A Study of the Conducivness of the Culture at Freeworld Automotive Coatings to the Implementation of Lean Manufacturing Techniques.

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Summary

It is becoming increasingly important for companies to be responsive to global demands and in order to remain competitive, many companies are looking at lean manufacturing to help them achieve this. Lean manufacturing is however more than just a set of tools as it also requires a change in the organisational culture of the company involved.

The creation of an organisation that has a culture of continuous improvement and achieving results through its various principles and philosophies is a main factor in Toyota’s Toyota Way Model. It was the aim of this research study to analyse and determine the factors relating to the impact of an organisation’s culture on the concepts of lean manufacturing based on the Toyota Way model. This was achieved by analysing how conducive the current organisational culture at Freeworld Automotive Coatings to the implementation of Lean Manufacturing principles?

The method used for the research study was the questionnaire method using a lean culture assessment questionnaire that has been designed by the researcher that was aligned to the principles important to the Toyota Way model.

It can be concluded from the research findings of this study indicates that the existing organisational culture of Freeworld Automotive Coatings is relatively conducive to the implementation of lean manufacturing principles within the company.
Acknowledgements

It is often said that life can spring surprises on oneself and this is the case with this research study that help kindle my passion for the field of organisational culture. It is however important for me to remember that this could not be completed alone.

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CHAPTER ONE

PROBLEM STATEMENT AND DEFINITION OF CONCEPTS

1.1 Introduction.

It has become increasingly evident that the ability of organisations to adapt their business strategies and cultures to the ever-changing competitive environmental forces will ultimately determine the degree of their success or their failure. The impact of mounting global competition coupled with aggressive advancements in technology and constant pressure to reduce operating costs along with the increased knowledge base to support them cannot be underestimated by today’s organisations. “To compete in an increasingly global market, organisations are changing every day, both structurally and culturally”. (Kumar, 2003).

In order for organisations to be responsive to global demands and to remain competitive, many organisations are looking at lean manufacturing (Liker and Hoseus, 2008:35). The concept of lean manufacturing is more than just the tools that enable process improvements and cost reductions to be implemented. It is also important for an organisation to understand that its culture also plays a role in becoming competitive as was recognised and documented by Toyota Way model 2001(Liker and Hoseus, 2008:13). This is even more evident for organisations in South Africa that in being able to remain competitive in the global environment they must be able to successfully adopt strategies that will help it create an organisational culture that can successfully merge the multicultural society and overcome the politics and perceptions of the past, while also encouraging a culture of continuous improvement. The right innovation strategy can help an organisation to add significant value to its internal and external environment (Mandel, 2003:1).
The modern day South African society consists of a mixture of people of different races and religions living and working together. The different cultures that exist in South Africa have only recently since the fall of apartheid begun to be recognised and accepted within society on the whole and organisations in South Africa. The existence of these varying cultures plays a vital role in how society functions and is not a static state but a dynamic one where everyone is constantly creating, affirming and expressing themselves (Douglas, 1985:13). In order to effectively implement management strategies to be more innovative, the existing organisations in South Africa may have to deal with the legacies of the past because the majority of the population was stifled in this respect in the apartheid era.

The creation of an organisation that has a culture of continuous improvement and achieving results through its various principles and philosophies as described by Liker and Hoseus (2008:37) is important to the Toyota Way model. It is the aim of this research to analyse and determine the factors relating to the impact of an organisation’s culture on the concepts of lean manufacturing based on the Toyota Way model.

1.2 Main Problem Statement.

To maintain its competitive position, the ever dynamic global business environment has coerced organisations to acquire superior technology, more proprietary products and services, and better processes (Pinchot, 1987:1). The desire for organisations to become innovative has led to them focusing on manufacturing concepts such as lean manufacturing that as discussed by Pieterse (2007:2) are important in order for a company to succeed in the competitive global environment.

The culture of an organisation and its applied strategies varies from one organisation to another and as indicated by Liker and Hoseus (2008:5) the
organisational culture of a company plays an important role in shaping the company towards becoming an effective and competitive business.

The Toyota Way lean manufacturing culture concepts as described by Liker and Hoseus (2008:4) has become Toyota’s core competence and is a major part of Toyota’s success in being able to continuously improve and remain competitive globally. The core values that make up the this culture are important factors in order to become lean as there needs to be a specific culture within an organisation in order for it to become lean. Toyota believes that lean is not just a set of tools to reduce cost for the short term, but building a learning organisation that can become adaptable and dynamic for the long term (Liker and Hoseus, 2008:503).

This leads to the following problem that will be assessed by the proposed research:

How conducive is the current organisational culture at Freeworld Automotive Coatings to the implementation of Lean Manufacturing principles?

1.3 Sub-Problems.

The following sub-problems have been identified in order to deal with and solve the main problem:

- What does literature reveal with respect to the effect of an organisation’s culture in promoting lean manufacturing?
- Does the organisation on a whole, through its strategies, promote the creation of a lean climate based on Toyota Way culture principles?
1.4 Definition of Concepts.

1.4.1 Definition of an organisation.

An organisation, as defined by Schultz, Bagraim, Potgieter, Viedge and Werner (2003:5) is “a collection of people who work together to achieve a wide variety of goals.” The goals entail a combination of personnel goals and organisational goals with the individual goals being goals such as making money; achieving prestige and also achieving work satisfaction. The organisational goals will involve goals such as providing good products and services while also making a profit (Schultz et al 2003:5).

The organisational structure involves the interaction of individuals and groups, which help to provide systems and processes to help direct the efforts of the organisation (Schultz et al 2003:7). For the purpose of this research, an organisation will be defined as a formal collection of individuals and groups that interact with each other to provide systems and processes in order to direct the organisation to achieve the goals of the employees and the organisation.

1.4.2 Definition of culture.

The term culture, as stated by Aycan, Kanungo, Mendonca, Yu, Deller, Stahl and Kurshid (2000:194), is defined as the common pattern of beliefs, assumptions, values and norms of behaviour of individual and groups of people. Bodley (1994)] described culture, as quoted by GenEd web site (2004), as having at least three components which are what people think, what they do, and the material products they produce. Bodley (1994) also stated as quoted by GenEd web site (2004) “that some anthropologists would define culture entirely as mental rules guiding behaviour, although often wide divergence exists between the acknowledged rules for correct behaviour and what people actually do.”
There is also the concept of culture that involves culture being a tool kit or repertoire of beliefs, practices, understandings and modes of behaviour from which people select different pieces for constructing lines of action to deal with the manifold situations they face in everyday life (Swidler, 1998:171-187). For the purpose of this research, culture will be defined as a repertoire of beliefs, values, understandings and modes of behaviour by individuals or groups of people that help shape the behaviour of the individual or group to life situations.

1.4.3 Definition of organisational culture.

Organisational culture is defined by Steel (2004:2) as the emergent result of the continuing interactions and negotiations about values, meanings properties between the members of the specific organisation and with its environment. Johnson and Scholes (2002:45) define organisational culture as the assumptions and beliefs that are shared by the employees of an organisation that also defines an organisations identity and its environment.

For the purpose of this research, organisational culture will be defined as the culture that exists in an organisation through continuing interactions and negotiations between the members of the specific organisation and with its environment that is also influenced by the culture brought into the organisation.

1.4.4 Definition of lean manufacturing.

Lean manufacturing is described by McGivern and Stiber (2008:1) as employing continuous improvement processes focusing on the elimination of non-value added steps within the organisation.

The concept of lean manufacturing was originally developed at Toyota and as discussed by Pieterse (2007:1) combined the best concepts of mass and craft
production. The resultant lean Toyota model focused on the concept of reducing waste through out the product and people value streams using the Toyota way model values that enable it to become a learning company that is continuously improving and achieving results.

For the purpose of this research, lean manufacturing will be defined as the reduction of non-value adding steps in a company’s product and people value streams using the core principle values of the Toyota Way model.

1.4.5 Definition of Toyota Way culture.

The culture entrenched in Toyota, as previously discussed, is regarded by them as being their core competence and essential in them being able to continuously improve and be competitive. The Toyota culture, as discussed by Liker and Hoseus (2008:4), is the way that people think and behave according to the core values of Toyota that promote respect for people and continuous improvement with-in the Toyota environment.

For the purpose of this research the Toyota Way culture will be defined as Toyota’s core competence that involves the way people think and behave with the Toyota environment that promotes respect for people and continuous improvement.

1.4.6 Definition of organisation strategy.

An organisation’s strategy as described by Johnson and Scholes (2002:9) is affected by environmental forces that impact on the company a well as the availability of resources at the company’s disposal. The strategy therefore must be relevant and appropriate the company in order for it to implement its goals effectively and efficiently. Johnson and Scholes (2002:10) therefore defines strategy as the long term direction and scope of an organisation in order to
achieve an advantage the use of its resources within a changing environment while fulfilling the expectations of its stakeholders.

Mintzberg (1994:2) argues that strategy appears as a pattern that involves a company blending intended responses with responses that emerge out of the changing environment. Porter (1996) defines competitive strategy as "a combination of the ends (goals) for which the firm is striving and the means (policies) by which it is seeking to get there." This therefore highlights the requirement of an organisational strategy not only to be defined in how it is going to achieve its goals but to also be flexible to the changing business environment.

For the purpose of this research organisational strategy will be defined as a clearly defined aligned strategy that enables an organisation to implement its goals effectively and efficiently within a dynamic business environment while fulfilling stakeholder expectations.

1.5 Delimitation of Research.

Delimiting the research serves to ensure that the research that is to be undertaken is not too broad and therefore is manageable while also realistic to complete. The absence of any specific topic does not mean that there is no need to research them.

1.5.1 Type of organisation being investigated.

The organisation that will be investigated in this research study is Freeworld Automotive Coatings which is principally a manufacturing based organisation that manufactures automotive coatings for the new automotive vehicle manufacturing and the refinish after market. Freeworld Automotive Coatings is part of the Freeworld Coatings group.
1.5.2 Level of management.

The research study will be conducted with the aim to include all organisational levels, which will include the spectrum from the team member up to the management level of the company.

1.5.3 Geographical delimitation.

The research will be limited to Freeworld Automotive Coatings manufacturing site in Port Elizabeth, South Africa.

1.6 Research Methodology.

In order to answer the questions and to achieve the aim of this quantitative research, an explorative, descriptive survey questionnaire will be used. The purpose of the explorative, descriptive design is to acquire information about one or more groups of people which could be their opinions, characteristics or attitudes by asking them questions (Leedy and Ormrod 2005: 183). The main use of the descriptive design is to identify the level of impact of an organisation’s culture on the implementation of lean manufacturing while also identifying possible improvements in the process.

The questionnaire survey method has been chosen as the preferred type of data collection procedure for the study, because of logical, investigational and data-producing properties of the survey design. It is also regarded as an inexpensive means of collecting data, which allows historical comparison and it is quick. The disadvantages of a survey design is that the data may be incomplete, set variables are collected, which limits the scope of the study (Katzellenbogen, Joubert & Abdool Karim, 1997:8).
A descriptive survey design is chosen for this study, because information is collected from a variety of people who resembles the total population of interest for the researcher ([Leedy and Ormrod 2005: 183]).

1.6.1 Method of data collection.

The research method is focusing on data collection. It is described in three fold: the target population and sampling; the instrument used for data collection; and the data collection procedure. The pilot study will be used to assess the efficiency and validity of the chosen data collection instrument of this research study which is the lean culture assessment questionnaire.

1.6.1.1 The target population and sampling.

The sampling design for this population is a random sampling method. The random sampling method is used because every member of population who will be selected for the study will have the same chance, likelihood of being selected to participate in the study and is appropriate when population is small (Leedy and Ormrod 2005: 201).

The individuals will be selected randomly with the aim of achieving a 60% percent rate of population sampling at the Port Elizabeth site of Freeworld Automotive Coatings that employs a total of 181 employees on the site.

1.6.1.2 The data collection instrument.

The data collection instrument which is going to be used for the survey, as previously stated, is a questionnaire. The questionnaire will be designed and administered by the researcher, after permission is granted in writing from the Human Resources department at Freeworld Automotive Coatings in which the study will be done. The contents of the questionnaire will be explained to the
employees prior to hand out. The questionnaire will be handed out to the employees by the researcher himself where possible, because it will make the study more reliable. The researcher will then collect the completed questionnaires from the employees.

The questionnaire will be completed anonymously and all information will be dealt with confidentially.

1.6.1.3 The pilot study.

The efficiency of the data collection instrument will be tested in the pilot study. The reason for doing a pilot study is to see whether the questionnaire is sufficient to collect the relevant data. The pilot study also gives an indication whether the questionnaire is clear and easy to understand for the employee.

The result of the first 10 questionnaires that were completed by the employees will be analysed and assessed by the researcher. If the data collection instrument is effective for the study, the employees who were used for the pilot study will be included in the study.

1.6.2 Method of data analysis.

The purpose of data-analysis is to answer the research question of the researcher (Roberts and Burke, 1989: 274). The researcher will first explore the graphical display of the data before the statistical analysis is calculated for the collected data. The researcher will use the data to calculate descriptive statistics. Descriptive statistics is described in Brink (1996:179) as a summary and a description of data. The collection of data is organised in an organised manner so that the data have some meaning for the readers.
Inferential statistics will be used in determining correlations between different aspects in the study and the organisation compared to the Toyota model (Brink, 1996:179). The researcher himself will analyse the data for this study by using statistical computer software.

1.6.3 Reliability and validity.

The reliability of the study refers to the consistency, stability and repeatability of the information, as well as the recording and collection of information accurately (Brink, 1996:124). Validity can influence the research process and can refer to the degree to which an instrument measures what it is supposed to measure (Cormack, 2000: 29).

The reliability of the data collection tool will be increased, if the same results are received if the method of sampling is repeated. Reliability can therefore be seen as the degree of similarity of the information obtained when the measurement is repeated on the same subject (Cormack, 2000: 33). The reliability validity will analyse by the researcher after survey is completed.

1.6.4 Ethical aspects.

The ethical aspect includes the respect and protection of the respondent and the research environment (Burns and Grove, 1993:767). The quality of the research is increased, because the researcher will maintain high standards and honesty through the research process.

The ethical aspects will include:

- The permission granted by Freeworld Automotive Coatings and the participants for the implementation of research and the collection of empirical data.
• The employee’s anonymity and privacy will be maintained during the data collection, due to the fact that no employee’s name will appear on the questionnaires.

• The privacy of the employees will be maintained where possible, due to the fact that the researcher will do data collection himself where possible, according to the objectives of the study.
1.7 **Summary.**

The dynamic global business and economic factors of today’s company’s micro and macro environments have pressurised companies to re-look at their operational strategies in order to remain competitive in their environments. There has been a shift of operational practice towards implementing the concepts of lean manufacturing with a view of achieving economic and ergonomic benefits through making their processes more efficient through the elimination of waste. There are, however, various factors that affect a change process such as the implementation of lean manufacturing. Among them is the organisational culture that exists within the company that will impact on the success or failure of the process. The next chapter will use relevant literature in order to discuss the different theories and concepts that will affect the implementation of lean manufacturing according to the Toyota Way model.
CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction.

The impact of the organisational culture of a company has become increasingly more important as companies look to introduce different strategies to react to the changing business rules and environments. This chapter consists of a review of the literature concerning the organisational culture of a company that is required to be conducive to implementation of lean manufacturing principles. According to the Toyota Way, culture is the cornerstone of the implementation model (Liker and Hoseus, 2008:4).

The chapter will review the literature covered, in conjunction with the author’s opinion, in three main areas which are firstly the review of literature pertaining to the history of lean manufacturing. The second main area is a review of literature on the alignment of organisational culture with respect to promoting lean manufacturing implementation with respect to the Toyota Way Culture principles. The third main area to be reviewed is a review of the assessment of organisational culture. The key concepts in each area’s will also be discussed and defined.

2.2 History of Lean Manufacturing.

2.2.1 Phases of manufacturing.

The history of manufacturing has progressed through three distinct main phase types over a period of history since its inception. The first main phase as discussed by Pieterse (2007:02) was craft production which involved the manufacture of product specifically for the customer on a small scale by highly
skilled workers. Russell and Taylor (2003:4) also craft manufacturing as the process of handcrafting specific products or processes for the use of individual customers.

The craft manufacturing concept was generally expensive and inconsistent in its nature the next phase was one that looked to initially encapsulate the cost benefits of the manufacture of products on a large scale using assembly lines as discussed by Pieterse (2007:4). The mass production phase, as it became known, also involved the use of machines dedicated to the manufacture of specific products parts to ensure that they would be manufactured cheaply and with minimal set-up costs. The mass production philosophy was relatively successful until the 1970’s when the business environment started to change and as discussed by Russell and Taylor (2003:7) the companies, mainly in the United States, failed to react to the consumer environment while the mass production concept itself was one that did lend itself to adapt or react well to changes in demand. Mass production in essence had become a concept that was complex and expensive due to its requirement for expensive machinery, large stock buffers and its need to have additional support departments (Pieterse, 2005:5).

The changes in the business environment led to the need for companies to look at a different manufacturing philosophy in order to remain competitive and successful. The creation of a new manufacturing phase concept originated in Japan where a just in time (JIT) philosophy was originated where mass production was adapted to have the main focus on being flexible and ensuring that a good quality product was produced (Russell & Taylor, 2003:7). The new manufacturing philosophy created in Japan created interest from companies in the West which led to research into the methods applied in Japan. This in turn led to the term ‘lean production’ being defined first by Womack, Jones and Roos in 1990 in their book *The machine that Changed the World* that was a result of their extensive research into the new manufacturing methods in Japan (Liker & Morgan, 2006:5). It essentially described lean production as a thought process
and a philosophy that is to be used to look at any type of business that involves a supplier and customer with the goal of eliminating non value added activities.

2.2.2 Formation of Toyota Way model.

The lean manufacturing concept as discussed by Liker and Morgan (2006:5) as an operational strategy derived from the Toyota Production System (TPS) that formed the foundation for global shift towards lean and that was orientated to achieving the shortest possible cycle time by eliminating waste. This would be achieved, as discussed by Liker and Hoseus (2008:461), by focusing on adding value to customers during every step in the manufacturing process to give more value to the customer and society with less effort by the elimination of waste.

This new phase of manufacturing was pioneered by the Toyoda family that founded Toyota and a production engineer at Toyota called Taichi Ohno. This led to the development of the TPS that enabled Toyota to be able to make their process lean through continuous improvement and by also eliminating waste through using lean tools and developing an organisational culture that moulds its employees in alignment with the Toyota core principles.

The mass production philosophy used by Ford and GM that involved using economies of scale and large machines to manufacture cheap and large volumes of parts was in contrast to the manufacturing philosophy that Toyota had to develop. Liker (2004:7) states that the market in post-war Japan was small one and that flexibility in accordance to the market was a key factor for Toyota due to the fact that it had to manufacture a variety of vehicles on the same assembly line to satisfy its customers. It was the market environment that Toyota reacted to by developing its lean concepts through its TPS. Liker (2004:7) discusses that the market environment was similar then as it is today for many companies where the requirement is for fast, flexible processes that strive to give the
customers what they want at the right time and at the highest quality and affordable cost.

The research and book by Womack, Jones and Roos helped to give an insight to the western manufacturing companies of the concepts of lean production practiced by the Japanese companies as discussed by Pieterse (2007:2). It gave them the emphasis to look at implementing the new concepts in their own production environments. There has however been mixed success in implementing the lean production concept outside of Toyota. This as discussed by Liker and Hoseus (2008:13) is mainly due to the fact that where the TPS concept practiced in Toyota uses people as it’s centre of TPS house the companies outside of Toyota have tended to focus only on the lean tools to look to take waste out of the manufacturing process.

The principles of TPS model was developed further by Toyota when the created the Toyota Way model in 2001 that in fact superseded the TPS model. The Toyota Way model has the core pillars of the model focusing on people in terms of continuous improvement and having a respect for others (Liker and Hoseus, 2008:13). It can be seen from the Toyota Way model in figure 2.1 that Kaizen is shown on the foundation of the model. Liker and Hoseus (2008:130 say that the Toyota Way model regards the lean tools as sub methodologies that support Kaizen which is defined by Pieterse (2007:136) as a method of improving quality through many small steps.
The Toyota Way model focuses on creating a culture within Toyota to enable it to develop core principles that can be adaptive of global locations and business environment and is therefore a model that organizations should strive towards using the lean tools whilst remembering the importance of the organizational culture in the concept and success of the model (Liker and Hoseus, 2008:37).

2.3 Alignment of Organisational Culture to Lean Manufacturing.

2.3.1 Theoretical Aspects of organisational culture.

The ability of an organisation to remain competitive in the dynamic global business environment will determine whether the company and its employees will be a success or failure. The organisational culture of a company plays an important role in how a company is able to achieve a level of competitiveness in the global business play field. Schultz et al (2003:12) state that in order to create
a competitive advantage, an organisation’s individuals, teams and management need to create a culture that is both effective and efficient.

An organisation was defined in chapter one by the author as a formal collection of individuals and groups that interact with each other to provide systems and processes in order to direct the organisation to achieve the goals of the employees and the organisation. Most definitions state that the culture of an organisation is a system of shared assumptions by its employees that differentiate it from other organisations as stated by Schultz et al (2003:22). It forms the basis on how the individuals and groups interact with each other and how effective the organisation is in reacting successfully to changes in its environment (Hinde, 1999:3).

Hill (2003:458) states that culture refers to a system of values and norms that are shared by people. The values and norms form behavior that is the basis of an organisation’s style that the new employees joining the organisation are encouraged to automatically (Hill, 2003:458). There are two types of values as discussed by Schultz et al (2003:23) which are espoused and enacted values where espoused values refer to preferred values that are formally stated by an organisation. An example of espoused values would be a company’s code of conduct that would formally state the values which the employees would be expected to live by with-in the company’s day to day operations. Enacted values refer to values that are visible through the normal daily behavior and actions of the employees of the company.

There may be in some companies a difference between its formal espoused values and the behavior and actions of its employees. This would be an example of a non-strong organisational culture as the employees would in either some instances or in general not be living the formal values of the company. It is when a company has a strong organisational culture that is generally more
commitment by the company’s employees to the company and its core values and norms (Schultz et al, 2003:107).

The culture and the resultant climate of a company as discussed previously forms the backbone of how it functions and as discussed by Timmons and Spinelli (2004:566), it has a significant impact on the performance of the company within its environment. The culture of a company is formed through different sources and is also influenced by its environment. Hill (2003:458) discusses that a company’s founders or important leaders have a major impact on its organisational culture as well as the social culture of the country where the company is based and operates from. Another factor is the specific history of the company that may have had an influence on the organisational culture and therefore contributed to the formations of the values of the company (Hill, 2003:459). It is therefore evident that a combination of factors had helped to shape the culture and the core values of a company. It can be seen from figure 2.2 that there are cultures that exist at multiple levels which all have an influence on the formation of organisational culture over time.

Figure 2.2 Culture at multiple levels. Source Liker 2008.
The core values is referred to by Schultz et al (2003:24) as the values of the organisation’s dominant culture that is shared by the company’s employees while there are also sub cultures in existence that are a reflection of situations and problems that have occurred in the work place in specific department or sections. It is important that a company has a uniform dominant culture in existence in order to help ensure that its employees are aligned to its core values and as stated by Schultz et al (2003:24) it is required to also ensure that its employees are guided in knowing what is acceptable behavior in the working environment. The existence of a uniform dominant culture also helps to create an identity for the organisation that it helps to make the company unique in terms of its organisational culture.

The organisational culture of a company can be maintained using different methods such as having defined recruitment criteria, performance rewards, socialization process and a defined communication strategy (Schultz et al, 2003:26).

2.3.2 Impact of a strong organisational culture.

The concept of a strong culture which, as previously discussed indicates a deeply entrenched organisational culture, is an interesting one as there are apparent benefits and liabilities to a specific company who has a culture that is an example of a strong organisational culture.

A strong organisational culture will exhibit core values and norms that that are deeply entrenched in the company that will help to ensure that the managers of the company will be aligned to the specific core values and norms thus helping to ensure a level of consistency with in the organisational culture (Hill, 2003:460). The previously discussed greater commitment of employees to the company and its values and norms with-in a strong culture has also an added benefit in helping
the company achieve its goals and targets as employees who are more committed will have a stronger will to achieve their targets and goals.

There is however some evidence that a strong culture is not always positive and therefore not always to a company’s advantage. Hill (2003:460) states that a strong organisational culture is not always good or ethical and uses the example of the Nazi political party as an example, as it was a very strong culture that aligned millions of Germans to common goals but its methods of achieving its goals were neither good or ethical. A strong organisational culture can also have a negative impact when its organisational culture negatively affects its strategies which in turn can negatively affect the performance and success of the company. This as discussed by Hill (2003:460) can be due to certain companies becoming too slow to react to their changing environments such as IBM not reacting quick enough in the dynamic environment of the computer industry. It was IBM’s strong culture of consensus based decision making that had prevented the company from being able to react quick enough to competitors from eating away at its market share as its decision making was slow and laboured.

It is important that company’s continuously monitor its specific business environment including its macro-environment to include the influences from a global perspective especially in today’s dynamic global environment. This will, as discussed by Johnson and Scholes (2002:98), enable the company to understand its business environment in order to identify key issues to put strategies in place to cope with change in its environment with the aim of remaining competitive in its environment. The business environment layers are made up of the following major sections that are shown by Johnson and Scholes (2002:98) to be as follows:

- The internal environment of an organisation that consists for example of the employees, organisational culture and systems that are in place.
• The market environment that incorporates the organisation’s actual and potential group of customers; stakeholders; competitors in the form of strategic groups and suppliers.
• The industry environment that incorporates all organisations and factors associated with the broader industry or sector within which the organisation operates.
• The macro-environment, which incorporates all the broad societal sections, which influence or effect the industry or market environments and the organisation.

It is therefore important that the company timeously aligns its strategies and organisational culture where required to remain competitive. Hill (2003:460) therefore states that research has shown that companies who have managed to remain successful over a period of time have generally tended to be companies that have had a strong organisational culture that is also an adaptive culture which has been successful in adapting to the demands of the business environment. This ability of a company to have this type of organisational culture is however easier said than done as in general the stronger the organisational culture the more difficult it is to change over a short period of time (Schultz et al, 2003:26).

2.3.3 The role of organisational culture in lean implementation.

2.3.3.1 Effect of existing organisational culture.

The organisation’s culture, as previously discussed, forms the back bone of the operation of a company and therefore dictates how people work, their attitudes toward work and change, their relationships with each other and management, and the way change is introduced, embraced and tackled.
Kaplan and Norton (2005:71) state that the organisational culture of a company is one of the major factors that affects the company’s ability to change and that the organisational culture should be tailored in order to support the company’s strategy. There are varying organisational cultures from company to company that also include sub cultures that are apparent from department to department and as discussed by Liker and Hoseus (2008:19) the process of achieving strong alignment of a company’s goal culture across varying levels of culture is a difficult process to achieve. The culture that is prevalent within an organisation prior to embarking on a change strategy such as the implementation of a lean philosophy will have a distinct impact on firstly on the degree of difficulty of implementing the change and secondly how the process will take. Ligus (2006:2) states that the implementation process will be a difficult one without the right existing organisational culture and that a company with a strong culture of being controlling and bureaucratic will have difficulty in developing a lean culture.

Kaplan and Norton (2005:63) state that the existing organisational culture can either be a barrier or an enabler to the change implementation. This effect, as the lean philosophy was developed by Toyota in Japan, is also influenced by the differences between the Eastern and Western way of thinking and their apparent traditional cultures. Liker and Hoseus (2008:23) states that research has shown that there are the following cognitive differences between Eastern and Western cultures:

- Eastern cultures tend to focus more on environments with western culture focusing more on objects.
- The western culture tends to be more controlling on the environment that the eastern culture which may have a negative effect on innovation.
- It is assumed that the western culture leans towards stability while the eastern culture leans towards change.
- The western culture leans towards looking at logical rules to help understand events that have occurred than the eastern culture.
These differences in the general cultures of the eastern and western cultures have a significant role to play when an organisation is looking to implement lean manufacturing into its work place. The philosophy of the TPS and the Toyota Way model concepts that have been developed by Toyota in Japan, as discussed previously, forms the foundation of the lean manufacturing. These principles have therefore been developed over time in the East and as Liker and Hoseus (2008:24) states the Toyota Way models is therefore more of a reflection to the Eastern culture. The general western culture of focusing on objects rather than environments has had the effect of company’s not focusing on the company culture in the same way as Toyota when implementing lean manufacturing. They tend to make the mistake of beginning the process by using the lean tools as a tool kit to control the working environment to achieve results while failing to understand or grasp the broader cultural philosophy’s that enable Toyota to be successful (Liker and Hoseus, 2008:27).

The existing cultures of companies in South Africa can also be influenced by the history and cultural diversity at a national level that exists in South Africa. The South African work place has been affected over time by the politics of the nation that has occurred over time especially during the apartheid era. Companies may still have a culture that may be a reflection of this era and discussed by Pieterse (2007:98) a culture that promotes the concept of all the knowledge being at the management level and workers doing what they are told may still be prevalent in South Africa.

The challenge of building a corporate non-racial integrative culture in South African multicultural organisations is an additional challenge that has been faced since the first all-race elections in 1994 while also being confronted with the economic transition of towards a global economy. The success of an organisation in this dynamic period is linked to its ability to mould the diverse cultures of its employees into an effective unit hence creating an organisational
culture that helps to facilitate the achievement to individual and organisational targets and goals.

Collier and Bornman’s (1999:136-156) study found that respondents in the organisations in the study defined themselves first along racial lines and not along corporate identity. The study suggests from that perspective, that the main obstacles and barriers to building a corporate multicultural identity in South African organisations could first be mental barriers which tend to find an expression in the norms, values, perception of the others and explicit management styles. There have been legal improvements through mainly affirmative action particular but indirect and subtle barriers may remain. This calls for a strategy to manage cultural diversity that would build an acute awareness and understanding of commonalities and differences of cultural preferences of the diverse cultural forces present in the organisation.

It is therefore important for an organisation and its managers in South Africa to be able to effectively identify and manage the cultural and behavioural factors that exist among the employees of the organisation especially prior to a change intervention. It was previously mentioned that a diverse cross-cultural work force in the African countries is even more significant in South Africa. Although the management of cross-cultural employees in African organisations has traditionally been neglected by the mainstream international management literature three different approaches have been identified as discussed by Prime (no date available: 2), which are as follows:

- The Euro centric approach that involves the traditional dominant western style of management. It is globally consistent with western value systems in which the primacy is given to individualism and related self-centred concepts, which amongst others are self-fulfilment and self-development.
- The Afro centric approach is a broad concept that uses Africa’s ubuntu-based value system which implies the belief that man is very much part of societal
fabric and that each individual will see the need to find his place in a societal structure.

- The synergistic inspirational approach that involves consciously integrating traditional African management practices, values and philosophies with western management techniques.

The synergistic approach would mean building trust and respect for different values, building common values, and learning. This approach if in existence in a company’s organisational culture prior to the implementation of lean manufacturing would be an advantage as discussed by Pieterse (2007:106) the success of lean manufacturing depends on people working efficiently in groups with an ability to transcend ethnic differences.

2.3.3.2. Lean culture based on the Toyota Way model.

The implementation of lean has been attempted by numerous companies in the West with a view to look at achieving efficiencies and cost reductions through eliminating waste from their processes in order to remain competitive. Companies as discussed by Liker and Hoseus (2008:12) have attempted to learn and implement the principles that have enabled Toyota to remain successful. There have however been various levels of success as most manufacturing companies have adopted some type of “lean initiative,” but as discussed by Liker and Morgan (2006:5) most of these initiatives have been limited quick fixes to reduce lead time and costs and to increase quality. It may have involved the company undertaking some training of employees on some basic lean tools concepts and an introduction of some forms of lean in the workplace. EMS Consulting Group (2008:1) that they have observed companies were they have introduced a lean cell or have attempted to introduce tools such as total preventative maintenance (TPM) but have failed to fully implement lean manufacturing through its management failing to create a lean culture.
The companies in general during these occasions not have been able to create a true learning culture with in the company which is a feature of the culture at Toyota which as discussed by Liker and Hoseus (2008) is focused on continuous improvement and respect for people. Liker and Morgan (2006:5) discusses that many manufacturing companies have therefore learned the hard way that the isolated application of lean tools and techniques does not guarantee sustainable continuous improvement and that it is the overall organisational culture of the company that tends to separate the short-term improvements from the longer term lean company.

The Toyota culture of focusing on continuous improvement and respect for people forms the two pillars of the Toyota Way model as seen in figure 1. The Toyota Way model, as stated by Liker and Hoseus (2008:xxviii), uses the philosophy that the lean processes and tools are there to support people and the process of problem solving. It is important to understand that elimination of waste in the product value stream is achieved through the actions of people and as stated by Liker and Hoseus (2008:38) the organisational DNA system of a company is made up of not only the product value stream but also the people value stream with the process of problem solving linking the two value streams. As with the product value stream that is all the process that occurs to produce a product the people value stream incorporates the process of an employee’s career. The need for employees to learn and undertake specific levels of development within a company will be apparent at different levels depending on their existing organisation culture that exists and what strategies they want to implement. Liker and Hoseus (2008:38) state that in the people value stream that even if an employee’s work performed is productive, it will be classified as waste if the work performed does not have any contribution to the learning and development of the employee involved as the aim to develop people that are will and able to identify and solve problems when they arise.
Any company that wants to make sustainable improvements can benefit from a lean culture which can mean several things. One of the concepts is that the company encourages employees to actively seek and act on solutions to problems. To have a lean culture, companies need commitment from the top. Management needs a clear vision of how they want to grow their business. This will help translate the vision so people understand how they can support it.

One of the key factors that will lead to a successful lean implementation process is the total commitment of everyone in the organisation to make it work. Pieterse (2007:105) covers this issue by stating that in a lean culture every employee in deed has the right and obligation to make a sustained contribution to the improvement of the process and the product. The importance of the employee development and problem solving in the lean culture that Toyota has achieved can also been seen in the 4P Model of the Toyota. It can be seen from figure 2.3 that the 4P model takes the form of a pyramid and as Liker and Hoseus (2008: xxv) where the foundation of the pyramid is the long term philosophy that looks to add value to both customers and society.

![Figure 2.3. The 4P Model of Toyota Way-source Liker (2004).](image-url)
The Toyota management system has been described by fourteen principles which can be categorised into four broad categories, as discussed by Liker (2004:36) that form the 4P’s of the 4P model of Toyota Way which are as follows:

- Philosophy which is all about Toyota’s purpose and long term strategy.
- Process that is all about how Toyota will achieve operational excellence through eliminating waste.
- People that who Toyota believes drives the company through team work and respect in achieving common goals.
- Problem solving that is all about the Toyota culture enables people to continually improve.

The Toyota Way is implemented through example, through coaching and through understanding and helping others to achieve their goals. The model is not simply a set of tools and concepts, which can be implemented by command and control. Rather it is a fully integrated management and manufacturing philosophy and approach. The problem that can occur during implementation as discussed by Liker (2004:12), that while the concepts are not new, the western companies do not totally understand what makes them work as a system and only adopt the process level of the 4P model of the Toyota Way. The fact that a company only adapts to the “Process” level of the 4P model, as shown in figure 2.3, of the Toyota way will not allow them to develop an organisational culture that can sustain a culture of long term continuous improvement.

It can be seen from figure 2.4 that, as discussed by Liker and Hoseus (2008:507), illustrates how a competitive advantage is achieved through developing supporting systems and a strong culture that help to develop quality people within the company. These concepts are an important factor in the Toyota Way culture that Toyota has achieved within its plants that has contributed to its lean concepts showing benefits for the company. This helps build the culture of
creating quality process that are developed and improved by quality people that produce quality products that meet the expectations of the customer.

![Diagram](image)

**Figure 2.4** Quality people create competitive advantage. Source: Liker & Hoseus (2008).

It is therefore apparent that a company that has an existing organisational culture that incorporates certain areas some of the principles of the Toyota Way culture may be more receptive to lean implementation than a company that is less aligned to the Toyota culture. It is however important to remember that every company has its own unique culture and business environment so it is important for the company to understand its strength and weaknesses of its culture in order to decide on a lean implementation strategy that will be successful in its environment (Liker & Hoseus, 2008:546).
2.3.3.3. Implementation of the lean culture philosophy.

There are distinct proven benefits to implementing a successful lean culture philosophy and tools into the workplace of a company. These benefits normally include an improvement in profitability and product throughput time through waste reduction as well as increased customer satisfaction (Ligus, 2006:1).

It however important that the company approaches with a clear strategy in place that has been derived with the aim of aligning it to the specific needs of the company in accordance with the organisational culture that exists in the company as well as the goals and targets that it wants to achieve within its business environment. The importance of leadership throughout the implementation process cannot be underestimated and as discussed by Liker and Hoseus (2008:525), it starts from the top while the leadership values at all levels also needs to be developed. Strong leadership is therefore essential for the success of this process. The principle of team work as discussed by Pieterse (2007:43) is important to the success of lean manufacturing and as this concept involved a level of team empowerment a clear implementation strategy is what is also needed to manage this top down approach while at the same time empowering the employee teams.

McGivern and Stiber (no date available: 1) discusses that the challenge of lean manufacturing is to create a culture where there is a sustained commitment at all levels of the company. There are there the following lean manufacturing principles that can help guide a company on their way to lean thinking that were identified by Womack and Jones (Pieterse, 2007:8):

- The value which is the foundation of the value stream and is determined by the customer.
- The identification and mapping of the value stream of all actions in the whole process with the aim of identifying non-value activities.
• Flow which involves the elimination of process stoppages to ensure a smooth value stream flow.
• Pull which involves changing the product production process to one that reacts to customer requests.
• Perfection which involves continuously looking to make improvements in order to strive to reach perfection.

These principles help to enable the company about to undertake the implementation of lean manufacturing to have a basic outline of the major process steps involved. These steps outline the lean journey from a perspective of optimising the value stream process through eliminating waste. It is however important that when a company has decided on the strategy of implementing the lean philosophies using some of the principles of the Toyota Way model as a starting point that they understand that the process is going to require a level of organisational change. The degree of this change will depend of the strengths and weakness of its existing organisational culture that as discussed by Liker and Hoseus (2008:544) is required to be able to create a future vision for developing the company’s culture in order to build on its strengths. The time required for the transformation will also be dependant on each company’s starting position as well as the commitment of its leadership.

The company needs to initially look for quick wins in terms of using the above lean manufacturing principles using lean tools to focus on an area where improvements can be made relatively quickly to help to highlight the potential benefits of lean in order to commence the road to a cultural change. This process needs to repeated a few times and as discussed by Liker and Morgan (2006:19), the company must now look at its broader cultural implementation process and they advise for the company involved to ask the following questions:

• Do the implemented changes lead to a standardisation of processes that in turn leads to further waste reduction?
• Have the employees within the company started to become engaged in continuous improvement with alignment to a common set of goals and targets.
• Are all the relevant tools available and being used in order to support employees improving precuts and services for the customer.

The answer to these questions will enable the company to determine where they are in the journey to organizational change and the creation of a learning organisation that will be able to enjoy the benefits of having a culture of continuous improvement.

2.3.3.4 Resistance to implementation.

It has been discussed previously that a successful implementation of lean manufacturing according to the Toyota Way principles will require a certain amount of change within the company depending on the initial organizational culture of the company. One of the things that a company has to deal with when undertaking a process of change is the resistance to the change process itself.

Schultz et al (2003:259) describe the resistance to change as a natural phenomenon that may negatively affect the change process. It is important for a company and its managers to be aware of effect that any apparent resistance to the strategy of change that they are trying to implement. The resistance to change should therefore be carefully managed and in cases where the initial culture of the company is one that will not be receptive to change, it should be gradually introduced with management showing persistence in introducing the philosophies into the company (Schultz et al, 2003:259).

The resistance that can negatively affect the change process that a company is undertaking can be present in different types. The normal main component of this resistance is the company's employees themselves, including the managers of
the company. Employees may be set in their ways and may not understand what the company is trying to achieve through the specific change process. Another example in the case of lean manufacturing is that they might not understand the benefits that will be achieved by the tools and philosophy. Pieterse (2007:104) describes that this lack of awareness of the benefits from the lean thinking concepts can be addressed through the company undertaking giving the employees more information and training on the concepts involved.

The resistance from managers also will also have a negative affect on the process as they normally play a significant role within the company and therefore are important in helping the change process to be successful. The resistance from managers normally comes from them fearing that they will lose some status and authority while there might be also the apprehension that normally exists when dealing with something new Schultz et al (2003:260). There is also an additional factor when implementing lean manufacturing thinking that causes resistance from middle management which is the resistance to the concepts due to the fact that the role of a middle manager is required to change in order to help to create a true lean culture. Pieterse (2007:104) states that the role of a middle manager in a lean culture needs to become more of a facilitator and a trainer rather than the traditional one of being an enforcer. The impact of this role change will vary depending on the initial organisational culture of the company and its environments.

It will in general be a difficult barrier to overcome in South Africa as the role of the middle manager and supervisor has historically been an autocratic ‘do as I say’ one. This has also been influenced by the area of apartheid where these positions were generally filled by white employees with their roles reflecting the politics of the era. It is therefore important that there is management commitment to the implementation at the beginning of the process and for them to remain committed through out the process.
Another potential resistance barrier is the fear of employees losing their jobs through the implementation of lean manufacturing. This comes from the fact that some employees may become redundant through the lean concepts making the processes more efficient (Pieterse, 2007:105). It is therefore important from the beginning to stress to the employees and the unions that no employees will lose their jobs due to the changes that will occur. Pieterse (2007:106) states that this should be addressed by through natural attrition of employees and through any possible retirements of employees that may occur.

2.4 Assessment of Organisational Culture.

The importance of the organisational culture in the success or failure of a company is not in question but there have been a differing of options on how the organisational culture of a company should be measured.

The types of methods that are used in the study of organisational culture can be divided into two main type’s namely quantitative and qualitative methods. Aiman-Smith (2004:3) discusses that there has been various discussions on the pro’s and cons of these two different main methods for measuring organisational culture. There is the view that the qualitative method is an interactive one that enables the company to get an insight to the experiences and perceptions methods that may not be able to be ascertained by quantitative methods. The organisational culture of a company is somewhat unique and in some examples cannot be defined correctly using a standardised for of measurement. This may be a problem unless as discussed by Kaplan and Norton (2005:71) the one way to overcome this would be to develop a questionnaire that is more aligned to be able to measure the company’s culture. The other main method that is used, namely the quantitative methods, mainly takes the form of questionnaires, surveys and interviews. These quantitative methods helps to give the company and it’s managers that advantage of having structured data to work with in order to perform analysis on and track over time (Aiman-Smith, 2004:3).
The type of method that is selected by the company depends on the practical problem or the research type of the company being studied and the research problem resulting from it. The method that is chosen will have an impact on the picture of culture that will be obtained needs to be obtained. Aiman-Smith (2004:3) discusses that in some cases there may be benefits of combining different methods of measurements to gain different perspectives that can help to achieve a thorough picture of the company's organisational culture. The more thorough and relevant the picture of culture that is obtained will enable the company to assess how it compares to other companies and where to focus it's resources in order to achieve the most progress and returns (Finger, 2005:2).

There may various reasons why a company undertakes the process of measuring its organisational culture. There may be the need for the company to focus on assessment criteria that are aligned on areas that are important to maintaining a good working culture within the company workplace. There may also be occasions when a company undertakes the process with the aim of aligning the assessment criteria in order to compare itself to other companies or to compare it to theoretical concepts or models. It all depends on what the company’s strategy is and what results it wants to achieve from the process of measuring organisational culture.

Rieman and Oedewald (2002:15) reviewed the different types of measurement methods and categorised them as follows:

2.4.1 Self-assessment.

They argue that although self-assessments, when carried out correctly, provide a good method of doing some critical examination of one’s own work development it is not an objective method of assessing a company’s culture. This is mainly due to the fact the process involves individuals, groups and the management level
critically assessing their own activity and its productivity. The person or group undertaking the process of self assessing will normally come from within the company itself. This person or group may as a result therefore be biased in the perceptions or conclusions that are obtained.

2.4.2. Questionnaire studies.

Rieman and Oedewald (2002:18) discuss that organisational culture questionnaires attempt to provide clarification on the influences of individual factors on perceptions and views of culture. The questionnaire is a method that will involve them being completed by individuals with the aim of obtaining data that will help to achieve an understanding of aspects of the culture of the company.

The method of using questionnaires can provide sufficiently valid descriptive information about an organisation including information about the views and attitudes of the employees in the company. The method of questionnaires due to the fact that it provides hard data can also be used to clarify the various connections between variables and to explain statistically the differences that may be found in the data results (Rieman and Oedewald, 2002:15).

The other benefits of questionnaires are that as they are filled in by individuals it is possible to make them anonymous and that it is also possible to be able to achieve a large percentage completion of the employees. A possible drawback of using the questionnaire method is that the process may be when the questions asked by the researcher may not be relevant to what the company is trying to ascertain.
2.4.3. Interviews.

This method involves the interviewing of staff in order to look to ascertain views and subjective opinions on significant issues that may not be able to be ascertained through more structured methods of assessment (Rieman and Oedewald, 2002:20). This is possible during the possible by asking questions in order to gain more information around certain issues. The possible drawback of this method is similar to the questionnaire method where the nature of the questions may not be relevant to that specific company.

2.4.4. Observation.

The method of observation as discussed by Rieman and Oedewald (2002:22) is one where an external researcher is asked to enter a company with the aim of observing the everyday activities of the company. They discuss that this process can be one where the observer is involved in some way in the work performance or it can be one where the observer undertakes the observation without any actual involvement in the activities.

The method allows the observer to view actual happenings in the work place and to make to assessment on observations by viewing what the employees actually do. The drawback of this method is that it relies on what the observer views and the results may be affected negatively depending on what type of activities is visible on any particular day.

It is therefore important for the researcher to be aware what the company wants to achieve by the assessment prior to choosing the type of method of assessment to be used. This would involve having insight to the purpose for which the company wants to use the results of the assessment. By being aligned to the requirements of the company it will help the researcher choose the correct
applicable method and for example structure the questions of a questionnaire in alignment with these requirements.

2.5 Summary.

The aspects of organisational culture that were discussed in the review of literature show that the culture of a company is a complex concept that is created over time by internal and external factors. The organisational culture of a company has a major role to play in the day to day operations of a company and its ability to survive in its business environment. It is clearly apparent from the literature discussed that organisational culture is an important pillar of the success that Toyota has achieved initially through its TPS principles that developed to the Toyota Way model. The Toyota philosophy forms the back bone of the concepts of lean manufacturing principles that many companies are either starting or have implemented in order to enable them to remain competitive through becoming more efficient through stream lining their value stream and eliminating waste through out their process.

The review of literature however also highlights that a change process such as the implementation of lean manufacturing concepts is not an easy one as it involves a process of implementing new concepts and tools that company will normally require a change in the company’s organisational culture. It is important for a company to analyse its organisational culture prior to embarking on the implementation process as it will help it ascertain its initial organisational culture with the aim of determining its strengths and weakness’ to help it build a successful strategy of implementation. It is however important that the method used for assessing a company’s organisational culture is aligned to the company’s initial state and required outputs. This would involve the questions that the employees are asked to be relevant to the aspects or principles of what the company wants to achieve. This would be relevant to the questionnaire
method that has been decided by the researcher to be used in this research as it
would involve the questionnaire in this research to be aligned to the principles
important to the Toyota Way model which will be discussed in chapter three
which will discuss the research design and methodology.
CHAPTER THREE

RESEARCH DESIGN AND METHODOLOGY

3.1 Introduction.

The importance of the role of organisational culture in the success or failure of a company’s ability to successfully implement a new philosophy such as lean manufacturing should not be underestimated, as discussed in the previous chapter. The initial organisational culture that exists within a company prior to the company deciding on embarking on a change process has an impact on the specific process such as the implementation of lean manufacturing principles and tools. The initial organisational culture will affect what strategies the companies’ managers must decide on when beginning the process.

This research study is intended to discuss and evaluate the organisational culture that presently exists at the manufacturing Freeworld Automotive Coatings with a view of analysing the affect of the existing culture of Freeworld Automotive Coatings will have on the implementation of lean manufacturing. The measurement of a company’s organisational culture, as discussed in the previous chapter, can be affected by the method of measurement chosen by the researcher as well how the chosen method is aligned to the company in question desired outputs. It has been decided that this study will use the data collection method of using a questionnaire in order to measure the existing culture that exists at Freeworld Automotive Coatings. This chapter will discuss the format of the designed questionnaire that was used in order to collect the data required for the study as well as the alignment of the questionnaire to the desired output of the study’s problem statement. The method of data collection using the questionnaire will also be discussed with the view of discussing how the data was collected and how the data was captured and edited while also discussing how it was analysed.
3.2 Background of Freeworld Automotive Coatings.

Freeworld Automotive Coatings is an organisation that operates in South Africa with its manufacturing site situated in Port Elizabeth. Freeworld Automotive Coatings was previously known as Barloworld Automotive Coatings and is part of the Freeworld Coatings group that was de-listed from the Barloworld group in 2007 and listed separately on the JSE stock exchange. The manufacturing site in Port Elizabeth manufactures various automotive paint products for the Original Equipment Manufacture (OEM) motor vehicle manufacturers and Refinish segments of the automotive coatings market environment.

The OEM section’s business definition is to import, develop, manufacture and supply automotive coatings while providing technical support services and paint systems management to OEM manufacturers and associated component suppliers (metal and plastic substrates) in South Africa. The Refinish section’s business definition is to import, develop, manufacture and supply automotive refinish paint systems and associated support services to distributors, commercial vehicle manufacturers and OEM repair lines in sub-equatorial Africa.

An average of between 4 and 5 million litres of automotive paint is manufactured in Port Elizabeth annually, depending on customer demand that is distributed from the manufacturing site to various customers around South Africa and Africa. The Port Elizabeth site manufactures a wide range of different product types that include solvent base and water base products such as primers, topcoats, basecoats, toners and clearcoats. The company employees 240 employees with the majority of the employees situated on the Port Elizabeth manufacturing site with the rest situated at depots around the country performing a technical and sales function while there are employees also working at the electrocoat coating manufacturing facility in Durban.
The automotive paint market is an environment that demands a high level of quality and customer service and this is especially pertinent to the products supplied to the motor vehicle manufacturer plants such as Daimler Chrysler; BMW and VWSA in South Africa. These manufacturers have obtained export contracts that enable them to export vehicles all over the world on the basis that the quality of a vehicle manufactured in South Africa must be equivalent to the quality of vehicles manufactured elsewhere in the world.

Freeworld Automotive Coatings therefore has a strong focus on quality as a competitive priority as this, along with a high quality service is demanded by the customers and not achieving the specified high level of quality according to the specified customer requirements will lead to a loss of market share. The importance of being able to compete on quality has lead to Freeworld Automotive Coatings forming a joint venture with Dupont Performance coatings which enables it to manufacture the latest quality products under license and it also enables it to have a gateway to the latest paint technology.

It is however becoming increasingly evident, even in the segmented market of the automotive paint market, that focusing on quality alone is no guarantee to continue having a competitive edge over rivals. The ever changing global environment and the advancement in technology has made it important to also focus and prioritise on the other facets of the business to remain competitive in its market environment especially with the South African market having limited growth potential with regards to the automotive paint market environment. This involves Freeworld Automotive Coatings focusing on cost minimisation; becoming more flexible in the manufacturing of products and being able to supply products quickly when the customer requires it. This has lead to Barloworld Freeworld Automotive Coatings to modify its business strategy of differentiation where the main focus was quality; technology and service to a focus strategy that is a combination of differentiation and the overall cost leadership strategy (Porter, 1980:40). The successful implementation of the lean manufacturing tools and
concepts using the Toyota Way model would provide the tools to enable Freeworld Automotive Coatings to achieve the successful achievement of its strategical goals; provided it can create a culture that can sustain the principles of the Toyota Way model in the long term.

3.3 Discussion of Research Problem.

The market business environment, in which Freeworld Automotive Coatings operates, as discussed, is a very competitive one with regards to product pricing and quality. There are macro and micro market forces that have a distinct influence on the long term strategy of Freeworld Automotive Coatings. The competitive nature of the market segment that the manufactured product is sold to is being increased due to economic pressures and increase in competitor products though the globalisation of the environment. The customers such as the major OEM companies are putting pressure on their suppliers with regards to pricing and specific supply demands that are in turn pressurising the suppliers to re-look at their strategic plans to be able to react to the changing times to be able to remain competitive. It is therefore important that Freeworld Automotive Coatings continuously monitors its environmental changes to ensure that it continues to supply products and service that will create value by satisfying its customers. The modern business environment is such that companies now need to do more than this by even looking further ahead in order to anticipate changes (Harvard Business School Press, 2005:3).

The possible implementation of the lean manufacturing philosophies at Freeworld Automotive Coatings is a strategy that can add value to the company though using the lean concepts and tools. The concept of lean manufacturing for this research was defined in chapter one as the reduction of non-value adding steps in a company’s product and people value streams using the core principle values of the Toyota Way model. Liker and Hoseus (2008:37) state that the Toyota Way culture is a critical factor in the Toyota’s organisational DNA that has allowed it to
adapt as a global company. The organisational culture that is part of the Toyota Way model is important factor in the company’s success as it has enabled Toyota to have an organisational culture that focuses on continuous improvement and where respect for people is important (Liker & Hoseus, 2008:13).

It is therefore important for a company to be aware of the influence of organisational culture to the success or failure of a change process such as the implementation of lean manufacturing. The organisational culture that exists within a specific company will vary in some way from other companies, and certain elements of its existing organisational culture may either be conducive to successful implementation of lean manufacturing or it may have elements of its culture that will be a barrier to the implementation process. This will also apply to Freeworld Automotive Coatings when they decide to implement lean manufacturing, as the knowledge of its existing organisational culture will enable the company to assess its potential strengths or weaknesses of its organisational culture. This will provide the company’s management with the detail that will help them to understand the present cultural state of the company.

It was therefore decided to undertake this study with the aim of assessing the organisational culture of Freeworld Automotive Coatings prior to the possible implementation of lean manufacturing. The collected data will be analysed using the principles of the Toyota Way model with the aim of assessing the conduciveness of the present organisational culture towards having a culture that can sustain lean manufacturing. This therefore defines the need for the study of organisational culture at Freeworld Automotive Coatings with the following main problem statement that will be assessed by the proposed research which is:

How conducive is the current organisational culture at Freeworld Automotive Coatings to the implementation of Lean Manufacturing principles?
There will be two sub problems that have also been identified in order to help analyse and address the main problem statement. These two sub problems are as follows:

- What does literature reveal with respect to the effect of an organisation’s culture in promoting lean manufacturing?
- Does the organisation on a whole through its strategies promote the creation of a lean climate based on Toyota Way culture principles?

3.4 Format of Questionnaire.

The method of data collection that was chosen for this research study was the questionnaire method. The questionnaire was designed by the author with the aim of ensuring the format of the questionnaire was aligned to the desired output of addressing the main problem statement of how conducive the present organisational culture at Freeworld Automotive Coatings is to the implementation of lean manufacturing concepts and tools in the company. The method of the questionnaire was chosen with the aim of obtaining data in order to assess the organisational culture of Freeworld Automotive Coatings through analysing the results of the specific questions asked.

The different sections of the questionnaire were created in order to align them to specific principles that are the foundation of the organisational culture that is created by the Toyota Way model and that is regarded as an ideal climate for encouraging lean manufacturing. The individual sections of the questionnaire have questions that are asked in relevance to the specific section in order to ascertain a measurement of that specific principle when the employees answer the questions.

The sections of the questionnaire, as already discussed, that were developed in alignment with the Toyota Way model are structured in a way to categorise the
main core principles of the Toyota Way culture that is incorporated in their people value stream. The different sections of the questionnaire that can be seen in addendum 1 that was used for the data collection will now be discussed in more detail.

3.4.1 Employee development.

It is important for the training and development programmes in a company to also include a certain element of coaching and mentoring. Johnson and Scholes (2002:481) state that there is an increase in the use of coaching and mentoring in companies. It is therefore important that from the time an employee first joins a company that there is an effective training and development programme that includes the induction programme and training on competencies required for the position while also ensuring the employee is properly developed fundamental skills and values. This will form part of the process of incorporating the new employee into the organisational culture of the company.

Swanepoel, Erasmus, Van Wyk and Schenk (2003, 453) state that two of the reasons that employee development is undertaken is to improve the performance of employees once their training needs have been identified while also improving interpersonal skills that helps to make the company’s working environment better. It is also important that a company ensures that its employee training and development programmes are aligned to the company’s strategy and structure (Swanepoel et al, 2003:453). The questions in this section were therefore asked to assess the present culture that exists with regards to the employee training and development structures in place as well as the coaching and mentoring of the employee’s supervisor or manager.
3.4.2 Teamwork.

The successful use of teams in the work place has enabled companies to achieve benefits in terms of achieving goals and creating an environment that benefits the employees working with in the team concept. Schultz et al (2003:96) states that effectively managed teams can enable the company to achieve greater performance levels while also increasing the company’s effectiveness. Schultz et al (2003:96) defines a team as a group of people that work together in a cooperative way to achieve an outcome. It is therefore important that in order for a team to be effective that the team members are happy with in their team environment with their roles and responsibilities clearly defined. It is also an important requirement that the team’s goals are clearly defined and aligned to the company’s goals and targets.

Liker and Hoseus (2008:228) state that one of the main ways to transmit the Toyota Way culture is through the basic team concept that helps provide the roles of supporting the individual doing their work and solving problems in order to improve how their work is done. The questions asked in this section of the questionnaire were therefore asked to assess the present culture that exists with regards to the effective operation of the teams with in the company.

3.4.3 Problem solving.

The concept of effective problem identification and solving within the company’s working environment has an important role to play in the creation of an organisation culture that promotes innovation and continuous improvement. The concept of problem solving, as discussed in chapter two, forms one of the four main principles that incorporated in the 4P model of the Toyota Way. Liker and Hoseus (2008: 223) state that the core of the Toyota Way is the development of employees that are willing and competent to continually improve the way work is done. It is therefore important that the employees of the company are trained and
competent in the tools of problem solving with the problems being timeously identified and solved in order for the company to be continuously improving. This is an important factor in the company’s ability to react and adapt to its changing environment while the level that this problem solving culture exists will also impact on the time line of the implementation of lean manufacturing concepts and tools. The questions in this section of the questionnaire were therefore asked to assess the current existing culture with regards to the identification and solving of problems by the employees within the company.

3.4.4 Standardisation.

The concept of standard work is important within a company as the process of how the work place operations needs to be documented in a way that firstly is reflective of how the process is performed and secondly in a way that employees can be effectively trained. Pieterse (2007:22) states that the documenting of standard tasks can help to prevent operational mistakes, accidents and minimise the recurrence of defect products while the standardisation of a process also enables it to be improved by it being documented. The employees performing the everyday operations must realise that they are the process owners and that they have the responsibility to continually revise the standard processes with a view of improving them.

Pieterse (2007:22) states that the employees performing the standard process will develop a sense of pride and ownership through continually improving their standard processes. It is therefore important for a company to have documented standard processes in place that are accessible to the employees performing the operations and that a culture exists where the employees look at improving the standard processes. The questions in this section of the questionnaire were therefore asked to assess the current culture that exists with regards to the level of standardisation that exists in the company and the employees’ approach to improving the standard processes.
3.4.5 Trust.

The level of trust that exists between a company’s management and its employees has a significant effect on the organisational culture of the company as it will help determine how they interact with each other. It is apparent that if low levels of trust were to exist with in a company then it would be difficult for the employees to work openly together. Swanepoel et al (2003:184) states that trust is the cornerstone of employment relations and Liker and Hoseus (2008:39) state that if the company’s employees do not trust their employers they would be reluctant to highlight problems and that a culture would therefore be created where employees would feel that is safer to actually hide problems.

It is therefore important for a company that there is a sufficient level of trust between the management and employees that promotes a transparent working environment where there is mutual respect between employees. The questions in this section were therefore asked to assess the current level of trust that exists with in the company to determine if would be conducive to the implementation of a change process.

3.4.6 Motivation.

The level of success of a company in achieving its goals and targets through its employees and teams is affected by the level of motivation of its employees. The level of motivation of an employee can be affected by various factors such as personal circumstances, to the environment that exists with in the company. The environment that exists with in the company is influenced by the manager’s ability to understand their employees and to also understand what motivates them to achieve their goals while also understanding that each employee is different (Schultz et al, 2003:53). It is therefore important for a company to actively ensure that its managers are effective in promoting an organisational culture that helps to create an environment where its employees feel motivated in
their job function. The questions in this section of the questionnaire were therefore asked to assess the current level of motivation of the company’s employees as this has a significant impact on it achieving it goals and targets.

3.4.7 Communication.

The effectiveness of the communication that exists within the company plays a major binding role in the other sections of the questionnaire as communication has an influence on everyday activities that occur in the workplace thus influencing the organisational culture that exists in the company. Schultz et al (2003:119) states that the communication that exists within a company allows employees to be able to coordinate actions and to share information while also helping to satisfy the social needs of the employees. The communication that exists needs to be able to transcend the levels of hierarchy in the organisation to ensure that employees can get feedback on problems that were raised while team members can effectively share feeling while resolving conflicts and problems.

It is therefore important that there is an effective communication policy that exists within the company that incorporates specific principles that promotes a culture where employees are satisfied with the level of communication that exists. The questions in this section of the questionnaire were therefore asked to assess the current communication culture that exists in the company.

3.5 Data Collection and Analysis.

3.5.1 Data collection.

The questionnaires used for this research study were completed by the employees after they had completed a half day basic lean principles and techniques training. This training was given to operations department’s
employees as well as the supporting functional departments. This ensured that the sample selected was a large one in that a total of 108 questionnaires were completed by the employees while also ensuring that the sample was representative. The completed questionnaires were then collected by the researcher and consolidated for the data analysis.

3.5.2 Analysis of collected data.

The results of the questions from the completed questionnaires were inputted into an excel spreadsheet by categorising each answer as per the questions and sections of the questionnaire. The average score for each question was then calculated for all the successfully completed questionnaires which were then used to calculate the average score for each section of the questionnaire to be used for analysis. These calculated averages of each section were then transposed into graph formats in order to compare the data results of each section of the questionnaire using the Toyota Way model culture as the ideal.

The average score for each section of the questionnaire for the production department and laboratory department was also separately calculated and then transposed into graph format in order to undertake a comparison of the data results between the production department and the laboratory department. All the data results were analysed with the aim of assessing the sections of current organisational culture that exists at Freeworld Automotive Coatings in order to determine apparent strengths or weaknesses of the organisational culture that would either be or not be conducive to the implementation of lean manufacturing principles.

There were six spoilt questionnaires of the 108 questionnaires that were completed and the results of these questionnaires were not used in the data analysis thus giving a total of 102 questionnaires that were successfully completed for data analysis. The 108 questionnaires that were completed
therefore gives a calculated rate of population sampling of 59.67 which is slightly below the target rate of population sampling rate of 60%. The achieved rate of population rate for the operational department and direct support departments was 74.48%.

3.6 Summary.

It is important when undertaking a research study of this nature that the data collection tool used is aligned to the required output that the researcher or company wants to achieve. The questionnaire that was used in this research study was created by the researcher with the aim of aligning the questions asked in each section to the main key principles that are required in order to create an organisational culture that will be conducive to the implementation of lean manufacturing principles.

The principles that the researcher used were principles that are at the core of the Toyota Way model culture as this is considered as the ideal organisational culture to promote the lean manufacturing principles and tools. It is however important to remember that while the Toyota Way model culture is considered as the ideal that each company is different therefore it would be unrealistic to try to copy Toyota’s culture. It is however realistic to determine the existing organisational culture using Toyota culture principles prior to the implementation of lean manufacturing principles in order to determine apparent strengths or weaknesses. The company can then use this assessment information to create an implementation strategy that can incorporate areas that will sue the strengths of the existing organisational culture while also focusing on the weaknesses of the organisational culture.

The analysed data results that were collected using the questionnaires will be described and discussed in chapter four with the aim of determining what areas
of the existing organisational culture of Freeworld Automotive Coatings are conducive to the implementation of lean manufacturing techniques.
CHAPTER FOUR

PRESENTATION AND DISCUSSION OF RESULTS

4.1 Introduction.

The questionnaire method of data collection, as described in chapter three, was used by the researcher with the aim of providing data that can be analysed with the aim of assessing the existing organisational culture of Freeworld Automotive Coatings. This collected data was then analysed to determine what areas of the existing organisational culture are in place that will provide a strong foundation for the process of creating a lean culture to enable the successful implementation of lean manufacturing techniques. It is a significant benefit for a company such as Freeworld Automotive Coatings to understand how its existing organisational culture will affect its strategies that it wants to implement in order to remain successful in its business environment. A company that is able to assess and understand its organisational culture effectively will be able to have the advantage of adjusting the implementation strategy to take advantage of its cultural strengths while also focusing on improving its cultural weaknesses.

The analysed data that was collected using the questionnaire will be presented and summarised in this chapter with the aid of graphs to show the results that have been obtained with the aim of describing the different results calculated for each section of the questionnaire including the results of the pilot study. The researcher will then discuss the results in alignment to the research problem of how conducive the existing organisational culture of Freeworld Automotive Coatings is to the implementation of lean manufacturing techniques, highlighting the main findings using the key principles of the Toyota Way model as a basis for the discussion.
4.2 Presentation of Results.

The data from the 102 questionnaires that were successfully completed by Freeworld Automotive Coatings was correlated and inputted by the researcher into a Excel programme spreadsheet to be able to calculate the averages of each individual question and the average of each the sections of the questionnaire. The six questionnaires that were spoilt during the data collection process by the employees completing them were excluded from the data analysis. The results of the pilot study as well as the results of the overall averages of each section of the questionnaire will now be discussed in more detail.

4.2.1 Results of pilot study.

A pilot study was done on the first 10 questionnaires that were completed by the employees during the completion of the lean culture questionnaires. The pilot study was undertaken to see whether the lean culture questionnaire is a sufficient data collection instrument in order to collect the relevant data required to assess the existing culture of Freeworld Automotive Coatings. The pilot study was also undertaken in order to give an indication whether the questionnaire is clear and easy to understand for the employees involved in the research study sample.

The 10 questionnaires used in the pilot study, although there was one spoilt questionnaire, showed that the questionnaire was clearly understood by the employees completing the questionnaire. This is also evident in the results achieved from the pilot study that can be seen in figure 4.1. The results from the pilot study indicate that the questionnaire is valid as they show that as they appear to be consistent with no apparent indication that the employees that completed the questionnaire did not understand the questions that were asked. The average standard deviation of the pilot study of 0.925 for the 47 questionnaire questions also indicates this as it is less than the minimum variable
that an employee could score the questionnaire which is a variable of one. The standard deviation is a common measure of statistical dispersion of measuring how widely spread all the values in a certain set of data (Wikipedia, 1: accessed 4/11/2008).

**Figure 4.1: Bar chart of the pilot study questionnaire section averages.**

It can therefore be concluded from the results and observations from the pilot study that the questionnaire is valid for this research study and the results of the pilot study will therefore be included in the overall results that were obtained from the questionnaire. The results of the pilot study, along with the questionnaire being vetted by Prof. Koot Pieterse prior to use, also indicate that the designed questionnaire is a reliable data collection method from a qualitative perspective.
4.2.2 Results of overall study.

The results obtained from the completed 102 valid questionnaires were consolidated in order to calculate the average scores achieved in each section and to also calculate certain basic descriptive statistics on the research data obtained from the questionnaires. The calculated section average scores can be seen in the bar chart graph in figure 4.1 below. The average score of all the sections was calculated to be 4.04 which is a relatively high result which equates to a percentage of 80.08% as the highest score that could be scored for each question was five. The bar chart in figure however indicates some differences when comparing the sections to each other.

![Bar chart of the section averages of lean culture assessment.](image)

Figure 4.2: Bar chart of the section averages of lean culture assessment.

It can seen from the bar chart that three sections namely problem solving, standardisation and motivation have calculated average scores of above four with the standardisation section having the highest calculated average of 4.44.
The rest of the sections have calculated averages below four but are still relatively high with the employee development section having the lowest calculated average of 3.79.

The basic descriptive statistics analysis of the data that was calculated is shown in table 4.1 below. It can be seen from the table that although the average range (highest minus lowest value) for the collected data is 3.88 the average calculated standard deviation is 1.05 which indicates that the data values have a close spread and the range is not a true indication of the spread of the data.

**Basic Descriptive Statistics of Lean Culture Assessment Data.**

<table>
<thead>
<tr>
<th>Section No.</th>
<th>Section Name</th>
<th>Mean</th>
<th>Mode</th>
<th>Range</th>
<th>Standard Deviation</th>
<th>Standard Error</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Employee development</td>
<td>3.79</td>
<td>4.44</td>
<td>4.00</td>
<td>1.13</td>
<td>0.11</td>
</tr>
<tr>
<td>2</td>
<td>Teamwork</td>
<td>3.88</td>
<td>4.67</td>
<td>4.00</td>
<td>1.12</td>
<td>0.11</td>
</tr>
<tr>
<td>3</td>
<td>Problem solving</td>
<td>4.22</td>
<td>5.00</td>
<td>3.75</td>
<td>0.93</td>
<td>0.09</td>
</tr>
<tr>
<td>4</td>
<td>Standardisation</td>
<td>4.44</td>
<td>4.71</td>
<td>3.43</td>
<td>0.84</td>
<td>0.08</td>
</tr>
<tr>
<td>5</td>
<td>Trust</td>
<td>3.85</td>
<td>4.80</td>
<td>4.00</td>
<td>1.16</td>
<td>0.12</td>
</tr>
<tr>
<td>6</td>
<td>Motivation</td>
<td>4.17</td>
<td>5.00</td>
<td>4.00</td>
<td>1.01</td>
<td>0.10</td>
</tr>
<tr>
<td>7</td>
<td>Communication</td>
<td>3.94</td>
<td>4.71</td>
<td>4.00</td>
<td>1.13</td>
<td>0.11</td>
</tr>
<tr>
<td></td>
<td><strong>Average</strong></td>
<td><strong>4.04</strong></td>
<td><strong>4.76</strong></td>
<td><strong>3.88</strong></td>
<td><strong>1.05</strong></td>
<td><strong>0.10</strong></td>
</tr>
</tbody>
</table>

Table 4.1: Basic descriptive statistics of lean culture assessment data.

The standardisation section of the questionnaire has the lowest standard deviation value which is 0.84 with the trust section having the highest standard deviation value of 1.16. The standard deviation of the all the sections are however relatively close to each other which indicates a consistent spread of results across the seven different sections of the questionnaire.
4.2.3 Comparison of operations and technical department’s results.

The data that was collected by the completed questionnaires was then sorted by departments into the two main department sections namely operations department and the technical department of Freeworld Automotive Coatings. The operations department includes all the departments involved in the operational running of the company with the specific departments being the production, maintenance, purchasing, warehouse and process departments. The technical department includes all the specific laboratories involved with the development and testing of company products with the specific laboratories being the research and development, quality control and raw material laboratories. The application centre which sprays the various panels for testing products was also included in the technical department.

The aim of sorting the data into the operations and technical departments was to enable the researcher to compare the results of the two departments in order to analyse if there is any apparent differences in the current cultures of the employees of the two departments. These two departments are the two main departments in the value chain of the company that are involved from the start of the product design to the production of the product until it gets despatched to the customer. It is therefore important that the organisational cultures of these two departments are aligned to the extent that would allow the employees to be able to work together effectively.

The calculated section averages of each department that can be seen on figure 4.3 below show that although there some differences there is a relative good level of alignment between the two departments. The alignment of the data can also be tested by calculating the correlation coefficient which is descriptive number that will show the magnitude and direction of the association of the data from the operations and technical departments (Brink, 2000:188). The calculated correlation coefficient for the two sets of sectional averages is +0.93 which is an
indication of good correlation between the data as the perfect correlation is 1 and
the fact that the correlation coefficient is a positive number shows that two sets of
sections averages increase and decrease together (Brink, 2000:188).

Lean Culture Assessment - Operations vs Technical.

<table>
<thead>
<tr>
<th>Section</th>
<th>Operations Average</th>
<th>Technical Average</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Employee Development</td>
<td>3.76</td>
<td>3.87</td>
</tr>
<tr>
<td>2. Teamwork</td>
<td>3.9</td>
<td>3.81</td>
</tr>
<tr>
<td>3. Problem Solving</td>
<td>4.25</td>
<td>4.1</td>
</tr>
<tr>
<td>4. Standardisation</td>
<td>4.44</td>
<td>4.5</td>
</tr>
<tr>
<td>5. Trust</td>
<td>3.85</td>
<td>3.84</td>
</tr>
<tr>
<td>6. Motivation</td>
<td>4.17</td>
<td>4.16</td>
</tr>
<tr>
<td>7. Communication</td>
<td>3.96</td>
<td>3.88</td>
</tr>
</tbody>
</table>

Figure 4.3 Bar chart of the Comparison of operations and technical section averages.

It can be seen from the bar chart seen in figure 4.3 that the technical department has slightly higher section averages in the employee development and standardisation sections of the questionnaire. The operations department has slightly higher section averages in the teamwork, problem solving and communication sections of the questionnaire with the problem solving section having the biggest relative difference between the two departments of 0.14.
4.2.4 Results of the production department.

The data collected from the questionnaire was then sorted in order to calculate the section averages for the production department in order to for the researcher to analyse the existing culture in the production environment to ascertain the strengths and weaknesses of the culture in that department. The production department is obviously an important department in Freeworld Automotive Coatings the employees in this department are responsible for the production processes performed in order to manufacture the products.

The section averages for the production department that are shown in the radar chart in figure 4.4 below show the each section in comparison to the ideal questionnaire score of five.
Lean Culture Assessment - Production Section Averages.

It can be seen from the radar chart of the production section averages that the strongest sections are the standardisation and problem solving sections with calculated averages of 4.45 and 4.22 respectively. The two weaker sections of the production sections averages are the motivation and employee development sections with calculated averages of 3.53 and 3.6 respectively.
It can be seen from the comparison of the overall section averages with the production section averages shown in bar chart in figure 4.5 that the one significant observation is the difference in the calculated averages for the motivation section with the overall motivation section average being 4.17 and the production average being 3.53.

Figure 4.5: Bar chart of the comparison between overall and production averages.

The calculated production average for the employee development section of 3.6 is also slightly lower than the overall average of 3.79 with the averages of the rest of the sections showing relative alignment between the overall and production average values.

The correlation coefficient for the overall and production section average values was calculated to be 0.72 which an indication of fairly good correlation of the
average values which is expected as the production values is included in the overall results but the correlation was negatively affected by the difference between the motivation average values.

4.3 Discussion of Results.

The specific sections of the questionnaire, as discussed in chapter three, were chosen by the researcher as they are the key principles of a lean organisational culture using the Toyota Way model culture as the ideal example of a lean culture. The results of the lean culture assessment questionnaire, that have been presented earlier, will now be discussed to analyse the various results to determine the level alignment in accordance to the research problem of how conducive the existing organisational culture of Freeworld Automotive Coatings is to the implementation of lean manufacturing techniques.

4.3.1 Discussion of overall results.

The overall section averages of the 102 valid completed questionnaires indicates an existing organisational culture that would be a relatively good cultural base that shows results that are strong in certain aspects of a lean culture. This is evident by the fact that the average section value for the questionnaire used in this research study was calculated to be 4.04 of an ideal maximum of five. There is however differences in the results when comparing the average result values of the different sections. These relative strengths and weaknesses of the results of the different sections will be discussed in more detail.

4.3.1.1 Discussion on areas of strengths.

There are three sections out of the seven sections of the questionnaire that have averages above four from the overall data. The highest average score is 4.44 which was calculated for the standardisation section of the questionnaire
indicates that a strong standardisation culture exists within the company. This indicates that the work place operations are well documented and that they are assessable to the company’s employees. This is a benefit when looking to implement lean manufacturing techniques, as discussed in chapter three, as it is important to have assessable well documented processes in order for them to be continuously improved by the employees. A strong organisational culture of standardisation also provides a good base for effective training of the employees of the work place operations using the documented process procedures and works instructions.

The average score of 4.22 calculated for the problem solving section is the second highest average value and also indicates a relatively strong existing culture of the company’s employees being aware of problem identification and problem solving techniques. This is important because the concept of problem solving plays a significant part in the lean culture promoted by the Toyota Way model. The use of problem solving within the company helps it to continuously improve which will be a benefit in the implementation of lean manufacturing techniques.

The other section with an average score above four is the motivation section with an average of 4.17. This value for the motivation section indicates that the company’s employees are relatively motivated in performing their everyday operations in the work place. This therefore indicates that in general there is an existing organisational culture within the company that promotes an environment where the employees feel motivated which will help the company achieve its goals and targets.

4.3.1.2 Discussion on areas of weaknesses.

There are specific sections of the questionnaire, although the section averages are relatively high, that have averages lower than other sections of the
questionnaire and therefore represents specific areas of its organisational culture that are relatively weaker than other areas. The fact that these areas have been identified can provide the company the opportunity to focus on them to try and improve these areas of its organisational culture which would enable them to be more conducive to the implementation of lean manufacturing techniques.

The section with the lowest average is employee development with an average value of 3.79 which indicates that the company should look at its current process of developing and training its employees to identify areas of improvement. The other sections with averages under four are the trust, teamwork and communication sections that have averages of 3.85, 3.88 and 3.94 respectively. The fact that these three averages for these sections are similar is not surprising as the concepts of trust and communication are important factors when employees are working together. The ability of a company’s employees to affectively work together in teams plays a significant role in the formation of a lean culture so it would beneficial for the company to look at improving in these areas.

4.3.2 Discussion of departmental results.

The comparison of the average results of the operations and technical departments showed that there was good alignment between the existing organisational cultures of two departments as indicated by the calculated correlation coefficient of 0.93. The relative positive alignment of the two departments’ existing cultures will be beneficial to the implementation of lean manufacturing as it will make the implementation process easier when these two departments that will play a major role in the process have similar cultures as a similar strategy can be used.

There are slight differences in average results of two departments with the largest difference being 0.14 in problem solving with operations having a higher
result. The differences are however relatively small in general and should not have a negative influence on the implementation of lean manufacturing at the company.

The analysis of the results for production department showed similar trends with regards to strengths and weaknesses to the overall results with the exception of the average for the motivation section that was calculated to be 3.53 that is lower than the overall motivation section of 4.17. This therefore indicates that the production department employees have an existing lower level of motivation than other areas of the company. This may be due to the nature of the functions performed by these employees but this may play a relatively negative role on the implementation of the lean manufacturing principles in the production area.

The section average of the employee development section for the production is calculated to be lower than the overall average for this section which further highlights the requirement for this section to be focused on.

4.4 Summary.

It was concluded that the lean culture questionnaire was reliable from a qualitative perspective by using the results calculated using the data collected using the lean culture questionnaire for the pilot study while also using descriptive statistics and verification from Prof. K.Pieterse. The data collected in the pilot study was therefore included in the overall collected valid data to be analysed. The questionnaire used to collect the data for this research study was
also concluded to be an affective method of enabling Freeworld Automotive Coatings to be able to achieve a relative picture of its existing organisational culture through the results achieved and correlation between different departments. It must however be remembered that this is a picture of its organisational culture at the time its employees completed the questionnaire and the results showed taken in that context.

The analysis of the calculated results showed that the existing culture of Freeworld Automotive Coatings has in general across the sections of the measured principles showed a good conducive base for the implementation of lean manufacturing principles. It was however observed by analysing the strengths and weaknesses of the results that there are certain areas of the results that need to focus on as they may have a relatively negative impact on the process the implementation of lean manufacturing techniques. The recommendations and conclusions of the researcher on the analysis of the strengths and weaknesses of the existing culture of Freeworld Automotive Coatings from the results of the lean culture assessment questionnaire will now be discussed in chapter five.

CHAPTER FIVE

CONCLUSIONS AND RECOMMENDATIONS.

5.1 Introduction.

The concept of lean manufacturing, as discussed earlier in previous chapters, is larger than just the tools that enable process improvements and cost reductions to be implemented. The initial organisational culture that exists within an
organisation also plays a significant role in the success or failure of the implementation of lean manufacturing in a company. It is therefore important for an organisation to understand that its culture also plays a role in becoming competitive especially in South Africa. This is mainly due to South Africa having the added challenge of successfully merging a multi-cultural society and overcoming the politics and perceptions of the past, while also encouraging a culture of continuous improvement.

The review of literature in chapter two highlighted that a significant change process such as the implementation of lean manufacturing concepts is not an easy one. This is due to the change involving a process of implementing new concepts and tools that requires a significant change in the company's organisational culture depending on the initial environment. It is therefore important for a company to analyse its organisational culture prior to embarking on the implementation process. This analysis will help the company ascertain its initial organisational culture in comparison to a lean culture with the aim of determining its strengths and weaknesses to help it build a successful strategy of implementation.

The questionnaire method that was chosen for this research study was designed with the aim of aligning the questionnaire to the principles important to the Toyota Way model as discussed in chapter three, in order to analyse the current organisational culture at Freeworld Automotive Coatings.

The conclusion and recommendations that have been determined through the analysis of the results of the data collected in this research study will be discussed in this chapter. This discussion will discuss the research study in terms of the conduciveness of the current organisational culture at Freeworld Automotive Coatings to the implementation of Lean Manufacturing principles. The conclusions will be discussed with the aim of recommending future actions.
that will help to ensure a successful implementation of lean manufacturing at the company.

5.2 Summary of Research Conclusions.

The main problem statement was to determine how conducive the existing organisational culture of Freeworld Automotive Coatings to the implementation of lean manufacturing techniques and the questionnaire was designed in order to collect results to measure the existing culture against lean culture principles. It was qualitatively concluded in chapter four that the questionnaire designed by the researcher was valid as the research collection method for the study. The analysis of the collected research data from the completed questionnaire in chapter four showed some significant observations of the calculated results with regards to the current organisational culture at Freeworld Automotive Coatings. The significant conclusions of the analysis of the research data will now be discussed in more detail.

5.2.1 Conclusions on overall results analysis.

The analysis of the collected data from the valid 102 completed questionnaires showed that the current organisational culture of Freeworld Automotive Coatings indicates a cultural base that has comparatively strong results in the measured aspects of a lean culture using the Toyota Way model as the ideal example of a lean culture. The overall average of 4.04 out an ideal maximum of five indicates that the existing organisational culture of the company will provide a good basis for the implementation of lean manufacturing techniques within the company. The calculated standard average of the seven sections of the questionnaires indicates a consistent spread of results across the collected data.

There are however differences evident across the seven analysed sections of the questionnaire that are an indication of specific relative strengths and weakness’
of the existing organisational culture at Freeworld Automotive Coatings. The analysis of the data for areas of strength showed that a strong culture of **standardisation** exists within the company that indicates the operational procedures and equipment works instructions are well documented. This strong culture of standardisation helps to provide a good platform for the employees to improve them in a lean culture environment. A main driving principle of the Toyota Way model is the ability of a company’s employees to be able to **identify and solve problems** and this section of the questionnaire indicated a strong overall culture existing with in the company. The analysis of the results also showed that the employees of Freeworld Automotive Coatings are generally **well motivated** although there are areas of the company where this is lower, which will be discussed in the departmental section.

The analysis of the overall results also indicated specific areas of relative weakness of the company’s existing organisational culture. This analysis indicated that the company may have to focus on the area of **employee development** as this section of the questionnaire had the lowest average overall result. The other sections of the questionnaire that had results that indicated relative lean culture weakness are the **trust, teamwork** and **communication** sections that can be considered to be interlinked as concepts which will be discussed more in the recommendations section of this chapter.

It can be concluded from the results achieved that the company’s strategies in general do promote an environment that would be conducive to a creation of a lean culture although there are areas of relative weakness that the company may need to focus on to improve those areas further.

5.2.2 Conclusion on departmental results analysis.

It can be concluded from the analysis of the average results of the operations and technical departments of Freeworld Automotive Coatings that the there is
good alignment with respect to their existing organisational cultures. The operations and technical departments are important departments in the everyday operations of the company. The good alignment of these two departments therefore shows that they have similar cultures which will be beneficial not only for the implementation phase of lean manufacturing but also in day to day cross functional interactions.

It can also be concluded that while the analysis of the average results for the production department showed similar trends to the overall average results an apparent area of concern within its existing culture is the motivation section. This section analysis showed that the motivation of the department’s employees had a relatively lower average result than overall result. This will be discussed further in the recommendations section.

5.2.3 Conclusion from literature review.

The review of showed that the organisational culture of a company is a complex concept that is created over time by internal and external factors that plays a major role to play in the day to day operations of a company. This therefore indicates that the organisational culture has an impact on the company’s ability to survive in its business environment. It can be concluded from the review of literature that organisational culture is an important pillar of the success that Toyota has achieved initially through its TPS principles that developed to the Toyota Way model. The Toyota philosophy forms the back bone of the concepts of lean manufacturing principles and significant benefits can be achieved from the successful implementation of these principles.

It can be further concluded from the review of literature that a change process such as the implementation of lean manufacturing concepts is not a straightforward process as it involves a process of implementing new concepts and tools that will normally require a change in the company's organisational culture. It is
therefore concluded that a company should look at analysing its organisational culture prior to embarking on the implementation process. This will help the company and its management to create a picture of initial organisational culture with the aim of determining its strengths and weaknesses to help it build a successful strategy of implementation.

The review of literature however showed that there various methods of collecting data to analyse in order to measure the organisational culture. The different methods of data collection all had positive and negative points related to their suitability of use for this function. It was therefore concluded that when choosing a method of data collection, the researcher should look to choose a method that is aligned to the company’s initial state and required outputs.

5.3 Recommendations.

The analysis of results and subsequent conclusions of this research study on the conduciveness of Freeworld Automotive Coating’s existing organisational culture to the implementation of lean manufacturing principles has led to the researcher identifying specific areas of possible improvements. These are areas that are recommended to be attended to in order to help to ensure a successful long term implementation of lean manufacturing principles by enabling the company to create a learning organisational culture.

5.3.1. Implementation strategy.

It is important that Freeworld Automotive Coatings and its management develop a defined strategy of implementation of lean manufacturing that has total commitment from the management and that involves clear communication of the implementation to all employees to minimise any misconceptions or negativity from the employees. The strategy needs take into account the macro and micro
environments that impact on the company while having defined goals and targets that the company wants to achieve.

The implementation strategy must be aligned to the current organisational culture with defined strategies in place to incorporate the existing strengths of its existing organisational culture while also focusing on the areas of relative weakness to enable improvement in these specific areas. It must be clearly understood that in order to become a learning organisation it will require changes in the existing organisational culture. The change process will take some time, so the company’s management must enter the process that effective change is a long term process.

This results of this research study has indicated that there are elements of its existing culture that are strongly in alignment to the main principles of a lean culture so these elements should be incorporated in the implementation strategy to aid the process.

The company must also identify a change agent that will help drive the implementation process along with the help of the departmental managers and team leaders. It is also recommended that the company identifies lean pilot projects that can achieve quick wins that will help show employees the benefits that lean manufacturing can achieve, which will help to create a positive attitude towards the process. It would be advisable that the area chosen for the pilot project be in an operational area such as production, so that the initial concepts can reach the shop floor.

5.3.2 Employee development.

This results of this research study has indicated that the company needs to focus on the area of employee development as this is a relative area of weakness. It is therefore recommended that all the existing procedures that relate to the
development and training of the company’s employees be looked with the aim of identifying possible areas of improvement in this area. This would involve close combined involvement from the human resources department and the relevant line managers to effect an improvement in this lean culture principle.

5.3.3 Teamwork.

The results of this research study have indicated that the company also needs to focus on the area of teamwork, trust and communication. The concepts of trust and communication are also important in effective running of teams in the workplace. It is therefore recommended that with in its implementation strategy the company has a sub strategy that will focus on the area of effective teamwork. This will involve the company having a strategy to help its various teams on site to be able to operate in an effective manner. It is recommended that this is done through training of its employees on the concept of teamwork while using its managers and team leaders to promote an environment that encourages communication and trust amongst employees. It may however take some time to build up trust in areas or teams where it is lacking and this should be driven by the leaders of the company, leading by example.

5.3.4 Motivation.

This results of this research study has indicated that the company also needs to focus on the motivation of the employees within the production department as the results indicate that motivation seems to be lower than in the other areas of the company. This result, as discussed in chapter four, may be influenced by the type of job functions the relevant employees are performing. It is however recommended that there is encouragement for more involvement of the
production employees in the dynamics of the team such as problem solving, equipment improvements and discussion of team performance. It is also important that the team leaders of the department are effective in creating an environment that will help to promote the employees within their teams.

5.3.5 Future research.

The questionnaire data collection method, although valid and reliable at measuring the organisational culture of Freeworld Automotive Coatings, has the limitation of measuring the culture based on the views of the employees at the point of time of completing the lean culture assessment questionnaire. It is therefore recommended that further assessments should be undertaken in the future at agreed time intervals to determine if any changes are evident. It is also recommended that the lean culture be measured through the observation of employees and the results achieved while also using the performance management process to also help to provide feedback on the organisational culture that exists within the work place of Freeworld Automotive Coatings.

It is also recommended that the organisational culture of other companies be measured to further validate the lean culture assessment questionnaire while also building up a data base of the various companies in comparison to the lean culture ideal of the Toyota Way model.

5.4 Summary.

It can be concluded from the research findings of this study that the existing organisational culture of Freeworld Automotive coatings contains elements of its culture that will provide an initial base that is conducive to the implementation of lean manufacturing principles within the company. This is apparent in the results achieved from the questionnaire designed for this research study that also indicates that it was a reliable and valid method for the research study. The
successful implementation of lean manufacturing techniques and principles will enable it to continuously improve that will lead to benefits for the company thus enabling it to remain competitive while also providing benefits for its customers.

There is however specific areas of its culture that it is recommended the company’s management to focus on that will further improve its ability to successfully implement lean manufacturing, while also improving the environment of the work place. It has also been recommended that the management of Freeworld Automotive Coatings put a lot of focus on the implementation strategy that will use to implement lean manufacturing techniques into their business as this will play an important role in the process being successful. The implementation strategy should also incorporate the results of this research study as the organisational culture will also play an important role in the process being successful in the long term.

The conclusion of this research study are based on the feelings of the employees of the company at the pint in time when they completed the questionnaire so it is therefore recommended that Freeworld Automotive Coatings looks at continuously monitoring their culture in the future. This can be done at specific agreed time intervals using methods.


GenEd web site. 1996. *Definitions and discussions about culture.*


Roberts, C.A., Burke, S.O. 1989. *Nursing research, a quantitative and qualitative approach.* Boston: Jones and Bartlett publishers


Annexure one: The letter requesting permission to conduct the research.

38 Harold Road
Charlo
Port Elizabeth
6070
13 June 2008

The Human Resource Executive  
Freeworld Automotive Coatings  
4 Bedford Street  
Neave Township  
Port Elizabeth  
6000

Dear Hein

Research study on the Conduciveness of Freeworld Automotive Coatings Organisational Culture to Lean Manufacturing Implementation.

I am presently enrolled at the Nelson Mandela University for a degree in Masters Degree in Business Administration (MBA).

One of the requirements of this degree is the completion of a dissertation on a specific topic. I have decided to undertake my dissertation on the topic listed above. I hereby request permission to undertake this research study at Freeworld Automotive Coatings. The employees will be requested to complete a questionnaire designed by myself. The confidentiality and anonymity of the employees is guaranteed and a copy of this research will be available on request.

Yours faithfully

Alexander Gray
Annexure two: The lean culture assessment questionnaire used for the research study.

Lean Culture Assessment

COMPANY:______________________________.

DATE:______________________________.

DEPARTMENT:______________________________.
Please note the following:

a. Please answer all questions openly and honestly to ensure accurate results by placing X on applicable box.
b. Please remember that you only need to fill in your company’s name and your department.

1. Employee Development

1.1 The company is employing competent people for the right positions within the organisation.

☐ Always
☐ Usually
☐ Sometimes
☐ Seldom
☐ Never

1.2 The company has an effective induction program when a new employee joins the company.

☐ Always
☐ Usually
☐ Sometimes
☐ Seldom
☐ Never

1.3 There is an annual assessment of my training needs.

☐ Always
☐ Usually
1.4 There are documented competencies that are required in my current position and other positions.

Always

Usually

Sometimes

Seldom

Never

1.5 The company assesses employees competency with regards to their current positions.

Always

Usually

Sometimes

Seldom

Never

1.6 The on the job training performed by the relevant Team Leader/Manager is satisfactory to the job requirements.

Always

Usually

Sometimes
1.7 My Team Leader/Manager provides a good coaching/leader role and allows me to grow in my current position.

☐ Seldom

☐ Never

1.8 Employees are well informed of the current company employee development policies.

☐ Always

☐ Usually

☐ Sometimes

☐ Seldom

☐ Never

1.9 Employees have been trained on basic problem solving techniques.

☐ Always

☐ Usually

☐ Sometimes

☐ Seldom

☐ Never
2. Teamwork.

2.1 My team has regular team meetings.

☐ Always
☐ Usually
☐ Sometimes
☐ Seldom
☐ Never

2.2 My current team members are aware of their roles and responsibilities with the team.

☐ Always
☐ Usually
☐ Sometimes
☐ Seldom
☐ Never

2.3 My team has clear goals and targets that are aligned to the organisational goals and targets.

☐ Always
☐ Usually
☐ Sometimes
☐ Seldom
☐ Never

2.4 My team regularly review and discuss performance and SHE issues.
2.5 My Team leader/Manager facilitates problem solving sessions when problems have been identified.

- Always
- Usually
- Sometimes
- Seldom
- Never

2.6 My team regularly identifies and solves problems as a team.

- Always
- Usually
- Sometimes
- Seldom
- Never

2.7 The organisation's various teams are aligned and work together towards a common goal.

- Always
- Usually
- Sometimes
2.8 I feel happy and content as a member of my team.

☐ Seldom
☐ Never

2.9 The company provides team-based recognition and rewards.

☐ Always
☐ Usually
☐ Sometimes
☐ Seldom
☐ Never

3. Problem Solving

3.1 I constantly look to identify problems or concerns when performing my job function.

☐ Always
☐ Usually
☐ Sometimes
☐ Seldom
☐ Never
3.2 I would stop the production process if it was discovered that something was wrong with process or the product.

☐ Always
☐ Usually
☐ Sometimes
☐ Seldom
☐ Never

3.3 Solutions and corrective actions are implemented effectively and timeously.

☐ Always
☐ Usually
☐ Sometimes
☐ Seldom
☐ Never

3.4 It is considered important in the organisation to continuously improve through identifying and solving problems.

☐ Always
☐ Usually
☐ Sometimes
☐ Seldom
☐ Never

4. Standardisation.
4.1 There are clear procedures and work instructions available in your work area.

☐ Always
☐ Usually
☐ Sometimes
☐ Seldom
☐ Never

4.2 There are clear visual displays in your work area highlighting possible deviations from procedure and work instructions.

☐ Always
☐ Usually
☐ Sometimes
☐ Seldom
☐ Never

4.3 I am allowed to contribute to improving procedures and work instructions.

☐ Always
☐ Usually
☐ Sometimes
☐ Seldom
☐ Never

4.4 My team regularly comes up with possible ideas to improve procedures or work instructions.

☐ Always
4.5 The organisation has specific housekeeping standards and targets i.e. 5S's

Always
Usually
Sometimes
Seldom
Never

4.6 The organisation has clear SHE rules and practices which are important within the organisation.

Always
Usually
Sometimes
Seldom
Never

4.7 The practice of working safely is important to my everyday work function.

Always
Usually
Sometimes
5. Trust.

5.1 The organisation treats all its employees equally with regards to respect, performance and recognition.

☐ Seldom
☐ Never

5.2 My Team Leader/Manager treats me with respect and dignity.

☐ Always
☐ Usually
☐ Sometimes
☐ Seldom
☐ Never

5.3 My fellow team members are treated the same by the relevant Team Leader/Manager.

☐ Always
☐ Usually
☐ Sometimes
☐ Seldom
5.4 My Team Leader/Manager allows me to learn and grow from my mistakes.

☐ Never

☐ Always

☐ Usually

☐ Sometimes

☐ Seldom

☐ Never

5.5 I am respected and trusted by my fellow employees.

☐ Always

☐ Usually

☐ Sometimes

☐ Seldom

☐ Never


6.1 I feel part of my company and I am proud to tell people were I work.

☐ Always

☐ Usually

☐ Sometimes

☐ Seldom

☐ Never

6.2 I achieve satisfaction when my team and myself achieve our targets and/or solve problems.
6.3 I feel responsible for my work place and equipment.

6.5 The organisation values have a positive impact on my family and myself.

6.5 The leaders of the organisation lead by example in maintaining values and the code of conduct.
6.6 I look forward to coming to work in the morning.

☐ Seldom
☐ Never

7. Communication.

7.1. There is a clear communication channel that effectively communicates the company's objectives and performance.

☐ Always
☐ Usually
☐ Sometimes
☐ Seldom
☐ Never

7.2. I am informed of formal and informal events happening within the company.

☐ Always
☐ Usually
☐ Sometimes
☐ Seldom
7.3. I am able to openly communicate on issues with my Team Leader/Manager or HR department.

- Never
- Always
- Usually
- Sometimes
- Seldom
- Never

7.4. I receive feedback on ideas and issues that I have raised.

- Always
- Usually
- Sometimes
- Seldom
- Never

7.5. I feel comfortable that I can discuss problems with my Team Leader/Manager.

- Always
- Usually
- Sometimes
- Seldom
- Never

7.6. Employees are regularly given feedback on safety incidents and their corrective actions.

- Always
Usually
Sometimes
Seldom
Never

7.7 Employees receive regular feedback on quality issues from customers.
Always
Usually
Sometimes
Seldom
Never