcome resistance to change and obtain resources;
- Emphasise such quantifiable measures as DPMO that can be applied to all parts of an organisation: manufacturing, engineering, administrative,

etc.,

- Ensure that appropriate metrics are identified early in the process and that they focus on business results, thereby providing incentives and accountability;
- Provide extensive training followed by a project team deployment to improve profitability, reduce non-value-added activities, and achieve cycle time reductions;
- Create highly qualified process improvement experts who can apply improvement tools and lead teams; and
- Set stretch objectives for improvement.

2.3 SIX SIGMA COMPARED TO TOTAL QUALITY MANAGEMENT (TQM)

Gaither and Frazier (2002:278) state that the objective of TQM programmes is to build an organisation that “produces products and services that are considered best in class by its customers”. Further, they observe that different organisations have called these quality improvement programmes different names. Motorola called it ‘Six Sigma’, Xerox called it ‘Leadership through Quality’ and Hewlett-Packard called it ‘Total Quality Control’.

Anthony, Kumar and Madu (2005) cite Harry and Schroeder (2000), Pande, Neumann and Cavanagh (2000) and Adams, Gupta and Wilson (2003) to argue that there are four aspects of the Six Sigma strategy that are not emphasised in TQM:

- Six Sigma focuses primarily on the bottom-line impact in hard dollar savings. Projects will not be approved without the teams determining the savings generated from them;
- Six Sigma effectively integrates both human aspects (culture change, training and customer focus) and process aspects (process stability, variation reduction and capability) of continuous improvement;

- Six Sigma methodology (DMAIC) links the tools and techniques in a sequential manner; and
- Six Sigma has a powerful infrastructure for training of Project Champions, Master Black Belts, Black Belts, Green Belts and Yellow Belts.

Six Sigma critics, according to Ehrlich (2002:6), claim that it has added nothing new to the field of quality management. Critics say that Six Sigma “merely rehashes old tools with a catchy new name”. In Ehrlich’s (2002) view, Six Sigma is different from TQM in the execution of the strategy. He argues that TQM was owned by the quality department which was incapable of integrating it throughout the organisation. He believes that Six Sigma is primarily a business strategy supported by a quality improvement strategy.

Pande *et al.* (2000) also stipulate that Six Sigma is different from TQM because it is implemented differently. They declare that clear goals are the centre piece of Six Sigma and the progress of projects can be tracked accurately. They contend that, in TQM, goals are unclear and there are no means to measure progress against goals or to identify if changes are required.

Although it may appear that many tools and techniques used in Six Sigma are similar to TQM and other quality initiatives, they are distinct in Six Sigma, because the focus is on the strategic and systematic application of the tools on targeted projects at the appropriate time.

2.4 OVERVIEW OF LEAN

Henry Ford started Lean Production during the early nineteenth century when he established the concept of mass production in his factories. Japanese organisations like Toyota adopted Lean Production and improved it.

While Lean Production began as a manufacturing model, Snyders and Peters (2004: 3) explain that now “Lean” includes the process of creating an “optimised flow” anywhere in an organisation. It is essential that this “flow” challenge current business practices to create a faster, cheaper and less variable and less error-prone process. Lean practitioners have found that the most effective method is to seek out inefficiencies and replace them with “leaner”, more streamlined processes.

The Lean methodology is a systematic approach to identify and eliminate waste through continuous improvement by following the product at the pull of the customer in pursuit of perfection (Bhuiyan & Baghel, 2005). Lean focuses on eliminating waste (*muda* in Japanese), so that all activities along the value stream create value and are perfect. Activities aimed at reducing waste are pursued through continuous improvement or *kaizen* events, or through radical improvement efforts called *kaikaku*. Hence, the Lean goal of perfection is never ending (Womack & Jones, 1996).

Kilpatrick (2003) describes the following forms of waste or non-value-added activities:

1. Overproduction- Producing more than the customer demands ties up resources. Lean suggests that products should be manufactured just as customers order them- the “pull system”;
2. Waiting- This refers to waiting for machines, operators, materials and tools. Lean demands that resources are provided on a just-in-time (JIT) basis;
3. Transportation- Raw material must be delivered at the point of use. Lean calls this point-of-use storage (POUS);
4. Non-Value-Added- Processing- Process waste resulting from inefficient, poorly designed processes. Examples are reworking (the product or

- service should have been done correctly the first time) and inspecting (product should have been produced using statistical process control techniques to reduce the amount of inspection required);
5. Excessive inventory- Inventory not required by the customer negatively impacts cash flow and uses valuable floor space;
 6. Wasted motions – poor workflow or layout results in operators leaving work stations to fetch required supplies;
 7. Defects- Waste of rework through producing defective batches; and
 8. Underutilised people- The mental, creative, and physical skills and abilities of employees are recognised.

Naslund (2008:4) cites Nave (2002), Snee (2004) and Womack (2006) in his description of the five basic steps in the Lean process:

1. Understanding customer value: Define customer value and all of the value –added activities in the process by process mapping;
2. Value stream analysis: Identify the “value stream,” which is the chronological flow of activities that add value in the process;
3. Flow: Force the activities to flow without interruption. Remove or reduce the impact of any non-value-adding activities;
4. Pull: The customer must be able to “pull” the product or service through the process, as in JIT manufacturing; and
5. Perfection: Continuous improvement of the process toward perfection is achieved by revisiting the steps again in a continuous loop.

Lean methods may significantly reduce lead times such that it becomes feasible to practise make-to-order (MTO) production, and still provide on-time deliveries. Lean Production promotes small batch sizes and the pull system so that the MTO approach is preferred. In the personal computer business, MTO production is the business model. At Dell, the “direct sales model”, quickly converts customer orders into finished personal computers ready for shipment (Sheridan, 1999).

However, Holweg and Jones (2001) criticise that there is a general misunderstanding of the contingent nature required to apply Lean. The piecemeal application of Lean results in the most productive car plants in Europe producing the highest level of finished stocks in Europe. This car industry cannot achieve an aligned supply that provides strategic value to the customer by building cars to customer order. Toyota in Japan also failed to produce more than two-thirds of their cars to real customer order.

Lean is also the reduction of variability at every opportunity, including demand variability, manufacturing variability, and supplier variability. Manufacturing variability refers to variation in product quality characteristics (e.g. length, width, weight), and variation present in task times (e.g. downtime, absenteeism, operator skill levels). The Lean goal is to reduce task time variation by establishing standardised work procedures. Supplier variability refers to uncertainties in quality and delivery times. Supplier variability may be reduced through partnerships and other forms of supplier-producer cooperation (Arnheiter & Maleyeff, 2005). However, Andersson, Eriksson and Torstensson (2006) criticise Lean as requiring a stable environment, where scale efficiency can be maximised. Lean cannot deal with highly dynamic market conditions, as there is no room for flexibility due to the focus on perfection.

Arnheiter and Maleyeff (2005) cite Shingo (1986) in describing Lean Production as based on the concept of Zero Quality Control (ZQC). This ZQC system includes mistake proofing (poka-yoke), source inspection (operators checking their own work), automated 100 percent inspection, stopping operations immediately when a mistake is made, and ensuring setup quality. Quality inspections are performed quickly using go-no go gauges rather than more time consuming variable measurement methods.

Other critics have highlighted the following gaps in Lean thinking:

- Human aspects

Lean Production was described as exploitative and stressful to the shop floor workers by Garrahan and Stewart (1992) in their studies of the extremely productive British Nissan facility. These claims alert Lean practitioners to consider the human factors of motivation, empowerment and respect for people in Lean implementation. Lean should be approached as more than a set of mechanistic hard tools and techniques for the long-term sustainability of the programme.

- Scope and lack of strategic perspective

Hines and Taylor (2000) state that there is more focus on how to apply Lean tools and techniques and almost no attention is paid to strategic level thinking in Lean programmes. They suggest the use of policy deployment and other strategy formation and deployment tools.

2.5 LEAN SIX SIGMA (LSS)

While both Six Sigma and Lean theories have proven that it is possible to achieve dramatic improvements in cost, quality and time by focusing on different aspects of organisational performance, many practitioners contend that in a highly competitive environment, diminishing returns may result when either programme is implemented in isolation.

Bertels (2003) argues that Six Sigma eliminates defects but it cannot answer the question of how to optimise process flow, and the Lean methodology excludes advanced statistical tools sometimes required to achieve the process capabilities needed to be truly 'lean'.

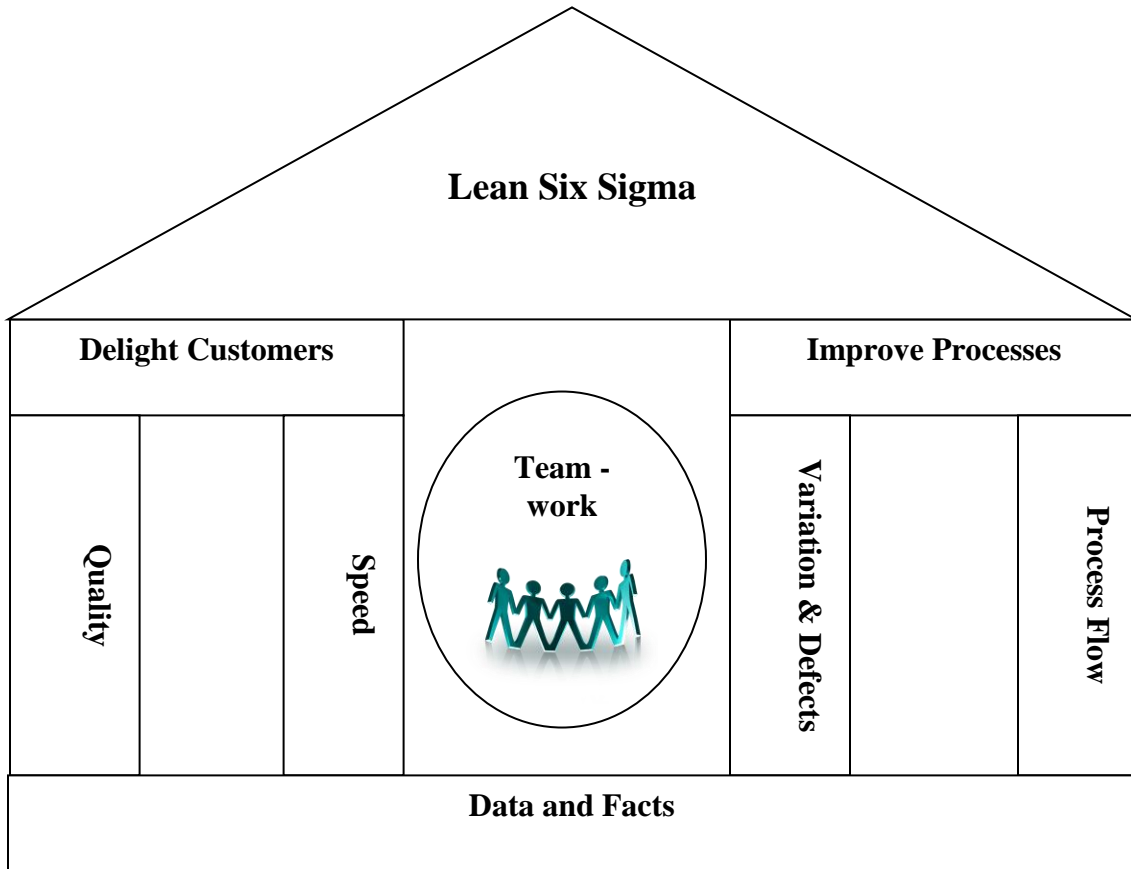
Lean Production focuses on using the minimum amount of resources (people, materials, and capital) to produce solutions and deliver them on time to customers. This process, however, is not disciplined enough to deliver results predictably. On the other hand, Six Sigma, operating independently, aims to improve quality by improving knowledge generating processes. More often than not, this leads to slow, deliberate, change and intolerant practices. To combat these challenges, organisations have learnt that, by “nesting” the Lean Production methodology within the Six Sigma methodology, a synergy can be attained that provides results much greater than if each of the approaches was implemented individually (Snyders & Peters, 2004).

After the apparent benefits of Lean and Six Sigma were sold to the business world, there were a number of big conglomerates that had implemented both Lean and Six Sigma to attain business excellence. They developed a new methodology called Lean Six Sigma (LSS) which is the most well-known hybrid methodology, a combination of Six Sigma and Lean.

LSS practitioners, like George, Rowlands and Kastle (2004:9), have borrowed what has worked in the quality management field and have improved on what did not work before to create the following “four keys” of Lean Six Sigma:

- delight customers with speed and quality;
- improve process flow, eliminating defects;
- use teamwork for maximum gain; and
- decisions are based on data and fact (refer to Figure 2.1).

Figure 2.1: The Keys to Lean Six Sigma



Source: George *et al.* (2004:10)

Bhuiyan and Baghel (2005:4) cite George (2002) in pointing out that “Lean Six Sigma maximises shareholders value by achieving the fastest rate of improvement in customer satisfaction, cost, quality, process speed and invested capital”. Combining Lean and Six Sigma methodologies results in greater value for the customer. While Lean focuses on waste elimination, Six Sigma aims to reduce variation. In LSS, waste is first removed, which then allows for variations to be spotted more easily. LSS further addresses the following issues that are overlooked by Six Sigma and Lean Production separately:

- The process steps that should be addressed first;
- The order in which process steps should be applied; and

- The extent and the ways in which significant improvements should be made in terms of cost, quality and lead times.

The fusion of the two methodologies has assisted organisations to maximise their potential for improvement. After all, Lean Production cannot bring a process under statistical control and Six Sigma alone cannot dramatically improve process speed or reduce invested capital.

2.5.1 LSS METHODOLOGY

LSS predominantly uses the DMAIC model, which has its roots in Six Sigma, for problem solving. DMAIC stands for Define-Measure-Analyse-Improve-Control. A key strength of this model is the division of the preparation and planning into multiple activities before the implementation of the improvements. Also, LSS training programmes are structured around the DMAIC model with most training programmes requiring the Belt to have an actual project to work on during training (Upton & Cox, 2004).

The following is a summary of the various activities performed within each phase of DMAIC.

Define phase - the problem is captured, and the customer impact and potential benefits of the project are assessed. The Project Charter, a two page statement that summarises the key logistics and framework of the project, is developed.

The following documents are produced in this phase:

Project Charter;

Problem/Opportunity Statement;

Process requirements;

Stakeholder and Barrier to Change Analysis; and

Team Targets and Training (Berger, 2003).

Measure phase - Focuses on how to measure the internal processes that impact the critical to quality (CTQ) elements of a product or process. Key input variables and key output variables are used to determine the effect on the CTQ element. This means understanding the causal relationship between process performance and customer value. Data is collected after asking the following questions:

- What questions are we trying to answer?
- What type of data will we need to answer the questions?
- Where can we find the data?
- Who can provide the data?
- How can we collect the data with minimum effort and minimum chance of error? (Evans & Lindsay, 2005).

Analyse phase - Thorough data analyses such as cause and effect study, time and motion analysis, analysis of statistical data are performed in this phase to uncover root causes of defects. Relationships between input factors and output factors are established (Aruleswaran, n.d).

Improve phase - A series of potential solutions are generated based on the identified root causes. The best solution is generated, the team tests the solution by piloting it to assess if it fulfills the project goals. The team develops and executes a full scale implementation plan (George, Rowlands, Price & Maxey, 2005).

Control phase - The improvements identified during the Improve phase are documented to ensure that they are maintained for long-term gains. The process is monitored and results of the key process metrics are publicised to promote continuous improvement and to guard against regression. The implementation may be re-visited after 3-6 months to review key metrics and evaluate if the initial progress has been sustained. Quite often, the key metrics like hard-cost savings and achievement of pre-defined Service Level Agreements are displayed on

notice boards to provide continuous feedback to the organisation and for decision makers to assess the project's level of success as it moves forward (Snyder & Peter, 2004).

A preventative methodology, known as Design for Six Sigma (DFSS), which consists of four stages: identify, design, optimise and validate (IDOV), is used when new processes or products are being developed (Coronado & Anthony, 2002).

The Kaizen DMAIC evolved in the application of Lean methods and is used to accelerate the pace of process improvements. Unlike the normal LSS project that lasts 3-4 months, a Kaizen that follows the DMAIC framework is completed in 3-5 full days (George *et al.*, 2005).

2.5.2 SPECIAL STAFFING OF LSS

George *et al.* (2004) are of the opinion that LSS cannot be done well if everyone involved in the programme has other full-time jobs and responsibilities. Hence, they suggest that organisations appoint some employees that work on improvement efforts 100% of the time. To keep LSS tied into the "real" part of the organisation, they also add LSS responsibilities onto some existing positions. LSS, in an organisation, is a top-down initiative carried out by a hierarchy of trained personnel designated as Project Champions, Master Black Belts, Black Belts, Green Belts and so on, with each designation reflecting a level of competence with respect to the extent of DMAIC knowledge and practice.

Waxer (2003) refers to Black Belts as Change Agents since the Black Belt role is a leadership position within an organisation. They are full-time project team leaders responsible for implementing process improvement projects (DMAIC or DFSS) within the business. Black Belts coach Green Belts and receive coaching

and support from Master Black Belts. Black Belts generally complete four weeks of training, and demonstrate mastery of the subject matter through the completion of projects and an examination. Hence, they are knowledgeable and highly skilled in the use of the LSS methodologies and tools, facilitation and change management.

Carnell and Shank (2002) argue that Green Belts are critical to the programme because they are the key to creating a culture shift. Black Belts cannot drive the culture change because they will spend most of their time tripping over each other as they scramble to create the "number of projects" or "dollars saved" metrics imposed by management to motivate them.

Nonthaleerak and Hendry's (2008) empirical study on nine Six Sigma companies in Thailand concluded that using a part-time Black Belt is a more realistic option for small organisations. This approach can still lead to successful Six Sigma implementation, despite the usual recommendation that the Black Belt should be full-time. Secondly, the authors emphasised that the Black Belt should report directly to the Project Champion who should also be the Process Owner and, hence, have direct responsibility for the project. Thirdly, they recommended that Belts should have easy access to coaching advice if projects are not to be unnecessarily delayed.

Carnell and Shank (2002) state that Project Champions are required to defuse any issues that may arise between a Black Belt and another person in the organisation, especially if the issue is with someone with a higher formal position in the company. Project Champions have a much larger role in the programme than just removing roadblocks. They must be integrated into the business; select projects accurately, adjust the speed of the projects as required, and take responsibility for implementation. The organisation must place metrics on the responsibilities of a Project Champion to ensure a successful deployment.

The Process Owner, according to Waxer (2001), is the responsible individual for a specific process. Process owners may be from the upper and lower levels of the organisational structure, depending on the size of the organisation and where the work is being accomplished.

A Team Member is expected to work with others, to discuss and resolve problems. Team Members must be enthusiastic about sharing and learning from each other. To be an effective Team Member, employees must have good listening skills, be able to brainstorm and discuss ideas, organise ideas and have good decision-making skills (George *et al.*, 2004).

Stakeholders are people who care about the outcome of the project. External customers and suppliers are stakeholders, but there are other stakeholders such as regulatory bodies and internal customers and suppliers within the organisation who must be considered (Przekop, 2006).

2.5.3 TRAINING PROGRAMMES

Training programmes are different depending on the organisation or the consulting company used. According to George *et al.* (2004), typical levels of training include:

- An awareness course (White Belt training): A short course, normally a day or two long, which aims to assist all employees, get familiar with LSS language and concepts. Employees do not need to be participants in LSS project teams;
- An introductory methods/tools course (Yellow or Green Belt training): This next level up assists employees to practise using the improvement methods and techniques. Training may last one to two weeks. The Yellow Belt is intermediate between the White and Green Belts. Yellow Belts are

trained to be Team Members and Green Belts are expected to lead projects within most organisations. Green Belts learn three main groups of tools and techniques, which are divided into team tools, process tools and leadership tools so that they can adopt the LSS methodology;

- A skill-building tools/methods course (Black Belt training): Black Belts are the core of the LSS programme. In some organisations, they lead projects, in others; they serve as coaches and resources to several projects at a time; and
- Advanced training in one or more specialties (Master Black Belt or enrichment courses). These employees are trained on a few LSS tools that are extremely valuable in some limited circumstances. It is not feasible to train every Black Belt on them since they are not needed as often as the more general LSS tools.

2.6 SUMMARY

LSS is sold as a methodology that can solve business problems. The success or failure of LSS is in the process rather than the content. Given that there is no standard methodology; organisations must be capable of choosing the most appropriate tools and techniques applicable to them. The challenge is to understand and integrate LSS in the context of a particular organisation. The question is more about adaptation of the LSS methodology to an organisation rather than the content of the tools used in the methodology. Hence, the next chapter focuses on the critical factors that must be considered for successful implementation of LSS.

CHAPTER THREE

CRITICAL FACTORS THAT AFFECT THE SUCCESS OF A LSS PROGRAMME

3.1 INTRODUCTION

While organisations like Motorola and GE have claimed huge savings with the adoption of Six Sigma, Hayes (2002) argues that there have been cases where entire Six Sigma programmes have been scrapped, after significant investment, due to low returns. Carnell (2002) maintains that he is not aware of any Six Sigma effort that has been without some form of failure. Just like any other business initiative, LSS plans must be made and metrics must be developed to evaluate the progress. Plans must be adjusted when the deployment is not going as expected.

This literature search reviews some of the factors that must be considered for the successful implementation of LSS within any organisation. Most articles and books that discussed the critical success factors for Six Sigma and Lean implementations were referenced separately since most organisations have implemented them as two separate programmes. The findings of this research were used to develop the questionnaire to evaluate the LSS programme at Valspar (SA).

3.2 LEADERSHIP COMMITMENT

Wheat, Mills and Carnell (2003: 49) state that

“It takes intelligence to understand the advantages of Lean and Six Sigma. It takes courage and good leadership to take action on that understanding”.

Hayes (2002) argues that executive engagement is a key success factor. Top management must be visible, must show consistent support and play an active role in communication and reward. They are responsible for assuring the linkage of Six Sigma to corporate strategies. Managers must set clear prioritisation (relative to other initiatives, programmes and priorities) and they must use facts and data to support actions at all levels of decision-making. Management is responsible for creating accountabilities, setting expectations and defining roles and responsibilities for the organisation. Managers must also conduct and attend regular reviews to assure and verify progress.

Some of the most recognised programmes, according to Wheat *et al.* (2003), were at Motorola under Robert Galvin, Allied Signal under Larry Bossidy and GE under Jack Welch. None of these leaders were spectators during the programme. Jack Welch communicated a clear message that he was solidly behind the Six Sigma programme by dropping in on weekly and monthly Six Sigma reviews, monitoring project progress weekly through summary reports, and by visiting manufacturing operations to observe the degree to which Six Sigma was ingrained in the culture. He expected every level of the organisation to commit to the programme with these words:

“We can no longer wait. Everyone in this room must lead the quality charge. There can be no spectators on this. What took Motorola ten years, we must do in five - not through short cuts, but in learning from others”.

(Welch, 2001:330)

Durnford's (2004) view is that middle managers also need to be on board early because their attitudes and behaviours are vitally important. Middle managers must be fully informed at the initial stages of the programme, to ensure that there are no feelings of being marginalised. Ignored managers can undermine and block the change progress. Project teams, with a supportive local management,

tend to grow from strength to strength while teams having managers that are not interested, or see teams as a threat to their role, fizzle out.

Chandra (2008) is in agreement with Durnford (2004) and states that not only senior leadership, but leadership at all levels in the organisation must walk the talk and continuously emphasise the importance of Six Sigma at all forums. He believes that no amount of good intentions, resources, effort or time can substitute sustained leadership support.

3.2.1 LEADERSHIP MUST LINK LSS TO THE BUSINESS STRATEGY

Six Sigma projects must be targeted for process and product improvements that have a direct impact on both financial and operational goals. Even if the first efforts focus on fairly narrow problems, their impact on the whole business should be clear. It needs to be clear how projects and other activities link to customers, core processes and competitiveness (Pande *et al.*, 2000).

Byrne *et al.* (2007:1) reviewed the records of several leading organisations that have implemented operational strategies based on LSS management techniques. Stagnant revenue growth prompted Caterpillar to undertake a massive transformation in January 2001. Caterpillar's ongoing LSS initiative led to product innovations, such as its phenomenally successful low-emissions diesel engine, and to redesigned processes, including a streamlined supply chain. By 2005, revenues had grown by 80 percent.

Byrne *et al.* (2007:2) identified several distinguishing characteristics that set Caterpillar and other successful LSS organisations, apart from those with a traditional operational improvement mindset. The critical characteristics were:

- The organisations developed a strategic innovation vision, based on factual customer and market insights. They crafted few, explicit objectives to achieve better focus;

- The leadership was committed to the programme. Chief Executive Officers (CEOs) and business unit leaders played active, enthusiastic roles;
- There was alignment across the extended organisation. The organisation's vision was used as a unifying force to align efforts in the different business units and influence supplier and customer relationships; and

The organisational capabilities made innovation habitual. At the deployment stage, successful organisations invested in an intense period of training, dedicated resources and an initial set of projects to initiate the transformation. However, over time, these organisations established a culture and enduring processes that helped drive continuous innovation throughout the organisation.

Although CEOs view the LSS approach primarily in terms of process improvement and cost reduction, research conducted by Byrne *et al.* (2007:7) suggests that this perspective is shortsighted. The successful organisations, which were researched, acted in a more visionary manner. They consciously expanded the scope of LSS, using it to promote significant innovation opportunities that affected much more than their operations. This process enabled them to improve business performance and establish organisational climates that have an inherent inclination toward innovation.

3.3 AWARENESS AND COMMUNICATION

Achanga, Shehab, Roy and Nelder (2006) confer that irrespective of the fantastic benefits Lean improvements provide an organisation, they generally end up disrupting the organisational framework and cause disruptions in the very process it is meant to improve. These disruptions occur because employees are sometimes afraid of job losses and are, therefore, prepared to cause sabotage. Employees usually resist this change because they are afraid of the unknown and they do not understand the need for change.

Some companies, that have succeeded in managing change, have identified that the best way to tackle resistance to change is through increased and sustained communication, motivation and education. However, organisations know that communication takes time and effort – but the investment is worthwhile. It is important for employees to be reminded of the vision and how far they have come in their efforts, since this will combat any cynics. It will also maintain morale and belief in the change process (Durnford, 2004).

A Human Resources (HR) plan must be created and communicated to all employees, to support Six Sigma roles. There must be regular written communications on Six Sigma news and successes to management and employees. A common language based on Six Sigma must be advocated and created, and pertinent facts about Six Sigma progress must be communicated at meetings (Hayes, 2002).

George *et al.* (2004:91) are in agreement with Hayes (2002) that communication is a critical success factor. They recommend that it is important to create a web of communication within the organisation:

- With bosses, to understand the corporate requirements and to get their assistance to overcome roadblocks or resolve conflicts that may arise between departments;
- With project team members, to ensure clarity on the purpose, goals, boundaries and expectations of projects. The team should also be comfortable to ask questions and clear any issues they have; and
- With all employees at all levels in the organisation so that they can support the LSS effort either directly or indirectly.

3.4 PROJECT MANAGEMENT

Berger (2003), like Hayes (2002), is of the opinion that project management is

the basic discipline for successful change. Organisations have failed LSS programmes when they pay too little attention to the value of good project management and when they fail to develop their project managers.

A lack of focus on project selection and prioritisation can result in projects that lack data or business focus or projects focused on process areas that are outside the Belts' area of control. This deficiency can lead to delayed or scrapped projects, and disillusionment among the Belts. Organisations must form a deployment team, consisting of all key business managers, to design the LSS effort. By giving these managers a voice in project selection, priorities and ongoing monitoring, the organisation can be assured of their commitment to the effort. Chandra (2008) recommends that deployment teams select Six Sigma projects that are data-based and focused on business, financial, process and customer goals which are properly prioritised to ensure that these goals are met. Deployment teams should conduct regular meetings for project identification and selection, and ensure that all selected projects have a Project Champion who will be responsible for tracking and signing off the business benefits of the Six Sigma project.

Ternon and Zeeb (2005) have observed that the most effective LSS organisations have a rigorous project selection process driven by an evaluation of how much shareholder value a project can generate. Projects are characterised as a trade-off decision comparing value delivered to effort expended. A one year Six Sigma project inventory, according to Hayes (2002), must be established and documented showing a clear linkage of Six Sigma projects to critical business and customer needs. Projects of appropriate scope and size must be established to achieve significant savings.

Project Champions and Belts must be assigned and held accountable for each project. Belts must be trained on basic project management skills like setting

agendas, setting and keeping ground rules. Project Champions and Belts should consider the key elements of project management i.e. time, cost and quality. A focus on these elements assists the team to define the scope, aim and resources needed to deliver an improvement in the short time, at the lowest cost and meeting the requirements needed (Eckes, 2000).

Hayes (2002), together with Motwani, Kumar and Antony (2004) and Ternon and Zeeb (2005), agrees that a good project tracking system must be implemented to assess the project's progress. These authors believe that LSS results must be quantified so that the organisation can appropriately evaluate their impact and assess whether resources are being properly utilised. A senior level finance person should be involved in the development of a results-tracking rule book. The organisation must consider the leading measurements or key performance indicators of the potential financial results. Project cycle times and project values are measured on a regular basis. Furthermore, a flexible and user-friendly database will enable the capture and leverage of knowledge.

Ternon and Zeeb (2005) also advise organisations to refrain from pushing too many projects into the LSS deployment, hoping to generate significant results within six months or a year. One of the key lessons that Lean principles teach is that pushing excess work into a process slows down the process and significantly increases lead times. Rather, organisations should control the number of active projects at any given time since Lean practitioners know that results can be speeded up by reducing the amount of work-in-process per Belt. It is better to focus on getting a few high impact projects done right than to just flood the organisation with dozens of low value projects.

3.5 RESOURCE ALLOCATION

Those organisations that have reaped the immense benefits of implementing Six Sigma made an important initial investment and allocated a special budget to launch the programme. Training and consultancy, improvement implanting costs, direct payroll and indirect payroll are some of the critical budget items to be considered. Pande *et al.* (2000) believe that the cost of not making this investment is much bigger than the cost of doing it.

Keller (2005) alleges that sufficient resource allocation to improvement teams is another key element of a successful deployment strategy. In small organisations, resource allocation is complicated because employees perform combined job functions. Also, many of these jobs include tasks that are critical to the daily operations, and not just the long-term survival of the organisation. In small organisations, especially, opportunities to improve exist because of resource constraints: people know the problem exists, have a good understanding of potential solutions, yet lack the time to investigate and deploy the best solution. Organisations need to realise that, only by diverting and adding LSS resources into the system, waste can be removed and profitability improved.

An important decision related to resources is whether or not to have full-time Black Belts. A mature Six Sigma programme usually has about 1% of its work force committed as Black Belts. However, once trained, these individuals work only on Black Belt projects. Hence, they are strictly overhead and contribute nothing directly to the everyday operations. Full-time Black Belts generally lead 4 to 7 project teams per year. The team comprises Green Belts, line personnel and subject matter experts involved in the process targeted for improvement. Except for Black Belts, Team Members maintain their operational roles in the organisation and participate only when serving on a project team.

Some organisations select Green Belts as designated project leaders, responsible for completing one to five projects per year. Since this approach can present time allocation problems, a preferred strategy is for full-time Black Belts to lead projects (Keller, 2005). Crom (2006) supports this view since experience has shown that full-time Black Belts get four times as much accomplished in half the time as part-time Black Belts. Further, the culture change that the organisation is seeking through LSS comes largely by placing successful and experienced Black Belts back into line management roles.

Smaller organisations, according to Keller (2005), use floating or part-time Black Belts or Green Belts to provide expertise to a number of Six Sigma teams throughout the organisation. Some organisations also use consultants as Master Black Belts, particularly for the first year or two of deployment. However, when part-time Black Belts are used, management assumes a risk in losing project focus to daily operational issues. These resources must be effectively managed by the Six Sigma Project Champions.

Bertels (2003) supports the option of using part-time Black Belts in small organisations. He argues that the traditional training model, with its emphasis on filling classrooms and extensive training curricula, does not work for small organisations because they struggle to free up the necessary number of employees for the classroom and they also cannot afford to wait for six to nine months until the Black Belt returns with the answer to the problem. Smaller organisations live in a less complex world, decisions can be made much quicker and access to leadership is never a problem.

3.6 TRAINING

Stamatis (2003:6) believes that

“Implementation in the context of Six Sigma is an issue of training, which is one of the most important characteristics that distinguishes Six Sigma from any other programme. What makes it special are both the amount of time required and the financial outlays associated with preparing an organisation to tackle problems of improvement”.

Snee and Hoerl (2003) state that an overall training system for each of the Six Sigma roles is a key element of the deployment plan. At launch, a training schedule is required for the initial wave of Belts. As employees get involved in the various roles in Six Sigma, there is a need for advanced training in certain areas. Hence, a functioning training system, with diverse curricula, must be developed. Snee and Hoerl (2003) do not recommend mass training. They recommend a well thought out system that identifies all the training needs of all the roles, and puts together a sustained, ongoing process to continuously satisfy these needs in the most efficient way. This recommendation requires a lot of work, but, fortunately, the complete training system is not needed at the launch of Six Sigma.

Chakraborty (2002) is in agreement with Snee and Hoerl (2003) that it makes good business sense for most organisations to get the help of external consultants, especially in the foundation phase of the programme. External consultants' knowledge is beneficial in the initial deployment of LSS since they can foresee roadblocks and address them at the very outset. They also assist the organisation with training, certification of the first few waves of Belts and help choose and certify Master Black Belts. Their job is to get a company to a point where they have their own stand-alone programme.

Wheat *et al.* (2003) caution that consultants cannot solve Six Sigma Projects for the organisation. Consultants enable an organisation to learn from those who have gone before, and assist it to move up the learning curve more quickly. Employees must solve the problems for themselves, with the consultants' help, for true change to occur in the organisation. The consultants' costs can be justified since their costs should be covered by the returns of the higher number of projects that can be completed using the expertise of seasoned consultants (Snee and Hoerl, 2003).

Appropriate Belt training programmes must be selected for facilitators. Some training programmes emphasise technical, analytical or statistical skills and ignore people skills. Too much emphasis on the technical aspect of LSS can result in confusion within the organisation, if Belts return from their training all fired up and speaking a new, unfamiliar language. Belt training should incorporate a balance of hard (tools and statistical analysis) and soft (behavioural) skills. This balance will ensure the sound application of cutting edge techniques that are clearly understood and warmly received (Durnford, 2004).

Chatterjee (2002) supports the development of a mentoring process to ensure that proper guidance is given to new Belts after their training by experienced practitioners. This guidance will ensure that the project's progress is reviewed regularly and the projects get completed on time.

3.7 REWARD AND RECOGNITION

Chakraborty (2002:2) asserts that

“Doing the same old thing and expecting different results is the definition of insanity. As much as new tools and a new roadmap empowers people to do things differently, systemic constraints -- be it organisational structure or reward system -- if not addressed adequately can seriously damage the credibility of the effort and make cynics out of employees”.

Chakraborty (2002) argues that the organisation must confront big roadblocks early in the deployment phase to boost the morale of employees and provide the momentum for the LSS effort. If LSS is an enabler of strategy and key improvement initiatives, then Crom (2006) argues that success should be tied to variable compensation at the executive level. The personal performance objectives of Project Champions, Belts and department managers should incorporate active leadership of LSS.

Motwani *et al.* (2004) state that one of the key factors for Dow Chemicals Six Sigma success story was the fact that employee compensation plans were tied to Six Sigma results. Senior management had established an expectation that all employees must have at least one personal goal tied to Six Sigma. Also, the organisation had developed an expectation that all of its professional-level employees must have been involved in a successful Six Sigma project by year-end 2005.

Eckes (2005), like Snee and Hoerl (2003), reiterates that an organisation needs a reward and recognition plan to ensure that it is able to obtain (and eventually promote) the best possible candidates for Six Sigma roles. Snee and Hoerl (2003) believe in the power of "intrinsic motivation" (the idea that people do

something because they really want to do it), instead of relying on "extrinsic motivation" (people do something because they are coerced or "bribed" to do it). They contend that employees, who are enthusiastic about improvement, will generally perform better in Six Sigma roles than those solely looking for money or promotion. On the other hand, organisations must recognise that a total lack of extrinsic rewards for involvement in Six Sigma will be a disincentive, and they should consider rewarding these roles in such a way that top performers will be drawn to Six Sigma.

One of the most important things about entrenching LSS within an organisation is the integration of LSS into employees' careers. Welch (2001) supported this notion as follows:

"I became a fanatic about it (Six Sigma), insisting that no one will be considered for a management job without at least Green Belt training by the end of 1998. Even with my constant cheerleading and a lot of pounding in Session Cs and everywhere else, it took us three years to get all the best people into Six Sigma". Welch (2001:333)

Eckes (2005) reports that GE's HR Policy of promoting only those candidates with Six Sigma experience to better jobs in the organisation created a culture of better buy-in to Six Sigma. LSS will only be entrenched in employees' minds if it is taken as part of their professional development. This entrenchment will, in turn, lead to the LSS culture in the organisation because it takes care of the "what is in it for me" agenda of employees.

Chatterjee (2002) feels that Belts would be further motivated with the creation of a certification process. The certification process must be rigorous. Belts must successfully complete projects and demonstrate the proper use of the LSS tools and techniques to be certified. The Functional Area Manager, Finance Leader

and Six Sigma reviewer must authorise the certification.

3.8 SUMMARY

This review illustrates the critical success factors for the implementation of LSS projects. These factors were derived from a thorough analysis of various journals papers, books and case studies. The findings suggest that proper planning, constant evaluation of progress, senior management commitment, good communication, project management, resource allocation, training and a proper reward and recognition plan are essential factors that should be taken into account for optimising the financial return from LSS projects in all organisations. In order to achieve the full potential of LSS projects, it is important to take these factors into consideration. If any of these ingredients are missing during the implementation of LSS projects, it would be then the difference between a successful implementation and a complete waste of effort, time and money. The next stage of the research is to evaluate these factors in the Valspar (SA) LSS programme.

CHAPTER FOUR

RESEARCH DESIGN AND METHODOLOGY

4.1 INTRODUCTION

The previous chapter focused on the theoretical orientation to this study by outlining the chosen theoretical frameworks, concepts and models. The focus of this chapter is on a discussion of the methodological approach and method used to generate data, namely, the survey questionnaire.

After presenting a brief discussion on the methodological approach, information on the survey questionnaire, which is the primary data gathering tool employed in this study, is presented. Issues including the construction and design of the questionnaire, validity testing, the sampling framework as well as the techniques involved in data analysis are presented.

4.2 METHODOLOGICAL APPROACH

In order to obtain data on the issues related to the critical questions formulated in chapter one, the researcher chose to use a cross-sectional, descriptive and quantitative paradigm in order to investigate and address the research question. The quantitative researcher attempts to measure the properties of phenomena like the attitudes of people towards a certain topic by collecting data that can be presented in the form of numbers (Babbie & Mouton, 2001).

4.3 THE SURVEY QUESTIONNAIRE

The survey questionnaire was used as the primary data gathering tool because it is a good way of getting a picture of the current state of a group, namely, a community, an organisation, a set of corporations or a profession. Most often, surveys are viewed as snapshots or pictures of a particular point or period in time (Janes, 1999:1). Owing to the fact that the critical question in this study is focused around gaining information about the current views of employees on the LSS programme at Valspar (SA), the researcher found the questionnaire to be the most suitable data collection instrument.

4.3.1 CONSTRUCTION AND DESIGN OF THE QUESTIONNAIRE

Whilst questionnaires are a popular way of obtaining data, O' Sullivan and Rassel (1999:230) caution that poor questionnaires may result in low response rates, unreliable or invalid data, or inadequate or inappropriate information. They suggest that quality questionnaires require well-worded questions, clear responses and attractive layouts. The researcher kept this in mind when designing the questionnaire.

The questionnaire employed in this study had largely closed-ended questions. Closed-ended questions typically ask the respondent to select, from two or more alternative responses, the response that best suits them. Two questions were open-ended to allow the respondents to formulate their responses themselves. This opportunity allowed them to openly and freely express their thoughts and opinions (Welman & Kruger, 2001).

Hair, Babin, Money and Samouel (2003:189) advise that the length of the questionnaire and the way in which the questions are structured, sequenced and coded determine a high response rate and high quality responses. With this in

mind, the questionnaire (see Annexure B) was divided into eight sections:

- Section A- Work Information;
- Section B- Awareness and Communication;
- Section C- Leadership;
- Section D-Project Management;
- Section E- Resource Allocation;
- Section F-Training;
- Section G-Reward and Recognition; and
- Section H- General open-ended questions.

Sections A to G of the questionnaire contained closed-ended questions requiring either a categorical response or a scaled response. The majority of the questions required a scaled response and was of the Likert-type (see example below) which allowed respondents the latitude to indicate the extent to which they agree or disagree with a variety of statements.

STATEMENT

STRONGLY DISAGREE	1	2	3	4	5	STRONGLY AGREE

Anderson (1990:34) states that the Likert Scale is widely used in questionnaires where the researcher wants to assess views from respondents. It was developed by Rensis Likert to measure the direction and strength of an individual's opinion. According to Hawkins and Tull (1994:297), the Likert scale is simple and easy to construct and is useful for surveys since the instructions can be easily understood. However, Zikmund (1994:372) cautions that the major disadvantage of the Likert scale is its inability to quantify and adequately explain a score.

Section H of the questionnaire consisted of two open-ended questions which gave respondents the opportunity to comment on two aspects of the LSS programme at Valspar (SA).

4.3.2 PRE-TESTING AND VALIDATION OF THE QUESTIONNAIRE

A measuring instrument, like a questionnaire, is valid to the extent that it is accurately able to measure that which it intends to measure. Hence, this implies that the researcher is concerned that what he/she finds with the questionnaire actually represents the reality of what the researcher is measuring. Often researchers refer to content validity, criterion-related validity and construct validity when discussing the validity of a questionnaire. Content or face validity refers to the extent to which the measurement instrument, i.e. the questionnaire, provides adequate coverage of the research questions. Judgment of what is adequate coverage can be made through proper definition of the research through the literature reviewed and sometimes with prior discussion with others. Also, a panel of individuals may assess if each question in the questionnaire is 'essential' (Saunders, Lewis & Thornhill, 2007).

Thus, after the design of the questionnaire by the researcher, the validity of the questionnaire was determined by a panel of experienced researchers and the Master Black Belt to establish the face validity. Trochim (2006) says that any time a concept or construct is translated into a functioning and operating reality (the operationalisation), it is important to be concerned about how well the translation was done. Hence, when using face validity, the operationalisation must be looked at and assessed whether "on its face" it seems like a good translation of the construct.

(A sample of the questionnaire is attached as Annexure B)

4.3.3 SAMPLING FRAMEWORK

Fortunately, the researcher was able to acquire information from all the people about whom she wanted to make inferences. Given that thirty five employees are targeted for involvement in LSS projects at Valspar (SA), the researcher chose to administer the questionnaire to these employees, rather than select a sample. A census of all thirty five LSS participants at Valspar (SA) was conducted. Welman and Kruger (2001) distinguish between a survey and a census by stating that a survey is conducted on samples whilst in a census, each member of the population is supposed to be included and is classified in terms of certain biographical variables like employment status. A response rate of thirty one employees should be achieved to ensure validity of the study (Cooper & Schindler, 2001).

4.3.4 ADMINISTERING THE QUESTIONNAIRE

Prior to the distribution of the questionnaire permission had to be sought from the Managing Director of Valspar (SA) for administering the questionnaire to the targeted employees within the organisation.

All 35 questionnaires were hand delivered to each of the respondents. A one page subject information letter (see Annexure A) was enclosed together with the questionnaire which elucidated the following:

- The purpose of the research questionnaire;
- An assurance that the responses will be treated in the strictest of confidence. The researcher felt that this was the best way of obtaining responses that would be honest; and
- The need for a prompt response.

The researcher ensured that the process was conducted in an ethical and morally sensitive manner and that participants were not coerced into submitting

questionnaires. A drop-off box was left at Valspar (SA) reception for the return of the questionnaires. The questionnaires were available in English only as all employees involved in this study were fully conversant in the English language.

4.3.5 ANALYSIS OF DATA

The data was analysed by using a computer based analysis system (Microsoft Excel) to obtain descriptive statistics. Descriptive statistics 'include both specific numbers and ways of presenting data in tabular form in order to make the information succinct but clear to the reader' (Harris, 1995:6). In essence, descriptive statistics involve transformation of raw data into a form that would provide information to describe a set of factors in a situation. This transformation is done through ordering and manipulation of the raw data collected (Sekaran, 2000:395). The most popular tools of descriptive statistics include frequency distributions and bar graphs.

4.4 SUMMARY

This chapter highlighted how the research design was planned and executed. A detailed discussion with regard to the data gathering tool was presented. The sampling technique employed, issues concerning validity as well as data analysis procedures were discussed.

The next chapter deals with the presentation and analysis of data.

CHAPTER FIVE

PRESENTATION AND ANALYSIS OF DATA

5.1 INTRODUCTION

The previous chapter outlined the research design and methodology employed in this study. This chapter focuses on the presentation and analysis of the data gathered from the survey questionnaire.

5.2 PRESENTATION OF THE DATA

The researcher used descriptive statistics to present the quantitative data from the 94 % (33) response rate received from the survey. In order to make the data more comprehensible, the data is organised and summarised using frequency distributions and bar graphs, followed by a factual description of the data. Due to rounding off, the percentage figures and the cumulative percentage figures in the frequency distribution tables do not always correlate. The data analysis was based on the LSS organisational levels of the respondents. An understanding of how each group perceives the programme will assist the researcher to make valid recommendations for improvements in the LSS programme.

Information gathered from the open-ended questions were analysed using the emerging themes or factors identified in the theoretical and conceptual frameworks presented in the literature review.

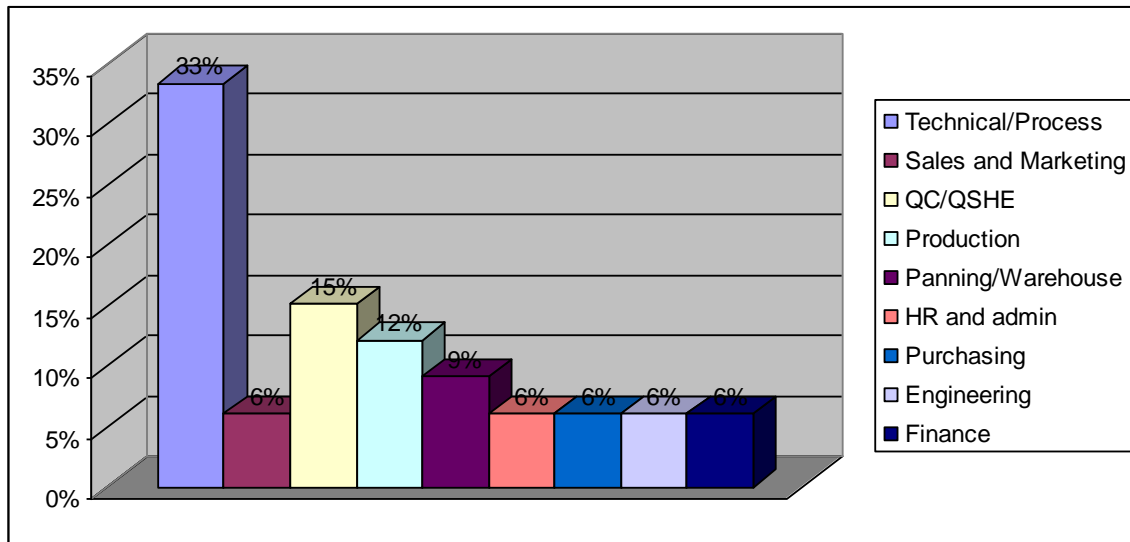
5.2.1 Section A- Work Information

Question One: In which department do you work at Valspar (SA)?

Table 5.1 Frequency distribution of respondents within departments at Valspar (SA).

	Frequency	Percent	Cumulative Percent
Technical/Process	11	33%	33%
Sales	2	6%	39%
QC/QSHE	5	15%	54%
Production	4	12%	66%
Planning/Warehouse	3	9%	75%
HR and admin	2	6%	81%
Purchasing	2	6%	87%
Engineering	2	6%	93%
Finance	2	6%	100%
TOTAL	33	100	

Figure 5.1 Bar graph depicting the distribution of respondents within departments at Valspar (SA).



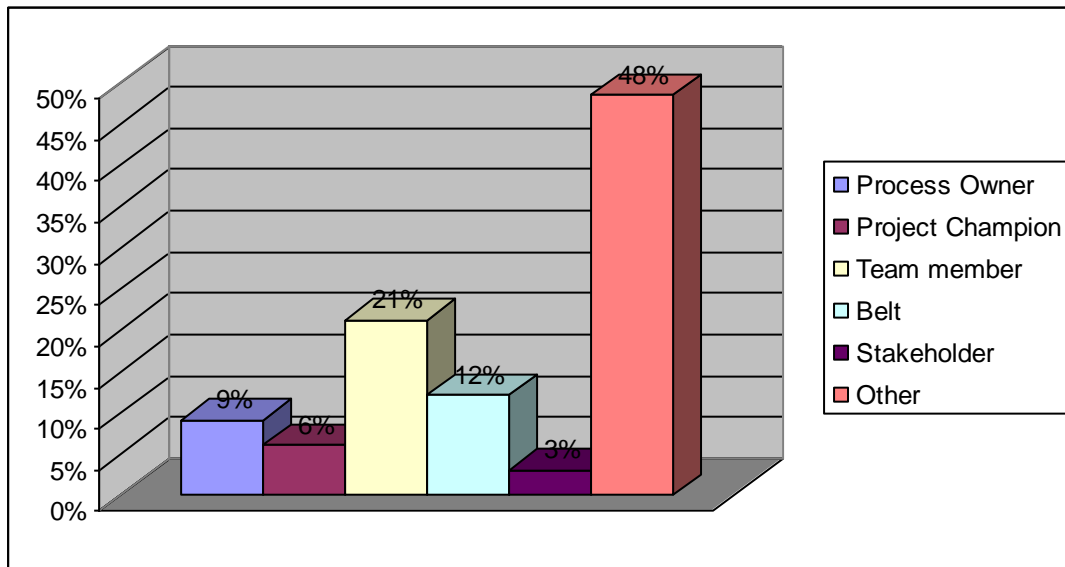
The majority of the respondents, totalling 11 and comprising 33% of the respondents, were from the Technical and Process departments. The least number of respondents, comprising 2 each, were from Sales, HR and admin, Purchasing, Engineering and Finance.

Question Two: At what organisational level are you involved in the LSS implementation at Valspar (SA)?

Table 5.2 Frequency distribution of respondents within the LSS organisational levels.

	Frequency	Percent	Cumulative Percent
Process Owner	3	9%	9%
Project Champion	2	6%	15%
Team member	7	21%	36%
Belt	4	12%	48%
Stakeholder	1	3%	52%
Other	16	48%	100%
TOTAL	33	100	

Figure 5.2 Bar graph depicting the distribution of respondents within the LSS organisational levels.



The vast majority of the respondents, totalling 16 and comprising 48% of the respondents, were Other. Other implies that the respondent is not currently participating, either as a Belt, Project Champion, Team Member, Stakeholder or Process Owner, in a LSS project. Only 2 Project Champions and one Stakeholder responded to the survey.

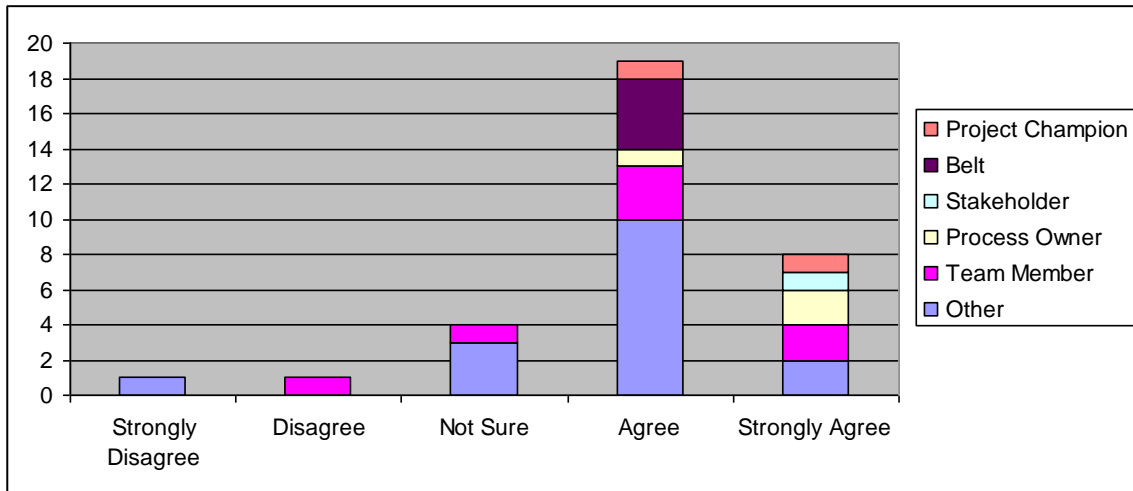
5.2.2 Section B- Awareness and Communication

Question 3: I understand what Valspar (SA) is trying to achieve with LSS.

Table 5.3 Frequency distribution of understanding what Valspar (SA) is trying to achieve with LSS.

	Other	Team Member	Process Owner	Stakeholder	Belt	Project Champion	Frequency	Percent	Cumulative Percent
Strongly Disagree	1	0	0	0	0	0	1	3%	3%
Disagree	0	1	0	0	0	0	1	3%	6%
Not Sure	3	1	0	0	0	0	4	12%	18%
Agree	10	3	1	0	4	1	19	58%	76%
Strongly Agree	2	2	2	1	0	1	8	24%	100%
TOTAL	16	7	3	1	4	2	33	100%	

Figure 5.3 Bar graph depicting the understanding of what Valspar (SA) is trying to achieve with LSS.



The majority of the respondents, totalling 27 and comprising 82% of the respondents, agreed and strongly agreed with the statement that they understood what Valspar (SA) was trying to achieve with LSS. This strong agreement with the statement was from 12 Other respondents, 5 Team Members, 3 Process Owners, 1 Stakeholder, 4 Belts and 2 Project Champions.

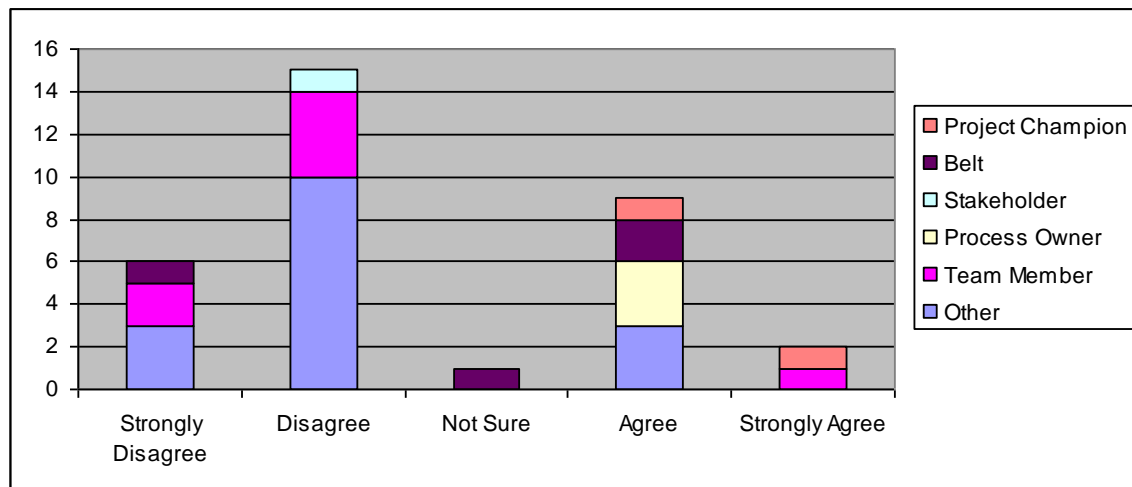
A minority of respondents, totalling 2 and comprising 6% of the respondents, disagreed and strongly disagreed with the statement. This disagreement came from 1 Other respondent and 1 Team Member.

Question 4: I receive regular communication about the LSS initiative in Valspar.

Table 5.4 Frequency distribution of receiving regular communication about the LSS initiative in Valspar.

	Other	Team Member	Process Owner	Stakeholder	Belt	Project Champion	Frequency	Percent	Cumulative Percent
Strongly Disagree	3	2	0	0	1	0	6	18%	18%
Disagree	10	4	0	1	0	0	15	45%	64%
Not Sure	0	0	0	0	1	0	1	3%	67%
Agree	3	0	3	0	2	1	9	27%	94%
Strongly Agree	0	1	0	0	0	1	2	6%	100%
TOTAL	16	7	3	1	4	2	33	100%	

Figure 5.4 Bar graph depicting the receiving of regular communication about the LSS initiative in Valspar.



The majority of the respondents, totalling 21 and comprising 64% of the respondents, disagreed and strongly disagreed with the statement that they received regular communication about the LSS initiative in Valspar. This strong

disagreement with the statement came from 13 Others, 6 Team Members, 1 Stakeholder and 1 Belt.

11 respondents, comprising 33% of the respondents, agreed and strongly agreed with the statement that they received regular communication about the LSS initiative in Valspar. This agreement with the statement came from 3 Others, 1 Team Member, 3 Process Owners, 2 Belts and 2 Project Champions.

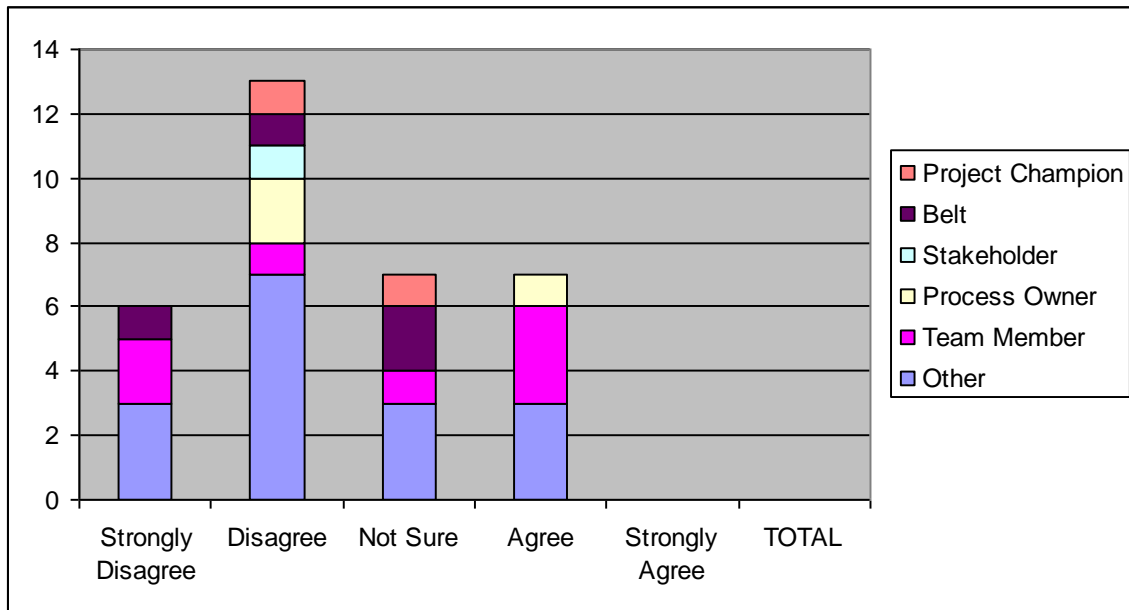
5.2.3 Section C- Leadership

Question 5: Managers talk about LSS at staff meetings and employee presentations.

Table 5.5 Frequency distribution of managers talking about LSS at staff meetings and employee presentations.

	Other	Team Member	Process Owner	Stakeholder	Belt	Project Champion	Frequency	Percent	Cumulative Percent
Strongly Disagree	3	2	0	0	1	0	6	18%	18%
Disagree	7	1	2	1	1	1	13	39%	58%
Not Sure	3	1	0	0	2	1	7	21%	79%
Agree	3	3	1	0	0	0	7	21%	100%
Strongly Agree	0	0	0	0	0	0	0	0%	100%
TOTAL	16	7	3	1	4	2	33	100%	

Figure 5.5 Bar graph of managers talking about LSS at staff meetings and employee presentations.



The majority of the respondents, totalling 19 and comprising 58% of the respondents, disagreed and strongly disagreed with the statement that managers talked about LSS at staff meetings and employee presentations. This strong disagreement with the statement came from 10 Others, 3 Team Members, 2 Process Owners, 1 Stakeholder, 2 Belts and 1 Project Champion.

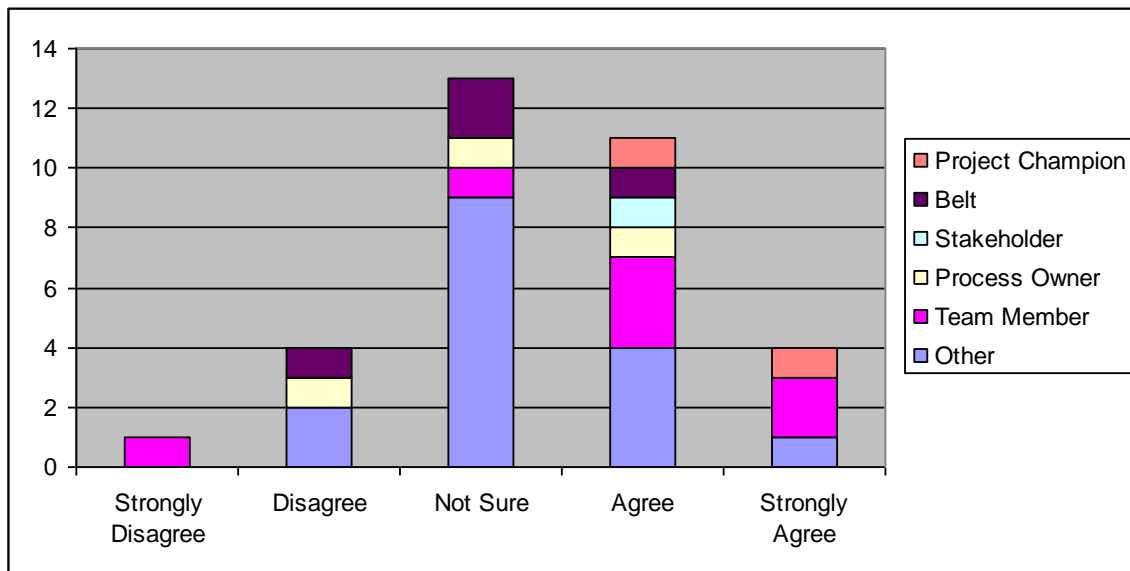
7 respondents, comprising 21% of the respondents, agreed with the statement that managers talked about LSS at staff meetings and employee presentations. This agreement with the statement came from 3 Others, 3 Team Members and 1 Process Owner.

Question 6: Managers at Valspar (SA) make decisions based on data.

Table 5.6 Frequency distribution of managers at Valspar (SA) making decisions based on data.

	Other	Team Member	Process Owner	Stakeholder	Belt	Project Champion	Frequency	Percent	Cumulative Percent
Strongly Disagree	0	1	0	0	0	0	1	3%	3%
Disagree	2	0	1	0	1	0	4	12%	15%
Not Sure	9	1	1	0	2	0	13	39%	55%
Agree	4	3	1	1	1	1	11	33%	88%
Strongly Agree	1	2	0	0	0	1	4	12%	100%
TOTAL	16	7	3	1	4	2	33	100%	

Figure 5.6 Bar graph of managers at Valspar (SA) making decisions based on data.



15 respondents, comprising 45% of the respondents, agreed and strongly agreed with the statement that managers at Valspar (SA) made decisions based on data. This strong agreement with the statement came from 5 Others, 5 Team Members, 1 Process Owner, 1 Stakeholder, 1 Belt and 2 Project Champions.

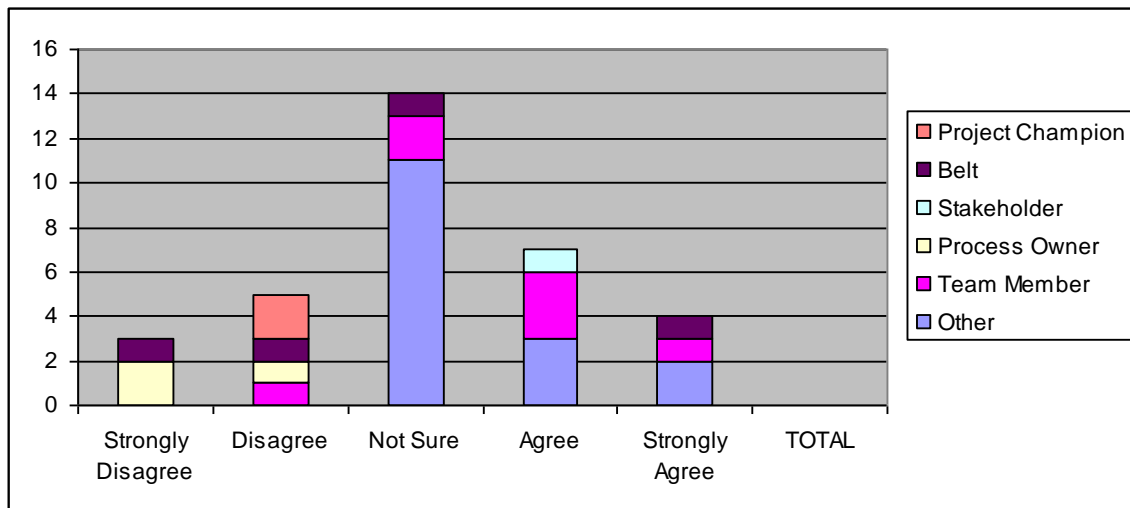
13 respondents, comprising 39% of the respondents, were not sure whether managers at Valspar (SA) made decisions based on data. This lack of awareness came from 9 Others, 1 Team Member, 1 Process Owner and 2 Belts.

Question 7: Green Belts and management are creating an exclusive club attitude around the programme.

Table 5.7 Frequency distribution of Green Belts and management creating an exclusive club attitude around the programme.

	Other	Team Member	Process Owner	Stakeholder	Belt	Project Champion	Frequency	Percent	Cumulative Percent
Strongly Disagree	0	0	2	0	1	0	3	9%	9%
Disagree	0	1	1	0	1	2	5	15%	24%
Not Sure	11	2	0	0	1	0	14	42%	67%
Agree	3	3	0	1	0	0	7	21%	88%
Strongly Agree	2	1	0	0	1	0	4	12%	100%
TOTAL	16	7	3	1	4	2	33	100%	

Figure 5.7 Bar graph of Green Belts and management creating an exclusive club attitude around the programme.



14 respondents, comprising 42% of the respondents, were not sure whether Green Belts and management have created an exclusive club attitude around the

programme. This lack of awareness came from 11 Others, 2 Team Members and 1 Belt.

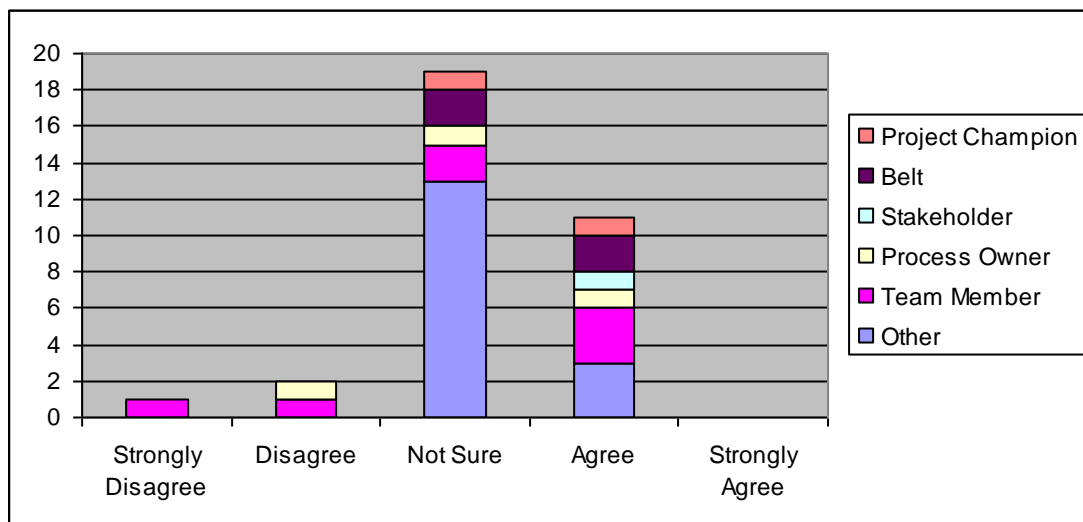
11 respondents, comprising 33% of the respondents, agreed and strongly agreed with the statement that Green Belts and management have created an exclusive club attitude around the programme. This strong agreement with the statement came from 5 Others, 4 Team Members, 1 Stakeholder and 1 Belt.

Question 8: Project Champions are actively engaged in projects.

Table 5.8 Frequency distribution of Project Champions' active engagement in projects.

	Other	Team Member	Process Owner	Stakeholder	Belt	Project Champion	Frequency	Percent	Cumulative Percent
Strongly Disagree	0	1	0	0	0	0	1	3%	3%
Disagree	0	1	1	0	0	0	2	6%	9%
Not Sure	13	2	1	0	2	1	19	58%	67%
Agree	3	3	1	1	2	1	11	33%	100%
Strongly Agree	0	0	0	0	0	0	0	0%	100%
TOTAL	16	7	3	1	4	2	33	100%	

Figure 5.8 Bar graph showing Project Champions' active engagement in projects.



19 respondents, comprising 58% of the respondents, were not sure whether Project Champions were actively engaged in projects. This lack of awareness came from 13 Others, 2 Team Members, 1 Process Owner, 2 Belts and 1 Project Champion.

11 respondents, comprising 33% of the respondents, agreed with the statement that Project Champions were actively engaged in projects. This agreement with the statement came from 3 Others, 3 Team Members, 1 Process Owner, 1 Stakeholder, 2 Belts and 1 Project Champion.

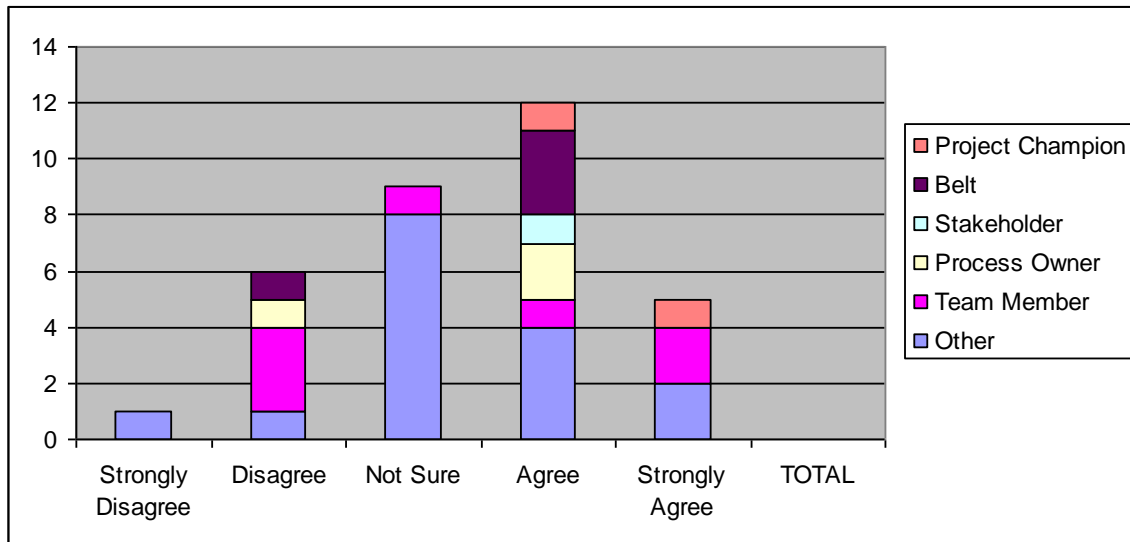
5.2.4 Section D-Project Management

Question 9: Valspar (SA) is working on the right projects that meet the business goals and customer expectations.

Table 5.9 Frequency distribution of whether Valspar (SA) has worked on the right projects that meet the business goals and customer expectations.

	Other	Team Member	Process Owner	Stakeholder	Belt	Project Champion	Frequency	Percent	Cumulative Percent
Strongly Disagree	1	0	0	0	0	0	1	3%	3%
Disagree	1	3	1	0	1	0	6	18%	21%
Not Sure	8	1	0	0	0	0	9	27%	48%
Agree	4	1	2	1	3	1	12	36%	85%
Strongly Agree	2	2	0	0	0	1	5	15%	100%
TOTAL	16	7	3	1	4	2	33	100%	

Figure 5.9 Bar graph of whether Valspar (SA) has worked on the right projects that meet the business goals and customer expectations.



The majority of the respondents, totalling 17 and comprising 51% of the respondents, agreed and strongly agreed with the statement that Valspar (SA) was working on the right projects that met the business goals and customer expectations. This strong agreement with the statement came from 6 Others, 3 Team Members, 2 Process Owners, 1 Stakeholder, 3 Belts and 2 Project Champions.

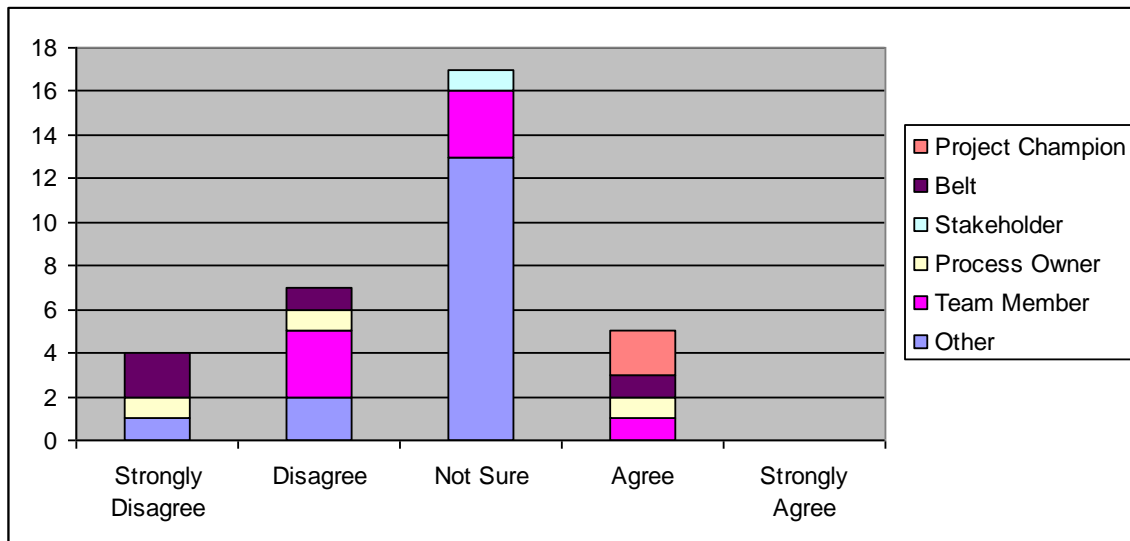
9 respondents, comprising 27% of the respondents, were not sure if Valspar (SA) was working on the right projects that met the business goals and customer expectations. This lack of awareness came from 8 Others and 1 Team Member.

Question 10: I am aware of the multiple projects queued up for each Green Belt (so when they complete a project, the next one has already been selected).

Table 5.10 Frequency distribution of the awareness of the multiple projects queued up for each Green Belt (so when they complete a project, the next one has already been selected).

	Other	Team Member	Process Owner	Stakeholder	Belt	Project Champion	Frequency	Percent	Cumulative Percent
Strongly Disagree	1	0	1	0	2	0	4	12%	12%
Disagree	2	3	1	0	1	0	7	21%	33%
Not Sure	13	3	0	1	0	0	17	52%	85%
Agree	0	1	1	0	1	2	5	15%	100%
Strongly Agree	0	0	0	0	0	0	0	0%	100%
TOTAL	16	7	3	1	4	2	33	100%	

Figure 5.10 Bar graph depicting the awareness of the multiple projects queued up for each Green Belt (so when they complete a project, the next one has already been selected).



The majority of the respondents, totalling 17 and comprising 52% of the respondents, were not sure if they were aware of the multiple projects queued up for each Green Belt (so when they complete a project, the next one has already

been selected). This lack of awareness came from 13 Others, 3 Team Members, and 1 Stakeholder.

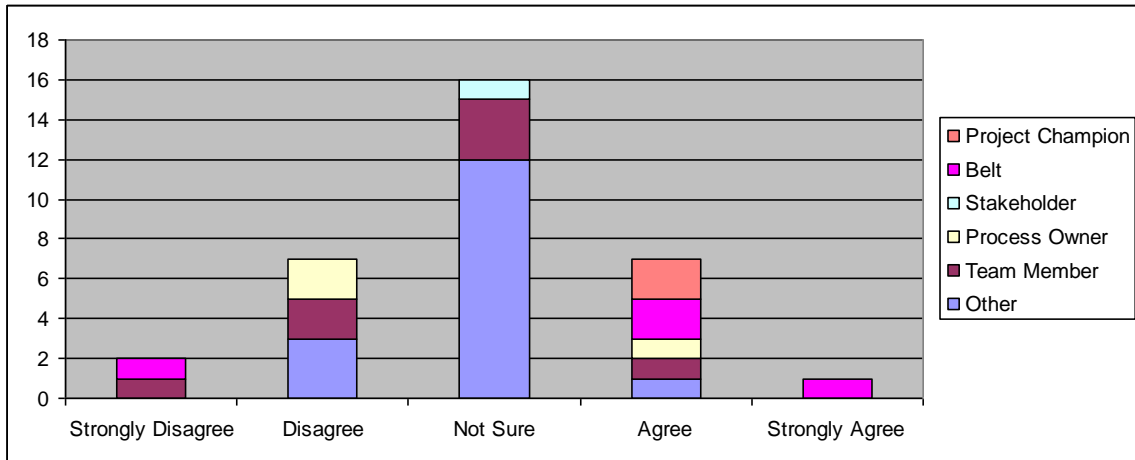
11 respondents, comprising 33% of the respondents, disagreed and strongly disagreed with the statement that they are aware of the multiple projects queued up for each Green Belt (so when they complete a project, the next one has already been selected). This strong disagreement with the statement came from 3 Others, 3 Team Members, 2 Process Owners and 3 Belts. 2 Project Champions agreed with the statement.

Question 11. Valspar has a good project tracking system to assess project progress.

Table 5.11 Frequency distribution of whether Valspar has a good project tracking system to assess project progress.

	Other	Team Member	Process Owner	Stakeholder	Belt	Project Champion	Frequency	Percent	Cumulative Percent
Strongly Disagree	0	1	0	0	1	0	2	6%	6%
Disagree	3	2	2	0	0	0	7	21%	27%
Not Sure	12	3	0	1	0	0	16	48%	76%
Agree	1	1	1	0	2	2	7	21%	97%
Strongly Agree	0	0	0	0	1	0	1	3%	100%
TOTAL	16	7	3	1	4	2	33	100%	

Figure 5.11 Bar graph of whether Valspar has a good project tracking system to assess project progress.



The majority of the respondents, totalling 16 and comprising 48% of the respondents, were not sure if Valspar had a good project tracking system to assess project progress. This lack of awareness came from 12 Others, 3 Team Members, and 1 Stakeholder.

9 respondents, comprising 27% of the respondents, disagreed and strongly disagreed with the statement that Valspar had a good project tracking system to assess project progress. This disagreement with the statement came from 3 Others, 3 Team Members, 2 Process Owners and 1 Belt.

8 respondents, comprising 24% of the respondents, agreed and strongly agreed with the statement that Valspar had a good project tracking system to assess project progress. This minority agreement with the statement came from 1 Other, 1 Team Member, 1 Process Owner, 3 Belts and 2 Project Champions.

5.2.5 Section E- Resource Allocation

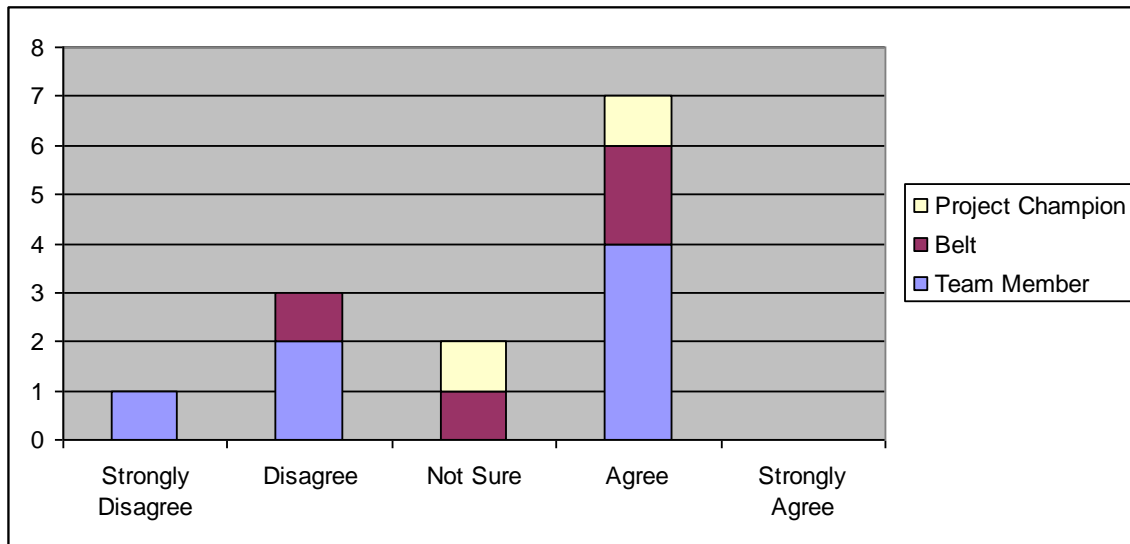
Data from the responses of Green Belts, Project Champions and Team Members only, were analysed in Question 12 and Question 13 below.

Question 12: As a Green Belt, Project Champion or Team Member, I have sufficient time to dedicate to the project.

Table 5.12 Frequency distribution of whether Green Belts, Project Champions or Team Members have sufficient time to dedicate to projects.

	Team Member	Belt	Project Champion	Frequency	Percent	Cumulative Percent
Strongly Disagree	1	0	0	1	8%	8%
Disagree	2	1	0	3	23%	31%
Not Sure	0	1	1	2	15%	46%
Agree	4	2	1	7	54%	100%
Strongly Agree	0	0	0	0	0%	100%
TOTAL	7	4	2	13	100%	

Figure 5.12 Bar graph showing whether Green Belts, Project Champions or Team Members have sufficient time to dedicate to projects.



The majority of the respondents, totalling 7 and comprising 54% of the respondents, agreed with the statement that, as Green Belts, Project Champions or Team Members, they have sufficient time to dedicate to the project. This agreement with the statement came from 4 Team Members, 1 Project Champion and 2 Belts.

4 respondents (3 Team Members and 1 Belt), comprising 31% of the respondents, disagreed and strongly disagreed with the statement that, as Green Belts, Project Champions or Team members, they have sufficient time to dedicate to the project.

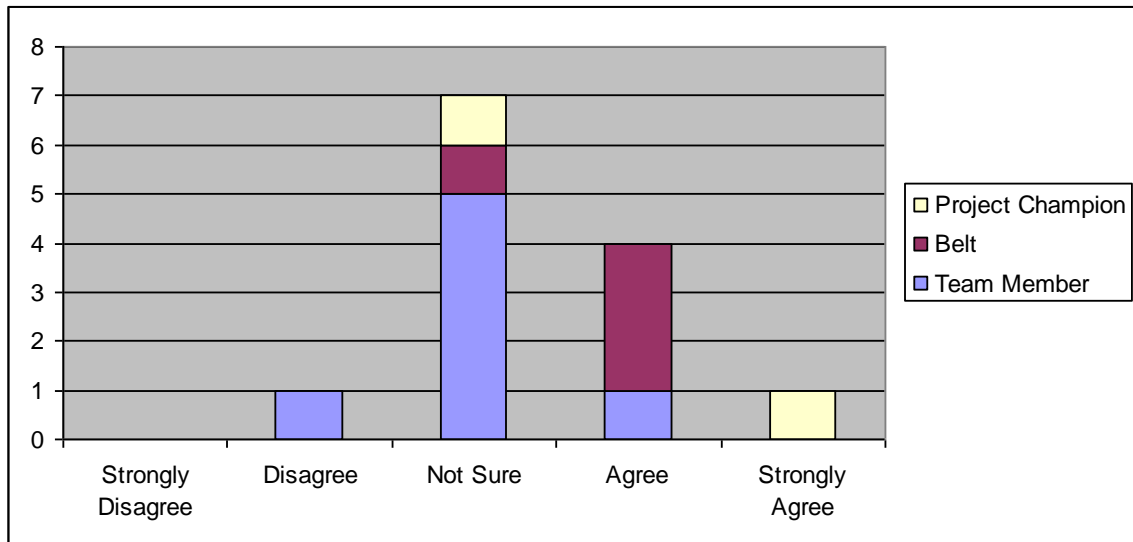
1 Belt and 1 Project Champion were not sure if they have sufficient time for projects.

Question 13: Green Belts are receiving adequate coaching from off-site Black Belts

Table 5.13 Frequency distribution of whether Green Belts are receiving adequate coaching from off-site Black Belts.

	Team Member	Belt	Project Champion	Frequency	Percent	Cumulative Percent
Strongly Disagree	0	0	0	0	0%	0%
Disagree	1	0	0	1	8%	8%
Not Sure	5	1	1	7	54%	62%
Agree	1	3	0	4	31%	92%
Strongly Agree	0	0	1	1	8%	100%
TOTAL	7	4	2	13	100%	

Figure 5.13 Bar graph showing whether Green Belts are receiving adequate coaching from off-site Black Belts.



The majority of the respondents (5 Team Members, 1 Belt and 1 Project Champion), totalling 7 and comprising 54% of the respondents, are not sure if Green Belts are receiving adequate coaching from off-site Black Belts.

5 respondents (1Team member, 1 Project Champion and 3 Belts), comprising 39% of the respondents, agreed with the statement that Green Belts are receiving adequate coaching from off-site Black Belts.

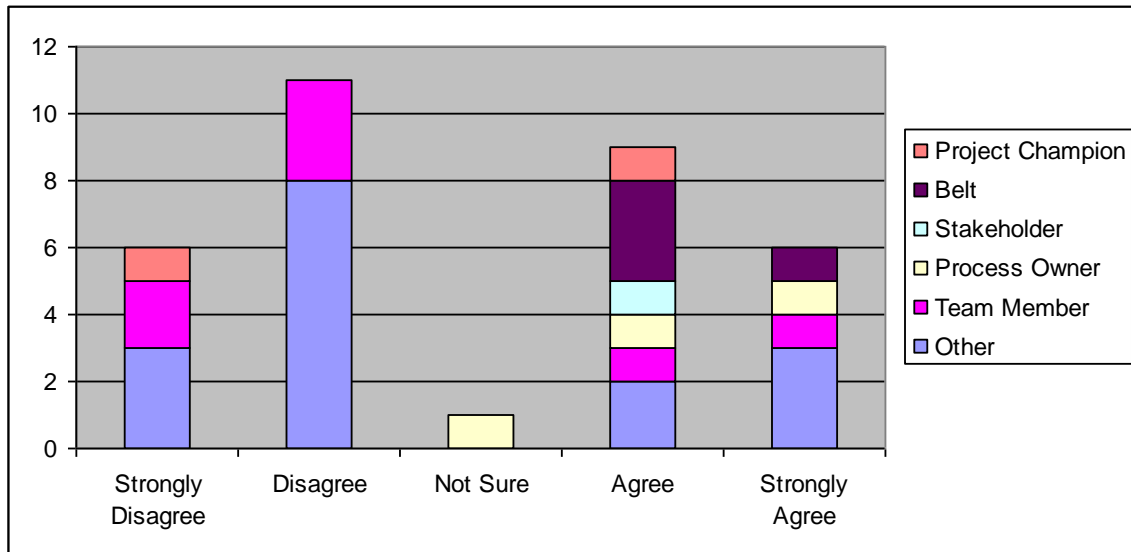
5.2.6 Section F-Training

Question 14: I have attended an LSS awareness session at Valspar (SA).

Table 5.14 Frequency distribution on the attendance of an LSS awareness session at Valspar (SA).

	Other	Team Member	Process Owner	Stakeholder	Belt	Project Champion	Frequency	Percent	Cumulative Percent
Strongly Disagree	3	2	0	0	0	1	6	18%	18%
Disagree	8	3	0	0	0	0	11	33%	52%
Not Sure	0	0	1	0	0	0	1	3%	55%
Agree	2	1	1	1	3	1	9	27%	82%
Strongly Agree	3	1	1	0	1	0	6	18%	100%
TOTAL	16	7	3	1	4	2	33	100%	

Figure 5.14 Bar graph on the attendance of an LSS awareness session at Valspar (SA).



The majority of the respondents, totalling 17 and comprising 52% of the respondents, disagreed and strongly disagreed with the statement that they had attended an LSS awareness session at Valspar (SA). This disagreement with the statement came from 11 Others, 5 Team Members and 1 Process Owner.

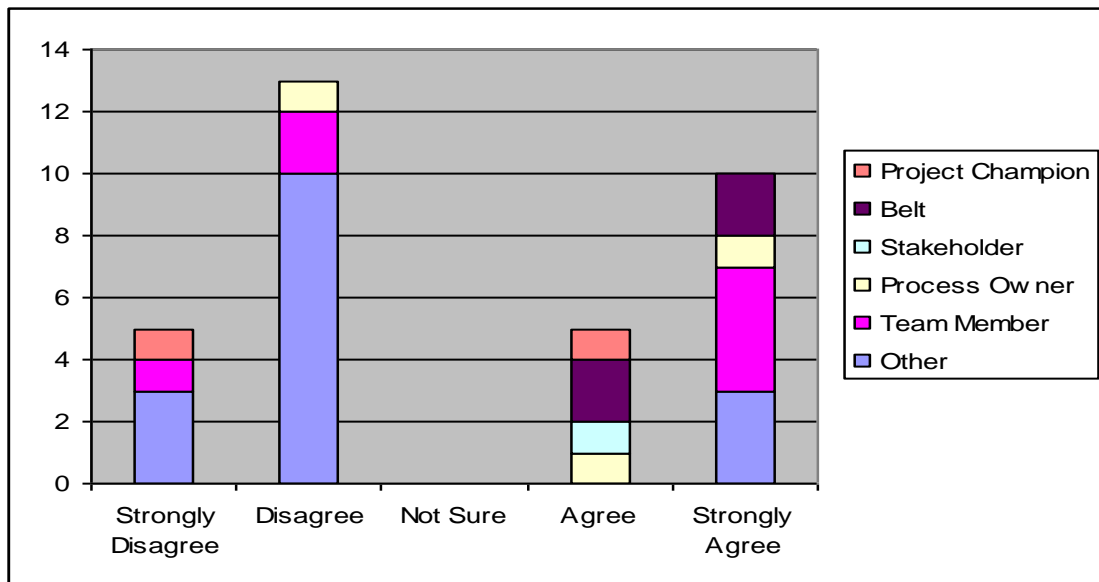
15 respondents, comprising 45% of the respondents, agreed and strongly agreed with the statement that they had attended an LSS awareness session at Valspar (SA). This agreement with the statement came from 5 Others, 2 Team Members, 2 Process Owners, 1 Stakeholder, 4 Belts and 1 Project Champion.

Question 15. I have attended LSS Leadership, Project Champion, Black Belt, Green Belt or Yellow Belt Training.

Table 5.15 Frequency distribution on the attendance of LSS Leadership, Project Champion, Black Belt, Green Belt or Yellow Belt Training.

	Other	Team Member	Process Owner	Stakeholder	Belt	Project Champion	Frequency	Percent	Cumulative Percent
Strongly Disagree	3	1	0	0	0	1	5	15%	15%
Disagree	10	2	1	0	0	0	13	39%	55%
Not Sure	0	0	0	0	0	0	0	0%	55%
Agree	0	0	1	1	2	1	5	15%	70%
Strongly Agree	3	4	1	0	2	0	10	30%	100%
TOTAL	16	7	3	1	4	2	33	100%	

Figure 5.15 Bar graph depicting the attendance of LSS Leadership, Project Champion, Black Belt, Green Belt or Yellow Belt Training.



The majority of the respondents, totalling 18 and comprising 55% of the respondents, disagreed and strongly disagreed with the statement that they had attended the LSS Leadership, Project Champion, Black Belt, Green Belt or Yellow Belt Training. This strong disagreement with the statement came from 13 Others, 3 Team Members, 1 Process Owner and 1 Project Champion.

15 respondents, comprising 45% of the respondents, agreed and strongly agreed with the statement that they had attended the LSS Leadership, Project Champion, Black Belt, Green Belt or Yellow Belt Training. This agreement with the statement came from 3 Others, 4 Team Members, 2 Process Owners, 1 Stakeholder, 4 Belts and 1 Project Champion.

5.2.7 Section G-Reward and Recognition

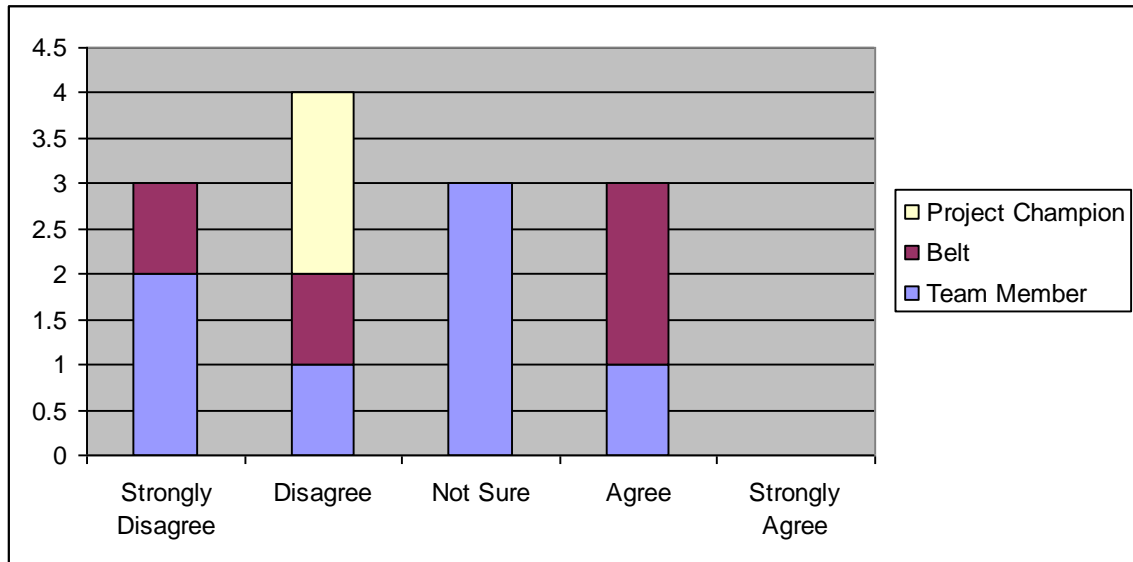
Data from the responses of Belts, Project Champions and Team Members only, were analysed in Question 16 below.

Question 16: My participation in LSS as a Project Champion, a Belt or a Team Member is reflected in my performance management objectives for 2008.

Table 5.16 Frequency distribution on the reflection of LSS participation as a Project Champion, a Belt or a Team Member in performance management objectives for 2008.

	Team Member	Belt	Project Champion	Frequency	Percent	Cumulative Percent
Strongly Disagree	2	1	0	3	23%	23%
Disagree	1	1	2	4	31%	54%
Not Sure	3	0	0	3	23%	77%
Agree	1	2	0	3	23%	100%
Strongly Agree	0	0	0	0	0%	100%
TOTAL	7	4	2	13	100%	

Figure 5.16 Bar graph showing the reflection of LSS participation as a Project Champion, a Belt or a Team Member in performance management objectives for 2008.



The majority of the respondents (3 Team Members, 2 Belts and 2 Project Champions), totalling 7 and comprising 54% of the respondents, disagreed and strongly disagreed with the statement that their participation in LSS is reflected in their performance management objectives for 2008.

3 respondents (3 Team Members), comprising 23% of the respondents, were not sure if their participation in LSS is reflected in their performance management objectives for 2008.

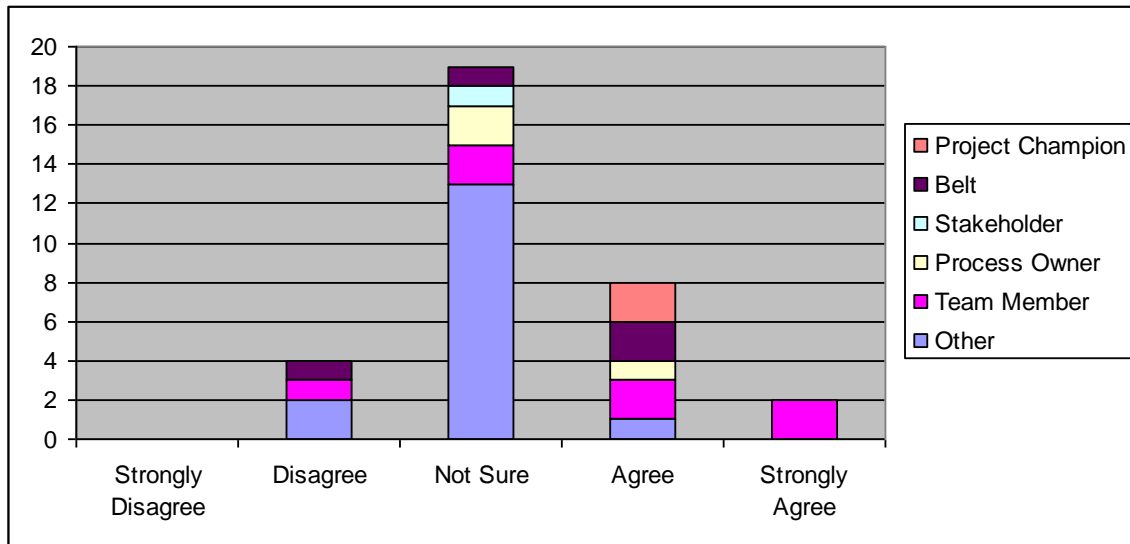
3 respondents (1 Team Member and 2 Belts), comprising 23% of the respondents, agreed that their participation in LSS is reflected in their performance management objectives for 2008.

Question 17: Valspar (SA) has no reward or recognition programme for LSS project team members.

Table 5.17 Frequency distribution of whether Valspar (SA) has no reward or recognition programme for LSS project team members.

	Other	Team Member	Process Owner	Stakeholder	Belt	Project Champion	Frequency	Percent	Cumulative Percent
Strongly Disagree	0	0	0	0	0	0	0	0%	0%
Disagree	2	1	0	0	1	0	4	12%	12%
Not Sure	13	2	2	1	1	0	19	58%	70%
Agree	1	2	1	0	2	2	8	24%	94%
Strongly Agree	0	2	0	0	0	0	2	6%	100%
TOTAL	16	7	3	1	4	2	33	100%	

Figure 5.17 Bar graph showing distribution of whether Valspar (SA) has no reward or recognition programme for LSS project team members.



The majority of the respondents, totalling 19 and comprising 58% of the respondents, were not sure about the statement that Valspar (SA) has no reward or recognition programme for LSS project team members. This lack of awareness came from 13 Others, 2 Team Members, 2 Process Owners, 1 Stakeholder and 1 Belt.

10 respondents comprising, 30% of the respondents, agreed and strongly agreed with the statement that Valspar (SA) has no reward or recognition programme for LSS project team members. This agreement with the statement came from 1 Other, 4 Team Members, 1 Process Owner, 2 Belts, and 2 Project Champions.

5.2.8 Section H- General open-ended questions

Question 18: Currently Valspar (SA's) LSS projects are taking too long (more than 6 months). Make recommendations to reduce the project life cycle.

Analysis of the recommendations made by respondents revealed two strong themes and factors that may reduce the project life cycle:

Resource allocation

The following suggestions were made by respondents:

- *“Assign more than 1 person to a project-depending on depth and involvement required for the project”;*
- *“Dedicated staff” ;*
- *“Ensure that project team make-up is correct”;*
- *“Choose the right team members”;* and
- *“Create time for project members to do the required work”.*

Project Management

The following suggestions were made by respondents:

- *“Set definite project deadlines. Involve all the required staff”;*
- *“Projects are not focused nor have strict guidelines set when they begin. They seem to have to expand or change in order to achieve the desired result”;*
- *“Decision making to be faster. Internal communication to be optimised. Regular (but short) team meetings (daily/every second day)”;*

- *“Projects should be assessed every 2 weeks for follow up of the projects to conclusion”; and*
- *“A plan needs to be put in place as to who will do what within a specific time”.*

Question 19: Suggest ways to create LSS awareness at the shop floor level in Valspar (SA).

Analysis of the recommendations made by respondents revealed that communication is the most important factor to create LSS awareness at the shop floor level in Valspar (SA). The following suggestions were made by respondents:

- *“Have workshops for feedback and information on projects”;*
- *“Newsletter”;*
- *“Have presentations on project work by Green Belts. Notice board to present "live" data to the workforce”;*
- *“Make information more visible and available”;*
- *“Market and campaign it. Get Green Belts exposing themselves at floor level regarding the status of their projects”;*
- *“LSS needs to be something everyone feels is worthwhile. Display successful results and their savings so people can see their impact”;* and
- *“Visual management. Visit to local organisations where LSS has been effectively incorporated into everyday activities”.*

A focus on training, to create LSS awareness at the shop floor level in Valspar (SA), was also suggested by respondents. The following recommendations were made by respondents:

- *“Training on benefits of LSS to the organisation, what the company is trying to achieve and the path forward must be known to all”;*
- *“Educate staff on floor level on what LSS is and how it works”;*

- *“All staff should be aware: Training should be given to understand LSS awareness at all levels”; and*
- *“LSS awareness session for each department by Black Belt. Must not be more than 1 hour”.*

Some respondents also highlighted that shop floor employees must be considered during resource allocation of projects. The following recommendations, to involve shop floor employees in projects, were made:

- *“Involve the floor personnel as much as they can. Show them that they are as important as the LSS/Valspar assets”; and*
- *“Involve shop floor level operators as team members”.*

5.3 SUMMARY

In this chapter the data obtained from the close-ended questions in the questionnaire was presented in the form of frequency distribution tables and bar graphs. The emerging factors were thematically analysed from the open-ended questions of the survey.

In the next chapter, the findings, the main conclusions of the study and certain pertinent recommendations are made.

CHAPTER SIX

DISCUSSION, CONCLUSIONS AND RECOMMENDATIONS

6.1 INTRODUCTION

In this final chapter, the main findings, conclusions and recommendations are presented. After careful consideration of the literature study and the research data, the researcher presents her findings and conclusions. Thereafter, pertinent recommendations, to improve the LSS programme at Valspar (SA), are presented.

The objective of this study was to assist Valspar (SA) to apply LSS correctly within the scope of the business. In order to achieve this objective, the researcher sought answers to the following key questions:

1. What are the critical factors that affect the successful implementation of LSS at Valspar (SA)?
2. To what degree are these critical factors present at Valspar (SA)?

6.2 DISCUSSION OF THE FACTORS

After a thorough study of the data, the emerging trends and patterns from the data are presented. Findings from the open-ended questions were infused into the discussion related to the closed-ended questions.

6.2.1 AWARENESS AND COMMUNICATION

Finding: The vast majority of the respondents understand what Valspar (SA) is trying to achieve with LSS.

This strong awareness of most employees suggests that they understand the need for change within the organisation. This finding means that there is a chance for better buy-in of the LSS programme.

Finding: 64% of the respondents do not receive regular communication about the LSS initiative in Valspar. Only 33% of the respondents receive regular communication about the LSS initiative in Valspar.

It was observed that mostly employees, who are not currently involved in projects and some Team Members, are not receiving regular communication about the LSS effort. It is interesting to note that 2 Belts felt that they received regular communication whilst 1 Belt was unsure and another Belt felt that the communication was not regular. It is good to see that Project Champions, who are generally the leadership in the organisation receive regular communication about LSS.

Employees felt that communication is the most important factor to create LSS awareness at the shop floor level in Valspar (SA). They made suggestions to include articles about LSS in the site newsletter, to display project work on notice boards and to have Green Belts doing presentations about their projects to the shop floor employees.

6.2.2 LEADERSHIP

Finding: Most respondents (58%) believe that managers do not talk about LSS at staff meetings and employee presentations.

Managers (2 Project Champions and 1 Stakeholder) admitted that LSS does not come up in staff meetings and employee presentations. This finding is disappointing since it implies that management at Valspar (SA) does not see

LSS as a key driver of business strategy. Furthermore, they are not creating and promoting the LSS culture within the organisation.

Finding: 45% of the respondents feel that managers at Valspar (SA) make decisions based on data. 39% of the respondents are not sure whether managers at Valspar (SA) make decisions based on data.

It is encouraging to note that respondents from the different organisational levels within LSS were in agreement with this statement, especially since the LSS programme is still in its infancy at Valspar (SA).

Finding: 42% of the respondents are not sure whether Green Belts and management are creating an exclusive club attitude around the programme. 33% of the respondents believe that Green Belts and management are creating an exclusive club attitude around the programme.

The concern with this finding is that only 24% of the respondents feel that there is no exclusive club attitude around the programme. This finding suggests that there is not enough transparency and information sharing about the LSS programme amongst employees.

Finding: 58% of the respondents are not sure if Project Champions are actively engaged in projects. 33% of the respondents feel that Project Champions are actively engaged in projects.

These results may be a bit skewed by the responses of the Others who are not currently involved in projects. However, it was surprising to observe that 2 Belts and 1 Project Champion are not sure about the support that Project Champions are lending to projects. This finding implies that they are unclear about the roles and responsibilities of a Project Champion.

6.2.3 PROJECT MANAGEMENT

Finding: The majority (51%) of the respondents feel that Valspar (SA) is working on the right projects that meet the business goals and customer expectations.

This is an encouraging response. However, it may be a bit biased since 3 Belts and the 2 Project Champions, who probably generated the project idea, responded favourably to this statement. It is surprising to note that 1 Belt felt that Valspar (SA) was not working on the right projects that met the business goals and customer expectations. It would be interesting to understand why 27% of the respondents are not sure if the right projects are being implemented. Could it be that they do not know the requirements of a LSS project?

Finding: Most respondents are not aware of the multiple projects queued up for each Green Belt (so when they complete a project, the next one has already been selected).

The fact that the majority of the respondents are not aware of the multiple projects queued up for each Green Belt is an indication that no such list exists. However, it could also be that the Project Champions, who agreed with the statement, have developed a list of potential projects but they have not published it for the rest of the organisation to review. A lack of transparency and information sharing is evident.

Finding: The majority of the respondents do not know if Valspar has a good project tracking system to assess project progress.

It seems that employees not involved in projects, Team Members, Process

Owners and Stakeholders are not aware of a good project tracking system to assess project progress. Interestingly enough, it seems that most Belts and Project Champions believe that Valspar has a good project tracking system to assess project progress. Once again, it is apparent that there is lack of information sharing with all employees about the systems used in the management of projects in Valspar (SA).

Employees cited poor project management as one of the reasons why LSS projects have extended life cycles at Valspar (SA). Projects are not properly scoped, project plans are not followed and decision-making takes too long.

6.2.4 RESOURCE ALLOCATION

Finding: Most respondents (54%) agreed that Green Belts, Project Champions or Team Members have sufficient time to dedicate to projects.

It is encouraging to note that the majority of the respondents agreed that they had sufficient time to dedicate to the project. Also, it was good to see that the responses were evenly split amongst the LSS hierarchy, which implies that Belts, Team Members and Project Champions, in certain projects, are properly allocating time for their projects. Those employees, that found time an issue, probably did not agree upfront on how much time they can allocate or are expected to dedicate to the LSS project.

Finding: 54% of the respondents are not aware if Green Belts receive adequate coaching from off-site Black Belts. However, 39% of the respondents feel that Green Belts receive adequate coaching from off-site Black Belts.

The majority of the respondents, who are not sure if Green Belts are receiving

adequate coaching from off-site Black Belts, were Team Members. This is expected since Team Members, unlike Project Champions, are not aware of the mentoring and coaching sessions that take place between Belts and Black Belts. It is reassuring to observe that the majority of the Belts (3) agreed that they are receiving adequate coaching from off-site Black Belts.

Suggestions to carefully consider resource allocation in project teams were strong recommendations made to reduce the life cycle of LSS projects at Valspar (SA). The recommendations made imply that employees are unclear about the type of team work required in LSS projects. Also, respondents suggested involving the shop floor employees in projects, to create LSS awareness at the shop floor level at Valspar (SA).

6.2.5 TRAINING

Finding: 52% of the respondents did not attend an LSS awareness session at Valspar (SA) whilst 45% of the respondents have attended an LSS awareness session.

It is disappointing to note that employees, not currently involved in projects and some Team Members, have not attended an LSS awareness session at Valspar (SA). Ideally, all employees should have completed the awareness training in this infancy stage of the LSS deployment. If this training has not happened, then it means that the right interest in the LSS programme has not been generated.

Finding: The majority of the respondents (55%) did not attend LSS Leadership, Project Champion, Black Belt, Green Belt or Yellow Belt Training. 45% of the respondents attended LSS training.

Mostly employees not currently involved in a LSS project and Team Members did not attend the relevant training. The fact that a Project Champion has not received the appropriate training is concerning. Belts and Team Members under the leadership of this Project Champion may get frustrated and demotivated since the Project Champion may not be fulfilling the role and responsibilities of this position. Also, Belts may find that Team Members are not actively participating in projects because they lack the basic LSS knowledge. It was reassuring to note that all Belts responsible for managing individual projects at Valspar (SA) are trained.

More LSS training was suggested to create awareness at the shop floor level at Valspar (SA). This training should include what LSS is, the benefits of LSS to the organisation and how Valspar is managing the LSS programme.

6.2.6 REWARD AND RECOGNITION

Finding: Most respondents (54%) indicated that their participation in LSS as a Project Champion, a Belt or a Team Member is not reflected in their performance management objectives for 2008.

It was surprising to observe that 2 Belts and 2 Project Champions are not performance managed for their participation in LSS. The fact that the leadership (Project Champion) is not measured on their participation in LSS shows and promotes a lack of leadership commitment to LSS. It was also odd that some employees (3 Team Members) do not know what is in their performance objectives. It raises the question whether all employees are performance managed at Valspar (SA).

It seems that some managers have bought into the benefits of LSS since there were 3 respondents, 2 Belts in particular, who are being appraised on

their participation in LSS. The fact that Belts only are being assessed for their participation in LSS will make it difficult for them to get the full support of the Project Champion and Team Members because there is “nothing in it for them”.

Finding: The majority of the respondents are not sure if Valspar (SA) has a reward or recognition programme for LSS project team members. 30% of the respondents feel that Valspar (SA) has no reward or recognition programme for LSS participation.

This finding supports the finding above to suggest that there is a total lack of awareness amongst employees on how participation in LSS can benefit employees on a personal level. Also, these results indicate that there is no HR policy in place at Valspar (SA) to encourage participation in LSS.

6.3 CONCLUSIONS

After careful consideration of the findings of this study, certain clear conclusions, within the context of the key research question, emerged.

It can be concluded that there are approximately six overarching factors: awareness and communication, leadership, project management, resource allocation, training, reward and recognition, which must be considered for the successful implementation of a LSS programme within any organisation.

At Valspar (SA), most employees understand what the organisation is trying to achieve with LSS, but there is not sufficient communication about the progress of the initiative to all employees. Management is receiving information but it is not being filtered down to their respective departments.

Communication was seen as a key factor to get the support of the shop floor employees.

There appears to be a lack of leadership commitment to the programme with managers not talking about LSS to employees and most employees believing that there is an exclusive club attitude around the LSS programme. However, data driven decision-making is happening at Valspar (SA) and some Project Champions are actively engaged in projects.

Valspar (SA) is working on the right projects at the moment. However, employees are not aware of the multiple projects that need to be completed in future and they are not aware of how projects are tracked at Valspar (SA). Poor project management was cited as the main reason why projects have a long life cycle. Projects are not properly defined in terms of the scope and project plans are not followed to meet definite project deadlines. Also, decision-making is slow and project progress is not properly assessed.

Resource allocation does not appear to be a significant problem at Valspar (SA), as most respondents, who are currently involved in LSS projects, have sufficient time to dedicate to projects. Also, Green Belts feel that they are receiving sufficient coaching from off-site Black Belts. However, poor resource allocation was suggested as a reason why projects are taking too long. Some respondents felt that project team compositions are not correct. Not enough Production employees are involved in the LSS programme, even though Valspar (SA) is primarily a manufacturing facility. LSS does not seem to be rolled out to all the departments in Valspar (SA), since the respondents were mostly from the Technical and Process departments.

The statement below implies that some employees do not see LSS projects as a team effort.

“Assign more than 1 person to a project-depending on depth and involvement required for the project”.

There is not enough Awareness and Yellow Belt training at Valspar (SA), which is preventing the constructive participation of employees in projects, especially those employees at shop floor level. There is also no HR policy, to reward and recognise employee participation in the LSS programme at Valspar (SA).

6.4 RECOMMENDATIONS

The following recommendations have implications for Valspar (SA).

RECOMMENDATION ONE: LEADERSHIP

To successfully implement LSS, senior management should first understand Valspar (SA)'s performance. They should measure the cost of poor quality (COPQ) to know how much money is wasted. The components of COPQ should be the internal failures (scrap, rework and lost capacity), external failures (field failures, warranty cost, complaints, returned material and lost business), appraisal (inspection, testing and audit) and prevention (quality planning, process control, improvement and training). Also, management should track operational performance, including reject rate, rolled yield, design effectiveness, cycle time, inventory levels, employee skills development and financial performance.

After implementing the correct performance measurements, management will be able to identify opportunities for improvement and waste in the processes. Armed with this data, management can formulate LSS projects to improve processes and reduce waste in all the departments at Valspar.

RECOMMENDATION TWO: PROJECT MANAGEMENT

Valspar (SA) needs to monitor the progress of projects and provide support to project teams as needed. Valspar (SA) must put in place a formal project selection process, a formal project review process and a project tracking system must be developed. This LSS scorecard must be updated regularly with information such as the amount of training completed, the number of future, active and completed projects in Valspar (SA) and the financial savings and business value of the future, current and completed projects.

A suggestion scheme should be implemented to encourage all employees, and not just managers, to contribute to the list of potential projects.

RECOMMENDATION THREE: TRAINING

To successfully implement LSS methodology at Valspar (SA), all senior management must be trained on the LSS methodology. Senior management must understand the concepts, steps, requirements, expectations and management to actively participate and contribute to the success of the project.

All Project Champions must be trained before sponsoring any LSS project.

Employees should never have reason to doubt management's priority to improve profitability using the LSS methodology. The entire company-management and employees-must have a common goal, a common objective and a common priority to make the LSS initiative successful.

An on-line awareness training presentation that employees within Valspar (SA) can access on the intranet should be developed. This linkage will create better interest and enthusiasm for the LSS programme. All Team Members in LSS projects must undergo Yellow Belt training so that they can make

meaningful contributions to the LSS project.

RECOMMENDATION FOUR: COMMUNICATION

Communicating change is a critical factor in managing the change within any organisation since effective communication can impact the culture of the organisation. Valspar (SA) needs to develop a communication plan to notify and educate all stakeholders regarding the LSS changes. Employees should be encouraged to visit the Valspar intranet which should document the latest, successful LSS projects within Valspar globally. Locally, LSS notice boards should display project progress, successes, and key learnings from projects. Having in-house success stories celebrated and publicised would be a great way to gain interest in other departments, divisions and management sectors. Also, Green Belts should present their projects to all employees at Valspar (SA), once they have been completed.

RECOMMENDATION FIVE: REWARD AND RECOGNITION

People only change either to seek pleasure or avoid pain, where the stimulus for avoiding pain is larger than seeking pleasure. Valspar (SA) should adopt both these methods in the roll out of LSS. Employees have to change and adopt the LSS methodology or they must be terminated – the painful stick. This approach can only be adopted if employees are properly performance managed for their participation in LSS. Also, a rewards programme can be set up to cater for the different LSS role functions as follows:

- Managers' successes in LSS projects can be rewarded and recognised through profit sharing and promotions;
- Green Belts can be incentivised to achieve certification by giving them a cash bonus. Also, Green Belts can be recognised at the annual Valspar LSS Event and they can be motivated if they know that that they will be

- given priority for Black Belt consideration and opportunities for career progression; and
- Team Members need to know what is expected of them and they need to be held accountable for their LSS achievements. Monthly reviews can be held with project teams to review project progress and the team must provide reasons why the monthly goal was not met. They can be presented with cash or small gifts as key milestones in the project are completed.

RECOMMENDATION SIX: LOCAL CHANGE AGENT

Valspar (SA) should refine the current LSS deployment model since it does not have the infrastructure to support a large, instantaneous LSS deployment. Senior management should appoint a local change agent or custodian for the LSS programme at Valspar (SA) since a committed resource, given the proper authority, can drive the culture change within the organisation. This custodian does not have to be a full-time Black Belt but rather a Green Belt, who is familiar with the tools and methodologies of LSS. The role function of the custodian would be to:

- Serve as a link for information transfer from the overseas Master Black Belt to leadership and employees at Valspar (SA);
- Convey the methodologies and benefits of LSS to others;
- Drive awareness and communication of LSS progress at Valspar (SA) and globally;
- Assist in changing the Valspar (SA) HR policy to recognise and reward employee participation in the LSS programme; and
- Monitor and motivate for LSS training for the site.

6.5 FURTHER RESEARCH

This study surveyed those employees currently involved and targeted for future involvement in LSS projects at Valspar (SA). There were too many respondents (16 Others) who were not involved in a LSS project, at this infancy stage of the deployment. Other employees, like the shop floor personnel, were not surveyed. After proper training and involvement of other employees in projects, it will be important to include these employees in this type of survey, every two years, as the LSS programme expands within Valspar (SA). This longitudinal survey will be able to assess the progress of the LSS programme at Valspar (SA) and it will ensure that it is sustained.

6.6 SUMMARY

In this chapter, the main findings and conclusions of the research were presented. The relevant recommendations, to improve the LSS programme at Valspar (SA), were also suggested.

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ANNEXURES

ANNEXURE A: Covering Letter-Questionnaire

valspar

The Valspar (SA) Corporation, (Pty) Ltd
P O Box 13052, Jacobs, 4026
255 Lansdowne Road, Jacobs, 4052
Phone: +27 (0)31 468 3280
Fax: +27 (0)31 468 8912

20 July 2008

Dear Valspar Colleague

I am conducting a research study on the Implementation of Lean Six Sigma (LSS) at Valspar, South Africa. The purpose of this research is to evaluate if Valspar (SA) is applying the LSS principles correctly within the scope of the business.

It would be appreciated if you could kindly complete the attached questionnaire as soon as possible and deposit it in the drop off box in Valspar reception.

Kindly note that the necessary permission from Valspar senior management has been obtained.

Please be assured that you will remain anonymous and responses will be treated with the strictest degree of confidentiality. It would, therefore, be appreciated if you could respond candidly to the questionnaire.

Your co-operation and assistance is highly appreciated.

Many thanks

Gayshree Naicker
(Researcher)

ANNEXURE B: Questionnaire

Topic: Implementation of Lean Six Sigma (LSS) at Valspar, South Africa.

Section A: Work Details

Place a tick in the appropriate column

1. In which department do you work at Valspar (SA)?

Technical/Process		1
Sales		2
QC/QSHE		3
Production		4
Planning/ Warehouse		5
HR and admin.		6
Purchasing		7
Engineering		8
Finance		9

2. At what organisational level are you involved in the LSS programme at Valspar (SA)?

Process Owner		1
Project Champion		2
Team Member		3
Belt		4
Stakeholder		5
Other		6

*Other means not currently involved in a LSS project.

Please indicate your opinion by ticking the appropriate column.

	1	2	3	4	5
Statement	Strongly Disagree	Disagree	Not Sure	Agree	Strongly Agree
<i>Section B: Awareness and Communication</i>					
3. I understand what Valspar (SA) is trying to achieve with LSS.					
4. I receive regular communication about the LSS programme in Valspar (SA).					
<i>Section C: Leadership</i>					
5. Managers talk about LSS at staff meetings and employee presentations.					
6. Managers at Valspar (SA) make decisions based on data.					
7. Green Belts and management are creating an exclusive club attitude around the programme.					
8. Project Champions are actively engaged in projects.					

	1	2	3	4	5
Statement	Strongly Disagree	Disagree	Not Sure	Agree	Strongly Agree
Section D: Project Management					
9. Valspar (SA) is working on the right projects that meet the business goals and customer expectations.					
10. I am aware of the multiple projects queued up for each Green Belt (so when they complete a project, the next one has already been selected).					
11. Valspar has a good project tracking system to assess project progress.					
Section E: Resource Allocation					
12. As a Green Belt, Project Champion or Team Member, I have sufficient time to dedicate to the project.					
13. Green Belts are receiving adequate coaching from off-site Black Belts.					

	1	2	3	4	5
Statement	Strongly Disagree	Disagree	Not Sure	Agree	Strongly Agree
Section F: Training					
14. I have attended an LSS awareness session at Valspar (SA).					
15. I have attended LSS Leadership, Project Champion, Black Belt, Green Belt or Yellow Belt Training.					
Section G: Reward an Recognition					
16. My participation in LSS as a Project Champion, a Belt or a Team Member is reflected in my performance management objectives for 2008.					
17. Valspar (SA) has no reward or recognition programme for LSS project team members.					

Section H: Open-Ended Questions

18. Currently, Valspar (SA's) LSS projects are taking too long (more than 6 months).

Make recommendations to reduce the project life cycle.

19. Suggest ways to create LSS awareness at the shop floor level in Valspar (SA).

Thank you for your time and co-operation in completing this survey.