



**Nelson Mandela**  
METROPOLITAN UNIVERSITY  
**Business School**  
*Leaders for tomorrow*

**HOW TECHNOLOGY CAN BE APPLIED TO SUPPORT CHANGE  
MANAGEMENT BEST PRACTICES IN THE SOUTH AFRICAN  
AUTOMOTIVE INDUSTRY**

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## **DECLARATION**

**I, Malcolm William Vorster, hereby declare that:**

- This work has not been previously accepted in substance for any degree and is not currently being submitted in candidature for any degree.
- This treatise is being submitted in partial fulfilment of the requirements for the degree of Masters in Business Administration.
- This treatise is the result of my independent work and investigation, except where otherwise stated. Other sources are acknowledged by complete referencing. A reference list is attached.
- I hereby give consent for my treatise, if accepted, to be available for photocopying and for interlibrary loan, and for the title and summary to be made available to outside organisations.
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## **ABSTRACT**

Organisations within the South African automotive industry (SAAI) are always seeking innovative ways to remain globally competitive. In order to keep costs as low as possible, existing facilities are often adapted to either cater for a wider variety of products or, alternatively, to produce larger volumes than they were originally designed to produce. In every instance, some form of change needs to take place.

When the change management processes are defined within the system, quick wins need to be identified. These quick wins may include the elimination of non-value-adding time that is spent moving paper work between offices or ensuring the correct checks are in place to prevent the process from moving to the next step until all the requirements for the current steps have been completed. Technology has been identified as a suitable support mechanism that would be able to integrate into the complex system that comprises processes to be followed in an order that can be predefined.

Every organisation faces its own unique challenges when technology is introduced. These can include a lack of computer literacy and the unwillingness to accept that change can in fact benefit the organisation. Getting the users to take ownership of the new systems through comprehensive training initiatives will be shown to be the most effective manner in which to ensure that the systems are effective and used to their full potential.

This treatise will investigate the change management systems currently being used in the SAAI and compare the most important factors against the perceived best practices of the resources that are involved in change management. Organisations that operate at various levels within the SAAI will be researched. A literature review of the best practices in change management systems combined with an investigation into how technology can assist in supporting these best practices will be conducted. The findings will then be summarised and recommendations based on the collected data and information will be formulated and put forward.

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## **LIST OF ABBREVIATIONS**

BP – Best Practice

CS – Current State

SAAI – South African Automotive Industry

OEM – Original Equipment Manufacturer

# 1 INTRODUCTION

## 1.1 Introductory remarks

This study is situated within the South African automotive industry (SAAI). It focuses in particular on technology and how it can be applied within the industry to support change management best practices. The study will identify elements of change management that should be executed in order for the change to be not only successful, but also sustainable.

With the ever-changing and competitive automotive environment requiring flexibility from factories and the facilities within them, it is important to ensure that change takes place in a co-ordinated and structured manner, in order for it not to be disruptive. Within the automotive industry worldwide, major model changes take place every 7 to 9 years (Black, 2001). This means that the large automotive factories have to undergo major changes on a regular basis, specifically when it comes to the processes and facilities surrounding the assembly lines. The change management principles used should aim to incorporate best practices that are up to date and therefore relevant at the time at which the facilities are installed or processes changed. As technology advances, new systems become available, and departments that try to stay ahead of the trend attempt to integrate these systems into the existing framework (Jean & Huijbers, 2012). These changes, while small in comparison to the initial roll-out, have to be executed in a more structured manner to ensure that they are effective and that they have the desired effect (Oakland & Tanner, 2007).

Maintaining momentum through employee turnover phases requires strong leadership: Employee turnover can have a negative impact on change management due to the break in continuity of processes. An employee that is in charge of a process is integral to that process – unless the process is structured correctly, with the correct feedback loops and cross-checks. In the instance where a process is structured in this way, it would minimise confusion and disruption should the employee no longer be involved in said process (Denis & Denis, 1995).

Change management is crucial to facilitating change in a structured manner as well as giving all stakeholders the opportunity to positively contribute and highlight any concerns they may have early on in the change process.

## **1.2 The research problem**

### **1.2.1 Background to the problem**

The SAAI is driven by technology (Jean & Huijbers, 2012). The ever-changing nature of this environment has a major impact on the processes that have been put in place to control it. As a result, processes become outdated rapidly. Processes that were developed before major advances in technology were compiled based on the working environment of the time. These processes would then get reviewed on an annual basis purely for audit-approval purposes. The updates that have been made to the processes in recent years have thus been incremental and conservative. These changes have not, however, matched the magnitude of the technological advances they are based on. This has resulted in a system that is relatively easy to maintain but has not been optimised to its full potential (Jean & Huijbers, 2012). While process steps are clear and uncomplicated, often with only one or two options for the person working through the process to select from, the landscape has changed greatly and the processes need to change accordingly.

Factories of today contain processes that are complicated due to the manner in which the facilities and the production system interact with each other. As a result of this complex interaction, specialists that have extensive knowledge in specific components of the system need to be involved when changes need to be made (Levasseur, 2004). These complexities have resulted in extensive sign-off procedures and information-gathering processes needing to be completed before the above-mentioned changes can begin to be implemented. The sign-off procedure and information-gathering process result in delays in the change process and increase the resource demands associated with the change (Madani et al., 2011). Often the resources involved are highly skilled and highly paid, increasing the direct cost associated with the change.

The result is that many change management initiatives fail to deliver the required outcomes. While the result may not be a failure as such, the solution provided is often not the best possible solution (Oakland & Tanner, 2007). Levasseur (2004) supports Oakland and Tanner's (2007) view that the processes in place need to be current and up to date.

Delays and inefficiencies in the change management process result from the highly engineered systems not having processes in place that complement their complexity. This is due to the fact that the systems are not fully understood by the resources that are tasked with installing, configuring and setting up the functional aspects of said systems (Leonardi, 2011). If the processes in place are not comprehensive, system changes should be carried out by resources that have received comprehensive training on all aspects of the system. In today's competitive economy it is not always possible to have specialists for all the systems. This drives home the need for effective, easy-to-use processes that need to cater not only for changes but also for other system requirements, such as monitoring, maintenance, operation and safety.

More often than not, documentation is sparse and incomplete, compounding the problem of system under-optimisation and misunderstanding. In situations like these, it is often clear that small operational improvements have been made with short-term objectives and quick wins in mind (Oakland & Tanner, 2007).

### **1.2.2 Statement of the problem**

Ideal change management processes that are supported by the available resources require leadership that is able to control the process effectively, the correct framework, room for negotiation and compromise by all stakeholders, and a structured communication platform (Stewart & Kringas, 2003). Birkinshaw, Hamel and Mol (2008) support the notion that stakeholder communication is important, as stakeholders need to be continuously kept up to speed when it comes to the updated processes which affect their operations.

Technology needs to be integrated into the change management process to provide stability as well as facilitate key aspects of the change management process such as knowledge management, stakeholder involvement, giving leadership an effective tool

with which it can manage change and a platform from which all communication can easily be facilitated between all parties involved (Jean & Huijbers, 2012).

The critical balance which needs to be considered when introducing technology into any component within an organisation is the total cost of ownership. Too often, managers look at the implementation cost of a system but neglect the day-to-day maintenance and running costs associated with ensuring that the system is operating optimally (Castellina, 2013).

It is necessary to determine where is a tipping point where the cost of technology outweighs the benefits associated with introducing technology into processes that are critical to the operational effectiveness of an organisation.

Leaders of today are moving away from the traditional approach of giving orders. Modern leaders provide their followers with a platform from which they can achieve the required outcomes in a collaborative manner (Levasseur, 2004). The framework within which the process is being executed needs to be transparent and easy to manage without causing too much interference. Technology is widely used by organisations, varying in the extent to which it is relied on within the businesses core functions and how effective it is in supporting the core functions (Karimi et al., 2001).

Defining how leaders should manage is a theme that is applicable to all industries. Sutanto et al. (2008/2009) identified top management support as a critical success factor when change is required. Support from top management gives traction to the ideas being generated by the resources. Without adequate support, the factors that are against the change will try slow the change or even stop it from taking place.

Through the use of technology, organisational intranet systems can be developed to facilitate the effective communication of information, data and other process-specific requirements (Mahler & Regan, 2003). The intranet platforms provide leaders with real-time access to process status reports and provide an effective framework in which to build a base of knowledge for future reference.

The power of leader influence has been at the centre of the change management conversation since as far back as the 1970s. This is evident in an article by Lee

(1977) entitled “Leader Power for Managing Change”. The article refers to the manner in which change is managed seems to be less important than the ability of the manager to influence the outcome of the change.

The turnover rate of skilled labour has increased continuously and, as a result, organisations have had to introduce very specific and regulated processes in order for them to maintain continuity within the workplace (Barnes & Meadows, 2008). Leaders’ effectiveness is therefore less reliant on the resources because the processes are monitored and provide tangible feedback. Technology has provided leaders with the opportunity to more effectively manage the business environment in which they operate and is therefore forcing the resources to manage themselves in a more structured manner (Stewart & Kringas, 2003).

### **1.3 Previous studies of technology use in strategic processes**

Since the 1990s, the introduction of technology into all aspects of an organisation has formed part of strategic planning discussions (Dixon & John, 1989). Information technology provides a platform that is very flexible. While this flexibility is not free, the positive impact a correctly implemented system can have on an organisation’s change management process’s effectiveness provides a short payback period. Too often, the benefits cannot be easily converted into relative financial gain. Decision makers therefore do not always see the value being added and, as a result, end up spending less for a substandard system that, in most cases, will not be as robust or effective (Itter & Larcker, 1997).

Being able to automatically transition between steps within the business process is the most influential aspect of any business system. It highlights the rapid improvements that will take place when processes are built around technology (Dixon & John, 1989). It is important to keep in mind that technology-rich systems are only as effective as the infrastructure around which they are built (Benner & Tuchman, 2003). The total cost of ownership needs to be calculated when trying to analyse the possible returns that could be expected from the introduction of an organisational process control system.



Process management using technology provides a diverse platform that is able to facilitate the easy inclusion of best practices in all areas of the organisation, not limited to production processes only (Benner & Tuchman, 2003). Itter and Larcker (1997) also highlighted the need to bring technology into all areas of an organisation to facilitate the most efficient methods of controlling the relevant processes. The cost of introducing technology, however, varies based on various factors. Organisational changes and transformations that are triggered by the introduction of technology need to be planned and managed correctly. Resource accountability and changes in the power structures involved in this technology planning and management need to be clearly defined (Dixon & John, 1989).

Ensuring that the business processes that affect the relationships between suppliers and customers are optimised early on in the development cycle will assist in building strong relationships between all the stakeholders. These long-term partnerships are associated with higher performance in output and effectiveness, which benefits both parties (Itter & Larcker, 1997).

Total cost of ownership is a concept that is too often overlooked when introducing technology-driven products into an organisation (Tibben-Lembke, 1998). During the initial decision-making discussions, the total expected amount that a system is going to cost often excludes many of the items that are critical to the success of a system's roll-out. Total cost of ownership is important to keep in mind when planning the introduction of technology-driven products.

Technology as a flexible production driver has been around for many years. A large number of industries apply technology to its full potential and have reaped the benefits not only through financial gains, but also through the resultant sustainable and effective operations that they were able to develop (Goldhar & Jelinek, 1985). The industries and, more specifically, the organisations that were able to commit financially to the technology-advanced vision began realising the gains almost immediately (Karimi et al., 2001).

While manufacturing received the greatest direct benefit from the integration of technology through the introduction of reduced change-over times and advanced scheduling systems, assembly processes also became more flexible (Goldhar &

Jelinek, 1985). The key economic advantage that was created by the revolution in manufacturing was the reduction in the costs associated with product diversity. Moving away from the 'economies of scale' mentality, where large volumes of one specific product needed to be produced in order to reduce costs, towards a more diverse 'economies of scope' resulted in marketing departments being able to offer a wider product range that production departments could produce cost-effectively (Goldhar & Jelinek, 1985)

Globalisation has allowed global organisations to combine the economies of scope and scale methodologies, taking advantage of the positive aspects of each. For example, the number of options available on vehicles today is large. Specific models are produced in select regions throughout the world, then shipped to the required locations. Large volumes of model-specific vehicles with varying options are being produced by a single facility (Black, 2001).

The progression of data management, robotics, process control systems, statistical analysis programs and similar technologies are being integrated by organisations into intense business systems that provide management with real-time feedback. Marketing, production, health and safety, planning, finance and purchasing departments are all benefiting from the information that is available at the press of a button (Jean & Huijbers, 2012).

More recently, the idea of a paperless office began gaining traction (Malik et al., 1999). With manual documentation distribution processes, information is often out of date before it has been received (Malik et al., 1999). Organisations began developing their intranet systems in such a way that all approvals processes and any information flow would be managed electronically. Organisation documentation is electronically published as a result. The information is instantly available throughout the organisation. The intranet is the core of the operations and accelerates all business-related activities which, in turn, improves the overall performance and competitiveness of the organisation (Malik et al., 1999). A key contributing factor is the reduction in the waiting time associated with approval processes. Between 4% and 8% of the total revenue spend previously associated with the creation and distribution of documents.

## **1.4 Research questions**

This study investigates the relationship between the current state of change management with the SAAI and the extent to which the best practices extracted from literature align with the perceived importance of these best practices.

The current state of change management is established by analysing the data received from the distribution of a questionnaire that was created based on the best practices and key elements identified in the literature review chapter.

Once this current state has been established, the best practices that support successful change management identified in the literature review are compared to the best practices that industry respondents perceive as being critical to the success of change management within the SAAI.

All the respondents operate within the SAAI, at various levels within their respective organisations. The organisations themselves also operate at different levels within the automotive industry framework. This framework comprises Original Equipment Manufacturers (e.g. General Motors, Volkswagen and Ford), First-tier (e.g. Lear Corporation and Johnson Controls), Second-tier (e.g. SJM Flex and Continental) and Third-tier (e.g. Bosch and Advics) Suppliers as well as other organisations that form part of the industry support structure.

### **1.4.1 Main research question**

RQ<sub>m</sub>: How can technology be applied within the SAAI to support change management best practices?

### **1.4.2 Sub-research questions**

To analyse the above main research question effectively, the following research questions were identified:

- RQ1: How important is effective communication when it comes to change management?
- RQ2: How important is knowledge and/or documentation management when it comes to change management?

- RQ3: To what extent does leadership affect change management?
- RQ4: How important is an effective approval process when it comes to change management?
- RQ5: How important is change status tracking when it comes to change management?
- RQ6: How does the scale of change affect the change management process?
- RQ7: To what extent does training affect the effectiveness of the change management process?
- RQ8: To what extent is technology supported when change management best practices are considered?

## **1.5 Study methods**

### **1.5.1 Participant selection**

The research questionnaire was made available online to managers, supervisors, specialists, engineers and technicians that operate within the SAAI. This included participants from various OEMs, First- and Second-tier Suppliers to the OEMs and Systems Integrators.

### **1.5.2 Research approach**

This study comprises a literature review that investigates change management and the best practices that surround it. The use of technology in change management is also analysed to establish how it is used to support change management best practices. A questionnaire was compiled based on the literature review that focuses on the critical technological factors that support effective change management. The sample population was then tested to determine their views on whether technology can be used to support change management.

The questionnaire responses are analysed and recommendations are made as to how best to proceed with the integration of technology into the change management process within the SAAI.

### **1.5.3 Participant selection**

The research questionnaire was made available online to managers, supervisors, specialists, engineers and technicians that operate within the SAAI. This included participants from various OEMs, First- and Second-tier Suppliers to the OEMs and Systems Integrators.

### **1.5.4 Data collection**

The primary data was collected by means of a questionnaire that was distributed to participants that deal with change management in the SAAI on a daily basis. The questionnaire used for the research was formatted using a five-point Likert Scale that ranged from (1) Strongly Disagree to (5) Strongly Agree.

A sample should be chosen so that, through it, the researcher is able to see all the characteristics of the total population in the same relationship as they would be seen were the researcher, in fact, to impact the total population (Leedy & Ormrod, 2001).

The results from the questionnaire are analysed using statistical analysis to determine whether the hypotheses proposed by the study hold true. Hypotheses established during the literature review are tested using a multivariate approach in which data from two or more variables are combined during analysis (Collis & Hussey, 2009). All questionnaires are anonymous and the overall findings are analysed in an unbiased manner, taking the views of all the participants into account.

The questionnaire responses are analysed using a system developed by an NMMU statistical analysis consultant. The system is Microsoft Excel-based and uses VBA Macros on a mixed platform to extrapolate key statistical indicators.

## **1.6 Ethics clearance**

The completed Form E for ethics clearance was submitted to the NMMU Business School and ethical clearance was granted.

## **1.7 Contents of the final report**

The treatise is arranged as follows:

- Chapter 1 is an introduction to the study and covers the initial study overview, the problem statement, the goals and objectives, the methodology used and the importance of the topic. The research questions are also included in this section.
- Chapter 2 is a literature review that focuses on change management processes and best practices, as well as how technology can be used within the SAAI to support change management. Key concepts that will influence the introduction of technology such as total cost of ownership are also reviewed here.
- Chapter 3 investigates the research design options and methods that can be used to ensure a study is able to establish concrete findings that meet the various research methodology requirements. The research paradigm, sampling design and various definitions specific to research are included in this chapter.
- Chapter 4 establishes the reliability and validity of the results collected during the research phase. These results are then evaluated based on their weighting and impact on the change management process.
- Chapter 5 consists of conclusions from the research findings and recommendations that management can consider when deciding how best to integrate change management into the organisations that they are involved with.

## **1.8 Importance of the study**

In order for a factory producing motor vehicles to compete in today's global automotive industry, it needs to ensure that every aspect of the operation is geared towards optimal efficiency (Pieterse et al., 2010). State-of-the-art facilities use the latest technologies to control and monitor every aspect of all processes and, as a result, a large amount of production information is collected and transferred.

Departments, factories and upper-level business systems use the supplied information and, for example, are able to indicate to customers where their specific car is in the build process. Other critical information such as daily production

volumes and production trends are used by management to make decisions that will affect the factory's day-to-day operations (Black, 2001).

The change management focus in this paper is on the processes within the factories in which the vehicles are produced that result in changes that will impact the quality and volume of the factory's output.

Mistakes and oversights when carrying out a change in any production environment will result in the loss of income through stoppages in the production system or even quality problems that need to be addressed through reworks, for example. Managing the change process effectively will reduce the number of these incidents through increasing awareness and thus encouraging the resources involved in the change to evaluate the risks. While the change may take longer to be implemented, there is more awareness of the impact a mistake will have and therefore lower the likelihood of mistakes being made.

In a fast-paced production environment such as the automotive industry, there is often not enough time to work with long processes. In urgent cases, management needs to take responsibility for the actions of the resources tasked by them to execute the emergency change and ensure that the resources have their full support. Blaming the resources involved does not help; if anything, it impacts negatively on the department's morale because the resources may feel that they have been abandoned by management. Poorly structured processes are inefficient and thus take longer to execute than if they were correctly implemented.

Final accountability for the change management process should always lie with management. Often the resources carrying out the change are blamed when the process does not produce the desired result. Management are often happy to be associated with a process that has been successful, but distance themselves from one which was not. Ensuring that all stakeholders are aware of who is responsible for which part of the process helps the change management process.

Due to excessive bureaucracy in form of approval and justification processes, there will always be time that is viewed as waste in any process. Often this time, spent on critical approval stages, is viewed as not productive. Time spent on approval can

save the organisation money by reducing premature project approvals that would have led to money being spent on projects that are perhaps not as important as others. The delays and unnecessary costs within the approval process, however, need to be eliminated where possible. Every process needs to be analysed independently; a decision then needs to be made as to whether or not all the steps are still relevant to the process. Additional steps may have been added that make preceding or subsequent steps unnecessary.

Managers and supervisors spend a lot of time overseas for business, especially in the automotive industry. These managers and supervisors are generally the gatekeepers for the approval processes (Black, 2001). The change management process must cater for scenarios where the resources that form part of the critical approval path are not able to fulfil their duties due to other commitments. This applies not only to work-related absence: being away due to sickness, for example, is also a scenario that should be provided for. Either a more senior figure or someone on the same level as the missing resource must be able to be brought into the approval process to ensure continuity and reduce the amount of time lost waiting for approval (Castellina, 2014). The previous scenario goes hand in hand with the principle of communication between all stakeholders. Having the correct system in place will assist in facilitating quick changes and allow for quicker response times to emergency situations.

The study as a whole aims to identify what the most important factors that influence change management within the SAAI. It will then explore the extent to which these factors can be supported by technology to produce effective change management systems.



## **2 LITERATURE REVIEW**

### **2.1 Understanding change management**

#### **2.1.1 A brief history of change management**

Change management in the 1980s and 1990s was generally carried out by leading consultation firms who managed the process for businesses (Prosci, 2014). As with any form of consulting, the cost was high, which resulted in only large corporations being able to use consultants. The 1990s saw extensive change taking place, with rapid changes in the areas of information technology and human resource management. The benefits of change management programmes and processes were highlighted on a broader scale. The experiences, consequences, and costs that surrounded change taking place without a structured approach resulted in organisations embracing change management tools (Prosci, 2014).

Change management became widely accepted as a business principle in the 2000s. The market for change management tools and training grew rapidly, with some consulting firms developing their own methodologies. Similar to project managers and chartered accountants, change management practitioners formed their own association known as the Association of Change Management Professionals (Prosci, 2014).

This paper will explore some of the change management methodologies and show how change management can be scaled and applied to various business processes.

#### **2.1.2 Understanding the reasons for change**

There are many reasons why change should or should not take place. There are two main classifications for change drivers. These are divided into external and internal drivers as per *Table 2-1: Main drivers of change (Oakland & Tanner, 2007)*.

External drivers	Internal drivers
<ul style="list-style-type: none"> <li>• Customer requirements</li> <li>• Demand from other stakeholders, such as the Government</li> <li>• Regulatory demand</li> <li>• Market competition</li> <li>• Shareholders/city</li> </ul>	<ul style="list-style-type: none"> <li>• Improving operational efficiency</li> <li>• Need to improve the quality of products and services</li> <li>• Process improvement</li> </ul>

*Table 2-1: Main drivers of change (Oakland & Tanner, 2007)*

While there are two classifications, they are interlinked, with the organisation's wellbeing and effectiveness at the heart of all the drivers. An automotive factory has a multitude of internal and external customers and stakeholders. The production team, for example, is the planning team's customer. If production has any requests, it escalates them to management. If it is decided that the request is a viable option that will add value to the production processes, it is handed over to planning to facilitate the request and provide production with a working solution. Too often, the production team requests facility changes, but are not willing to provide the planning team with the time required to make as well as test the changes in order to ensure that they are suitable and sustainable.

### **2.1.3 Preparing for change**

The inclusion of goals when it comes to a project is critical when preparing for change. It is easier to execute change when there are clear and measurable goals. Often ad hoc changes disrupt the change process: If the goals were laid out clearly and all the correct questions were asked during the preparation phase, there would be fewer changes taking place during the execution phase of a project (Carter, 2008). Depending on the size of the change, the team's focus can be split up so that various aspects can be focused on at the same time. In the automotive industry there isn't only one way of arriving at the goal, but there are preferred methods.

If a supplier is given loosely defined goals or requirements for a facility that they have previously developed for a customer, they are given a large amount of freedom to come up with solutions. In most cases, the solution will be more effective than if

the customer were to control every aspect of the facility's development (Carter, 2008). Large changes are also not always controllable through change management processes that are very detailed due to the vast amount of changes that need to occur. A broad goal places more responsibility on the supplier to manage operational aspects of the change more closely.

When a proposed change has never been made before and is possibly based on assumptions, it is often better to test the change on a small sample or in a pilot project (Ström, 2009). The reason for this testing outside the production environment is to reduce the risk of any mistakes or oversights affecting the current output volumes and quality. Incorporating lessons learnt from other processes and projects before proceeding will ensure that the execution phase involves fewer obstacles that could have been avoided. Pilot implementations provide project and process scope with less risk and reduced financial outlay. Change management should not be introduced too strictly in the pilot phase as it can reduce the team's effectiveness by reducing the opportunity for them to try new approaches. Due to the reduced scale, the pilot phase is easily controlled at a higher level. Change management is not integrated until the final scope for the changes has been defined. This will reduce the need for major scope changes moving forward and facilitates the use of small, controllable steps once the pilot phase has been completed (Andersen et al., 2007).

During the preparation phase for a change, unfreezing the current state in a strategic manner that encourages all stakeholders to be involved is essential when change is imminent (Carter, 2008). Ensuring that all stakeholders are informed about the reasons for the change as well as the benefits the change will bring with it and getting their buy-in early will make the transition into the change execution phase easier.

#### **2.1.4 Executing the change**

Change is generally enforced from the top and executed by teams that comprise various levels of skill, expertise, hierarchies and functions. Stakeholders include sponsors, executive boards, steering committees as well as operators on the shop floor. Every project or process will have a matrix that assigns varying levels of responsibility to each stakeholder; this includes the role that the stakeholder is

expected to play. The expectations for each role vary, and each role is measured differently depending on the expected output (Oakland & Tanner, 2007).

It is impossible to automate every business process, therefore human error needs to be accounted for (Castellina, 2013). Checks and balances controlled by the business rules allow supervisors and managers to catch errors before they begin to negatively influence the process. It is essential to monitor and control the rules through a comprehensive change management program that ensures changes are made correctly and in a timely fashion.

### **2.1.5 Key success factors for change management**

Ensuring that all stakeholders are informed throughout the entire change process is essential to the success of the change (Oakland & Tanner, 2007). The majority of communication during a change management program is top-down, generally in the form of guidance. Communication should take place at all levels and should also take place between levels. This will ensure that the stakeholders are able to contribute positively, not only within their own scope of work, but also in other areas.

Investigating and attempting to reduce risks associated with the change process should take place during the planning phase. Management needs to provide a platform to facilitate this process and should ensure that the relevant authority is given to those who require it, as well as ensuring that the process is constructive and incorporates the views and best outcomes of all the stakeholders involved (Castellina, 2013).

Leaders need to set out a clear direction for those executing the vision. The direction should include end goals that the change team view as achievable (Lee, 1977). It is important that the end goal is measurable against an accepted set of performance indicators. This will allow the team to monitor their progress through all the steps of a given process. Change management for major change can be executed using project management principles within the framework. These principles provide a solid platform on which to build processes. Short-term goals will assist the process and ensure that the team managing the change is moving in the right direction. Any major deviations from the proposed path should be identified early and escalated to

all the stakeholders through the correct forum. The forum must ensure that the recommendations of all stakeholders are considered and that the way forward is the best possible direction for the process as a whole.

The change management team must have the correct background and should be confident when it comes to executing the change. The approach to technological change will be similar to the approach to cultural change, for example. The overarching processes will be the same but the content and focus for each of the steps will be situation-specific. Comprehensive training that focuses on the specific change will give the change agents the confidence to propose solutions. It is important to formulate a solution that best suits the environment in which the change is taking place. Situation-specific change must take best practices into account. It is important to have experts involved that can ease the pressures on the change management team and give them the opportunity to focus on the process (Levasseur, 2004).

Ensuring that all members that are involved in a change are notified with regard to when they are required to execute specific processes as well as when tasks are due was argued for by Castellina (2013) as key success factors to a successful change management process.

Castellina (2013) shows in his study that 45% of best-in-class organisations incorporated business practices that were dynamically updated as and when new best practices emerged. A customised change management system is used to manage changes to business practices. Ensuring that business practices are always current and up to date positively influences the organisation's performance.

## **2.2 Technology and how it can support change management**

### **2.2.1 The impact of technology**

Ström's (2009) paper was based on the automotive industry and focused on the change process as a whole. The change management processes in the paper involved large numbers of functions within the customer's organisation and the supplier's organisation. The processes affect the product quality and cost, with the end result being optimised production facilities that deliver the best product to the

customer. This complicated environment is sensitive to disturbances. Processes therefore need to be as efficient as possible and must be structured in manner that supports the customer and an optimal production output (Ström, 2009).

All routines and technologies are made up of the same basic building blocks. These building blocks are defined and managed differently depending on who set up the original processes and designs. All the requirements must be clearly laid out, easy to understand and have a clear starting point in order for the process to be effective (Leonardi, 2011). Technology, when implemented correctly, can allow for the comprehensive analysis of how changes will impact multiple systems that work together (Ström, 2009). An example of this is using simulation software to analyse how a change to a production line will impact on the operator's ergonomics with respect to the job being carried out. It is essential that the simulation system configuration cater for all possible scenarios; in other words, the simulation system is only as effective as the resource that sets up the simulation system's understanding of the environment. As a result, while specialists of the simulation system need to be involved in the initial set-up, specialists from the surrounding processes and systems must be consulted as well.

These interdependencies are present throughout, including between the changed parts or products, the production facilities, other related products, personnel in different positions, logistics systems and customer requirements (Ström, 2009). These are some of the major challenges when implementing changes that impact multiple stakeholders simultaneously. This also highlights the importance of involving all the required stakeholders throughout the entire change management process.

### **2.2.2 How technology can assist short-notice changes**

It does not matter how well projects are planned, there will always be an element of uncertainty and risk involved during the execution phase. The result is often that engineering changes are unplanned and introduced late in the product development process (Ström, 2009). This is a reality in the automotive industry, where companies strive to ensure that the latest technology is integrated into their best-selling products to ensure that their competitive advantage is maintained.

Changes that have not been planned for can cause enormous problems. This includes that they tie up resources that may have already been planned to be used in either another phase of the same project or another project that may be running in parallel.

It is impossible for large organisations to avoid such changes. Being able to master the change process by foreseeing the side-effects earlier and being able to plan accordingly will strengthen the organisation and result in more resources being available for their intended roles in the strategic product development cycle (Ström, 2009). For these reasons, it is important to fully understand the change management processes and ensure that the technology in place is maintained, not only to reduce the number of last-minute changes and workarounds but also to indicate when there may be potential problems at an earlier point in time. This will provide management with the opportunity to react and plan accordingly.

### **2.2.3 The total cost of ownership for technology**

Total cost of ownership of a product is a methodology used by purchasing departments. It attempts to understand the true cost of implementing a system or buying a specific good or service (Tibben-Lembke, 1998). Traditional purchasing methodologies focused on the delivered price of the goods. When purchasing technology-driven systems that have a direct impact on production, more factors come into play and need to be considered when making management decisions. In an attempt to fully understand the total cost of ownership of an information technology system, for example, Tibben-Lembke (1998) suggests that the following activities be included in the cost calculations:

- Supplier qualification;
- Negotiation;
- Order transmission;
- Confirmation;
- Transportation;
- Receiving;
- Inspection;

- Rejection;
- Maintenance;
- Service;
- Production disruption;
- Lost revenues due to downtime;
- Disposal.

The total cost of ownership of systems that use telecommunications and computing as part of the infrastructure have become more affordable to maintain and operate (Kesner, 1998). This is even more applicable today, with big advances in technology taking place annually. At the same time, the systems themselves are becoming more complex and are being expected to perform more advanced tasks and functions.

This advanced functionality while using the same infrastructure makes use of more advanced software front-end systems. The development of these systems is very expensive if they are to be designed and implemented in the best possible manner. Key considerations include ease of maintenance, back-up procedures and ease of use of all functions. When it comes to total cost of ownership calculations with regard to technology, the more money that is spent initially, ensuring a stable and suitable solution, the greater the cost savings will be down the line, with reduced downtimes and shorter turnaround times for changes (Kesner, 1998).

## **2.3 Business process overview**

### **2.3.1 Critical aspects within business processes**

According to Castellina (2014), business processes need to be well defined. They form the foundation for a successful business. Changes carried out on business processes must focus on the components that are found to be ineffective or inefficient. Too often the whole process is changed without the relevant investigations taking place. The resultant change can then negatively impact the process as a whole. Business processes must be clearly defined, communicated and executed. Failure to do this may result in organisations incurring unnecessary costs or delivering sub-standard products or services, or even in non-compliance with rules and regulations outside the control of the business. This last result may negatively



impact the firm's credibility, and may open it up to liability cases in extreme situations (Castellina, 2014). The business's performance is directly impacted by the processes that are in place within the departmental structures. If the business processes are not followed, this may negatively impact on the business's performance.

### **2.3.2 Key business process strategies of the best-in-class**

The five major focus points that provide businesses with more effective processes are the following, according to Castellina (2013):

- Remap and re-engineer business processes to be more efficient;
- Promote collaboration between disparate business processes and units;
- Improve visibility into workflows;
- Involve the resources of business in more business strategy decisions;
- Build compliance and traceability into business processes.

Remapping and re-engineering were found to be the most effective manner of reviving the business's operational output, as voted for by 56% of the best-in-class respondents surveyed. Collaboration between business units and departments is critical. The interface agreements between stakeholders have to be in a workable state that will promote the effective execution of complex processes between departments. Stakeholders need to be aware of their role in the process to ensure that the process is as streamlined as possible. Visibility allows management the opportunity to easily assess the status of the processes. Built-in compliance and traceability is essential to ensuring output stability and execution correctness. As previously argued, if processes are not set up and executed correctly, the impact on the organisation will most certainly be negative.

### **2.3.3 Key requirements for successful business process management**

The following requirements are only part of the strategy, but it is essential to identify the critical aspects within each requirement and focus initial efforts on ensuring that each aspect is being executed correctly (Castellina, 2013):

- Building and executing efficient processes;
- Collaboration;

- Visibility;
- Accountability.

Efficient processes do not need to be complex webs of interlinked tasks and rules that result in the desired outcome. These processes could be as simple as visually displaying which resources are able to execute specific tasks most effectively, based on their skills and expertise, or even basic steps that ensure a task is approached from the correct angle, reducing wasted time and oversights. The goal of all the processes combined should be to ensure that the organisation is able to operate at its optimal output. This includes operating for as long as possible without system problems and being exposed to as little risk as possible (Castellina, 2013).

Ensuring that departments as well as systems are able to seamlessly work together is critical when dealing with processes (Castellina, 2013). The ideal situation is to have one master system that is able to track the processes through all the tasks as well as monitor each task's status. A single reference point allows all engineers and supervisors to monitor progress and allows for intervention from higher-level resources should the need arise. Ensuring that processes continue to flow will reduce the time wasted while waiting between process steps; the system will also flag overdue tasks and alert the relevant parties. Collaboration and visibility are interlinked, not only from the viewpoint that other users are able to follow up on processes that they are affected by, but also in that they assist in the identification of steps causing delays. Purely by measuring the time taken for each task or other operational metrics that provide feedback, organisations will be able to better understand where improvements are required and how they can modify the processes to better suit the workflow.

It is essential for employees to be accountable for their actions. Aided by the collaboration and visibility aspects of the business process model being executed, employees are able to identify who should be performing which component of the process, how they are supposed to be doing it as well as what measures will indicate the successful completion of the tasks and of the process as a whole (Itter & Larcker, 1997). It is essential to include specialists in the process development phase, especially when oversights could result in fines and legal battles. All templates and

documents should be stored in a central repository and updated whenever changes are required. This will assist in ensuring that the organisation complies with any regulatory requirements (Castellina, 2014).

In addition to the four key requirements described above, a more in-depth set of requirements is promoted by Ström (2009). Under this view, it is essential to identify what the customers of the process view as valuable. This will ensure that one separates value-added components from components that, while they may not be viewed as such internally, may be seen as waste by the customer. Major change points also need to be addressed thoroughly at the beginning of the process to reduce the impact these oversights may have later on in the process. It is better to address potential changes early on in the design phase of the change management process than later.

Change management within processes should be as simple as possible to avoid long waiting periods where the process flow may get stuck and seem stagnant. It is also essential to ensure that, where possible, standardisation of key process principles be applied to reduce variation between process steps. This will assist in creating flexibility and result in greater predictability in the outcome of the change (Ström, 2009).

Having a change management system that is integrated into the business' processes system will assist all stakeholders in assessing the status of a change on a regular basis without having to disrupt the resources within the process. Ensuring that all the relevant stakeholders that need to use the system are trained and understand what the system is capable of doing will reduce the time associated with using the system. Cross-functional teams that balance technical competencies and ensure that stakeholders from all critical areas are included will assist the change management process and ensure that all departments are kept up to speed with the proposed changes as well as the state of the change (Ström, 2009).

#### **2.3.4 Business process design focus areas**

Designing a business process that is as good as it can possibly be is very difficult. Published estimates indicate that, on average, only 30% of business processes have

been designed in such a way (Oakland & Tanner, 2007). The sponsor of the business process must be involved during the design phase, when the overall goals are being discussed and planned. This will contribute to the success of the system and ensures that the sponsor supports any required changes. During the design phase of a business process, communication and maintaining stakeholder support is critical. Progress should be tracked and the status of the design process should be shared amongst all the stakeholders involved (Oakland & Tanner, 2007). Ensuring that executive and departmental levels are in agreement with the relevant interface agreements will go a long way to ensuring that the efforts are supported. Continuous feedback with regard to the status will provide stakeholders with enough information to identify whether or not the process design is going to be finalised within the predefined time period allocated and whether or not intervention is required.

The process should provide for contingency replacements of key players within the process. This is required due to normal turnover rates for senior and middle managers within organisations (Oakland & Tanner, 2007). Taking best practices from business processes that are already integrated into the organisation will assist in standardising processes where possible, thus making them easier to follow and maintain.

### **2.3.5 Identifying waste within the process**

Waste presents itself in many forms when it comes to processes within an automotive factory. In general, waste present in a process can be directly associated with poor process design (Ström, 2009). Reworks occur either when a task has not been executed correctly or due to an oversight which results, for example, in a mechanical design having to be redone. Any time spent on reworking a component of a task is lost time and should be avoided at all costs.

Waiting for a resource to complete a task that is taking longer than expected due to unforeseen circumstances is unavoidable. Customers may change their requirements as a project progresses; processes need to be in place to ensure that all stakeholders are aware of how changes at specific stages within a process or project will affect the outcome. If, however, reworking of tasks is a result of internal oversights and/or mistakes, the process needs to be evaluated to identify how it can

be improved to avoid similar problems in the future. It is essential that estimated completion dates be assigned for all tasks so that the resources involved in the subsequent tasks are aware of when they are expected to be involved again. Well designed processes include expected timing for specific tasks and also offer the user the option to flag deadlines that they feel are critical to the completion of the process.

Outdated processes often contain tasks that have been superseded and are no longer valid. Due to the facts that employees are expected to follow the process and that they may not necessarily be familiar with the process, they will execute the tasks as detailed in the relevant process standard (Ström, 2009). It is therefore essential to ensure that all processes are reviewed and audited on a continuous basis by resources that are aware of all changes made to the environment in which the process operates. The flow of information, if not managed correctly, will have a negative impact on the process. Often the information is available but the resource executing a task does not know where to find the relevant document template, for example. Comprehensive process descriptions can assist in reducing time spent looking for information that is readily available.

The need to follow up on incomplete tasks or to co-ordinate information and data collection can be reduced by ensuring that all stakeholders have their own comprehensive processes in place (Ström, 2009). Where possible, documentation archiving should be controlled automatically by the system controlling the process. The benefit is that all documents associated with specific steps within the processes are assigned to the correct filing locations, making them easily accessible to all resources that have the rights to access them. The use of technology assists in reducing the amount of paper used. It also reduces the amount of time spent handling the physical documents. Every moment of time spent doing work that does not add value to the process can be viewed as wasted time. Advanced, well implemented systems can also reduce approval and sign-off times considerably: The approvals and sign-offs can be done by the required resources irrespective of where they are, as long as they have access to a computer (as well as the relevant security login details).

The seven most common types of waste that have been identified by 'lean system' best practices include the following (Gauthier, 2008):

- Overproduction waste;
- Waiting waste;
- Motion waste;
- Transport waste;
- Over-processing waste;
- Inventory waste;
- Defect waste.

Each of the above-mentioned types of waste needs to be quantified and packaged within the framework being investigated so that they make sense and can be identified easily.

Overproduction in a business process like change management may take the form of printed paper work that might change before it is needed or even processing an order that might change before it is needed. Overproduction does not add value to the customer in any form (Systems2win, 2014).

Waiting time when related to a change management process can have a great impact on the timing of the change. In the automotive environment, the number of opportunities to make changes to a production facility is limited. It is essential to get the approvals in a timely manner so that the relevant scheduling can be done. Waiting for approvals or information from customers as well as clarification or correction of work received from upstream processes are all forms of waiting time waste (Systems2win, 2014).

Motion waste refers predominantly to the human element and includes items such as walking to the copier/printer/fax machine, walking between offices or to a central filing office and trying to find missing documents or information (Systems2win, 2014). A well designed enterprise resource planning system can assist in eliminating a large amount of time wasting activities. The change management process should be integrated into the overarching systems in a manner that facilitates the optimal use of the resources available.

Transport waste is waste associated with the transportation and handling of physical documentation, multiple hand-off of electronic data, approvals, excessive email attachments and distributing unnecessary cc copies to people who don't need to be included, to mention a few examples (Systems2win, 2014). Manual change management systems and processes contain a large amount of transport waste because physical documents are couriered between departments, getting all the relevant approvals, before the change can be executed.

Relying on inspections rather than designing the process to eliminate errors, re-entering data into multiple information systems, making extra copies and generating unused reports are all forms of waste associated with over-processing (Systems2win, 2014). By introducing technology into the change management process and integrating it into the surrounding business systems, over-processing waste can be reduced considerably, and the increased level of control available to the system's users will provide them with the confidence to use the system effectively.

Inventory waste includes any item that is made or purchased before it is needed, items waiting in an inbox (electronic or physical), unread email and any form of stock produced through batch processing (Systems2win, 2014). Depending on the environment, inventory waste can generally only be reduced and not eliminated entirely. Most change management processes are not heavily impacted by inventory waste, unless the process is being held back by an approval that is waiting in an inbox or an email that needs to be replied to before the process can continue.

Any error or inconsistency when executing a task that requires additional input which could have been avoided is seen as defect waste (Gauthier, 2008). Due to the nature of change management and the fact that in the SAAI most of the changes revolve around already existing systems adds complications to the change process. Examples of the types of defect waste include data error entries, invoice errors, any errors that gets passed on to subsequent processes that need to be returned for correction or clarification, engineering change requests due to design flaws, employee turnover and absenteeism (Systems2win, 2014).

### **2.3.6 Key success factors for business processes**

Senior management's commitment and attitude towards processes have a major influence on the success rate of the processes. When senior management is not committed to the processes and has a negative view toward them, Goeke and Weiss (2012) found that only 22% of the processes were successfully deployed, whereas with neutral and committed levels of commitment by senior management the rates of success were 44% and 66% respectively. This clearly indicates that management should be involved in the creation and maintenance of the processes if they are hoping for the processes to be executed successfully.

Top-down deployments are generally the most successful. Bottom-up and middle-out approaches do work as well, but the level of effectiveness often reduces due to the differing views of the various levels within an organisation (Goeke & Weiss, 2012). It was clearly noted that any systematic approach tends to work better than an ad hoc approach where there is no structure.

Process improvement initiatives that are driven by customers external to the organisation or department tend to be more successful than those driven from within (Goeke & Weiss, 2012). When driven from within, it is assumed that all internal customers want the same result and have the same output requirements. As a result, outdated practices and methods are introduced into new processes. The result is then a remoulded version of the old system that was not functioning optimally to begin with. The use of external consultants can bolster the potential for success and will bring new open-minded ideas to the table.

There is a positive correlation between the continuous management of business processes within an organisation and the success of the organisation (Trkman, 2010). Continuous improvement is essential to maintaining effectiveness. 'If it isn't broken, don't fix it' is a very short-sighted approach, especially when the resources are available to manage the system.



### **2.3.7 Value stream and processes mapping**

Value stream mapping and process mapping are both tools that are extensively used by industrial engineers to visually depict processes at various levels. These mapping tools are focused on the micro level of operations within the organisations (Strategos, 2014a).

Visually mapping a process makes it easier to understand and gives the user or facilitator a clear reference to each component (Process Mapping Associates Inc., 2007). Mapping the process involves collecting and organising the inputs, outputs, activity points, decision points and functions of a process. Mapping a process aids in providing a simple overview that does not include unnecessary details; it displays them in a way that affords knowledgeable people the opportunity to question specific aspects of the process being analysed.

Value stream mapping provides an extra level of detail that provides a visual flow of the system being investigated as opposed to process mapping. This additional level of detail makes value stream mapping a powerful tool that assists organisations in exposing and eliminating waste in their processes (Pieterse et al., 2010).

Process maps set up momentum and reveal opportunities to improve work that is standardised. It establishes a base that can then be analysed and improved upon through the introduction of best practices to areas that may not have previously been noticed as bottle necks (Process Mapping Associates Inc., 2007). Quick-win opportunities can easily be identified and effective decisions can be made with confidence, understanding how they will affect the process as a whole.

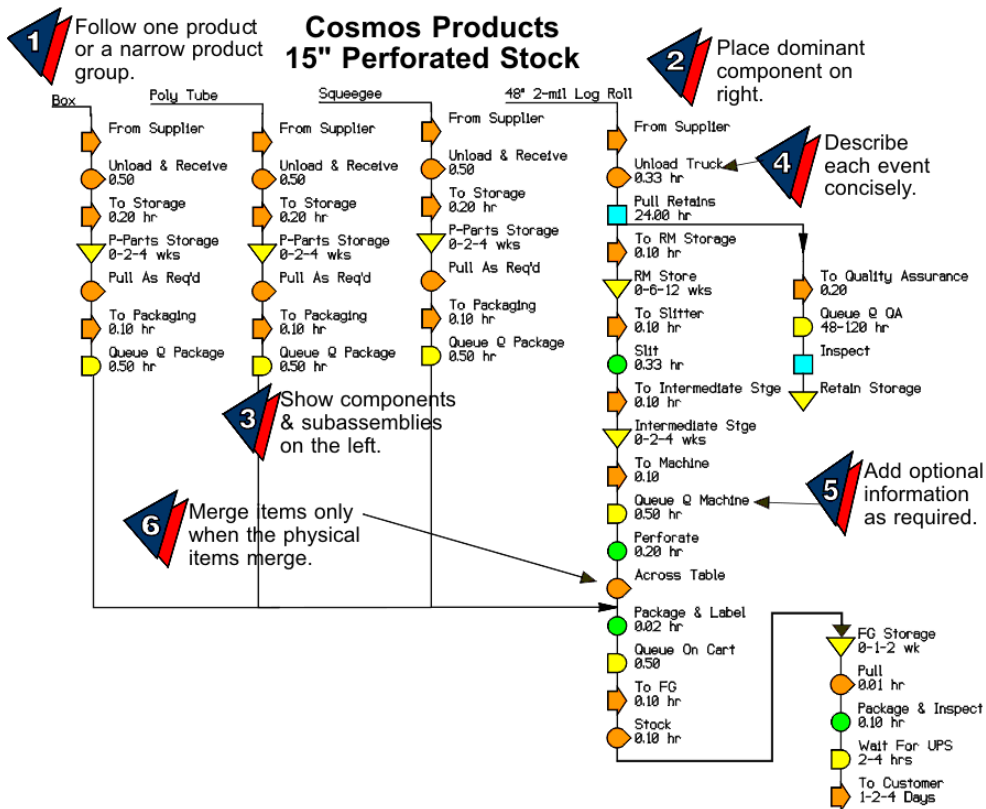


Figure 2-1: An example of Process Mapping (Strategos, 2014a)

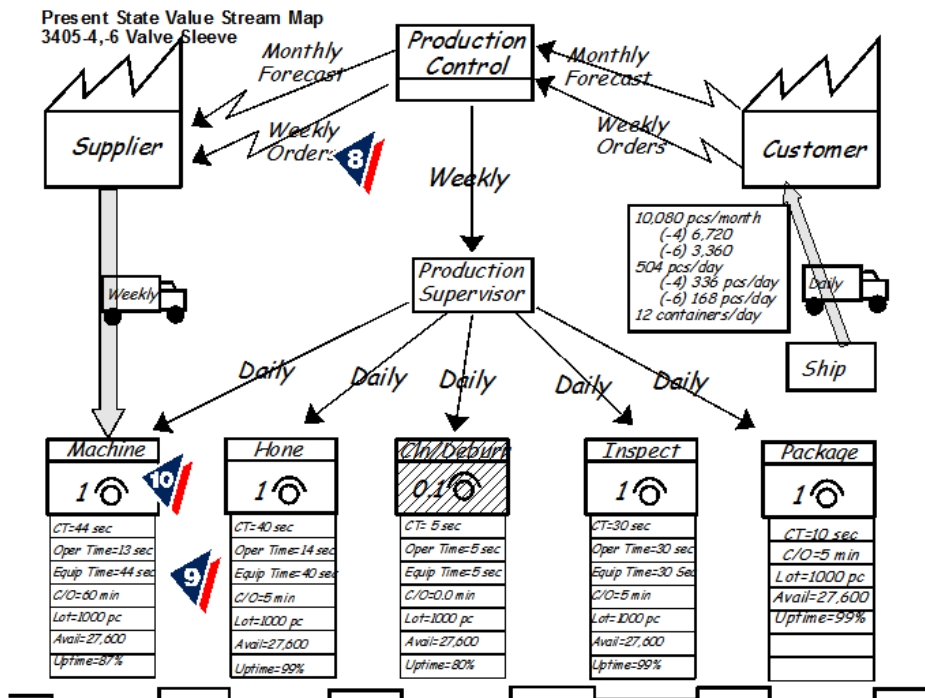


Figure 2-2: An example of Value Stream Mapping (Strategos, 2014b)

If major changes are proposed, the future state of the processes can be visualised before changes are made to the current state and before investing large amounts of capital (Process Mapping Associates Inc., 2007). These future-state maps can be analysed and adapted until all stakeholders are satisfied. They can then be used to guide the implementation of the proposed changes.

Value stream and process mapping should not only be used to analyse the change management process being executed, but should also be a critical step when executing the change management process (Ström, 2009). Visually mapping out the areas that will be impacted by the proposed change will provide all the relevant stakeholders with an opportunity to understand how they are going to be affected. This will provide the stakeholders with an opportunity to ask the relevant questions and begin putting the correct measures in place so that they can manage the change accordingly.

Best practices should be introduced into processes wherever possible; it is important, however, to select best practices that are applicable to the scenario in which they are going to be applied. Essentially, a best practice is a technique, method or process that delivers the desired outcome more effectively than any other technique (Gulati, 2009). Best practices are process-specific and should be evaluated on merit before committing the technique to specific scenarios. Best practices should improve not only performance but also efficiency if implemented correctly and under the correct conditions.

## **2.4 Incorporating change management into business processes**

### **2.4.1 Identifying the scope of change**

Any modification to a current process or any addition of a process that changes the way in which an organisation operates is a change. The scope or extent of the change that is to take place needs to be defined before the change process can begin to be defined (Carter, 2008). The initial goal is to identify how the change will impact the organisation at the varying levels early on in the change process and ensure that all the stakeholders are happy with the proposed change.

This will give the change team a better understanding as to how they should approach the change. Every change management process needs to be tailored to suit the end goal (Madani et al., 2011). There are, however, overarching themes that will be common no matter what the scale of the change is. The scope of the change hinges on key factors that need to be considered, which include the need for the change, the urgency for the change and the impact on the business should the change not take place.

The initial scope will almost always differ from the final scope once all stakeholder comments and requirements have been considered and catered for (where applicable).

#### **2.4.2 Key focus areas for a streamlined process**

Change within a process should always be approached systematically to avoid misdirected efforts that do not add value. The early stages of any change process should be characterised by data collection and investigations in an attempt to reduce the number of unknown factors that can influence the process. Ensuring that as many of these factors are understood and brought to the fore at the beginning will go a long way to minimising the number of reworks and direction changes as the process moves through the execution phase. It is important that the correct stakeholders are identified and that these stakeholders are involved from the beginning. Even the smallest oversight can result in costly direction changes that for the most part could have been avoided (Madani et al., 2011).

An ARCI (Accountable, Responsible, Consulted, Informed) matrix is a good tool for assigning differing levels of responsibility in an easy-to-interpret visual manner. Large and complex change teams that comprise many stakeholders should be tabled into an ARCI matrix in the early stages of a change project. The matrix represents the individuals and/or groups responsible, accountable, consulted and informed for each aspect of the process (Madani et al., 2011). The roles of the resources and/or the groups for the most critical aspects of the process must be defined.

Assigning roles and responsibilities should take place once the extent and impact of the change has been defined (Andersen et al., 2007). In large organisations, this may take the form of a predetermined department structure within a factory. In the case of a dynamic project team, the roles and responsibilities will vary depending on the scope of the project.

The sequence in which tasks need to be executed must be set up and critically reviewed by all stakeholders (Andersen et al., 2007). The work flow for each process must be analysed, and the priority and impact for each task should first be identified and then discussed between all the stakeholders to ensure that the most important points that will have the greatest effect are analysed and understood (Madani et al., 2011).

Key performance indicators for critical-to-success attributes need to be established once the change process has been defined. The key performance indicators should be unique to each process (Madani et al., 2011). It is important that the indicators are clearly defined and that it is possible to measure them.

The 'analyse, design and test' feedback loop must be established to ensure that there is continuous feedback between the resources involved in executing the process and the resources monitoring and managing the process. Keeping the tools simple and the work flow standardised as far as possible from an early stage in the process will go a long way to ensuring that all information collected is in the same format and readily available. Document types, standardised filing processes and work flows will all make the process easier to execute and ensure its effectiveness.

Cross-functional teams comprising specialists that incorporate as many of the different stakeholders as possible in the early phases of the process development discussions will generate a greater level of buy-in from all the departments. With the technology available today, a cross-functional team should have an electronic management system in place that allows projects and processes to be controlled centrally. The management system should facilitate information transfer and communication within the teams as well as provide integrated status tracking for all components to ensure that the required standards are being met and that all work is

being completed on time and according to the standardised work flows and processes built into the system (Sutanto et al., 2008/2009).

### 2.4.3 Applying change management principles

Change management principles are well defined and can be applied to various processes, regardless of the process's size or scale. The effectiveness of a consolidated set of change management guidelines on varying processes will vary, but the end result being a successful change should not differ. As previously stated, the focus of this paper is on processes within the automotive industry; various other examples have also been included to highlight alternate methods and best practices. With the automotive industry being of a highly technical nature and, as a result, containing production-critical changes that if not executed correctly can have a severely negative impact on the production of quality motor vehicles, the change process needs to be executed correctly the first time.

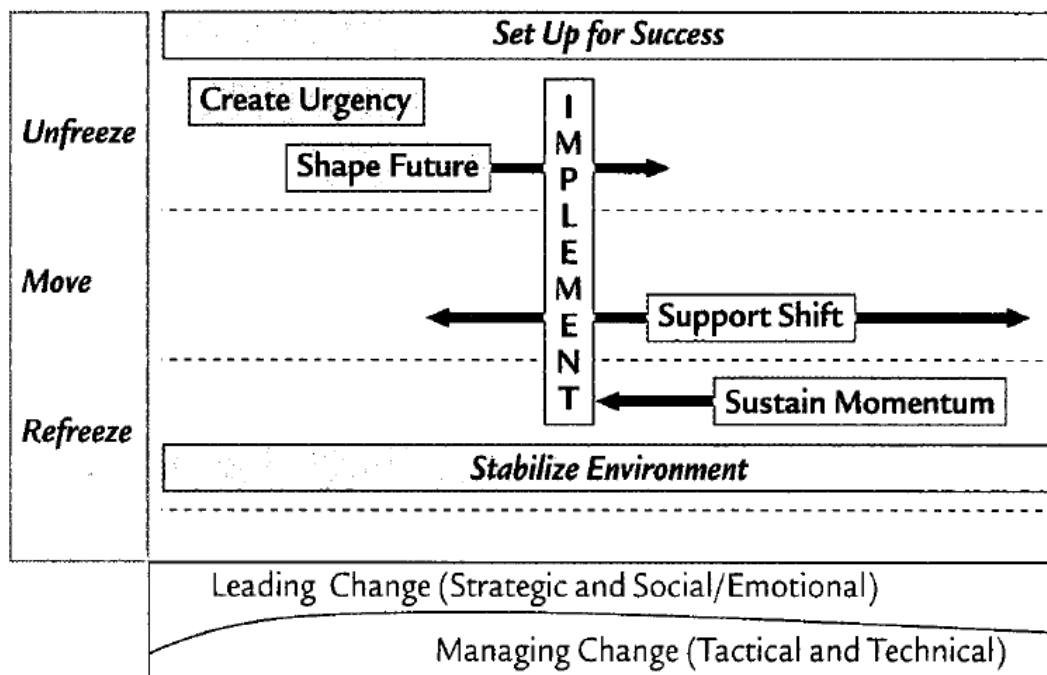


Figure 2-3: Change management model proposed by Carter (2008)

The magnitude of a change will vary depending on the desired end result. Large changes are often made up of many small changes that, when combined, result in the successful execution of the final objective. Figure 2-3 not only applies to the

overall change process but also to each of the small changes that take place within the larger framework.

'Set up for success' is the first phase in Carter's (2008) model. This phase encourages forces all the stakeholders involved in the change management process to first consider what is trying to be achieved before starting. This phase should be led and controlled by senior management to ensure that the vision is realised early. Before making the output of this phase known, it is essential that senior management be willing to back their decisions, as resistance is inevitable and tough decisions may need to be made. The end result should always be for the greater good.

By 'creating urgency', the change leader begins to explain the reasons for the change to all stakeholders; the goal here is to minimise the resistance to change in an attempt to ensure a smooth process when the actual change takes place. Resistance should be dealt with proactively, and ensuring that all communication is clear is critical during this phase (Carter, 2008). It is important to ensure that any change process that moves into the unfreezing phase already has the required support from all stakeholders.

Effective communication is critical in every phase of any change process and helps reduce resistance to the change, minimise uncertainty surrounding the change and increase stakeholder involvement and commitment (Carter, 2008). During the 'shape future' phase, it is essential that the vision and goal are shared and clearly laid out. The change leader must ensure that everyone knows what the impact will be and how it is going to benefit everyone. If the stakeholders understand what the result is going to look and feel like, they will be more likely to follow quickly and assist in facilitating the change. Uncertainty in this phase will increase the extent of the resistance and team members will react more slowly and, as a result, the process will take longer than it needs to.

When executing the 'implement' phase it is important to ensure that all the building blocks are already in place. Training on the new system, for example, should have taken place in the preceding phases to ensure that all team members affected are ready for the changeover. Any technical skills required in this phase should have

been gained prior to them being needed. Depending on the timing of the change, the required skills can either be brought in using specialists from outside the organisation or by building the knowledge and skill levels of the internal resources.

‘Supporting the shift’ is a phase that is often overlooked and not enough emphasis is placed on it during the planning phase. Ensuring that the change is supported after it has been made will have a direct effect on the potential future success of the change. This phase also allows for small adjustments to ensure that all stakeholders fully buy into the final result (Carter, 2008). Resistance during this phase can be dealt with either by making adjustments as mentioned previously or by proving the effectiveness of the change through information gathering and highlighting positive results that were generated through the change. If the resistance is not quickly addressed in a suitable manner, the result may be that the change gets reversed (back to the original state) and thus that any efforts made during the change process were essentially wasted.

Once the change has successfully been integrated and all aspects have stabilised, it is important to ensure that the momentum is maintained. Reinforcing positive behaviours, celebrating the success and ensuring that the lessons learnt are gathered and packaged correctly will all assist in ensuring that the positive aspects that resulted from the change continue into the future. Lessons learnt from any project help the next initiative to proceed more effectively and efficiently (Carter, 2008).

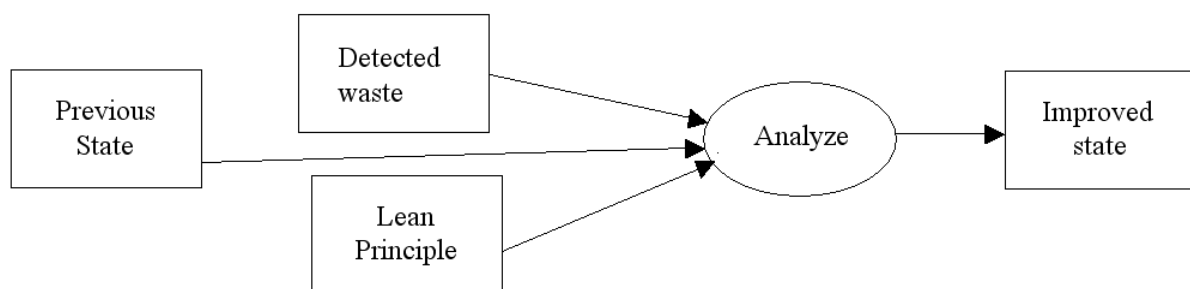


Figure 2-4: Execution of idea (change) by Ström (2009)

It is clear from the basic diagram above that the execution of change needs to be approached with some form of structure. The size of the change will determine to what extent each component is expanded upon. The basic overview of idea



execution depicted by Ström (2009) in *Figure 2-4* ties in with *Figure 2-3* (proposed by Carter (2008)).

No matter how insignificant a change may seem, it is important to evaluate the effects based on the resultant impact it will have on the situation as a whole. Successful change focuses on both strategic and operational issues and ensures that the change result is a positive outcome (Oakland & Tanner, 2007).

This will assist in facilitating the strategic implementation and build the team's change capability. Leadership is responsible for identifying and defining the change that is required (Oakland & Tanner, 2007). Using a project management approach to implementing larger-scale changes provides a proven framework on which to build the change process.

Understanding the organisation's culture and maintaining good communication are both vital when setting up a change management process within an organisation. It does not matter how low the priority associated with a change is or how small the risk of failure is, every change process must ensure that all potential negative implications to subsequent processes are evaluated and prioritised according to the impact that they will have. External consultants can add industry expertise, skilled resources, change management knowledge and experience to the change process (Oakland & Tanner, 2007).

Once the change process has been completed, it is essential that the lessons learnt are captured and understood not only by those resources involved in the process but also by resources from other levels within the organisation (Oakland & Tanner, 2007). Lessons learnt assist in preventing the same mistakes being made in the future and can form part of continuous improvement initiatives. These initiatives should include the updating of all the processes using the feedback loops as well as the checks and balances to prevent recurring mistakes. Ensuring that the processes are up to date and contain the best possible methods and steps makes them more efficient and effective.

## **2.5 Literature review conclusion**

The literature review highlighted specific focus areas that need to be considered when contemplating the role of structured business processes and the impact they will have on change management within the SAAI. The impact that technology can have and how it can be used to support change management was investigated, with key areas of interest being brought to the fore. The overall trend showed that using technology to support change management can result in a reduction of wasted time and effort. While the initial implementations can be very costly, the gains in time and reduction in overheads generally outweigh the costs associated with the system roll-out.

## **3 RESEARCH DESIGN AND METHODOLOGY**

### **3.1 Introduction**

The purpose of this study is to evaluate the current state of change management within the SAAI based on the key success factors and best practices identified in the literature review. Once the gaps between the current state and the proposed state have been identified, recommendations will be made which should have a positive impact on change management.

### **3.2 Research**

#### **3.2.1 Research paradigms**

There are two main paradigms around which business research can be structured, according to Collis and Hussey (2009). These are the positivist and the interpretive paradigms. A research paradigm is a set of guidelines structured around a philosophical framework that should be used when conducting scientific research (Collis & Hussey, 2009). Philosophy uses reason and argument when seeking truth and knowledge from scenarios that are surrounded by the forces of human behaviour and its unpredictability.

Positivistic research uses deductive processes with the goal of providing explanatory theories that provide insight into social phenomena (Collis & Hussey, 2009).

Interpretive research uses inductive processes with the goal of providing an interpretive understanding of social phenomena within particular contexts. This paradigm developed as a response to criticisms of the positivistic research paradigm. The core assumption made by the interpretive research paradigm is that social reality is in our minds and is also subjective and multiple in nature (Collis & Hussey, 2009).

Many new research paradigms have emerged over the years; as a result, few researchers use the pure forms of the two main paradigms that Collis and Hussey (2009) put forward.

### **3.2.2 Research paradigm for this study**

The nature of the research topic being investigated requires the research to be positivistic. This is because there is a lack of quantitative data for managers in the sector to use as a business improvement tool. The approach will be data collection that is quantitative in nature, findings that are objective, parameters that are scientific in nature and an interpretation method that is traditional.

### **3.3 Research methods**

#### **3.3.1 Study design**

The quantitative paradigm will be used to evaluate this study. The hypothesised relationships will be statistically tested. Descriptive statistics will be used when analysing, reporting and interpreting the data collected from the respondents' responses to the online questionnaire.

#### **3.3.2 Subjects**

Every employee within the SAAI is impacted by change management at some level. The sample group for this study is composed of employees that operate at various levels within the multitude of companies that form part of the SAAI.

##### **3.3.2.1 Inclusion**

The subjects of the study include all companies that are directly associated with the SAAI in a manner that facilitates the need for change management. Due to the impact change management has on the output of the organisation and the extent to which mistakes will impact their relationships with suppliers and customers alike, the target groups that were contacted to complete the research questionnaire included managers, supervisors, engineers and technicians that operate within the boundaries of the research context.

##### **3.3.2.2 Exclusion**

Only potential respondents that meet the required criteria were requested to respond to the survey. As a result, none of the responses were excluded from the results. Through statistical analysis general trends will be identified below. Only results that

comply with the statistical analysis requirements for concrete results will be considered for the study.

### **3.3.3 Recruitment plan**

Selected industry professionals were requested to put forward the names and e-mail addresses of potential respondents that they felt could contribute in an informed manner to the study. An e-mail (see Annexure 2: Recruitment Plan E-) was then sent to the selected professionals who responded with the required information. The addresses were tabled into excel and all duplicate entries filtered out. A check was done to ensure that the addresses are valid.

### **3.4 Data collection**

Once the recruitment plan was completed, the potential sample group was analysed to ensure that it represents a sufficient cross-section of the companies that operate within the SAAI.

It is impossible to have every individual that operates within the SAAI complete the survey; it is therefore essential to ensure that the sample is representative of the population as a whole.

SurveyMonkey.com was selected as the research platform through which the respondents would complete the questionnaire. The sample received an e-mail that contains an attachment outlining the goal of the questionnaire (see Annexure 1: Questionnaire Cover L) and a link to the online survey. Respondents followed the link and completed the online survey at their convenience. No personal details were captured by the system, ensuring the anonymity of the survey. This, however, does mean that the same respondent could do the survey multiple times. In an attempt to minimise the risk of this taking place, a rule was enabled in the SurveyMonkey.com questionnaire characteristics that would only allow a computer to be used once to complete the survey, which minimises the chance of the same survey being answered multiple times by the same respondent.

### **3.5 Data analysis**

Section A of the questionnaire comprises five questions which aim to establish the biographical composition of the respondents. This information is critical to the analysis as it allows for the comparison of management views on the research topic against the views of other levels within SAAI.

The questions that follow are divided into two sets of thirteen, with Section B trying to establish the current state of change management within the SAAI and Section C trying to establish what the industry sees as the desired situation. Sections B and C use a Likert Scale to test the respondents' opinions about the best practices established in the literature review section.

Interval-scaled Likert Scale data is a sub-classification of data that is numeric and is generated from rating scales that measure the respondents' attitudes, motivations, perceptions and preferences, according to Leedy and Ormrod (2005). General descriptive statistics that are used for interval-scaled data are the mean, median, standard deviation and skewness.

Management recommendations will be determined by further analysis of the data where the critical-to-success concepts identified during the literature review will be compared between the current state scenario and the perceived best practice scenario. These critical-to-success factors include effective communication, knowledge management, leadership, effective approval processes, change status tracking, the scale of change, training and whether or not the system supports the desired outcome.

### **3.6 Reliability and validity**

The reliability and validity of a research instrument must be established in order to ensure that the responses received are not influenced by the researcher's literature findings. All questions must be clear and should not guide the respondents in any manner. Reliability and validity are defined below.

### **3.6.1 Reliability**

Reliability is defined by Collis and Hussey (2009) as the extent to which an instrument is able to consistently measure what it is was designed to measure. According to Leedy and Ormrod (2005), there are three ways in which a measuring instrument's reliability can be improved:

- It is essential that the measuring instrument is always administered in a consistent and therefore standardised manner;
- Specific criteria must be established;
- Training on the research instrument is essential to ensure that all research assistants obtain similar results when using the research instrument.

### **3.6.2 Validity**

The validity of an instrument is the extent to which the instrument is able to accurately measure what it is supposed to measure when considered in the context in which it is being used. Two types of validity are evaluated when considering the content of a questionnaire: Content validity shows the extent to which a measurement represents the sample group's collective opinion, while construct validity shows how accurately a research instrument is able to measure characteristics that cannot be directly measured (Leedy & Ormrod, 2005).

Prior to the questionnaire being sent out, it was distributed for comment to a select group of engineers and supervisors who work within the SAAI. This was done to ensure that the content was valid and relevant to the topic, as well as to ensure that the questions did not instigate bias. Changes were made before the final questionnaire was distributed to the sample group.

### **3.7 Ethical considerations**

In order to guarantee the respondents' confidentiality, the following ethical issues needed to be considered by the researcher:

### **3.7.1 Permission to conduct the study**

Due to the nature of the study and the focus groups used for the survey, it was not a requirement for the researcher to request permission from any of the organisations that operate within the SAAI. None of the responses received could be connected in any manner to specific individuals or organisations.

### **3.7.2 Informed consent**

Before anyone in the sample group responded to the questionnaire, the scope of the study was explained by means of a cover letter that was attached to the requesting e-mail. The same information was also displayed on the introduction page of the questionnaire. All respondents were requested to confirm that they had indeed read the letter before they could proceed. The letter also stated that the survey was voluntary and that the respondents could exit at any time if they did not want to proceed.

### **3.7.3 Confidentiality**

It is the responsibility of the investigator to ensure that the information and data shared by the respondents is handled in a responsible manner that ensures that there isn't a link between any respondent and their response (Collis & Hussey, 2009). The SurveyMonkey tool used to collect the data was set-up without reference to the identity of the respondents.

## **3.8 Research design and methodology conclusion**

The research methodology aims to ensure that the questionnaire that get distributed is easy to respond to, does not force bias onto the respondents and complies with ethical requirements. The study design, sample group and sampling procedures were defined and researched to ensure that the most appropriate instance of each was selected. Once the questionnaire data was collected and interpreted, the findings will be analysed in chapter 4, this will be done in conjunction with the literature review conducted in chapter 3.



## **4 RESEARCH FINDINGS**

### **4.1 Introduction**

In Chapter 3 the research methodology was discussed. In this chapter, an analysis and interpretation of the data obtained by the empirical study will be done. Based on the data collected by the survey, correlations will be drawn that indicate which areas need to be addressed to improve the current state of change management within the SAAI. These areas will be identified by first identifying the change management shortfalls and then analysing the best practices and how important each of these is deemed to be.

The biographical data of the questionnaire will be analysed first, identifying and analysing the composition of the respondents.

### **4.2 Analysis of the empirical results**

The respondents were employees that operate within the SAAI at varying levels within their respective companies as well as at varying levels within the industry's framework.

#### **4.2.1 Response rate**

The questionnaire was distributed via e-mail to approximately 300 potential respondents, of which 96 responded to the request. Of the 96 respondents, only 84 completed the whole survey in a single sitting. Due to the survey settings only allowing one response per computer, if a respondent aborted the survey without completing it, they could not log on at a later stage to finish the survey unless they did so from a different computer. The response rate was therefore 32%, of which 87.5% completed the survey.

All responses that did not meet the minimum requirement of completing the entire questionnaire in one sitting were removed before the data was sent to the NMMU statistics department for analysis.

#### 4.2.2 Research questions

The research questions were broken down into three sections within the questionnaire. Each section had its own focus points that could later be used when making management suggestions and recommendations based on the responses.

#### 4.2.3 Study questionnaire

The questionnaire (Annexure 3: Questionnaire) that was distributed comprised three sections (Sections A, B and C). Section A aimed to collect the biographical information of the respondents. Section B focused on establishing the current state of change management when measured against key variables that were identified in the literature review. Section C aimed to establish which of the key variables were viewed as the most important best practices within change management. The responses in Sections B and C were collected using a Likert Scale model. To aid in the analysis of the Likert Scale data, values were assigned to each response.

Values	Text
1	Strongly Disagree
2	Disagree
3	Neither Agree or Disagree
4	Agree
5	Strongly Agree

*Table 4-1: Likert Scale Values*

#### 4.2.4 Section A: Demographic information

The demographic section of the questionnaire aims to establish how long the respondents have been at their current organisation, which department they work in, how long they have been in their current position and at what level the organisation they are currently working for operates within the SAAI.

This information should allow the researcher to establish to what extent the various levels of experience will influence a respondent's perception of the current state of change management and how this perception is influenced by their position within the organisation they work for.

#### 4.2.4.1 Demographic information questions

The five questions asked in order for the researcher to establish the respondent's demographic information:

BI-Q1: What is your current length of service in years within the company you currently work for?

BI-Q2: Which department are you currently in?

BI-Q3: What is your current position in the company?

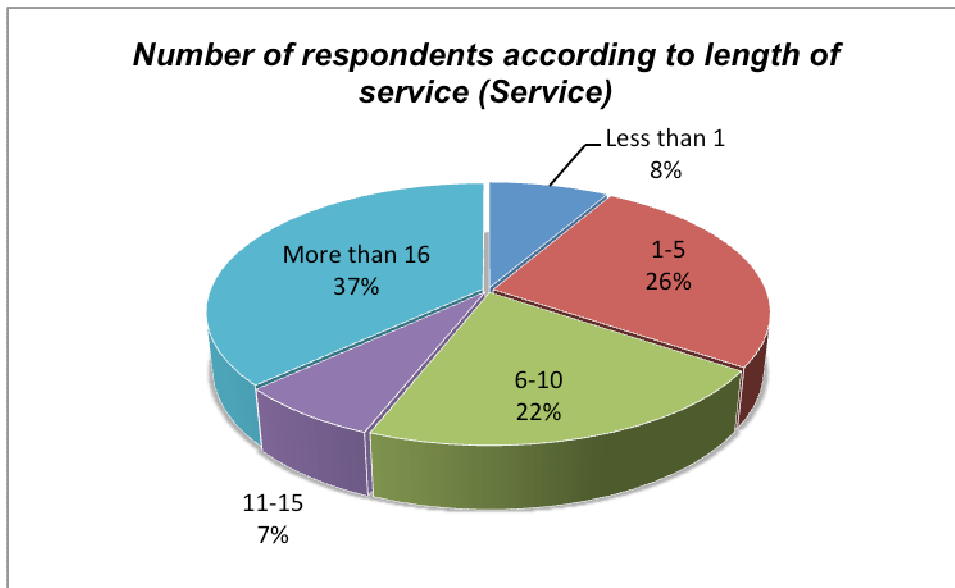
BI-Q4: How many years have you spent in your current position?

BI-Q5: At what level does your current company operate within the South African automotive industry framework?

#### 4.2.4.2 Demographic information analysis

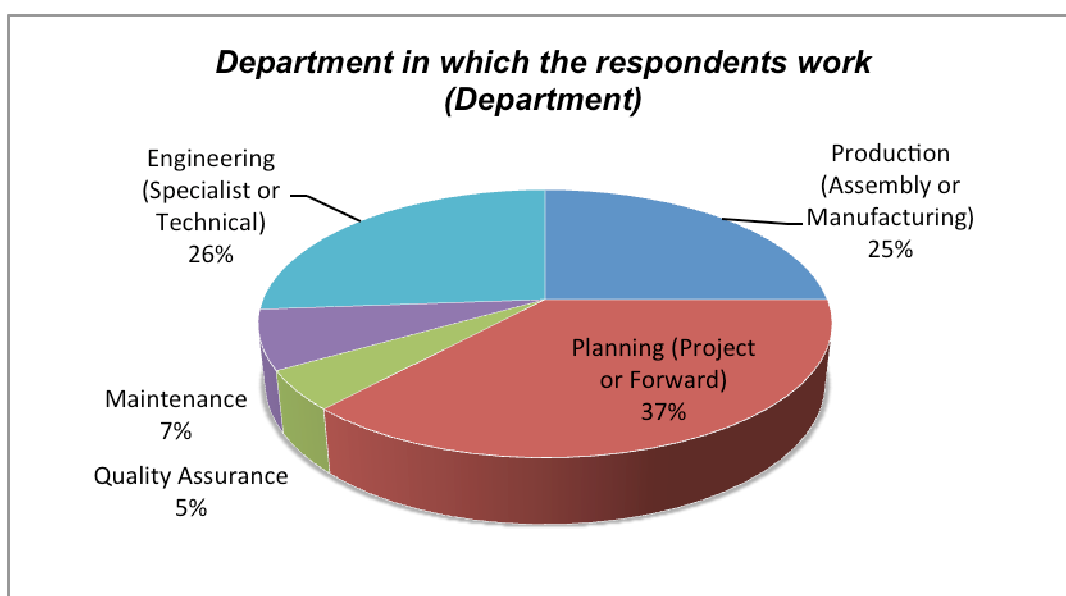
The demographic information was analysed according to the length of service at the current organisation, the department the respondent is currently working in, the position the respondent currently holds, how long the respondent has been in his or her current position and at what level the organisation the respondent works for operates within the SAAI framework. This data is summarised in **Error! Reference source not found.**

*Chart 4-1* shows that 65% of the respondents have been at their current organisation for more than five years. This indicates that the group is very experienced and are thus likely to be able to respond to the questionnaire from an informed perspective. Only 8% of the respondents have been at their respective organisation for less than one year. The majority of the respondents have been with their respective organisation for more than 10 years, which indicates that employees are willing to commit to an organisation for extended periods of time.



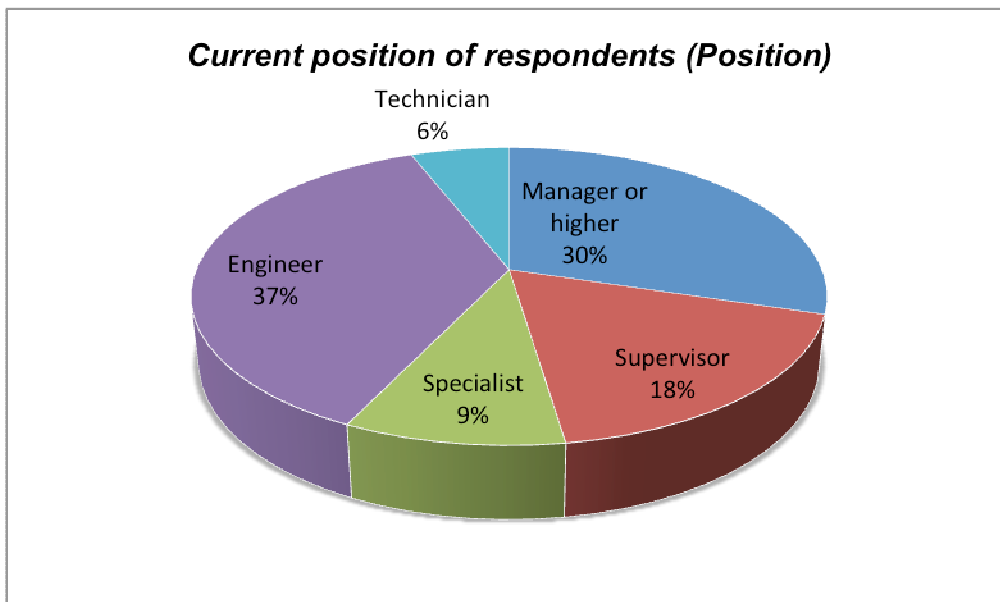
*Chart 4-1: Number of respondents according to length of service (Service)*

Chart 4-2 shows a breakdown of the departments in which the respondents work. The majority of the respondents are from the Planning (37%), Engineering (26%) and Production (25%) departments. These are generally the departments that operate in concert when it comes to executing change within organisations. Quality and maintenance support the change where required. Planning and Engineering assist in facilitating the majority of the changes, while in the majority of cases Production is directly affected. The sample group was therefore a good match for the research conducted.



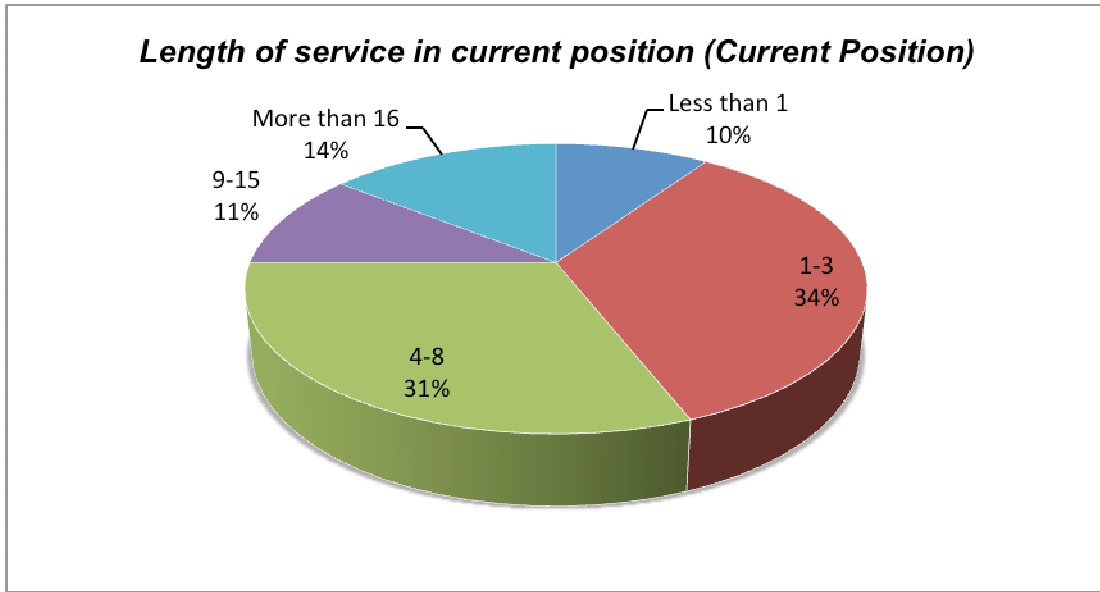
*Chart 4-2: Department in which the respondents work (Department)*

*Chart 4-3* indicates the positions of the respondents. The majority of the respondents were Engineers at 37%, followed by respondents that hold Management positions at 30%. Supervisors (18%) and Specialists (10%) made up a total of 28% of the respondents and the remaining 6% comprised technicians. Supervisors and Specialists operate at the same level within organisations, with a fundamental difference being that Supervisors have people that report to them whereas a Specialist does not.



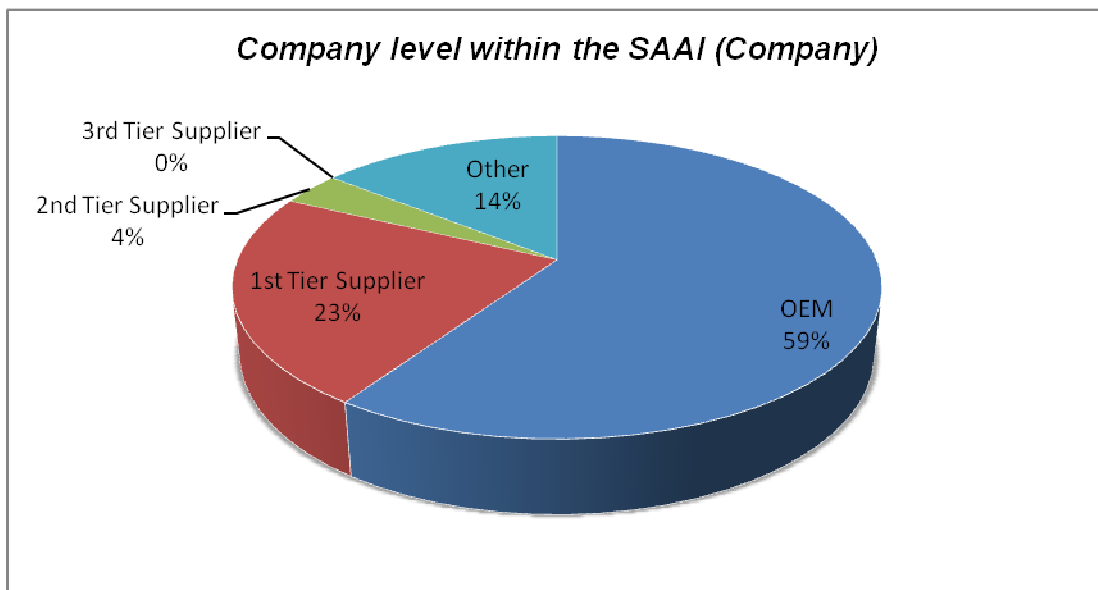
*Chart 4-3: Current position of respondents (Position)*

The information in *Chart 4-4* when read with *Chart 4-1* shows that the majority of respondents do not leave the organisation they work for within the first year; this could be as a result of career progression, with 45% of respondents only having been in their current position for less than four years. It could indicate that the respondents receive promotions frequently, as they do not stay long in their positions. The position makeup of the respondents shown in *Chart 4-3*, showing varying levels of skills, when combined with the length of service shown in *Chart 4-4*, shows that the sampled respondents are able to give comprehensive input into the survey that is of a holistic range of opinions at different levels of the organisation.



*Chart 4-4: Length of service in current position (Current Position)*

The distribution shown by *Chart 4-5* shows that the majority of the respondents represented the OEMs with 60%, while 23% of the respondents formed part of the First-tier Supplier network. There were no respondents that operate on the Third-tier Supplier level. It must be noted that most of the Third-tier Suppliers that supply the SAAI operate overseas and, as a result, do not fall within the scope of this research. This study focuses on the SAAI as a whole, therefore the sample that responded is in line with the requirements for this study.



*Chart 4-5: Organisations level within the SAAI (Company)*

#### 4.2.5 Sections B and C – Overall statistical analysis – Evaluating and improving the factors

	k Items/ Factors	Best Practice	Current State	Description
CHA TRA	1	-	-	Effective Communication
EFF APP	4	0.59	0.61	Knowledge / Documentation Management
EFF COM	3	0.68	0.88	Leadership
KNO MAN	3	0.68	0.82	Effective Approval Processes
LEAD	1	-	-	Change Status Tracking
TRAIN	1	-	-	Training
OVERALL	6	0.80	0.85	Average of six factors above

Table 4-2: Cronbach's alpha coefficients – All factors

Unacceptable	< 0.50
Poor	0.50 - 0.59
Acceptable	0.60 - 0.69
Good	0.70 - 0.79
Excellent	0.80 +

Table 4-3: Interpretation intervals for Cronbach's alphas (Collis & Hussey, 2009)

Table 4-4, Table 4-5 and Table 4-6 show what the resultant Cronbach alpha values would be should any of the factors be removed from the analysis. Based on the information below, it was agreed that there would be no benefit in removing any of the factors in an attempt to improve the Cronbach alpha reliability of the item being measured (Zaiontz, 2013).

	BP	CS
<b>All items alpha</b>	<b>0.68</b>	<b>0.88</b>
Items	If deleted:	If deleted:
EFFCOM1	0.53	0.84
EFFCOM2	0.52	0.78
EFFCOM3	0.73	0.88

Table 4-4: Cronbach's alphas if item deleted for Factor = EFF COM (n = 84)

	BP	CS
<b>All items alpha</b>	<b>0.68</b>	<b>0.82</b>
Items	If deleted:	If deleted:
KNOMAN1	0.67	0.79
KNOMAN2	0.61	0.70
KNOMAN3	0.45	0.75

Table 4-5: Cronbach's alphas if item deleted for Factor = KNO MAN (n = 84)

	BP	CS
<b>All items alpha</b>	<b>0.59</b>	<b>0.61</b>
Items	If deleted:	If deleted:
EFFAPP1	0.59	0.53
EFFAPP2	0.41	0.55
EFFAPP3	0.59	0.54
EFFAPP4	0.45	0.55

*Table 4-6: Cronbach's alphas if item deleted for Factor = EFF APP (n = 84)*

Based on the Cronbach alpha coefficients in *Table 4-2*, only three of the six factors could generate interpretation intervals. The best practice for an effective application (EFF APP) was the only factor that generated a poor Cronbach alpha of 0.59. The Cronbach alpha rating scale can be found in *Table 4-3*. Sub-factors were analysed, but can only be commented on during the statistical review.

#### **4.2.6 Section B: The current state of change management**

This section reports on the current state of change management within the SAAI. It provides empirical data that provides a baseline that will be used later when comparing the current state to the perceived best practice that would reflect the ideal scenario for change management.

##### **4.2.6.1 Current state of change management questions**

The following questions were tied to specific factors and sub-factors that would assist in trying to gauge the current state of change management within the SAAI. Reference for each question can be found in Annexure 4: Section B – Current State – Item / Factor.

The current state of effective communication was gauged by the following questions. Each question refers to the change management system being used within the respondent's respective organisation:

- EFFCOM1CS: Currently at my organisation there is effective communication between all stakeholders throughout the change management process;
- EFFCOM2CS: The current change management system being used at my organisation effectively facilitates communication between all the stakeholders that are affected by the change;



- EFFCOM3CS: The current change management system being used at my organisation ensures that the change leader informs all stakeholders about the changes that are going to take place.

The current state of effective approval processes was gauged by the following questions:

- EFFAPP1CS: The current change management system at my organisation requires all changes to be approved by management (at least one level higher);
- EFFAPP2CS: The current change management system being used at my organisation has an effective approval process that has short waiting times and only a few process steps;
- EFFAPP3CS: The current change management system being used by my organisation is transparent to all stakeholders that are influenced by the outcome of the change;
- EFFAPP4CS: The current change management system being used at my organisation provides the change leader with the ability to escalate change request approvals.

The current state of knowledge management was gauged by the following questions:

- KNOMAN1CS: The current change management system and processes being used at my organisation is effective and the processes support the business environment;
- KNOMAN2CS: The current change management system being used at my organisation controls the document filing locations automatically;
- KNOMAN3CS: The current change management system being used at my organisation ensures that the change management process is documented in line with the businesses requirements.

The current state of training with regard to the change management systems within the relevant organisations was gauged by the following question:

- TRAIN1CS: Currently at my organisation, comprehensive training specific to the change management system is provided to all the staff that use it.

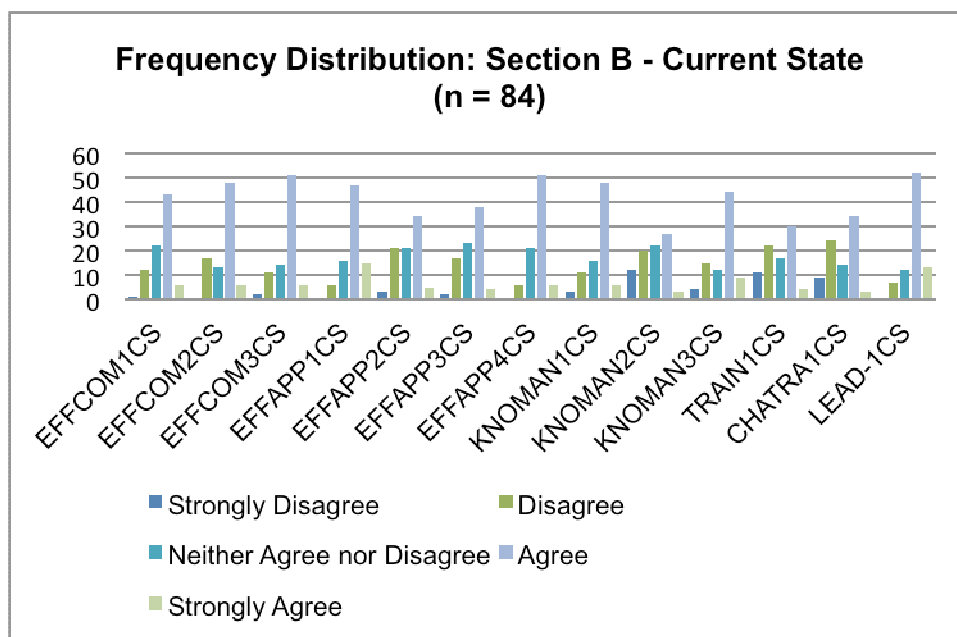
The current state of change tracking within the current change management systems was gauged by the following question:

- CHATRA1CS: The current change management system being used at my organisation gives all stakeholders the ability to be able to check the change status of a change at any point in time.

The current state of how much influence leadership has on the change management system within the relevant organisations was gauged by the following question:

- LEAD-1CS: The current change management system being used by my organisation ensures that management is involved.

#### 4.2.6.2 Current state of change management frequency distributions per question



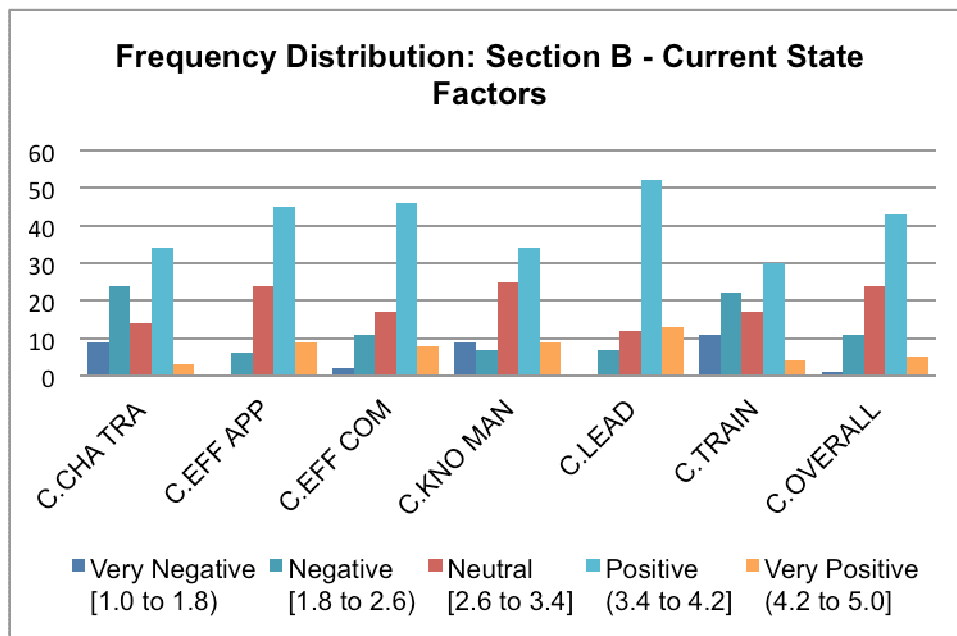
Graph 4-1: Frequency Distribution: Section B – Current State Questions

The graph above shows the frequency distribution for each of the questions that were asked in order for the researcher to establish the current state of change management within the SAAI.

While the majority of the respondents agreed with the relevant statements, it must be noted that in most cases there were respondents that strongly agreed as well as strongly disagreed. This indicates that not all companies that operate within the SAAI have active change management systems. There are, however, some that do have these systems in place.

The varied nature of the responses above indicates that while the majority of the respondents work within some form of structured change management system that facilitates the majority of requirements, there are instances where the systems do not facilitate any of the items at all.

#### 4.2.6.3 Current state of change management frequency distributions per factor



Graph 4-2: Frequency Distribution: Section B – Current State Factors

Once the relevant items were combined, the frequency distribution was recalculated so that the average number of responses still equated to 84 for all factors, so that they could be visually compared to each other. The means and standard deviations for the statistics can be found below in *Table 4-7*.

Variable	Mean	S.D.	t	p	Cohen's d
C.CHA TRA	2.98	1.13	-3.44	.001	0.38
C.EFF APP	3.51	0.59	1.64	.104	n/a
C.EFF COM	3.52	0.80	1.42	.160	n/a
C.KNO MAN	3.28	0.90	-1.21	.230	n/a

C.LEAD	3.85	0.78	5.21	<.0005	0.57
C.TRAIN	2.93	1.16	-3.73	<.0005	0.41
C.OVERALL	3.34	0.69	-0.75	.455	n/a

Table 4-7: One-sample t-Test: Bundle Current State Factors (n = 84)

Based on Table 4-7 and Table 4-8, the following statistics were collected for each factor and the following deductions can be made:

C.CHA TRA – The current state of change tracking when it comes to the change management systems in the SAAI resulted in a Mean score of 2.98 when the responses were statistically evaluated; this indicates that the respondents agree that in general there is some degree of change tracking taking place within their respective systems.

C.EFF APP – Effective approval process has a mean score of 3.51 and a small standard deviation of 0.59 in the current state. This score is the third-most positive factor and indicates that the current change management systems seem to have effective approval processes.

C.EFF COM – Effective communication is one of the most important aspects when considering a change management process. Technology can be used to facilitate the transfer of information to all relevant resources. This is not only an upward transfer to management, but also a transfer of information between the affected departments. With a mean score of 3.51 and a minimum score of 2, effective communication in the current state is not a major concern. As a result, only a few best practice recommendations will be made that relate to the integration of this factor into technology.

C.KNO MAN – The mean score for knowledge management is 3.28; this indicates that the respondents are neutral when it comes to their perception of how effectively knowledge of any form is managed within the current change management structures within the SAAI.

C.LEAD – With a mean score of 3.85, leadership involvement within the change management systems according to the respondents was the least problematic of the factors investigated. It must however be highlighted that there was only one question

asked that measured this factor directly. The minimum score for this item was 2, indicating that none of the respondents felt that the current state of leadership involvement was zero. Quartile 1, Median and Quartile 3 all returned 4 as the response. This shows a relative confidence that the current state has a positive leadership involvement.

C.TRAIN – Training has the smallest mean, with a value of 2.93. This indicates that of all the factors analysed in this study, it seems to have the worst current state. However, this factor has the largest standard deviation at 1.16, indicating that the respondents had varied views. This can be seen by the frequency distribution in *Graph 4-2*. With only one item being used to analyse this factor, it is hard to establish the true current state of change management training within the SAAI.

The overall score for the statistics resulted in a neutral (based on the mean score) opinion of the current state of change management in the SAAI. The median showed the current state to be positive. This is, however, skewed by the varying levels at which the respondents operate within the SAAI.

	Mean	S.D.	Minimum	Quartile 1	Median	Quartile 3	Maximum
C.CHA TRA	2.98	1.13	1.00	2.00	3.00	4.00	5.00
C.EFF APP	3.51	0.59	2.00	3.25	3.50	4.00	4.75
C.EFF COM	3.52	0.80	1.33	3.00	3.67	4.00	5.00
C.KNO MAN	3.28	0.90	1.33	2.67	3.67	4.00	5.00
C.LEAD	3.85	0.78	2.00	4.00	4.00	4.00	5.00
C.TRAIN	2.93	1.16	1.00	2.00	3.00	4.00	5.00
C.OVERALL	3.34	0.69	1.56	2.91	3.51	3.84	4.92

*Table 4-8: Central Tendency & Dispersion: Current State Factors (n = 84)*

## **4.2.7 Section C: The perceived best practices of change management**

### **4.2.7.1 Perceived best practices of change management questions**

The following questions were tied to specific factors and sub-factors that would assist in establishing which best practices that impact change management should be considered when working within the SAAI. Reference for each question can be found in Annexure 5: Section C – Best Practice – Item / Factor.

The best practice perception as to how important effective communication is was gauged by the following questions. Each question refers to the change management system being used within the respondent's respective organisation:

- EFFCOM1BP: Effective communication between all stakeholders throughout the change management process is essential for the change to be a success;
- EFFCOM2BP: For a change management system to be effective, it should facilitate effective communication between all the stakeholders that are affected by the change;
- EFFCOM3BP: It is the duty of the change leader to ensure that all stakeholders are informed whenever a change that will influence them is going to take place.

The best practice perception of how important an effective approval processes is was gauged by the following questions:

- EFFAPP1BP: For a change management system to be effective, it is essential that all changes be approved by management (at least one level higher);
- EFFAPP2BP: The change management systems approval process must contain as little waiting time as possible and as few process steps as possible;
- EFFAPP3BP: The change management systems approval process should be transparent to all stakeholders that are influenced by the outcome of the change;
- EFFAPP4BP: The change management system should provide the change leader with the ability to escalate a change request approval should the need arise.

The best practice perception of how important knowledge management is was gauged by the following questions:

- KNOMAN1BP: It is essential that the change management system and its processes support the business environment and its processes;
- KNOMAN2BP: The change management system should control the documentation filing locations to ensure that all relevant documents are easily available for audit purposes;

- KNOMAN3BP: The change management system must ensure that all aspects of the change are documented, this must include what needs to change and why.
- TRAIN1BP: In order for the resources to use a new change management system to its full potential, it is essential that they receive comprehensive system specific training.

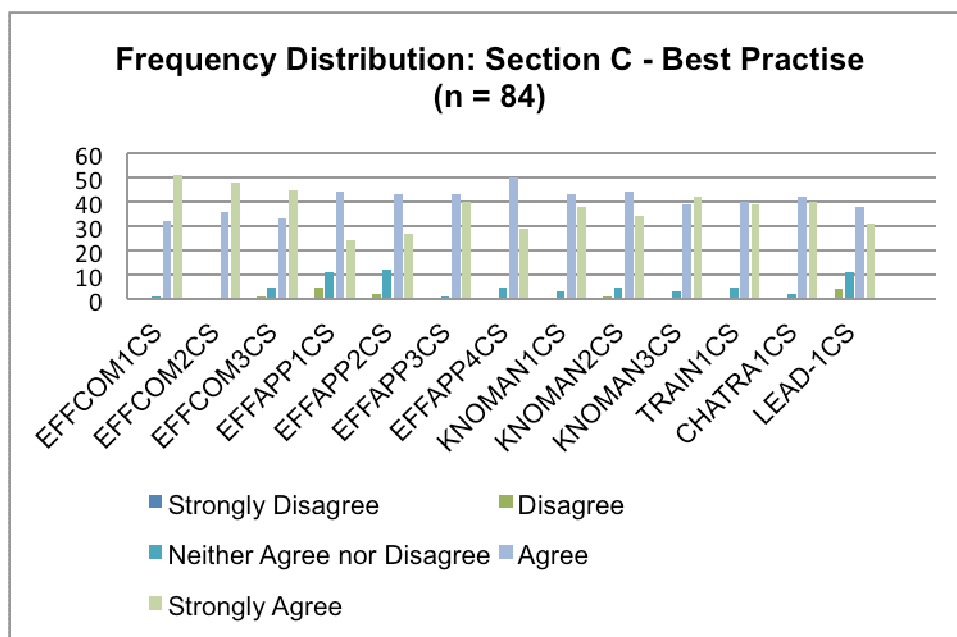
The best practice perception of how important change tracking is was gauged by the following question:

- CHATRA1BP: All changes once executed must be monitored to ensure that they in fact had the desired effect, these changes should be tracked, all stakeholders should be able to check the change status at any point in time.

The best practice perception of how much influence leadership should have on change management was gauged by the following question:

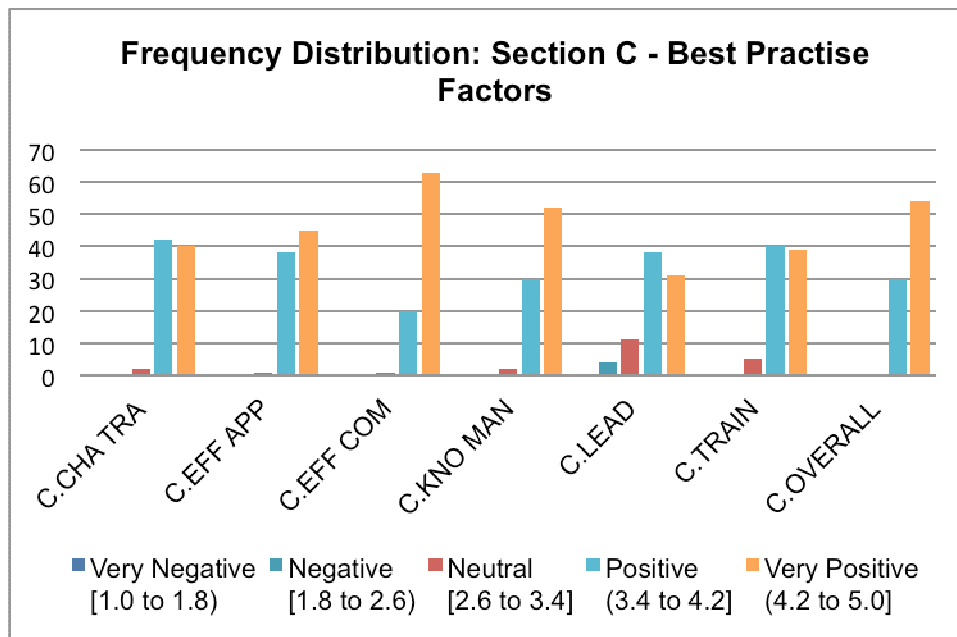
- LEAD-1BP: Management must always be involved in the change management process.

#### 4.2.7.2 Best practice of change management frequency distributions per question



Graph 4-3: Frequency Distribution: Section C – Best Practice

4.2.7.3 Best practice of change management frequency distributions per factor



Graph 4-4: Frequency Distribution: Section C – Best Practice Factors

Variable	Mean	S.D.	t	p (df = 83)	Cohen's d
B.CHA TRA	4.45	0.55	4.23	<.0005	0.46
B.EFF APP	4.23	0.45	0.59	.554	n/a
B.EFF COM	4.54	0.44	7.05	<.0005	0.77
B.KNO MAN	4.40	0.46	3.98	<.0005	0.43
B.LEAD	4.14	0.82	-0.64	.527	n/a
B.TRAIN	4.40	0.60	3.11	.003	0.34
B.OVERALL	4.36	0.40	3.66	<.0005	0.40

Table 4-9: One-sample t-Test: Bundle Best Practice Factors (n = 84)

Based on Table 4-9 and Table 4-10, the following statistics were collected for each factor and the following deductions can be made.

B.CHA TRA – Being able to monitor the current state of a change through the process is important. With a mean score of 4.45, this factor is the second-most important. The majority of the respondents either agreed or strongly disagreed with the statement. Only 2 of the 84 respondents were neutral, indicating that they did not find it necessary to be able to track the changes.

B.EFF APP – Having an effective approval process is the second-least important factor that was analysed. It has a mean score of 4.23 and a standard deviation of



0.45. An effective approval process depends heavily on the organisation’s structure and the respondents would have considered their current organisation when responding to the statement.

B.EFF COM – Having effective communication in the change management system within an organisation received the most ‘strongly agree’ responses, with 63 out of the 84 respondents. Effective communication also had the smallest standard deviation at 0.44, indicating that it also had the smallest spread of respondents.

B.KNO MAN – Knowledge management along with training both resulted in mean scores of 4.40. With a standard deviation of 0.46, knowledge management had a more common response range than training.

B.LEAD – With a mean score of 4.14 and a minimum response of 2, both of which are the lowest, leadership involvement in the change management system is the least important factor. The responses also varied considerably, which is highlighted not only by the histogram in *Graph 4-4* but also by the fact that the standard deviation for this factor is the largest at 0.82.

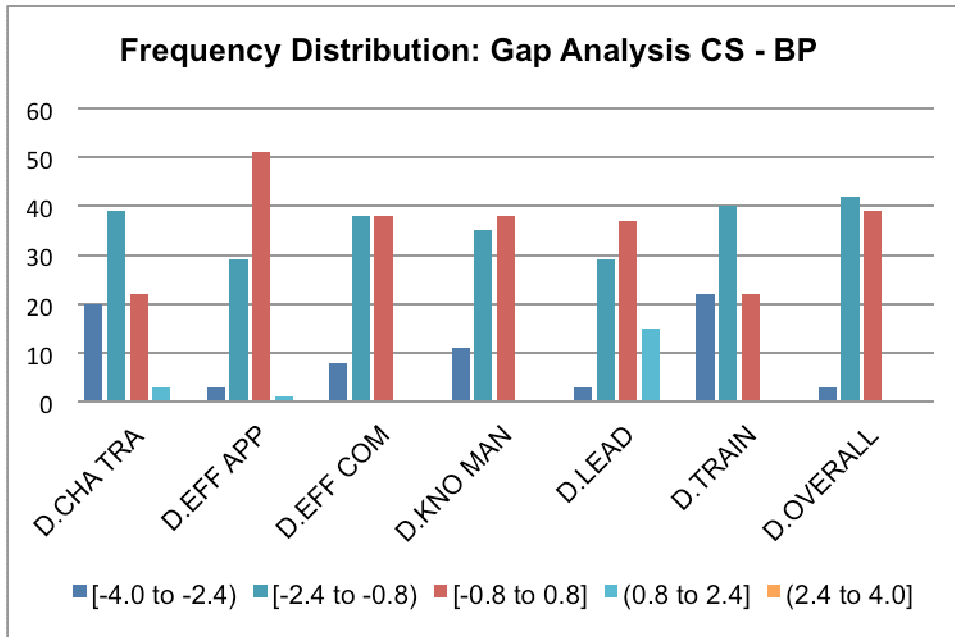
B.TRAIN – Training is one of the most overlooked factors in many systems; this is due to the fact that the majority of resources are already accustomed to the manner in which the system works. The respondents to this survey strongly agreed that training is important, with the mean score at 4.40.

The overall result of the best practice factors indicates that the majority of the respondents agree or strongly agree that it is important to have structure and get input from all the key stakeholders to enable the facilitation of effective change that will not extensively disrupt production and will enable the required changes to take place in a structured and acceptable manner.

	Mean	S.D.	Minimum	Quartile 1	Median	Quartile 3	Maximum
B.CHA TRA	4.45	0.55	3.00	4.00	4.00	5.00	5.00
B.EFF APP	4.23	0.45	3.00	4.00	4.25	4.50	5.00
B.EFF COM	4.54	0.44	3.33	4.25	4.67	5.00	5.00
B.KNO MAN	4.40	0.46	3.33	4.00	4.33	4.75	5.00
B.LEAD	4.14	0.82	2.00	4.00	4.00	5.00	5.00
B.TRAIN	4.40	0.60	3.00	4.00	4.00	5.00	5.00
B.OVERALL	4.36	0.40	3.40	4.00	4.33	4.63	5.00

Table 4-10: Central tendency & Dispersion: Best Practice Factors (n = 84)

4.2.8 Gap analysis: Frequency difference between CS and BP



Graph 4-5: Frequency Distribution: Gap Analysis between CS and BP

4.2.9 Gap analysis: Difference between CS and BP

Variable	Mean	S.D.	t	p (df = 83)	Cohen's d
D.CHA TRA	-1.48	1.29	-10.46	<.0005	1.14
D.EFF APP	-0.72	0.72	-9.25	<.0005	1.01
D.EFF COM	-1.02	0.89	-10.41	<.0005	1.14
D.KNO MAN	-1.12	0.93	-11.02	<.0005	1.20
D.LEAD	-0.30	1.13	-2.42	.018	0.26
D.TRAIN	-1.48	1.25	-10.85	<.0005	1.18
D.OVERALL	-1.02	0.77	-12.15	<.0005	1.33

Table 4-11: One-sample t-Test: Bundle Difference CS-BP Factors (n = 84)

In all cases, the mean of the current state was lower than the mean of the perceived best practice state. This indicates that the SAAI in general has room to improve when it comes to the change management systems that are currently operating. The worst case scenario would see the current state with a response of 'strongly disagree' and the perceived best practice with a response of 'strongly agree', resulting in a difference of -4.

How these differences could potentially be addressed will be covered in Chapter 5, where the literature will be brought in line with the focus factors and recommendations will be made.

D.TRAIN – Training is a problem when it comes to integrated management systems. The results of the survey confirm this: with a mean score of -1.48, training and change tracking have the largest differences when the mean scores of the current state and the perceived best practice state are compared. There is therefore more room for improvement in these areas and additional focus should be placed on these factors when considering what the best approach would be when deciding on how the change management system should be adapted or introduced.

D.LEAD – With a the difference between the means scores for current state and the perceived best practice state of -0.30, leadership's involvement is statistically the factor that requires the least attention when it comes to change management in the SAAI. The maximum difference for this factor that seems to be counter-intuitive is explained by the fact that 15 respondents indicated that, in their opinion, leadership is too involved in the change management processes within their organisations.

D.KNO MAN – The difference between the mean scores for the current state and the perceived best practice state is -1.12. This difference is significant and indicates that knowledge management within the SAAI needs to be considered when the change management systems used within the industry are evaluated for future improvement opportunities. The minimum value was -3.0 and the maximum was -0.33, which was the smallest spread of all the variables.

D.EFF COM – Effective communication had a mean score variance of -1.02 between the current state responses' and the perceived best practise responses', which indicates that the current state needs to be improved if the perceived best practice state is to be realised in the future.

D.EFF APP – It would seem that in general the approval processes within the SAAI are in an acceptable state, as the mean score difference is -0.72. This is, however, not reflective of the time taken for the approvals to take place. This is a factor that should be investigated further to establish the best approach for change

management systems. This will ensure that the required approvals are sufficient and the level to which an approval should be escalated is in line with the organisations specific requirements.

D.CHA TRA – Access to up-to-date information enables an organisation to make educated and effective decisions in very short time-frames. This applies to the change management system and is supported by the fact that the difference between the current state and the perceived best practice state has a mean score of -1.48, indicating its importance. Transparency drives honesty, which in turn allows for informed decisions that benefit the organisation.

	<b>Mean</b>	<b>S.D.</b>	<b>Minimum</b>	<b>Quartile 1</b>	<b>Median</b>	<b>Quartile 3</b>	<b>Maximum</b>
D.CHA TRA	-1.48	1.29	-4.00	-2.00	-2.00	0.00	1.00
D.EFF APP	-0.72	0.72	-3.00	-1.00	-0.75	-0.25	1.00
D.EFF COM	-1.02	0.89	-3.00	-1.33	-1.00	-0.33	0.67
D.KNO MAN	-1.12	0.93	-3.33	-1.67	-1.00	-0.33	0.00
D.LEAD	-0.30	1.13	-3.00	-1.00	0.00	0.00	2.00
D.TRAIN	-1.48	1.25	-4.00	-3.00	-1.00	0.00	0.00
D.OVERALL	-1.02	0.77	-3.00	-1.48	-0.90	-0.43	0.31

*Table 4-12: Central tendency & Dispersion: Difference CS-BP Factors (n = 84)*

### **4.3 Research findings conclusion**

The results from the statistical analysis of the current state scores showed the three lowest mean scores were for the following factors:

- Training;
- Change tracking;
- Knowledge management.

This indicates that these factors need to be investigated further to try and understand to what extent they influence the overall outcome of the change management process. The management recommendations will include input from the literature review as to how these factors can be boosted by the use of technology.

The results from the statistical analysis of the perceived best practice state scores showed that the four highest scores were for the following factors:

- Training;

- Change tracking;
- Knowledge management;
- Effective communication.

This indicates that the above factors are perceived to be more important and should therefore be focused on if the goal is to have the most effective change management system. As with the current state factors that were highlighted, the importance of each factor will be investigated and management recommendations will be made accordingly.

The difference between the two states was then analysed. Seeing that training, change tracking and knowledge management featured as low scorers in the current state and high scorers in the perceived best practice state, it is not surprising that they had the top three negative scores when the means were compared.

## **5 CONCLUSIONS AND RECOMMENDATIONS**

### **5.1 Introduction**

Chapter 4 describes the analysis and findings of the study in detail. The purpose of this chapter is to present a summary of the study and interpret the results of the study. Limitations of the study as it currently stands will be highlighted, and suggestions for further research that would focus on the shortcomings of this study will be made. Conclusions will also be drawn based on the information available in this study and recommendations will be made that can be used by management when deciding what the most appropriate approach would be, should the decision be made to introduce technology into an organisation's change management system.

### **5.2 Overview of the study**

#### **5.2.1 Summary of the research**

The aim of this study was to establish how technology could be integrated into the change management systems within the SAAI to support best practices. Chapter 1 introduced the research by outlining the main and sub-problems being experienced within current change management systems, and established the premise around which the study would be conducted. A review of the literature was presented in Chapter 2, while Chapter 3 identified the research methodology that would be used. Chapter 4 interpreted the results of the research and established findings based on the interpretations.

Chapter 2 began with an overview of change management by introducing a brief history of the subject. Understanding the reasons for change, how to prepare for change, how to execute change and the key success factors for change management were also investigated. Technology was then introduced by firstly establishing the impact it could have on change management in general and then focusing on how it could assist in facilitating short-notice changes. The total cost of ownership was also investigated in depth; this is an important aspect to consider, as business within the SAAI is bottom line driven. Business processes were then analysed, focusing on the design of the processes, the impact of waste on the end

result and which key success factors have the most influence on the outcome of the change management process.

Chapter 3 established a framework for the investigation of the literature. For the purposes of the research, a quantitative research design was established. A self-administered questionnaire was developed and used as the data collection method. The research design and methodology defined the research paradigms, and identified the research paradigm used for this study. The study design, the subjects to be questioned and the recruitment plan were also covered before indicating how the data would be collected and analysed. Due to the composition of the sample population and the manner in which the questionnaire was distributed, no ethical clearance was required from the Research and Ethics Committee. A Form E declaration form was, however, submitted to the NMMU (*Annexure 7: Form E – Ethics Clearance*).

The results of the data collected are presented in Chapter 4. This included an analysis of the quantitative data that included the respondents' demographic information, the current state of change management within the SAAI as well as the perceived best practices for change management within the SAAI and the difference between these last two.

## **5.2.2 Interpretation of the research questions**

### **5.2.2.1 Main research question**

The main research question of the study was stated as, 'How can technology be applied within the SAAI to support change management best practices?'

The goal of the main research question is to establish how technology can be systematically introduced into either existing or green-field change management systems within the SAAI.

In order to suggest possible ways in which this main research question could be answered, eight sub-research questions (RQ1 to RQ8) were constructed.

### 5.2.2.2 Sub-research questions

The key criteria for all the sub-research questions factors were investigated during the literature review conducted in Chapter 2 of this study. While the sub-research questions were not asked directly in the research questionnaire, the factors that influence the result of each question were put forward to the sample group in a format that aimed to establish what the current state of the factor is within the SAAI and what the perceived best practice is.

- RQ1: How important is effective communication when it comes to change management?

Communication was the focus of the first research question. The analysis of this factor found that, in general within the SAAI, effective communication is not a major problem. Effective communication was, however, identified as an important factor when considering the change management process. Technology can assist in facilitating the transfer of information between all stakeholders involved in the change management process.

- RQ2: How important is knowledge and/or documentation management when it comes to change management?

Learning points from previous change, knowledge sharing and structured documentation archives are all contributing factors when it comes to facilitating the change management process. Mistakes should only be made once and information should be readily available so that the decision-making process can be expedited where possible, reducing potential stumbling blocks and delays.

- RQ3: To what extent does leadership affect change management?

Leadership will always have an influence on change management. It is important to ensure that management is aware of changes that will impact on their department in any way. Management's involvement in change management as it currently stands in the SAAI is sufficient. It was highlighted in the literature review that management, while pushing for a change to take place, can also stop the process at any time, resulting in delays that impact on all stakeholders. Communication at the



management level needs to be controlled and information pertaining to upper-level discussions should be shared with all stakeholders involved in the change process.

- RQ4: How important is an effective approval process when it comes to change management?

Having an effective approval process contributes to the reduction of delays and therefore reduces the time taken to proceed between the process steps. An effective approval process will also ensure that all stakeholders are notified when approvals or rejections have been made. Each step of the approval process needs to be analysed on its merit and optimised accordingly.

- RQ5: How important is change status tracking when it comes to change management?

Technology can be used to ensure that the change management process is made transparent. It must, however, be noted that the information going into the system should always be verified to ensure that it truly reflects the status of the change and that it does not show bias towards any of the stakeholders. Inaccurate information may result in poor decisions being made, which would have a negative impact on the organisation.

- RQ6: How does the scale of change affect the change management process?

The basic steps followed to facilitate any form of change are the same. The scale of the change, however, will influence how much information is required to make decisions and how much data will flow between the various phases. Generally, the larger the change, the more checks and balances need to be put in place to ensure that the change is controlled effectively and that the end result meets the requirements as they were originally presented when the decision to undertake the change was made.

- RQ7: To what extent does training affect the effectiveness of the change management process?

While the change management process may seem straightforward, when technology is introduced to assist in facilitating the change effectively, there is often resistance from stakeholders who are set in the old ways of operating. Training will transfer information that relates to what benefits can be extracted by using the systems and will aid in ensuring that the system is used correctly to get the best results.

- RQ8: To what extent is technology supported when change management best practices are considered?

Best practice implementations will always require customised systems to some extent, to ensure that the processes are streamlined and executed correctly. The technology required is available but it is expensive and the total cost of ownership needs to be considered.

### **5.3 Recommendations**

The following recommendations are made in light of the research findings in combination with the best practices identified during the literature review.

The most important aspect of any process is ensuring that the process itself is as efficient and effective as possible. While this seems obvious, too often processes are handed over to individuals to create, due to the fact that they are either an afterthought or not viewed as important to the organisation's daily operations. Processes are the backbone of any organisation, and while often they are obvious to resources that have been extensively exposed to the way the organisation operates, individual interpretation can lead to the incorrect execution of steps which are critical to the success of the organisation. The SAAI, like other standards bodies, and due to legal requirements, insist that standard driven critical steps are executed correctly. Management involvement from all the key departments (Production, Planning, Quality, Maintenance and Engineering) identified in the study is essential when establishing the initial change management processes.

Business processes that are in place should be considered within the context of the current business environment. Outdated processes should be addressed within reason. If it does not make sense to reinvent the entire process, then the major

change points should be addressed on merit, with focus being placed on the processes or components that are no longer aligned with the organisation's operational requirements.

Training provided when introducing a change management system that uses technology to assist in facilitating the numerous best practices identified, amongst others, should also cover aspects such as why change needs to be controlled and why change needs to be transparent. By explaining the reasoning behind each of the process steps and how important each step is, as well as how each step influences the system as a whole, will provide the users with the confidence to use the system to its full potential. In addition, training will encourage users to take ownership of the system.

While system training usually focuses on the system and how to use it, focus should also be placed on what is trying to be achieved by using the system that is being introduced. Understanding why specific steps within the change management process are required may be obvious to management, for example, but the resources executing the change may not know why they are executing specific steps. It must be noted that the compulsory requirements contained within the processes are often not only organisational requirements. These requirements may be legal requirements that if not followed may result in the organisation or even the individual being punished (these should be detailed in the defined process).

It is important that the change management system facilitates status tracking and that the process is transparent. The information must be available to all stakeholders who require it at any point in time. Internal system checks and balances will ensure that all change items are kept up to date.

While additional functionality will cost more, the ideal change management system should automatically request all required documentation from the user. Once this documentation has been added to the system, it should be filed in the correct location in its digital form. Electronic document management systems are complex and the correct consultants should be involved when setting up the system's back-end. Depending on legal requirements, the documentation may need to be stored in hard copy as well. As identified in the literature review, the handling, storage and

printing of these additional documents will add additional costs. Integrated version tracking ensures that all stakeholders receive notifications when documents of interest to them get changed or deleted. This will allow the stakeholders to react accordingly when the notification is received.

Communication within any organisational environment is essential. Technology, when integrated effectively into any set of predefined processes, will facilitate effective communication. Every change will have a predefined group of stakeholders that need to perform specific functions. All of these stakeholders must be able to communicate with each other in a transparent manner.

The change leader must have a comprehensive understanding of the environment in which the change is taking place. In addition, it is important that the change leader has access to skilled resources that are able to consult on specialised items that are critical to the successful outcome of the change process being executed.

While management does not always have to be integrated into the change management process as far as tracking the various steps and laying out the key aspects, they must ensure that the process is heading in the right direction. Each department should appoint a resource within the change team that is looking out for the relevant department's interests.

Lessons learnt during any change, whether it was successful or not, must be documented and shared at the end of the change process. This will assist in minimising the effect of the learning curve. This documentation should be in the form of a predefined template that gets completed at the end of the process; it will then form part of the documentation archive along with the rest of the project documentation and data.

All business processes must be reviewed annually or alternatively when major organisational changes take place that influence any part of a process.

## **5.4 Limitations of the study**

The study focused on change management in the broad sense of the term. This approach does not provide sufficient detail for each step of the change management process. This limitation has been included as an area for future research.

Due to the varying influence on the operational level of the majority of companies that operate within the SAAI that are controlled by parent organisations from across the globe, each environment needs to be investigated on its own merit. The sample group was, however, representative of the majority of organisations that operate within the SAAI. This resulted in a broader generalisation that in the researcher's opinion could produce misconceptions of the perceived state should individuals from various organisation consider the study when making the decisions as to whether or not the change management systems or processes within their own organisation need to be improved or optimised.

Critical technological criteria were not investigated during this study. These include:

- Hardware requirements;
- System redundancy;
- System architecture.

All the items mentioned above will contribute to the total cost of the system.

## **5.5 Future research**

As identified in the limitations of the study section, the change management process could be broken down into core activities. Each of the activities has its own set of challenges that need to be investigated and addressed

An effective approval process requires various levels of approval. Potential future research could be conducted to establish which levels only need to be informed and which level of management needs to actually approve the change application.

The security required to ensure the technology is safe to use for the specific requirements needs to be investigated to ensure that the process is secure. Digital signatures, chip and pin technology, username and password options all need to be

considered and the most appropriate security must then be integrated to ensure that the organisation is protected against potential legal action and malicious behaviour that may result from abuse of the system.

## **5.6 Summary**

Technology can be effectively integrated into the change management systems used in the SAAI. The total cost of ownership is a limiting factor that must be kept in mind when deciding how flexible the system needs to be and to what extent the system must control or guide the change management process.

Being able to track each change and ensure that it has been executed using a single system with a unique point of reference will assist management in effectively controlling the changes that take place within their respective departments and organisations.

Change can be effectively controlled, provided the correct systems are put in place. These systems must be supported by training that is able to engage the users and ensure that the required knowledge is transferred to them.

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## Annexure 1: Questionnaire Cover Letter



September 2014

Dear Respondent,

Time Required: 5-8min

Transparency: Anonymous

I am studying towards my MBA (Masters in Business Administration) degree at the Nelson Mandela Metropolitan University Business School. The goal of this questionnaire is to gauge the current state of Change Management in the South African Automotive Industry based on key variables identified through my literature review. The current state will then be compared to the perceived Best Practice aspects and recommendations will be made as to how the gaps, if any, can be narrowed through cost effective initiatives.

This questionnaire should take between five and eight minutes to complete. There are no correct or incorrect answers. Please answer the questions as accurately as possible and ensure that the answers you provide are in line with your perception of Change Management as it applies to your specific work scenario and environment.

All responses are being captured through SurveyMonkey, this guarantees that your identity is not linked to your responses making the survey 100% anonymous.

For Section A, select the answer that relates to your current situation.

For each statement in Section B and C, tick the column that best describes your experience or perception.

Please answer all questions.

Please note that your participation in this study is entirely voluntary and that you have the right to withdraw from the study at any stage.

Thank you

Malcolm Vorster

To verify the authenticity of the study, please contact Evert P Knoesen at +27 (0)41 582 2387 or [evertk@equisol.co.za](mailto:evertk@equisol.co.za) .

Malcolm Vorster

Project Engineer (Final Assembly – Volkswagen South Africa)

Supervisor – Evert Knoesen – NMMU Business School

## **Annexure 2: Recruitment Plan E-mail**

*Subject:* MBA Questionnaire – Change Management within the South African Automotive Industry

Good evening [NAME],

I am in the process of gathering the e-mail addresses of potential respondents for my MBA treatise questionnaire.

The topic being investigate is as follows:

AN INVESTIGATION INTO HOW TECHNOLOGY CAN BE APPLIED WITHIN THE SOUTH AFRICAN AUTOMOTIVE INDUSTRY TO SUPPORT CHANGE MANAGEMENT BEST PRACTICES

My goal is to get roughly 300 individuals that work or have worked within the boundaries of the South African Automotive Industry (OEM, 1st Tier, 2nd Tier, 3rd Tier and Systems Integrators), they can be Technicians, Engineers, Supervisors and Managers (all levels).

If possible, could you please send me a list of people that you feel would give constructive insight into this topic?

- Name
- Surname
- e-mail Address

The respondents will be required to answer 5 questions that relate to their demographic profile then rate 26 statements on a scale of 1-5. The questionnaire will take between 5 and 10 minutes to complete.

The information gathering process is completely confidential and will use a web based interface.

Your assistance on with regard to this is much appreciated.

Many thanks

## Annexure 3: Questionnaire

### **MBA Questionnaire – Change Management**

#### **Change Management within the South African Automotive Industry**

Dear Respondent,

Time Required: 5-8min

Transparency: Anonymous

I am studying towards my MBA (Masters in Business Administration) degree at the Nelson Mandela Metropolitan University Business School. The goal of this questionnaire is to gauge the current state of Change Management in the South African Automotive Industry based on key variables identified through my literature review. The current state will then be compared to the perceived Best Practice aspects and recommendations will be made as to how the gaps, if any, can be narrowed through cost effective initiatives.

This questionnaire should take between five and eight minutes to complete. There are no correct or incorrect answers. Please answer the questions as accurately as possible and ensure that the answers you provide are in line with your perception of Change Management as it applies to your specific work scenario and environment.

All responses are being captured through SurveyMonkey, this guarantees that your identity is not linked to your responses making the survey 100% anonymous.

For Section A, select the answer that relates to your current situation.

For each statement in Section B and C, tick the column that best describes your experience or perception.

Please answer all questions.

Please note that your participation in this study is entirely voluntary and that you have the right to withdraw from the study at any stage.

Thank you  
Malcolm Vorster

To verify the authenticity of the study, please contact Evert P Knoesen at +27 (0)41 582 2387 or [evertk@equisol.co.za](mailto:evertk@equisol.co.za).

# MBA Questionnaire – Change Management

## Section A

Biographical Information

**1. What is your current length of service in years within the company you currently work for?**

- Less than 1
- 1-5
- 6-10
- 11-15
- More than 16

**2. In which department are you currently in?**

- Production (Assembly or Manufacturing)
- Planning (Project or Forward)
- Quality Assurance
- Maintenance
- Engineering (Specialist or Technical)

**3. What is your current position in the company?**

- Manager or higher
- Supervisor
- Specialist
- Engineer
- Technician

**4. How many years have you spent in your current position?**

- Less than 1
- 1-3
- 4-8
- 9-15
- More than 16



## MBA Questionnaire – Change Management

**5. At what level does your current company operate within the South African automotive industry framework?**

- OEM
- 1st Tier Supplier
- 2nd Tier Supplier
- 3rd Tier Supplier
- Other

# MBA Questionnaire - Change Management

## Section B

Change Management - Current

### 6. Evaluate the following statements.

	Strongly Disagree	Disagree	Neither Disagree Nor Agree	Agree	Strongly Agree
Currently at my organisation there is effective communication between all stakeholders throughout the change management process.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The current change management system being used at my organisation effectively facilitates communication between all the stakeholders that are affected by the change.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The current change management system being used at my organisation ensures that the change leader informs all stakeholders about the changes that are going to take place.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The current change management system at my organisation requires all changes to be approved by management (at least one level higher).	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The current change management system being used at my organisation has an effective approval process that has short waiting times and only a few process steps.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The current change management system being used by my organisation is transparent to all stakeholders that are influenced by the outcome of the change.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The current change management system being used at my organisation provides the change leader with the	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

## MBA Questionnaire - Change Management

ability to escalate change request approvals.

The current change management system and processes being used at my organisation is effective and the processes support the business environment.

The current change management system being used at my organisation controls the document filing locations automatically.

The current change management system being used at my organisation ensures that the change management process is documented in line with the businesses requirements.

Currently at my organisation, comprehensive training specific to the change management system is provided to all the staff that use it.

The current change management system being used at my organisation gives all stakeholders the ability to be able to check the change status of a change at any point in time.

The current change management system being used by my organisation ensures that management is involved.

# MBA Questionnaire - Change Management

## Section C

Change Management - Perceived Best Practise

### 7. Evaluate the following statements.

	Strongly Disagree	Disagree	Neither Disagree Nor Agree	Agree	Strongly Agree
Effective communication between all stakeholders throughout the change management process is essential for the change to be a success.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
For a change management system to be effective, it should facilitate effective communication between all the stakeholders that are affected by the change.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
It is the duty of the change leader to ensure that all stakeholders are informed whenever a change that will influence them is going to take place.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
For a change management system to be effective, it is essential that all changes be approved by management (at least one level higher).	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The change management systems approval process must contain as little waiting time as possible and as few process steps as possible.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The change management systems approval process should be transparent to all stakeholders that are influenced by the outcome of the change.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The change management system should provide the change leader with the ability to escalate a change request approval should the need arise.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
It is essential that the change management system and its processes	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

## MBA Questionnaire - Change Management

support the business environment and its processes.

The change management system should control the documentation filing locations to ensure that all relevant documents are easily available for audit purposes.



The change management system must ensure that all aspects of the change are documented, this must include what needs to change and why.



In order for the resources to use a new change management system to its full potential, it is essential that they receive comprehensive system specific training.



All changes once executed must be monitored to ensure that they in fact had the desired effect, these changes should be tracked, all stakeholders should be able to check the change status at any point in time.



Management must always be involved in the change management process.



## Annexure 4: Section B – Current State – Item / Factor

Current – The current state of change management processes			
Item	Question / Statement	Factor	Sub-factor
EFFCOM1CS	Currently at my organisation there is effective communication between all stakeholders throughout the change management process.	C.EFF COM	LEAD-
EFFCOM2CS	The current change management system being used at my organisation effectively facilitates communication between all the stakeholders that are affected by the change.	C.EFF COM	SYSTEM-
EFFCOM3CS	The current change management system being used at my organisation ensures that the change leader informs all stakeholders about the changes that are going to take place.	C.EFF COM	LEAD-
EFFAPP1CS	The current change management system at my organisation requires all changes to be approved by management (at least one level higher).	C.EFF APP	SCA CHA
EFFAPP2CS	The current change management system being used at my organisation has an effective approval process that has short waiting times and only a few process steps.	C.EFF APP	SYSTEM-
EFFAPP3CS	The current change management system being used by my organisation is transparent to all stakeholders that are influenced by the outcome of the change.	C.EFF APP	CHA TRA
EFFAPP4CS	The current change management system being used at my organisation provides the change leader with the ability to escalate change request approvals.	C.EFF APP	CHA TRA
KNOMAN1CS	The current change management system and processes being used at my organisation is effective and the processes support the business environment.	C.KNO MAN	SYSTEM-
KNOMAN2CS	The current change management system being used at my organisation controls the document filing locations automatically.	C.KNO MAN	SYSTEM-
KNOMAN3CS	The current change management system being used at my organisation ensures that the change management process is documented in line with the businesses requirements.	C.KNO MAN	SYSTEM-
TRAIN1CS	Currently at my organisation, comprehensive training specific to the change management system is provided to all the staff that use it.	C.TRAIN	KNO MAN
CHATRA1CS	The current change management system being used at my organisation gives all stakeholders the ability to be able to check the change status of a change at any point in time.	C.CHA TRA	SCA CHA
LEAD-1CS	The current change management system being used by my organisation ensures that management is involved.	C.LEAD	EFF APP

## Annexure 5: Section C – Best Practice – Item / Factor

Best Practice – Should be considered and included			
Item	Question / Statement	Factor	Sub-factor
EFFCOM1BP	Effective communication between all stakeholders throughout the change management process is essential for the change to be a success.	B.EFF COM	LEAD-
EFFCOM2BP	For a change management system to be effective, it should facilitate effective communication between all the stakeholders that are affected by the change.	B.EFF COM	SYSTEM-
EFFCOM3BP	It is the duty of the change leader to ensure that all stakeholders are informed whenever a change that will influence them is going to take place.	B.EFF COM	LEAD-
EFFAPP1BP	For a change management system to be effective, it is essential that all changes be approved by management (at least one level higher).	B.EFF APP	SCA CHA
EFFAPP2BP	The change management systems approval process must contain as little waiting time as possible and as few process steps as possible.	B.EFF APP	SYSTEM-
EFFAPP3BP	The change management systems approval process should be transparent to all stakeholders that are influenced by the outcome of the change.	B.EFF APP	CHA TRA
EFFAPP4BP	The change management system should provide the change leader with the ability to escalate a change request approval should the need arise.	B.EFF APP	CHA TRA
KNOMAN1BP	It is essential that the change management system and its processes support the business environment and its processes.	B.KNO MAN	SYSTEM-
KNOMAN2BP	The change management system should control the documentation filing locations to ensure that all relevant documents are easily available for audit purposes.	B.KNO MAN	SYSTEM-
KNOMAN3BP	The change management system must ensure that all aspects of the change are documented, this must include what needs to change and why.	B.KNO MAN	SYSTEM-
TRAIN1BP	In order for the resources to use a new change management system to its full potential, it is essential that they receive comprehensive system specific training.	B.TRAIN	KNO MAN
CHATRA1BP	All changes once executed must be monitored to ensure that they in fact had the desired effect, these changes should be tracked, all stakeholders should be able to check the change status at any point in time.	B.CHA TRA	SCA CHA
LEAD-1BP	Management must always be involved in the change management process.	B.LEAD	EFF APP

## Annexure 6: Section B and C – Factor Descriptions

Factors	Factor Description	No. of Items	
		Current	Best Practice
EFF COM	Effective Communication	3	3
KNO MAN	Knowledge / Documentation Management	3	3
LEAD	Leadership	1	1
EFF APP	Effective Approval Processes	4	4
CHA TRA	Change Status Tracking	1	1
TRAIN	Training	1	1
OVERALL	Average of six factors above		



## Annexure 7: Form E – Ethics Clearance



FORM E

### ETHICS CLEARANCE FOR TREATISES/DISSERTATIONS/THESES

*Please type or complete in black ink*

**FACULTY:** Business and Economic Sciences

**SCHOOL/DEPARTMENT:** NMMU Business School

I, (surname and initials of supervisor) **Evert P Knoesen** the supervisor for (surname and initials of candidate) **Malcolm W Vorster** (student number) **20308840** a candidate for the degree **Magister of Business Administration** with a treatise/dissertation/thesis entitled (full title of treatise/dissertation/thesis):

**“AN INVESTIGATION INTO HOW TECHNOLOGY CAN BE APPLIED WITHIN THE SOUTH AFRICAN AUTOMOTIVE INDUSTRY TO SUPPORT CHANGE MANAGEMENT BEST PRACTICES”**

considered the following ethics criteria (*please tick the appropriate block*):

	YES	NO
1. Is there any risk of harm, embarrassment or offence, however slight or temporary, to the participant, third parties or to the communities at large?		X
2. Is the study based on a research population defined as 'vulnerable' in terms of age, physical characteristics and/or disease status?		X
2.1 Are subjects/participants/respondents of your study:		
(a) Children under the age of 18?		X
(b) NMMU staff?		X
(c) NMMU students?		X
(d) The elderly/persons over the age of 60?		X
(e) A sample from an institution (e.g. hospital/school)?		X
(f) Handicapped (e.g. mentally or physically)?		X
3. Does the data that will be collected require consent of an institutional authority for this study? (An institutional authority refers to an organisation that is established by government to protect vulnerable people)		X
3.1 Are you intending to access participant data from an existing, stored repository (e.g. school, institutional or university records)?		X

4. Will the participant's privacy, anonymity or confidentiality be compromised?		X
4.1 Are you administering a questionnaire/survey that:		
(a) Collects sensitive/identifiable data from participants?		X
(b) Does not guarantee the anonymity of the participant?		X
(c) Does not guarantee the confidentiality of the participant and the data?		X
(d) Will offer an incentive to respondents to participate, i.e. a lucky draw or any other prize?		X
(e) Will create doubt whether sample control measures are in place?		X
(f) Will be distributed electronically via email (and requesting an email response)?		
Note:		
• If your questionnaire <b>DOES NOT</b> request respondents' identification, is distributed electronically and you request respondents to return it <i>manually</i> (print out and deliver/mail); <b>AND</b> respondent anonymity can be guaranteed, your answer will be NO.		X
• If your questionnaire <b>DOES NOT</b> request respondents' identification, is <i>distributed via an email link and works through a web response system (e.g. the university survey system)</i> ; <b>AND</b> respondent anonymity can be guaranteed, your answer will be NO.		

**Please note that if ANY of the questions above have been answered in the affirmative (YES) the student will need to complete the full ethics clearance form (REC-H application) and submit it with the relevant documentation to the Faculty RECH (Ethics) representative.**

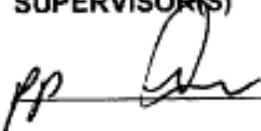
and hereby certify that the student has given his/her research ethical consideration and full ethics approval is not required.

  
\_\_\_\_\_

SUPERVISOR(S)

25 August 2014

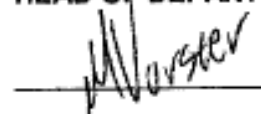
DATE

  
\_\_\_\_\_

HEAD OF DEPARTMENT

29/8/2014

DATE

  
\_\_\_\_\_

STUDENT(S)

27/8/2014

DATE

**Please ensure that the research methodology section from the proposal is attached to this form.**