QUALITY IMPROVEMENT USING VISUAL MANAGEMENT TECHNIQUES

by

NADINE LOUISE STEYN

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Supervisor: Prof. CM Moll

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Declaration

I, Nadine Louise Steyn, declare that the contents of this dissertation/thesis represent my own unaided work, and that the dissertation/thesis has not previously been submitted for academic examination towards any qualification. Furthermore, it represents my own opinions and not necessarily those of the Cape Peninsula University of Technology.

Signed **Date**

Summary

The fundamental activities of a business can be summarised as being a cycle of strategy development and implementation, operations design and management and finally performance measurement, which feeds back into strategy design. This research aims to determine whether visual management can assist the quality motive by adding value to the above-mentioned business activities for start-up businesses and strategic business units within the South African context.

The main topics to be addressed are performance management and visual management (VM). Performance management entails investigating the concept of strategy, its formulation and eventual implementation; performance measurement; improvement initiatives and greater quality theory. Visual management will be introduced as an angle on corporate communication and the importance of sharing information indiscriminately throughout the organisation.

Both empirical and non-empirical research methods are used to answer the question of the impact of VM on business activities. The first involves a theoretical synthesis from the literature, the second was based on interviews with professionals from the relevant industries, the third is content analysis of the above.

The findings report that visual management has a positive impact on business activities and greatly supports the quality motive. Specific themes repeat themselves throughout the research including the importance of organisation-wide focus, employee empowerment and the power of creative thinking.

Suggested further research possibilities include designing a model that determines the magnitude of the financial impact of visual management on business activities.

Acknowledgements

I wish to thank:

- Prof Moll for his knowledge, guidance, faith and patience throughout this process.
- Mr Snyman senior and Mr Van Der Spuy Brink for their time and enthusiasm.
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- Mr Blom for his support and encouragement.

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Glossary

Terms/Acronyms/Abbreviations	Definition
Motion	Human movement without contributing to work tasks. Motion takes place when employees wonder, wander, search for answers or randomly provide them, themselves (Galsworth, 2005).
Process	The progression of inputs through a system of transformation to result in desired output that can be either tangible or intangible.
Visual management (VM)	A system of improvement that focuses employees on what is important for job completion and over all business success. It allows for a tangible understanding of company vision, ethics, targets and philosophy, as these elements are constantly displayed in the work area (Liff & Posey, 2004).
Visual workplace	An environment equipped with visual technology that provides information and draws attention to certain happenings. The visual workplace self informs, organises, controls and improves itself.

Chapter 1: Scope of the research

Chapter one is the first phase of the research.

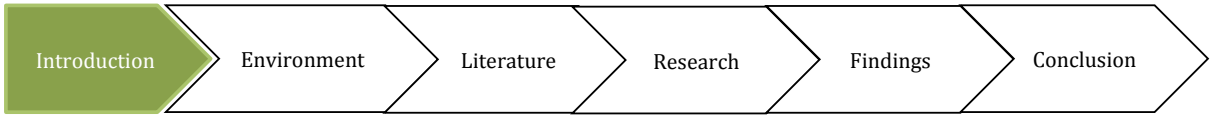

Figure 1: The first phase of the research

1.1 Background to the research

Every business, whether an international corporation or a small to medium enterprise (SME), has the very same goal: to create value for its shareholders by servicing the needs of customers in society. Depending on how this goal is achieved, the process can be complex. Getting entangled in this complexity is, unfortunately, where many organisations lose their way.

The ability to maintain the lifeline-focus of satisfying customer needs whilst at the same time meeting stakeholders' expectations throughout the various functions and business units of an organisation is vital. The message is often simple; however, the means of communicating it have not always been so. In fact the value and necessity of effective communication as a whole is often misunderstood. It should become a priority for managers that all persons involved in a business activity understand their contribution and what is expected of them.

Implementing visual management (VM) efforts could facilitate the above by simplifying and prioritising communication. Lean practitioners have been using visual process management tools for this purpose for many years in contexts such as Rolls Royce, Airbus UK and Weston Aerospace (Parry & Turner, 2007).

In fact, if one had to take a moment to consider the seven tools of quality (being the Ishikawa Diagram, Pareto Chart, Check Sheet, Control Chart, Histogram, Scatter Diagram and Run Chart), it becomes apparent that each one of them encapsulates VM at its core.

Chapter 1: Scope of the research

The fundamental activities of a business can be summarised as a cycle of strategy design and implementation, operations design, operations management and, finally, performance measurement, which feeds back into strategy design.

The first step in starting a business is to scan and analyse the environment to see whether a gap can be found in the servicing of needs. The drive to fill this gap must be delicately woven into the strategy design and implementation of the organisation. The needs of all stakeholders, as well as employee purpose and company expectation, must be considered when the organisation is designed and planned.

Once the organisation is designed and functional, it must be managed and controlled. At this stage it becomes more important than ever that activities add value to the final offering to clients. The rate at which competition continuously evolves makes it vital that this stage be improved continually to prevent the organisation from falling behind and becoming irrelevant. The decision to deliver high-quality products or services to customers has become a widely adopted philosophy. However, a philosophy and a set of quality tools serve no useful purpose if these are not successfully communicated, implemented and understood by those whom they affect.

The final stage of the business activity cycle is to measure the performance of operations and to establish whether the strategy developed in stage one has been achieved/successful. Decisions are then taken regarding new strategic direction and remedial efforts are made to address areas where efforts have fallen short of targets, while successful operations are rewarded.

Each one of the above-mentioned stages plays a fundamental role in the accomplishments of a business. However, these stages cannot operate within a vacuum. Knowledge accumulated from one stage must be transferred to and shared with individuals involved in the next. It is the aim of this thesis to investigate whether adopting VM techniques across all activities of the business will positively impact on the quality motive by improving the efficiency and effectiveness of purpose in the organisation.

Chapter 1: Scope of the research

1.2 Significance of the research

This study attempts to identify ways in which VM improves quality and adds value to existing organisational processes.

1.3 The problem statement

It is too often the case that information sharing within an organisational setting is ineffective and inefficient. Strategic managers struggle to communicate company values and goals, while employees are unsure of what is expected of them and what their progress is in achieving targets. Managers generally do get feedback information from performance measures, but this is sometimes presented too late to be useful, or it is presented in a format that is difficult to interpret and so act upon meaningfully. Effective information transfer is of the utmost importance. When this is improved, it can lead to improved operations and productivity.

1.4 The greater research question

Can the implementation of VM assist the quality motive by improving strategy development, operations design and management and performance measurement within an organisation?

1.5 Research sub-questions

1.5.1 How does VM create value within an organisational setting?

- 1.5.1.1 How is VM traditionally implemented within an organisation?
- 1.5.1.2 In what ways is VM applied creatively?
- 1.5.1.3 What types of improvements does VM typically enable?
- 1.5.1.4 What magnitude of improvements can be expected if VM efforts are to be implemented?

1.5.2 Can VM aid in strategy development and the implementation thereof?

- 1.5.2.1 How can VM facilitate strategy design and implementation?
- 1.5.2.2 What advantage is gained by using VM in strategy design?

1.5.2.3 How does VM impact on employee motivation when implementing the designed strategy?

1.5.2.4 What magnitude of improvements can be expected if VM efforts are to be implemented?

1.5.3 In what ways can VM improve the operations design process within an organisation?

1.5.3.1 How can VM facilitate operations design within an organisation?

1.5.3.2 What advantage is gained by using VM in operations design?

1.5.3.3 What is the magnitude of the improvements to be expected?

1.5.4 How could VM methods impact on operations management activities?

1.5.4.1 How can VM methods facilitate operations management within an organisation?

1.5.4.2 What advantage is gained by using VM methods in operations management?

1.5.4.3 What magnitude of improvements can be expected if VM efforts are to be implemented?

1.5.5 Can VM improve the effectiveness and efficiency of performance measurement?

1.5.5.1 How can VM facilitate performance measurement within an organisation?

1.5.5.2 Will VM methods improve the effectiveness of performance measurement?

1.5.5.3 Will VM methods improve the efficiency of performance measurement?

1.5.5.4 What is the magnitude of the improvements to be expected if VM efforts are to be implemented?

1.6 Research objectives

The following objectives are pursued in the research:

1.6.1 To accumulate knowledge on VM within the field of quality and business management;

1.6.2 To establish methods of using VM beyond traditional application within an organisation;

1.6.3 To understand the role that VM plays in strategy design and implementation;

1.6.4 To ascertain how VM can be implemented to facilitate operations design and management; and

1.6.5 To establish how the effectiveness and efficiency of performance measurement can be improved by adopting VM methods.

1.7 Scope of the research

The nature of a master's degree and the researcher's time constraints has necessitated certain delimitations. These are as follows:

- A theoretical synthesis of VM, quality and related business concepts (e.g., strategy), based on the underlying theory and logic of these approaches has been adopted;
- Research methodologies are based on soliciting the knowledge of experts from general industry, integrating their feedback and, where possible, empirically calculating scientific values which describe the extent and rate of success; and
- Conclusions are drawn from industry feedback through mind mapping and root-cause analysis.

1.8 Assumptions

The following assumptions have been made regarding the study:

- All experts interviewed in the framework validation process will be objective and honest when answering interview questions; and
- By conducting the literature review in a methodical and structured way, the author will gain an objective insight into the current body of knowledge.

1.9 Literature review

1.9.1 Visual Management

According to Liff and Posey (2004) visual management (VM) is a system of improvement that focuses employees on what is most important for job completion, as well as for overall business success. It allows for a more tangible understanding of company vision, ethics, targets and philosophy, as these elements are constantly displayed for employees to see. VM transforms data about target customers and operations performance into

graphic representations thereof which are far easier to understand and more difficult to ignore. Ad Esse Consulting (2007:1) define VM as a "lean technique" that is implemented to ensure that anyone who walks into the organisation's work area, whether knowledgeable of the type of business and processes or not, can quickly identify what is being done, understand it to a greater or lesser extent, then clearly ascertain what is under control and what is not. They go on to explain that using visuals, including images such as illustrative diagrams, photographs and organisational charts, is the simplest and most efficient method of communicating what is required. It is the process of "displaying critical information", both for the benefit of operators who can evaluate themselves, as well as for everyone to see what their level of performance is (Red Lion, 2011). Galsworth (2005) adds that VM takes instructions and guidelines, which were traditionally communicated in manuals, then builds them into the physical work environment through signage and feedback systems. In doing so, employees are able to complete their work with less supervision and increased autonomy.

The basic functions of VM include transparency, discipline, job facilitation, on-the-job training, creating shared ownership, management based on fact, simplification and unification (Tezel, Koskela & Tzortzopoulos, 2009).

1.9.2 Quality

According to Hill (2005), the specifications of a product or service must meet or, ideally, exceed the expectations of the consumer. Quality is achieved when these needs and expectations are consistently met by repeatedly realising required predetermined specifications (Hill, 2005).

When customer satisfaction is a priority to the business, understanding the customer's definition of quality and providing them with it, is greatly important. Quality has various dimensions and means different things to different people, but generally the following must be provided for consumers to feel that what they have received is of quality. The product/service must (Krajewski & Ritzman, 1999):

- Conform to specifications;
- Add value;
- Offer fitness for use;

- Be provided along with the necessary support during and after purchase; and
- Be considered carefully in conjunction with the psychological impressions of customers, such as whether or not the product or service contributes to a customer's need to create a pleasing atmosphere, develop their prestige or enhance their physical appearance.

Garvin (1988) adds to this by describing several quality approaches, these being transcendent, manufacturing-based, user-based, product-based and value-based.

Various quality tools have been developed over the years, the most popular being checklists, histograms and bar charts, Pareto charts, scatter diagrams, and cause-and-effect/ Ishikawa diagrams (Krajewski & Ritzman, 1999).

The main contributors to the philosophy of quality are the following:

- Deming (1986), who explained that the key to achieving quality is to reduce variation. He also defined the 14 points for management to consider when implementing a quality approach and introduced the plan-do-check-act cycle;
- Juran (1988), who wrote the much-revered Quality Control Handbook and adopted the stance that "fitness for use" is essential when implementing quality; and
- Crosby (1979), who believed that quality is more the responsibility of top management than it is anyone else's. He introduced the "zero-defect" concept.

1.9.3 Strategy

Before any venture can begin, there needs to be an idea that is nurtured and explored. From this idea stems goals, vision and action plans. To achieve the goals and vision, a strategy must be developed.

Porter (1998) is well recognised for his contribution to the understanding of business competitive strategy and explains in his book, *Competitive Strategy*, that the heart of strategy development lies in analysing the business in terms of its environment. While acknowledging the impact of social and economic forces in the environment, Porter (1998) chooses to focus on the forces of the industry within which the firm operates. He feels that there are "five basic competitive forces" within any given industry. These

combined forces dictate the level of competition and, by extension, the profitability of the industry, making them fundamental when formulating strategy (Porter, 1998). They include the threat of new entrants, the bargaining power of buyers, the threat of substitute products and services and, finally, the bargaining power of suppliers (Porter, 1998).

Porter (1998) identifies three generic strategies that can be used to defend the firm's position within a given industry and its related forces, these being cost leadership, differentiation and focus. He mentions that, while it is possible to pursue a combination of the three, in most cases each one requires complete commitment to achieve.

The low-cost position demands unwavering focus by management on cost reduction using aggressive cost, overhead and waste controls in an attempt to undercut competitors by earning an above average return on product or service (Porter, 1998). This position allows the firm to stay ahead of competitors by incurring lower costs; it protects the firm from influential buyers as they only have power in reducing costs; it wards against suppliers averting power by having the ability to adjust to increases in material costs; the firm enjoys barriers to entry through economies of scale and low pricing; and finally, the risk of substitutes is reduced (Porter, 1998).

The differentiation strategy entails providing a product or service that is clearly distinguishable from others through, for example, the use of advertising, technology, added features, customer service, exclusivity or after-sales service (Porter, 1998). This position protects the firm from competitive rivalry through brand and product loyalty, reducing the price sensitivity of consumers. The unique nature of the product/service and customer loyalty associated with the differentiation strategy, act as barriers to entry. The firm can charge higher prices making it less vulnerable to the power of suppliers. The firm enjoys limited buyer power and there is little threat of substitutes, as alternatives are not freely available (Porter, 1998).

The last generic strategy is focus. This involves choosing a very specific target market that is individual, geographical or technology driven (Porter, 1998). In this way, the firm is able to focus all its efforts on the chosen market and provide a product or service that far outweighs competitors' efforts whose attention is more broadly applied and

resources more widely scattered (Porter, 1998). In doing so, the firm inadvertently accomplishes differentiation, or lower costs, or both, by acting within the best interests of its focus group (Porter, 1998).

According to Ansoff (1965), strategy is the "…common thread among a corporation's activities, products and markets. Strategy was (is) the rule for decision-making that links a corporation's key elements". Ansoff (1965) is the creator of the 'adaptive search method' and takes the approach that strategy is a 'problem' that needs to be resolved. In order to find an appropriate resolution, Ansoff (1965) explains that decisions need to be made. These decisions can be either 'strategic', 'administrative' or 'operating' in nature. The main activity of his strategic decisions category is choosing a mix of products (goods and services) and markets (customer segments) from his developed matrix (Ansoff, 1965).

Mintzberg, Ahlstrand and Lampel's (1998) *Strategy Safari* has been acknowledged for its powerful contribution to current strategy theory, as we know it today. They (1998) describe strategy using the analogy of three blind men attempting to describe an elephant (Mintzberg et al., 1998). Strategy is vast, complicated, multifaceted and individual understandings are biased by personal perspective. To elaborate, they (1998) define strategy using 'the 5 P's of strategy': in that strategy is a plan, pattern, position, perspective and a ploy of sorts. Their greatest contribution, however, lies in the way they isolate and explain the ten schools of thought on the topic, organised according to defining characteristics. They (Mintzberg et al., 1998:3) describe the first category as being "prescriptive" as it focuses on how a strategy should be devised. The schools of thought in this category include Design, Planning and Positioning. The second is the "descriptive" group, which discusses the process of strategy formulation as it usually occurs. The schools of thought included here are Entrepreneurial, Cognitive, Learning, Power, Cultural and Environmental (Mintzberg et al., 1998). The concluding category includes the last school of thought only, that being Configuration, which deals with attempts to break the process of strategy planning into predefined phases (Mintzberg et al., 1998).

Hamel and Prahalad (1989) are of the opinion that when strategy is developed by the elitist top management of a business, creativity is difficult to achieve. This is mainly

because there are physically insufficient people in those levels of management to think of comprehensive ways of "challenging conventional wisdom" (Hamel & Prahalad, 1989:76). Too often the strategy for tomorrow is based on what happened today. They encourage management to involve all employees to devise ways of making the business more competitive. Hamel & Prahalad (1989) also stress that strategic management need to have the courage to steer their companies toward achieving objectives that fall far outside existing planning and resources. They conclude that top management's general approach to strategy in 'playing it safe' and achieving incremental targets based on past performance is a reflection of their lack of confidence in their ability to get the whole organisation excited and involved in a challenging new direction. Thus, to achieve organisational global leadership, top management are advised to cultivate self-confidence within the organisation to achieve difficult goals and to nurture a focus on the main activities aimed at achieving them (Hamel & Prahalad, 1989).

1.9.4 Operations design

Deciding upon and defining business strategy is imperative for corporate success. However, it is meaningless unless it is actually implemented. Implementation involves action and well-coordinated resources, all of which fall under the general term of 'operations'. The design of such operations is as important as the function itself. Finneston (1987) defines design as follows: "… the conceptual process by which some functional requirements of people, individually or en masse, is satisfied through the use of a product or of a system which derives from the physical translation of the concept". Design activities can be summarised using the Four C's of Design, namely creativity (designs need to be new), complexity (decisions to be made often involve several variables and concerns), compromise (it may not be possible to achieve all requirements) and choice (deciding how to achieve objectives) (Pycraft et al., 2003:120).

The design of products/services should be directly integrated within the design of the process intended to produce them, as changes in the one design will directly impact the other (Pycraft et al., 2003; Hill, 2005).

The activity of design regarding products and services transforms concepts into specifications through an intricate process of elimination, divided into specific stages

(Pycraft et al., 2003). The questions posed at each stage query the feasibility, acceptability and vulnerability of each design option (Pycraft et al., 2003).

Hill (2005) clearly defines the process of product and service design and development as including these stages: generating ideas; screening ideas; a feasibility study; preliminary design and development; testing prototypes; market sensing and testing target markets; and the final decision.

There are various kinds of processes to chose from when designing a system, the appropriateness of which is determined by whether a product or service is being offered (Pycraft et al., 2003). The manufacture of a product usually entails a combination of project, jobbing, batch, mass/line/flow, cellular production and continuous processes (Pycraft et al., 2003; Hill, 2005). By contrast, service operations often fall into the categories of professional services, mass services or service shops (Meredith & Shafer, 2002; Pycraft et al., 2003; Hill, 2005).

1.9.5 Operations management

Once operations have been thoroughly designed, they need to be implemented and managed to achieve the overall corporate strategy. Operations Management encompasses the way in which businesses produce products and services (Pycraft et al., 2003). The 'Operations Function' of the business is to organise and manage resources associated directly with the production of products and services (Pycraft et al., 2003).

Every operation, whether simple or complex, involves "The Process of Transformation" (Pycraft et al., 2003). An operation comprises various inputs, which are used to transform or are themselves transformed into outputs (Pycraft et al., 2003). Examples of transforming inputs include human resources, capital, land and energy; transformed inputs are raw materials, information and, in the case of services, the customers themselves (Krajewski & Ritzman, 1999; Pycraft et al., 2003). The transformation process/system involves 'materials processing', 'information processing' and 'customer processing' (Pycraft et al., 2003:14). It adds value to inputs by: facilitating change, be it physical, 'sensual', or psychological; providing convenience such as delivery and storage; or by supplying a professional opinion in the case of medical examinations or financial

advice (Meredith & Shafer, 2002). The results of this process are products and services which meet the specific needs of the target consumer.

Krajewski and Ritzman (1999) explain that the input-transformation-output process can be applied to the organisation as a whole, or to the activities of each department delivering to customers both inside and outside the organisation. There are several types of operations often distinguished by measures such as volume, variety, variation and customer contact (Pycraft et al., 2003). Each type of operation will vary in terms of 'repeatability', 'specialisation', 'systemisation', 'capital intensity', 'low unit costs', 'flexibilty', 'capacity', 'utilisation of resources' and customer 'waiting tolerance' (Pycraft et al., 2003:23).

1.9.6 Performance measurement

Striving toward productive operations, which add value with every effort, can only be achieved if current performance is measurable and comparable to goals set during strategy development. Performance measurement entails identifying what needs to be measured, setting appropriate targets and then looking for ways to reduce the gap between what is expected and what is happening Hill (2005).
Traditionally the dimensions focussed on when measuring performance include price, quality conformance, delivery speed, delivery reliability and service or product range.

When measuring price, one looks at employee cost per unit, return on inventory and capital investment and overall overheads per unit (2005). Various intricate cost variance tools and frameworks have been developed and are available to assist in comparing target costs (based on past figures or engineering estimates) and actual costs (Meredith & Shafer, 2002).

Quality conformance measures include percentage defects, returns, complaints and levels of waste (Hill, 2005). The products manufactured are inspected and the production processes monitored using statistical process control (Pycraft et al., 2003).

Delivery speed entails measuring lead times and reliability looks at the percentage of successful deliveries and whether these were on time (Hill, 2005). Finally, service or

product range measurement investigates the efficiency of stock control and the ability to provide the product or service when it is demanded (Hill, 2005).

The Balanced Scorecard developed by Kaplan and Norton (1996) has become an increasingly popular tool to measure performance as it offers a comprehensive set of measures against which a business can assess itself. As show in Figure 2 below, there are four key areas of measurement (Kaplan and Norton, 1996):

- Financial: profitability measures such as return on equity, return on investment and economic value attained.
- Customer: customer satisfaction, growth and retention.
- Internal business: quality, response times and process ratios.
- Learning and growth: employee retention, productivity and motivation.

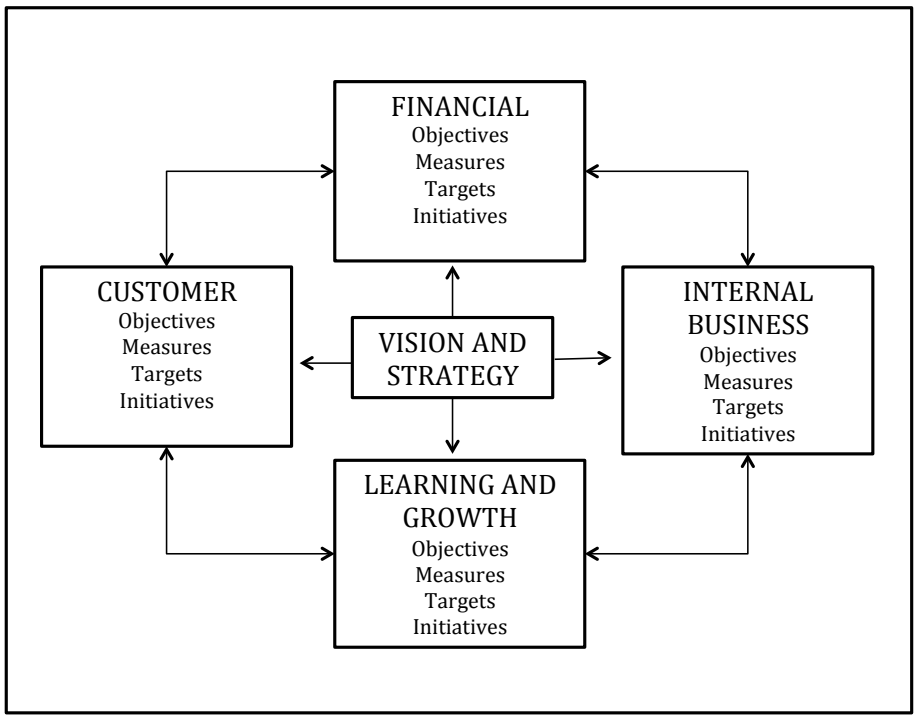

Figure 2: Balanced Scorecard (Kaplan and Norton, 1996)

1.10 Research design and methodology

There are many research methodologies and designs that are used for various types of research. Yin (1994:2) explains that research design is "…the logic that links data to be collected (and the conclusions to be drawn) to the initial questions of a study".

Chapter 1: Scope of the research

Cooper and Schindler (2012:127) describe the essentials of research design in the following way:

- It is, "An activity- and time-based plan";
- The plan is focussed on answering the research question;
- It offers guidelines for choosing sources and "types" of information;
- It provides an opportunity to understand and explain the various relationships between the variables in the study; and
- It is a formalised approach for research activities.

The research design and methodology chosen for the purposes of this thesis were informed by the design mapping process developed by Mouton (2009). The final design and methodology was decided upon as a result of a structured process of elimination after considering all the options available. This section will explain the reasoning behind the final selection.

Firstly, the type of study needed to be defined. It became clear that there are two main areas of study to consider, the first being empirical, and the second non-empirical.

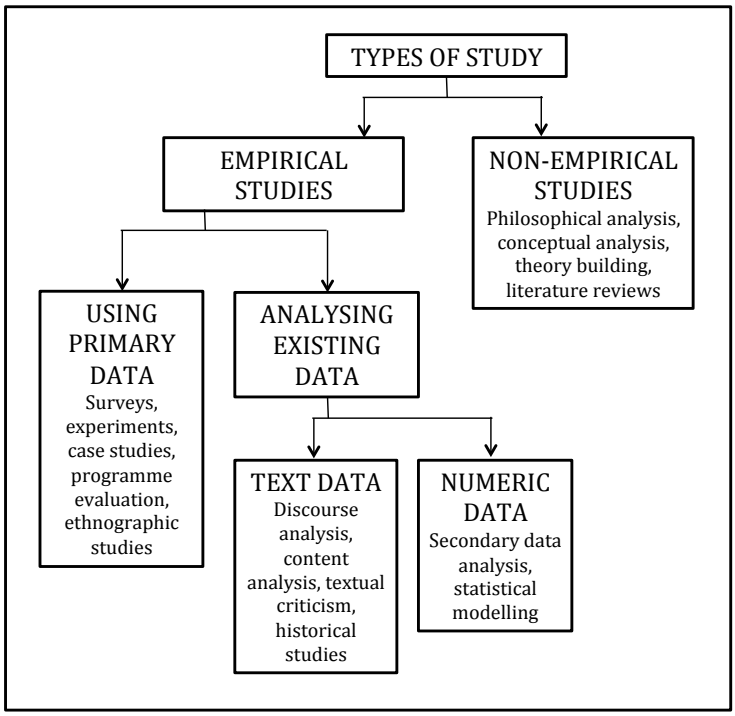

Figure 3: A typology of research design types (Mouton, 2009)

Empirical research, as shown in Figure 3 above, generally involves a quantitative enquiry involving numeric analysis of primary or existing data. In the case of primary data, the researcher herself or himself collects the data through various means including surveys, experiments, case studies, etc. Analysing existing data entails studying already captured data in an attempt to find meaning and answers. The data can be either textual or numeric, but often involves a combination of the two and includes, but is not limited to, discourse analysis, content analysis, textual criticism, statistical modelling and other secondary data analysis techniques (Mouton, 2009).

Non-empirical research is often qualitative in nature and focuses on gaining an acute understanding of certain strategic concepts, interactions, relationship and issues. Questions used inquire as to meaning, plausibility and suitability, rather than for fact-finding and substantiation, as in the case with empirical research (Mouton, 2009).

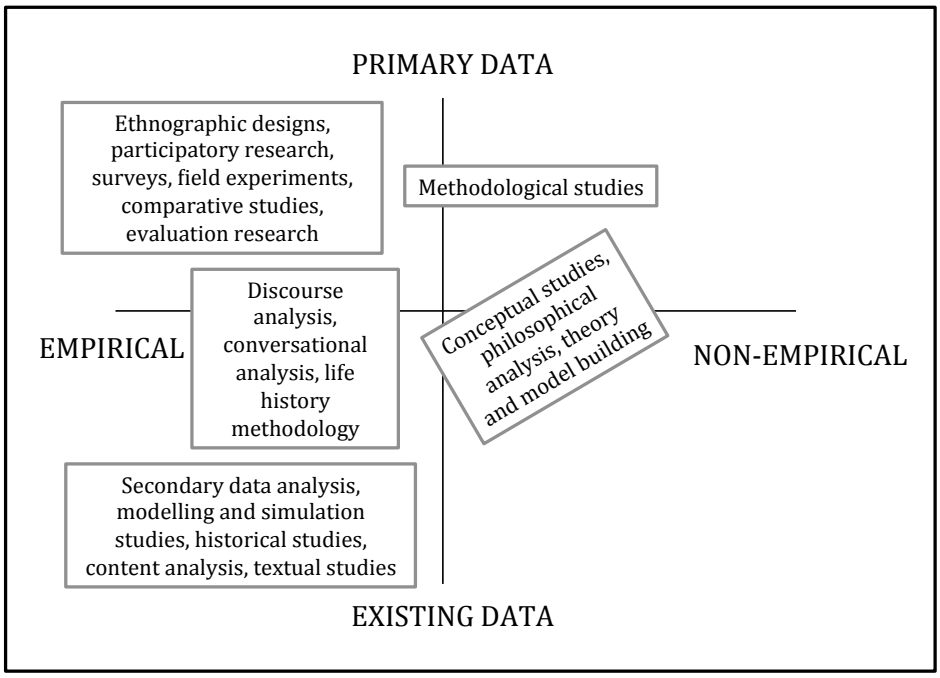

Figure 4: The relationship between the choice of study and the type of data (Mouton, 2009)

The relationship between the type of study and the nature of the data involved is examined more carefully in Figure 4 above, where the various design options are mapped. Empirical studies, through the collection of primary data, generally include ethnographic designs, participatory research, surveys, experiments, etc. Discourse analysis, conversational analysis and life history methodology include the collection of data and the analysis of existing data. Secondary data analysis, modelling and simulation

studies, as well as historical studies, fall purely into the arena of empirical studies, using existing data. Interestingly, it can be seen that in reality research often fails to fall neatly into categories, as in the case with conceptual studies, philosophical analysis, theory and model building. These types of approaches can be empirical or non-empirical (depending on the nature of the research) and can involve primary data collection in combination with consideration of existing data (Mouton, 2009).

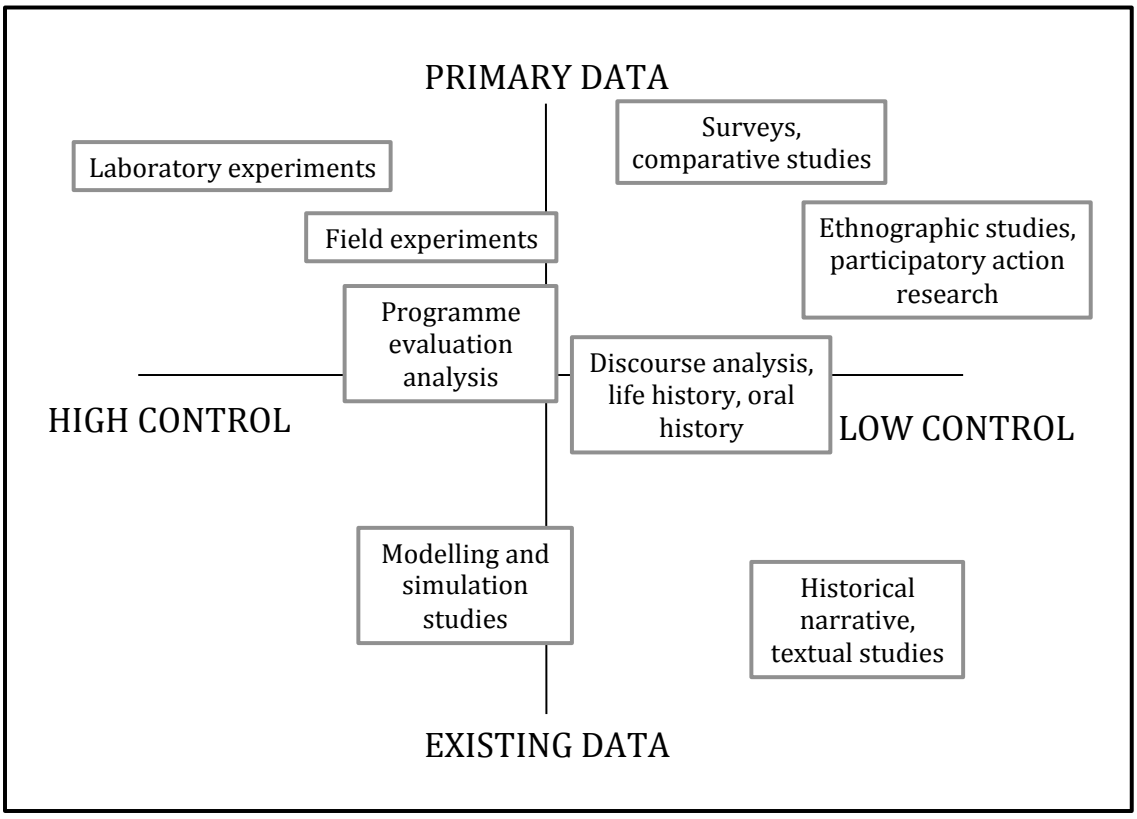

Figure 5: The relationship between the type of data and the related level of control (Mouton, 2009)

The direct consequences of the choice of primary versus existing data, in terms of control, is mapped in Figure 5 above. Laboratory experiments allow a high degree of control, while field experiments, modelling and simulation offer lesser control. Surveys and discourse analysis offer minimal control, while participative action research, narrative and textual studies offer even less (Mouton, 2009).

After studying the above-mentioned relationships and considering the research objectives of this thesis, the researcher decided upon a research design that combines empirical and non-empirical enquiry, combining content analysis, interviews and literature reviews.

The reason for selecting these research methods lies in the nature of the research questions. Each question and, by extension, each sub-question, cannot necessarily be adequately answered using the same research method.

Table 1 shows the research questions, the research design and methods planned to answer the questions.

Table 1: Research methods for each research question

RESEARCH QUESTION	RESEARCH METHOD
How does VM create value within an organisational setting?	
How is VM traditionally implemented within an organisation?	Literature review and interviews
In what ways has VM been applied creatively?	Literature review and interviews
What type of improvement does VM typically enable?	Literature review and interviews
What magnitude of improvements can be expected?	Literature review and interviews
Can VM aid in strategy development and the implementation thereof?	
How can VM facilitate strategy design and implementation?	Literature review and interviews
What advantage is gained by using VM in strategy design?	Literature review and interviews
How does VM impact on employee motivation when implementing the designed strategy?	Literature review and interviews
What magnitude of improvements can be expected	Literature review and interviews
In what ways can VM improve the operations design process within an organisation?	
How can VM facilitate operations design within an organisation?	Literature review, interviews and content analysis
What advantage is gained by using VM in operations design?	Literature review and interviews
What magnitude of improvements can be expected?	Literature review and interviews
How could VM methods impact on operations management activities?	
How can VM facilitate operations management within an organisation?	Literature review and interviews
What advantage is gained by using VM in operations management?	Literature review and interviews
What magnitude of improvements can be expected	Literature review and interviews
Can VM improve the effectiveness and efficiency of performance measurement?	
How can VM facilitate performance measurement within an organisation?	Literature review and interviews
Will VM methods improve the effectiveness of performance measurement?	Literature review, interviews and content analysis
Will VM methods improve the efficiency of performance measurement?	Literature review, interviews and content analysis
What magnitude of improvements can be expected	Literature review and interviews

1.11 Ethics guidelines/approval

Potential ethical issues that could arise from this research include the exploitation of interview candidates, the misrepresentation of data and information and plagiarism. However, the research will not harm human participants, client organisations, health and safety matters, the environment, publication rights nor threaten the ethics policies of institutional research.

According to Spencer et al., (2003:11), the quality and integrity of the research will be safeguarded by ensuring that:

- Findings are credible;
- Knowledge has been enhanced;
- The evaluation addresses the original purpose;
- The evaluation appraisal is clear;
- The research design is defensible;
- Data collection is thoroughly and methodically carried out;
- The formulation and approach of the analysis has been adequately explained;
- Contexts of data sources are retained and portrayed;
- There is diversity of perspective and content;
- Sufficient detail, depth and complexity of data was conveyed;
- The links between data, interpretation and conclusions are clear;
- Reporting is clear and coherent; and
- The research process is carefully documented.

Informed consent will be obtained from participants through their completion of a consent form prior to the interviews.

The transcribed interview will be sent to each participant before handing it in to ensure that they are satisfied that their views have been adequately represented.

The research will be conducted using electronic media and devices so the impact on the environment will be limited.

There are no conflicts of interest relating to the student and supervisor in this research; and no other parties will benefit from the research.

The author is aware of what plagiarism is and that it is illegal to use the ideas and knowledge of others without correct citation. The Harvard referencing system has been studied and implemented when compiling this thesis.

1.12 Chapter overview

Chapter 1 – Scope of the research. This chapter defines the extent and possibility of the proposed research.

Chapter 2 – A holistic perspective of the research environment. In this chapter, the environment in which the research will be conducted is examined.

Chapter 3 – Literature review. This chapter provides an extensive review of the current body of knowledge pertaining to VM-oriented business model design and implementation.

Chapter 4 – Research design and methodology. The research design and methodology to be implemented are motivated; and the key framework will be developed.

Chapter 5 – Interpretation of the literature in Chapter 3 will be compared to interview responses and the results of content analysis.

Chapter 6 – Conclusion and recommendations.

1.13 Risk analysis and contingency plan

The following situations are assumed to have a negative impact on the research to be conducted. They will be individually discussed and a relevant contingency plan will be outlined.

- The computer on which this thesis will be typed could prove to be unreliable. The author is fortunate enough to have access to a backup computer if necessary.
- The storage device used to back up the thesis could become corrupted. To avoid this, the author will save the thesis on several external storage devices, as well as on the computer itself. All files will be stored in separate locations. These will be updated regularly.
- One or more of the interviewees could suddenly become unavailable for the interview process. The author will avoid the negative impact of this scenario by providing a buffer through interviewing more specialists than necessary.
- The impact of unforeseen changes in the researcher's financial position will be mitigated by support offered by personal contacts. The author also plans to investigate available academic funding opportunities.

1.14 Schedule

The following schedule was planned shown in Table 2.

Table 2: Research schedule

Schedule	
Date	**Key activities**
June	Compile research proposal
July	Write Chapter Two (Holistic perspective of research environment)
August and September	Write Chapter Three (Literature review)
October	Write Chapter Four (Develop framework)
November	Write Chapter Five (Validate framework)
December	Write Chapter Six (Conclusion and recommendations)

Chapter 2: Research environment

This chapter is the second phase of the research.

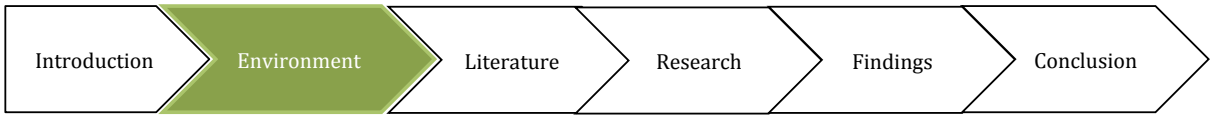

Figure 6: The second phase of the research

2.1 Introduction

The research environment is focussed on the landscape of start-up businesses and the expansion of units within greater businesses in the South African context.

2.2 Start-up businesses

Small business ventures have quietly been contributing to the development and betterment of society since the establishment of civilised man. From as early as between 10 000 and 3000 BC trading on a small scale has been a way of life for many and was for a long time the heart of independent (non government) commerce. Intricate systems of barter transformed for convenience sake to even more complicated systems of currency where families worked together in the trade in which they were born. As society evolved and with the help of the Industrial Revolution, it became possible for businesses to grow quickly and sustainably as automation became dominant. From that point, the private sector became dominated by corporations who themselves, employed thousands of people to manage the machines and all that came with them. During this time, "start-ups" and small-established businesses struggled and those that succeeded went through a process of evolution to redefine themselves and stake their claim. For a long time corporations have dominated economic conversation; however, over the last few years, it has not been possible to deny the importance and contribution of start-ups and small businesses.

It is no surprise that entrepreneurs and their small businesses have become the focus of many discussions relating to economic growth. According to a study conducted by Abor and Quatey (2010) during which they contrasted the nature and struggles of small businesses in South Africa and Ghana, they found that in the Republic of South Africa,

50% of GDP is contributed by small businesses (52 to 57%) and they provide roughly 61% of the employment in the country. Gravely, despite this undeniable contribution to society, most start-ups fail before they have an opportunity to do so. Olawale and Garwe (2010) estimate that the failure rate of new businesses in South Africa is as high as 75%. The pressing question is obviously: why is this figure so high and what can be done to reduce it?

In most cases small businesses begin as the dreams of entrepreneurs. Since as early as 1912, the likes of Schrumpeter began formally acknowledging the importance of entrepreneurship and its vital contribution to economic development (Thurik & Wennekers, 2004:140). The innovation and creativity of purpose adopted by entrepreneurs in their attempt to be noticed, positively challenges existing market leaders to keep up to date with changing technology and consumer needs (Thurik & Wennekers, 2004:140). This unique process was defined as "creative destruction" in the Shrumpeter Mark I regime (Thurik & Wennekers, 2004:140).

Mazzarol, Volery, Doss & Thein (1999:48) describe entrepreneurship as "…the driving force in the modern economy". They go on to comment that, while big corporations have conformed to a trend of "downsizing" and initiating redundancies due to automation and recession trends, small businesses have intervened and facilitated job creation and new ventures into unexplored territory.

The intimate nature of the relationship between the start-up and (eventually) small business and its owners often makes it difficult to distinguish them from one another. When asked to describe the characteristics of a small business, many find it more useful to describe the personality traits of the entrepreneur.

In an attempt to define the characteristics of entrepreneurs, Gupta & Fernandez (2009:311) performed an extensive study across India, Turkey and the United States. They found that the common characteristics of entrepreneurs across all three include: having curiosity; having the need for power; being adventurous; being forceful; having leadership and analytical ability; being competitive; being creative; having a high need for autonomy; desiring responsibility; being trained in business; being ambitious; having a strong need for achievement; and being well informed dominant, aggressive,

independent, intelligent, persistent, objective, decisive, self-controlled, intuitive, self-confident, authoritative, understanding, frank, self-reliant and competent.

2.2.1 Strategy

The strategy adopted by start-ups will naturally differ in nature to those of large corporations. In some cases, a lack of education and exposure to theory will limit the sophistication of strategy adopted, while in other cases, mere necessity will dictate the way forward. Most successful "start-up" businesses have found a way to satisfy a particular need in society and they do it very well. However, success is sometimes short-lived, as "start-ups" have been known to struggle to adapt to sudden increases in demand or to facilitate substantial and sustained growth. Thompson (1999) addresses this very issue by saying that the key challenge for entrepreneurs is to manage the tactical and structural changes needed for growth to occur. He explains that developing a strategy that takes advantage of available resources, skills and abilities, while managing them in order to meet the desires of stakeholders, is imperative. The inevitable limitation of resources forces the entrepreneur to prioritise and purposefully direct efforts. Every opportunity cannot possibly be pursued, and for this reason a strong focus is important. The proper management of choice and mix of resources and effort is often what separates the successful from the rest.

Thompson (1999) earnestly warns that once a successful strategy for market share and innovation is identified and implemented, the stronghold attained must be sustained and the strategic position continually improved upon. He importantly reminds entrepreneurs that they function in an environment where the only constant is change. This involves mastering the skills of continuous improvement (Thompson,1999). Entrepreneurs must develop the ability to improve what needs to be improved, and reengineer what is no longer bringing the required return. Thompson (1999) refers to these processes as being "single-loop" and "double-loop learning" respectively. "Single-loop learning" involves maintaining a current position in a changing environment, while "double-loop" learning entails innovation and gaining additional competitive edge.

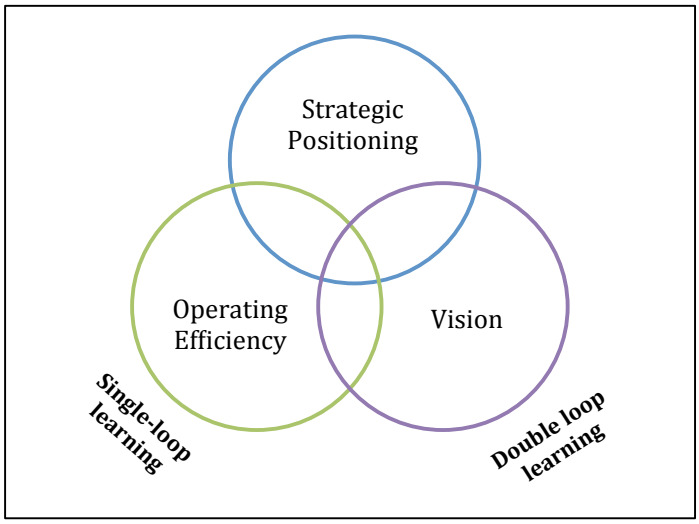

Figure 7: The entrepreneurial organisation (Thompson, 1999)

The interaction of these two learning types is portrayed in Figure 7. It depicts the concept that, for success to be achieved, the entrepreneur must balance these elements: strategic positioning (market share within the greater external environment); operating efficiency (the effective use of resources); and vision (strategic direction and values), while aggressively pursuing single and double looped learning. It is very important that the entrepreneur source and attain the needed resources, exploit internal skills and abilities, then strategically take advantage of all opportunities presented (Thompson, 1999).

2.2.2 Reasons for failure

As Thompson (1999) explains above, a balance must be maintained between the three spheres. The unfortunate failure experienced by so many entrepreneurs often occurs when the three spheres are not balanced. For example, if there is no overlap between any of the spheres it indicates that products and services are out of line with market requirements and that the vision of the business is out of touch with the market and internal resources (operations) (Thompson, 1999). There are very few businesses operating in this manner and it's predicted that they stand very little chance of sustained success (Thompson, 1999).

It is far more common to find one sphere out of place. In the situation where overlap is found between the strategic positioning and vision sphere, the entrepreneur is informed and understands the needs of the market and so lines up strategy to achieve maximum

market share; however, his operations are not well planned and controlled. This often results in low or unstable levels of quality and consistency, if any. Many small businesses do not have access to the necessary infrastructure needed, or the entrepreneur is not properly trained to manage this area of the business. An entrepreneur finding himself in such a situation is probably spending most of his time putting out fires rather than anything else (Thompson, 1999).

In the situation where there is overlap between operating efficiency and strategic position, but a disconnect from vision, things often seem to run smoothly with little effort and intervention (Thompson, 1999). In this case often successes are undervalued, resources are not used efficiently and reasons for failure are difficult to isolate (Thompson, 1999). This state will most likely continue until the environment changes even slightly when more or none of the spheres align (Thompson, 1999).

When only the operating efficiency and vision spheres are aligned, it is clear that the business produces products and services that are not in line with the needs of the market, irrespective of how effectively and efficiently they are produced.
The most common situation is where alignment between all spheres is initially established and maintained, but over time these spheres drift apart.

This sentiment is confirmed by Abor and Quatey (2010) when listing their main reasons for failure: a limited access to necessary technology and the global market; restricting legislation and "red-tape"; inefficient internal processes and controls; a lack of management skills, training and experience; and, most devastating, a lack of access to funding.

2.2.3 Finding finance

Finding finance has always been a struggle for new businesses across the globe. However, the Business Environment Specialists (SBP, 2014), claim that the scope for funding in South Africa is less hostile than imagined. Most small businesses included in their study, made use of bank credit/overdraft facilities, bank loans and lease agreements. This shows that the banking sector within South Africa seems to be supporting entrepreneurs and their small business ventures (SBP, 2014). The next most popular source of funding was found to be internal funding. In most cases, retained

earnings showing profits made are, to a large extent, reinvested in the business venture itself (SBP, 2014). The other popular source of internal funding was shown to have come from personal relationships manifesting in loans from friends and family (SBP, 2014). Interestingly, the report shows that, despite efforts made by government in issuing grants, only 6% of those small businesses included in the survey received these grants or subsidised loans (SBP, 2014).

2.2.4 The benefits

The success of entrepreneurs can result in stable small to medium enterprises (SME) operating in the private sector and contributing successfully to job creation and poverty alleviation. More and more, the need and benefits of small businesses within growing economies are being acknowledged. In fact, Mbonyane and Ladzani (2010:550) go as far as to say "…small businesses are the backbone of many economies across the globe". Abor and Porter (2010:218) refer to them as being "…efficient and prolific job creators, the seeds of big business and the fuel of national economic engines".

According to Rwigema and Karungu (1999) there are tangible benefits to an economy if SMEs are supported. These include:

- SMEs provide employment where big companies fail to do so;
- They are generally owned and controlled by local citizens and have the potential to include and support the families of entrepreneurs and other cultural systems;
- Often the products and services offered by SMEs are influenced by the traditions of the surrounding area, which allows them to offer a specialised service otherwise difficult to achieve by big business;
- SMEs offer variety and customisation throughout the country, which creates an increased opportunity for employment in less industrialised areas;
- The production of local goods and services in the SME context is likely to involve local inputs and technology, which is particularly beneficial in rural areas where communication and transport opportunities are scarce;
- SMEs allow for entrepreneurial experimentation and growth. Individuals are given the platform to try new ideas and test the market, while keeping the initiative on a small scale;

- SMEs require less management which, in most cases, is a costly resource to employ;
- With specific reference to rural areas, in a society where woman have not yet been freed from the effects of being withheld from the working environment in the past, SMEs allow the talents of these persons to be explored. This is often achieved through the production of crafts, knitting, sewing, pottery and other art forms, which are marketed and retailed in cities. The profits from these activities are then invested back into the community.

Harper (1984:13) cited by Luiz (2002) adds to this by saying that extensive research into industrialised countries shows that, despite the lower pay and working environments in an SME, most people prefer to work in an SME than in a larger firm. He continues, saying that SMEs will possibly be more robust in a recession, offering greater stability of employment than larger counterparts. This is due to the simple fact of diversity. SMEs typically serve a wide range of customers from various income levels and source their material from many different suppliers. Harper (1984) cited by Luiz (2002) also found that studies focussing on SMEs and large businesses throughout developed and developing countries reported that SMEs generally create employment for more labour per unit of capital and need less capital per unit to produce their output.

2.2.5 Unemployment in South Africa

The promise of job creation is particularly important within the South African context, where unemployment levels have been critically high for many years. According to Statistics South Africa (2014), unemployment in South Africa is at 25.2%. In 2013, it was the eighth highest in the world, according to the International Labour Organisation (2014). Kingdon and Knight (2004) summarise the situation in their study by saying that unemployment in the country is so widespread that an unemployed individual faces a high probability of remaining so, no matter the nature of their search activity. In a country where being employed is a privilege, every effort should be made to support and assist small businesses which are creating jobs for others.

The importance of supporting entrepreneurs through the process of growth has been acknowledged by the South African government, who have developed various mechanisms to do so. Before these support structures are investigated, it is important to

understand the definition of a small to medium sized enterprise (SME) within the context of the country

2.2.6 SME definition

In South Africa, the National Small Business Act of South Africa No. 102 of 1996 has provided a formal definition of an SME. Section 1(xv) and (xvi) of the Act describes a small business as being a

"…separate and distinct business entity, including cooperative enterprises and non-governmental organisations, managed by one owner or more which, including its branches or subsidiaries, if any, is predominantly carried on in any sector or subsector of the economy."
"...it includes any entity whether or not incorporated or registered under any law, which consists mainly of persons carrying on small business concerns. "

Due to the varying natures of small businesses, their defining attributes, namely number of full-time paid employees, total annual turnover and total gross asset value, have been set out according to sector in the Act. Table 3 shows an abbreviated version of the schedule in the Act and will inform the definition discussed in this chapter. According to the Act, a micro-firm has on average fewer than five full-time salaried employees, amasses an annual turnover of under R150,000.00 and owns assets to the value of less than R100,000. 00; a medium-sized business employs on average between 100 and 200 full-time employees, generates between R4 and R50 million turnover and has assets to the value of from R4 to R18 million, depending on the sector or sub-sector within the economy.

Table 3: Schedule of SME criteria (National Small Business Act of South Africa No.102 of 1996)

Sector or sub-sector	Size or class	Total full-time equivalent of paid employees *less than:*	Total annual turnover *less than:*	Total gross asset value *less than:*
Agriculture	Medium	100	R4.00m	R4.00m
	Micro	5	R0.15m	R0.10m
Mining and quarrying	Medium	200	R30.00m	R18.00m
	Micro	5	R0.15m	R0.10m
Manufacturing	Medium	200	R40.00m	R15.00m
	Micro	5	R0.15m	R0.10m
Electricity, gas and water	Medium	200	R40.00m	R15.00m
	Micro	5	R0.15m	R0.10m
Construction	Medium	200	R20.00m	R4.00m
	Micro	5	R0.15m	R0.10m
Retail and motor trade and repair services	Medium	100	R30.00m	R5.00m
	Micro	5	R0.15m	R0.10m
Wholesale trade	Medium	100	R50.00m	R8.00m
Commercial agents and allied services	Medium	50	R25.00m	R4.00m
	Micro	5	R0.15m	R0.10m
Catering, accommodation and other trade	Medium	100	10.00m	R2.00m
	Micro	5	R0.15m	R0.10m
Transport, storage and	Medium	100	R20.00m	R5.00m
	Micro	5	R0.15m	R0.10m
Finance and business services	Medium	100	R20.00m	R4.00m
	Micro	5	R0.15m	R0.10m
Community, social and personal	Medium	100	R20.00m	R5.00m
	Micro	5	R0.15m	R0.10m

2.2.7 Support from government

As mentioned earlier, the South African government has made several efforts to support entrepreneurs and their small businesses.

In the 2014 Republic of South Africa Budget Speech, the Minister of Finance Mr Pravin Gordhan, announced that:

- R6.5 billion rand will be allocated to the support of SMEs over the next three years;

- The turnover tax regime will be revised to reduce the tax burden on micro-enterprises;
- The graduated tax structure for small businesses may in time be replaced with a refundable tax compliance credit;
- The venture capital company tax regime and associated rules to acquire foreign capital are to be eased;
- The intellectual property rules will be revised; and
- Several grants have been made available, all of which will be tax exempt.

The Employment Equity Act of South Africa also makes exceptions for entrepreneurs and their small businesses. The Act came into being after the Apartheid regime was ended in South Africa. It was drafted to ensure that the "discriminatory laws and practices" which were in place during that time never occurred again; and to attempt to correct the "disparities in employment, occupation and income experienced within the national labour market" which occurred as a result thereof (Employment Equity Act, No. 55 of 1998, 1998:s1). There are various Affirmative action duties to be fulfilled by any employer who meets the definition of a "designated employer" as outlined in the Act (Employment Equity Act, No. 55 of 1998, 1998:s3). Some of these are:

- Employees must be properly consulted;
- An analysis of prescribed employment equity issues within the workplace must be completed;
- An employment equity plan must be prepared and a report to the Director-General on advancement made in implementing the afore-mentioned plan Act, and
- A manager must be designated to deal with employment equity matters within the firm.

The definition of a "designated employer" purposefully excludes entrepreneurs and start-up small businesses by allowing employers who employ fewer than 50 employees and who earn a total turnover of less than between R6,00 m and R75,00 m (depending on the sector or subsector in accordance with the Standard Industrial Classification Act) to be exempt from the Affirmative action duties laid out in chapter three of the Act (Employment Equity Amendment Act, 2014:22).

The Department of Trade and Industry has implemented various support structures for new businesses including the "Export Market and Investment Assistance (EMIA)" which specifically offers cash grants to promote the export of South African products (Business Environment Specialists; SBP, 2014). Other cash grants offered include, but are not limited to, these: training in technology and IT; research and development; underwriting export credit loans; supporting the manufacturing sector; capital investment support; facility upgrade support; and environmentally friendly activities (SBP, 2014).

2.3 Business Units

The second area of focus is the strategic business unit (SBU) within a large company. There are many similarities between the small start-up and a SBU, including authority over purpose and operations. The major difference, however, is that a SBU enjoys the support of the larger company, all its resources and combined knowledge and skills, whereas a small business is often dependent on the skills and drive of one or two people. In addition to this, the SBU sources all its funding for capital investment from the greater company, whereas a small business often has to source income from external independent sources such as banks and investors.

Figure 8 shows the SBU's position within the hierarchy of divisions in a major company in terms of autonomy and governance.

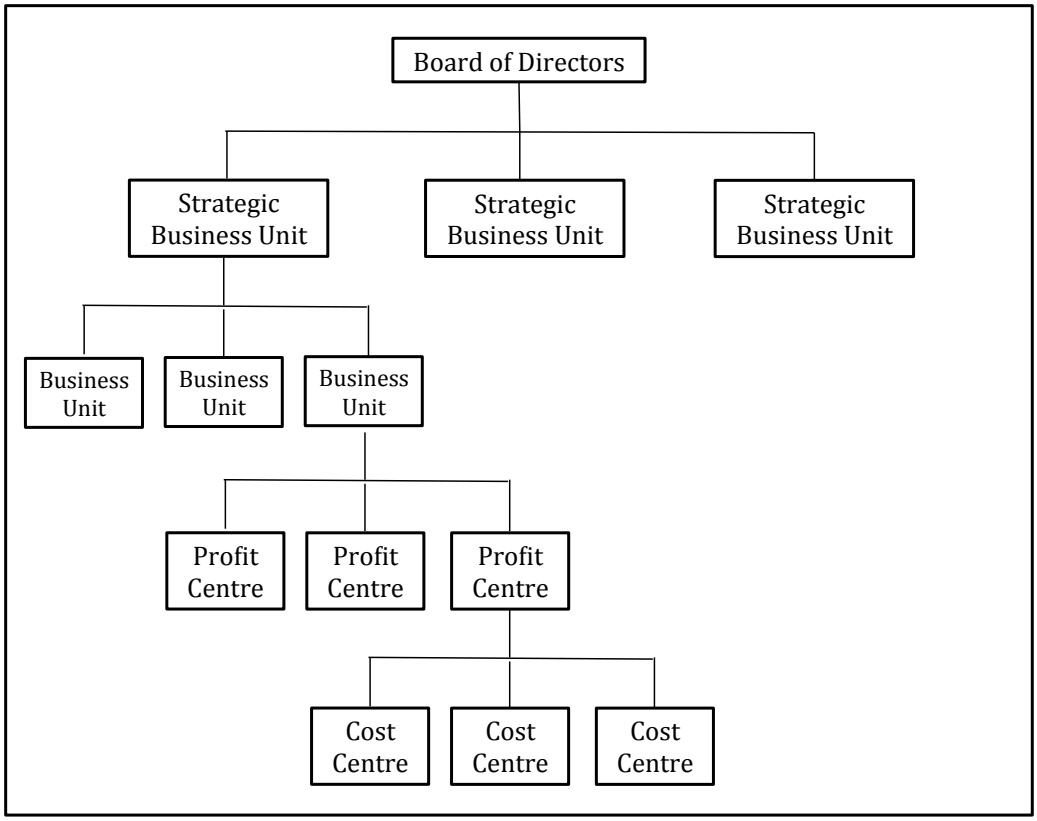

Figure 8: The hierarchy of company divisions

Starting from the bottom, the first element is the cost centre. The cost centre is a manufacturing or operations activity where strategic management is responsible for determining what is produced and what the inputs to the process are (Kaplan, 2010). Local managers have no decision-making power over quantity and pricing of materials, human effort, or the time it takes to manufacture each product (Kaplan, 2010). Their only responsibility is to produce the quantity and type of products as dictated by strategic management, in the most efficient way possible (Kaplan, 2010). Their performance is measured purely on the cost variances between actual and budgeted production (Kaplan, 2010).

Managers of profit centres have the same authority as that of cost centre managers, as well as control over the price and quality of inputs used. They can decide how products are manufactured within the capital facilities provided by strategic management.

On the third level is the business unit, where the manager has control over both production and sales (Kaplan, 2010). They have autonomy over decisions regarding what materials to buy, what products to produce, the required product quality and

quantity, as well as the price and how distribution takes place (Kaplan, 2010). However, they have no say over capital investment, instead focussing their actions on to creating value from the structures already put in place by strategic management (Kaplan, 2010).

Above the business unit is the strategic business unit (SBU). The manager of a SBU or investment centre has all of the responsibilities of a normal business unit as well as control over capital investment (Kaplan, 2010). The performance of these units is measured in terms of profitability of operations relative to capital investment, including well-known indicators, such as the return on investment, return on assets and economic value added (Kaplan, 2010; Leonard, Kruger & Moll, 2006).

The board of directors (BoD) is made up of a group of professional individuals voted into top strategic management positions by the shareholders of the company. It is their responsibility to manage the business in such a way that they create maximum shareholder value while strategically leading the company forward.

2.3.1 Corporate governance

In a multidivisional situation such as shown in Figure 6, the decision-making process and powers of authority need to be very clear and consistently applied (Moll, 1998). Corporate governance is based on two important relationships, namely, the one between strategic and operational management; and the activities of planning and control (Moll, 1998). The first answers the question of authority and responsibility and the second, the timing of accountability.

Either strategic management plays a fundamental role in the planning of activities of units before the fact, or they step back and allow operational managers the authority to plan, but they control the outcome by holding these managers accountable once the activity is completed (Moll, 1998).

From these relationships portrayed in Figure 9, four styles of leadership and governance can be isolated (Moll, 1998).

Figure 9: The dimensions of corporate governance (Moll, 1998)

The first leadership style is strategic planning governance, where the BoD develop strategic direction and complete planning activities on behalf of each unit (Moll, 1998). The second is strategic control governance where the BoD set specific targets to be reached and the unit is responsible for planning and implementing activities to achieve these targets (Moll, 1998). The third is operational planning governance where the operational manager assigns short-term activities to be completed. The fourth dimension is operational control governance where the operational manager sets short-term targets to be achieved but does not prescribe how they are to be realised (Moll, 1998).

For the purposes of this study, a strategic control governance style will be assumed, in that the SBU has authority over planning and finances its capital investments by sourcing funds from within the greater company. Traditionally the various SBUs compete with one another by presenting their proposals for expansion to the BoD which has a certain budget within in which to work. The proposal presented is usually the culmination of a strategic study of expansion options.

2.3.2 Strategies for growth

According to Koller, Goedhart and Wessels (2010) there are four general strategies for growth available to the SBU. These will now be discussed.
Firstly the efficiency of current operations can be improved. This entails analysing operating processes to identify and eliminate non-value adding activities and waste (Koller, Goedhart and Wessels, 2010). The most common approach is to adopt the philosophy of continuous improvement and to apply quality methods and tools in the process.

Secondly, it may happen that a SBU experiences a breakdown in machinery or other equipment causing a halt in operation procedures and, by extension, a loss of income. In this case, the SBU manager will need to decide whether to repair the damaged items or replace them with new ones in order to restore previous capacity (Correia, Flynn, Uliana & Wormald, 2003). Once the decision has been made, the manager will have to make efforts to source the required funds from the holding company.

Lastly, if operations are at their most efficient and the need for growth persists, managers could decide that adding new capacity is the answer, which is often referred to as green field projects (Rhodes & Wilkinson, 2006). Otherwise a brownfield project can be pursued, which entails merging with or acquiring an existing business.

Once the projects have been presented to the Board of Directors, they consult predefined criteria to establish which of the submissions are viable and will received the requested funding. There are various criteria to be considered, the main ones being:

- A question of strategic fit;
- A profitability study where the weighted average cost of capital is compared to the expected returns of the project; and lastly
- A consideration of timing.

The question of strategic fit is usually answered by looking at the structure of the holding company's business portfolio (Koller, Goedhart & Wessels, 2010). The investment portfolio is the "blueprint" of company strategy and the instruction guide on how value will be created through investing in capital (Koller, Goedhart & Wessels,

2010). This portfolio provides a scientific process for reviewing and selecting potential projects, as well as identifying whether existing projects have run their course (Koller, Goedhart & Wessels, 2010). The structure of the company portfolio can have a single focus or be diversified (Koller, Goedhart & Wessels, 2010). Some say that diversification is a safer option as projects in different business sectors have differing business cycles and, by extension, different timing of cash flows which provides stability (Koller, Goedhart & Wessels, 2010). Others feel that a focussed portfolio is more responsible as core competencies are developed and maintained. Which is better has been the topic of debate for some time. However, Koller, Goedhart and Wessels (2010) claim that it depends on the holding company and whether or not they are able to generate value from their investments. Each project presented to the board is inevitably evaluated against the portfolio. If it is in line with business focus, then the potential value to be obtained is analysed, if not, then the strategic business unit will have to go back to the drawing board to find other means of expansion.

2.3.3 Profitability studies

The potential value to be generated, better known as a 'profitability study', is rooted in the concepts of corporate finance and involves comparing the cost of the financing required for the projects with their expected returns (Correia et al., 2003). The cost of funding is represented by the holding company's overall weighted average cost of capital (WACC) (Correia et al., 2003). The funds to finance capital must be sourced from somewhere and, in most cases, costs money to obtain. The company traditionally has three main sources of funding to choose from. The first is to acquire additional interest-bearing debt such as debentures or long term loans with market-related interest rates (Correia et al., 2003). The cost of this capital is the interest or coupon to be paid and is generally the cheapest of the options, although it carries a large associated risk (Correia et al., 2003).

The second option is to issue preference shares, the cost of which is the dividend attached to the share. This may seem less risky than debt as dividends do not have to be issued regularly; however, the consequences of failing to issue a dividend must be considered. Firstly, it could cast doubt on company creditworthiness; and secondly, this type of share automatically attracts voting rights when dividends are in arrears, which could ultimately result in the dilution of control.

The final option is shareholder's equity. This is the rate of return to be achieved in order to preserve the value of the shares (Correia et al., 2003). In most cases, it is determined by calculating the expected dividend yield and is often the most expensive source of finance (Correia et al., 2003).

In practice, a combination of all three is generally managed according to the predefined capital structure of the company. However, as mentioned before, they do not all cost the same, so a weighted average cost (WACC) must be calculated (Correia et al., 2003). This is achieved by multiplying the cost percentage of each option with their weighting as per the capital structure, then summing the totals (Correia et al., 2003).

The expected returns of the project can be estimated using several techniques such as:

- The net present value (NPV);
- Internal rate of return (IRR);
- Discounted payback method;
- Accounting rate of return; and
- Economic value added (EVA).

The NPV, IRR and discounted payback method all make use of the discounted cash flows method and are rooted in the time value of money principle (Correia et al., 2003). The NPV involves discounting future cash inflows expected at the company's required rate of return and then deducting the actual cost of the project from the calculated present value (Correia et al., 2003). If this produces a positive figure, then the project is considered profitable (Correia et al., 2003).

The IRR is the discount rate at which the present value of net future cash flows equals the cost of the investment (Correia et al., 2003). If the IRR is greater than WACC then the project can be accepted, as the return is greater than the cost (Correia et al., 2003).

The discounted payback method is a rough indicator of risk as it looks at how long it will take for the company to recover the investment it put in to the project (Correia et al.,

2003). It involves looking at future cash flows and how many years/ months it will take to accumulate the initial investment amount.

The accounting rate of return is based on the ratio of average incremental net income and average investment. The average incremental net income figure is calculated by dividing the expected annual increase in net income by the economic useful life of the project. The ARR is compared to the return on investment (ROI) or return on assets (ROA) required by the company to determine whether or not the project should be accepted (Correia et al., 2003; Leonard, Kruger & Moll, 2006).

Finally, the EVA looks at the economic value of the project by taking the cost of capital into consideration when looking at normal accounting net profit after tax figures (Correia et al., 2003).

The last factor is one of timing. The directors will consider each proposal against the current capital commitments of the company and, if large projects are coming to a close, there is often more chance of the proposal being accepted than if the company has just invested large amounts of capital in new projects.

2.4 Conclusion

This chapter has provided a description of the environment in which the research has taken place. The main areas of focus are described as being start-ups and expanding strategic business units within the South African context. In both cases the functions of strategy development, finding funding and general impacts on profitability the will be discussed.

It was shown that there are many similarities between start-ups and strategic business units in terms of autonomy over purpose; however, there are also fundamental differences affecting strategy and operations. The first key difference is the type of support received by both. In the case of the start-up, the business and entrepreneur are directly exposed to the current economic climate and have very little in the way of protection from variable conditions. This unfortunately has historically resulted in the failure of many start-ups and has encouraged the government of South Africa to provide

various support structures to stimulate small business growth. Far less formal support is provided for strategic business units, as they usually enjoy the security of operating within a larger company setting and, in this way, they are buffered from market variations to some extent.

The second noticeable difference is the sources of income available to each. Start-ups rely heavily on self-supplied and external funding, while strategic business units traditionally source funding from the greater company in which they operate. What they do have in common, however, is the need to convince others to invest in their operations, using all means available.

Chapter 3: Literature review

This chapter is the third phase of the research.

Figure 10: The third phase of the research

3.1 Introduction

This chapter will focus on discussing performance management with specific reference to visual management. Various approaches to performance management are described in the literatures, however five activities seem to recur being: strategy formulation and implementation, performance measurement, improvement and quality management theory.

Once the traditional activities of performance management have been addressed, the dynamics of visual management as a contrast will be considered.

3.2 What is strategy?

3.2.1 Strategy formulation

Any venture, whether formal or otherwise begins with an idea that is nurtured and explored. From this original idea stems goals, vision and action plans for achieving what is set out. These intricate plans are formally referred to as 'strategies' and can vary profoundly from situation to situation.

Porter (1998) is well recognised for his contribution to the understanding of business competitive strategy. He explains in his book, *Competitive Strategy* that the heart of strategy development lies in analysing the business in terms of its environment. While acknowledging the impact of social and economic forces in the environment, Porter chooses to focus on the forces of the industry within which the firm operates (Porter, 1998). He feels that there are "five basic competitive forces" within any given industry. These combined forces dictate the level of competition and, by extension, the profitability of the industry, making them fundamental when formulating strategy (Porter, 1998). They include the threat of new entrants, the bargaining power of buyers,

the threat of substitute products and services and, finally, the bargaining power of suppliers (Porter, 1998).

As discussed in detail in Chapter 1, Porter (1998) identifies three generic strategies that can be used to defend the firm's position within a given industry and its related forces: cost leadership, differentiation and focus. He mentions that while it is possible to pursue a combination of the three, in most cases each one requires complete commitment to achieve.

According to Ansoff (1965:104), the concept of strategy appropriately describes the nature of the business and provides direction by narrowing the "selection process" to the most profitable prospects. Ansoff (1965:104) explains that, while objectives are important and set the standard for performance, they do not satisfactorily describe the "business of the firm". A "common thread" is required which describes the progression from current to future product markets (Ansoff, 1965:105). The common thread can vary in nature according to the nature and environment of the business. It can be defined either by manufacturing or engineering technologies, the market it serves, specific product or service characteristics, or by the customer profile and their range of unique needs (Ansoff, 1965).

Ansoff (1965) further explains that there are four identifiable components of strategy and, by extension, of the common thread. These will now be described.

The first component is the "product-market scope" that describes the specific industries in which the firm operates. However, this distinction is very broad, as a single industry can facilitate a number of different products, focuses, customers and technologies (Ansoff, 1965:108).

The second component relates to the "growth vector" and denotes the direction taken by the business in terms of its chosen "product-market" position (Ansoff, 1965:109). The growth direction options available are portrayed in Ansoff's (1965:109) matrix, as shown in Figure 11.

Product / Mission	Present	New
Present	Market penetration	Product development
New	Market development	Diversification

Figure 11: Ansoff's (1965) Growth vector

Ansoff (1965) explains the logic of the matrix, starting with "market penetration" which represents growth by improving market share for current "product markets". "Market development" below depicts new ventures for existing products and services, while "product development" focuses on options for new products and services (Ansoff, 1965). Lastly, "diversification" combines the two in seeking new products and markets for the business to explore (Ansoff, 1965).

The third component is to define the common thread by the specific opportunities available in the industry, as defined by the "product-market" and growth vector mentioned above (Ansoff, 1965). This represents the competitive advantage of the business and describes the "product-market" characteristics in order to establish strategic position (Ansoff, 1965). Ansoff (1965) describes these three specifications as the "triplet of specifications" and asserts that they represent the external environment approach.

The final component is "synergy", the businesses aptitude for gaining full advantage of a new "product-market", which can be either aggressive or defensive (Ansoff, 1965).

Hamel and Prahalad (1989) believe that company strategy should not only be devised by those in strategic management positions, but should rather involve the whole organisation. This is in order to tap into all available innovative ideas and opportunities for improving competitiveness, instead of restricting creativity of thought to a select few (Hamel & Prahalad, 1989). They conclude that the general approach taken by strategic management of setting targets based on past performance should be replaced by setting

challenging goals and inspiring confidence and excitement within every employee in the business to achieve them (Hamel & Prahalad, 1989).

Mintzberg, Ahlstrand and Lampel (1998) describing strategy in their book *Strategy Safari* using what they define as being the 5 P's"

- Plan: a road map showing how to get from where the business is now, to where it wants to be, by guiding and focussing decisions and actions (intended strategy). Unfortunately, the authors note that, in most cases, the plan is very seldom followed in practice.
- Pattern: the persistence of a certain type of behaviour such as constantly achieving market leadership in technology, or low prices. While the plan focuses on the future, the pattern analyses the past (realised strategy).
- Position: the pursuit of developing and producing specific products or services in particular markets.
- Perspective: this angle focuses on the intentions of the strategists themselves, as well as the overriding objectives of the business as a whole. The authors explain that, while changing position within perspective is relatively simple to achieve, changing perspective while attempting to sustain a certain position is far more challenging.
- Ploy: this is a premeditated scheme to outplay the competition, where actions are taken to mislead rather than add immediate value.

Their greatest contribution, however, lies in the ten schools of thought devised according to key characteristics and described below (Mintzberg et al., 1998).

The design school is without doubt the most popular view of strategy and focuses on how various strategies are developed and how the most appropriate is chosen and implemented: "a process of conception", as shown in Figure 12 (Mintzberg et al., 1998:30). Making use of the well-known SWOT analysis (strengths, weaknesses, opportunities and threats), this model attempts to align "internal capabilities and external opportunities" (Mintzberg et al., 1998).

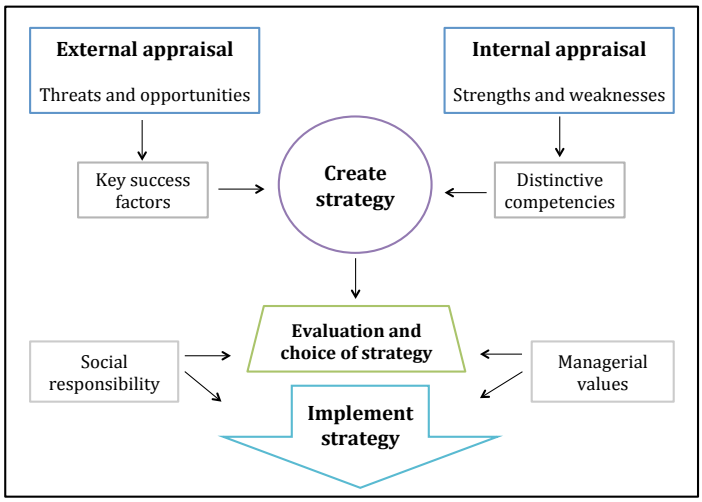

Figure 12: Basic design school model (Mintzberg et al., 1998)

The internal environment is difficult to see objectively and emphasis should be placed on experience rather than brief instances of strength (Mintzberg et al., 1998). The external environment deals with the impact of technology, the greater macroeconomic environment, as well as political and social circumstances, very much in line with Porter's five forces (Mintzberg et al., 1998).

Once the various strategy options have been designed, they need to be evaluated and the most appropriate one implemented (Mintzberg et al., 1998). Various considerations are taken into account when choosing the right strategy. Including consistency of purpose and feasibility, appropriate to the demands of the external environment and generally advantageous to the firm (Mintzberg et al., 1998). Lastly, once the strategy has been chosen, it must be thoroughly implemented (Mintzberg et al., 1998).

The planning school described by Mintzberg et al. (1998) is focused on the formal process of strategy planning performed by top designated management with a direct line to the CEO. It involves official procedures, training, analysis and statistics. In most cases, the model begins with a SWOT analysis and formalises the procedure using various techniques and checklists. Focus is put on setting objectives and developing sophisticated budgets and plans to achieve them (Mintzberg et al., 1998).

The main steps are as follows:

1. Set objectives: formal procedures are developed to thoroughly analyse and quantify the aims of the firm in order to establish control;

2. The external audit: as in the design school, once goals have been set, the external environment of the business is scrutinised for indications of future conditions using scenario planning and other strategic tools;
3. The internal audit: the strengths and weaknesses of the firm are assessed using formal techniques and checklists;
4. Strategy evaluation: the various strategy options are analysed and the most appropriate chosen using various tools such as ROI and risk analysis, all orientated to focus on quantitative measures of value creation;
5. Strategy operationalisation: this is where the strategy is broken down into sub-strategies and operational plans are broken down into categories of long, medium and short term;
6. Scheduling the whole process: the steps to achieve the strategy and the time frame in which they are to be completed are formalised.

   The positioning school (an analytical process) was, in many ways, built upon the design and planning schools. However, it diverted the focus from the process of developing strategies to the substance of the strategies themselves (Mintzberg et al., 1998). It also claimed that there is a limited set of strategies available for improving profitability in each industry and position (Mintzberg et al., 1998). Michael Porter is said to have been a fundamental player in this movement and opened the door to conversation by writing *Competitive Strategy* in 1980 (Mintzberg et al., 1998).

Over time, strategies in this school became generic stances within the economic environment, which was characterised as being highly competitive (Mintzberg et al., 1998). Strategy development became a task of analysing the internal and external environments and choosing a generic strategy which would most appropriately fit the situation, using tools of analytical reasoning (Mintzberg et al., 1998). In this way, strategies would already be formulated and tested in other contexts so would merely need to be adjusted and implemented, resulting in a market positioning determining strategy (Mintzberg et al., 1998). The progress of this school is said to have occurred in three waves, beginning with "military maxims", moving on to "consulting imperatives" and ending with "empirical propositions" (Mintzberg et al., 1998:90; 98; 104).

The entrepreneurial school takes quite a different focus in that the strategy is formulated in the mind of the leader in the form of long-term goals and vision

(Mintzberg et al., 1998). There is not a structured process for strategy formulation and the strategy chosen depends completely on the perceptions and experiences of the leader, whether developed originally or adapted from others' strategies (Mintzberg et al., 1998). There is a strong control element in this school, as the leader is the driving force in all implementation and action so that any revisions can be made when needed (Mintzberg et al., 1998). The overall vision is strong and often unwavering, but the means to achieve this end changes as the path unfolds, allowing the overall business to adapt to fast changing trends (Mintzberg et al., 1998). This school of strategy is often found in specialised markets, protecting it to some extent from the strong forces of generic competition (Mintzberg et al., 1998).

The cognitive school perceives strategy as a mental process born in the mind of the strategist in the form of perspectives, plans and reactions to the stimuli of the world (Mintzberg et al., 1998). The way in which these inputs are interpreted varies according to whether the "subjective" or "objective" approach is taken (Mintzberg et al., 1998:174). The objective approach involves the input progressing through many subconscious "filters" before being consciously interpreted by the strategist; while the subjective approach claims that the inputs are perceptions and interpretations experienced uniquely by the strategist (Mintzberg et al., 1998:174). In this school, it is believed that strategies are complex and difficult to perceive clearly and even more difficult to adjust, should the need arise (Mintzberg et al., 1998).

The learning school explains that because of the intricate and unpredictable nature of the external environment, combined with the complexity of strategy explained in the cognitive school, strategy is merely the accumulation of learning from experience over a long period of time (Mintzberg et al., 1998). Unlike the other schools, there are ideally many potential strategists within the business, all of whom present their accumulated learning to form the greater strategy (Mintzberg et al., 1998). The activity of learning comes from retrospectively analysing situations and identifying common trends in successes; and anyone is capable of doing so, as long as they are willing and have the resources to learn (Mintzberg et al., 1998). In this way, the role of leadership shifts substantially when compared to the other schools, as leaders are not solely responsible for developing strategies, but rather for guiding and supervising a group-driven strategy development process derived from the past experiences of all involved (Mintzberg et al.,

1998). Therefore strategies first present themselves as patterns and trends from past experiences and develop to become the guiding influence for future endeavours (Mintzberg et al., 1998).

The power school claims that strategy is driven and shaped by power and politics within the firm itself, and this power is used to navigate the external environment (Mintzberg et al., 1998). The strategies that develop through this process tend to be innovative and often fall closer to positions and ploys, rather than perspectives (Mintzberg et al., 1998). The "micro power" stance perceives the formulation of strategy as being the result of conversing, negotiating, convincing and sometimes even demanding within the firm, often presenting as "political games" between the ever shifting major players (Mintzberg et al., 1998:262). By contrast, "macro power" sees the firm as an entity safeguarding its interests by domineering or collaborating with other businesses within its environment. Its purpose is to meet its ends through the use of "strategic manoeuvring and collective strategies", creating networks and building worthwhile relationships (Mintzberg et al., 1998).

The cultural school explains that strategy formation is the result of "social interactions" based on the firm's shared values and goals. In most cases, people buy into firm culture through a subtle, unconscious process, although there have been instances where formal coaching is practised (Mintzberg et al., 1998). The fact that firm culture often forms subtly and through the interaction of many, results in members being unable to fully define their collective beliefs, let alone trace how they evolved (Mintzberg et al., 1998). This type of strategy is best described as being perspective, and involves a collective intention when allocating resources and skills for competitive advantage (Mintzberg et al., 1998). This school does not encourage a great deal of change in strategy; if any, it encourages an evolution of position within the overall business strategy (Mintzberg et al., 1998).

The environmental school sees the firm's environment as being the major determinant of its strategic course and explains that the firm must be able to adjust to external forces in order to remain relevant, as those which fail to adapt and respond timeously unfortunately do not survive (Mintzberg et al., 1998). The role of leadership is thus focussed on interpreting and forecasting changes in the environment that will impact on

the business, as well as internal actions to withstand such forces (Mintzberg et al., 1998). This theory explains that businesses find their place in the market and function successfully until their needed resources are exhausted or the environment becomes too adverse, in which case they cease operations (Mintzberg et al., 1998).

The configuration school takes the angle that, generally, a business goes through phases of various structures and characteristics, repeating responses to the relevant context and the time frame, based on an appropriately developed strategy for that period (Mintzberg et al., 1998). These stages of supposed stability, are disrupted by an internal process of transformation that propels the business into a new configuration (Mintzberg et al., 1998). The relationship between the timing of configuration and transformation can be described as "organisational life cycles" (Mintzberg et al., 1998:305). The role of the strategist in this school is both to identify and achieve stability when stability is required and to facilitate transformation when it becomes necessary, minimising the destruction that such disruptions can result in (Mintzberg et al., 1998). This school believes that strategy formulation can be,

"...conceptual designing or formal planning, systematic analysing or leadership visioning, cooperative learning or competitive politicking, focussing on individual cognition, collective socialisation, or a simple response to the forces of the environment; but each must be found at its own time and in its own context" (Mintzberg et al., 1998:306).

3.2.2 Strategy implementation

Once strategies have been designed and formalised, the next logical step is implementation. Unfortunately, in many cases, strategy fails to be converted into actions that improve operations, relationships or overall position. Sterling (2003) has isolated the major causes of implementation failure as being the following:

- Unanticipated market changes: Strategy is formed based on certain external conditions. If the anticipated conditions change unexpectedly before the strategy is implemented, the strategy will probably become obsolete before it can benefit the firm. Sterling (2003) suggests that strategy developers should identify the conditions that will have the greatest impact on the firm and focus on ways to adapt swiftly to possible changes. He also recommends that the "unknowns" must

be acknowledged and, as a result, be more closely monitored than other conditions. He adds that strategy needs to be dynamic and ideas of direction must be discarded when new circumstances arise, as there is no room for sentimentality.

- Effective competitor responses to strategy: Before the strategy is implemented, the firm's leadership must consider how major competitors will respond to it and have the necessary contingency plans to minimise the impact thereof. Sterling (2003) advises that a study of prior behaviour, market positions and style of management should be conducted to inform contingency plans.
- Application of insufficient resources: It does not matter how sophisticated or appropriate the strategy is, if there are not enough resources available for thorough implementation, planned success will not be achieved. Sterling (2003) suggests that a financial evaluation of key strategies be performed alongside their development to ensure that no unexpected value is eroded and that the necessary resources for implementation will be affordable.
- Failures of buy-in, understanding, and/or communication: It does not matter how appropriate the formulated strategy is, if those who are responsible for implementing it do not fully understand the strategy itself or how to support its success, it is likely to fail. Sterling (2003) suggests that the people responsible for implementing the strategy be involved in its design and that a communication plan is developed and implemented before the strategy itself is implemented.
- Timeliness and distinctiveness: It is sometimes the case that another business has the same or similar strategic angle and gets to the market first, causing the planned exploitation of circumstances to be far less effective, if effective at all. Sterling (2003) suggests that the core strengths of the firm be identified and made identifiable to the consumer, offering more than just obvious first moves.
- Lack of focus: Attempting to please everyone all the time inevitably results in very few being pleased at all. The offering to the market must be focussed and distinct to the consumer and competitors to avoid wasting resources on too many 'plates in the air', an endeavour which eventually must give in to gravity.
- Bad strategy: Sometimes the reason strategy fails, is because it was badly formulated to begin with.

Sterling (2003) concludes by saying that it is vital to carefully monitor all implementation initiatives, tracking progress and amending where needed. In doing so, the lines of accountability must be clear and enforced with vigour. He also mentions that "symbolic actions" can be very powerful and should be considered as a means to reinforce the key values and goals of the strategy, using physical settings or other VM tools. Sterling (2003) concludes by advising that information technology be closely aligned with strategy, as in today's world. The one cannot be successful without the other.

Allio (2005) advises that the implementation of strategy be uncomplicated and that the main activities be isolated and focussed on. He reiterates Sterling's (2003) points: the strategy must be properly communicated using plain language; implementation must be monitored using qualitative and quantitative metrics; and budgets must be developed and followed throughout. He adds that long and short term implementation tactics must be adopted and that the strategic actions must be precise and explained using verbs.

3.3 Performance measurement

Once the formulated strategy has been implemented, the firm must establish whether actions have achieved what was planned. This analysis is formally known as 'organisational performance measurement' and has various important functions, as explained by Spitzer (2007) and illustrated in Table 4:

Table 4: The functions of performance measurement (Spitzer, 2007)

The functions of Performance Measurement	
Empowers action	When employees are aware that certain activities are being monitored and measured, they naturally put more effort into those specific activities relative to the others.
Improves the visibility of performance	It is difficult to assess the success of performance by observing operations and outcomes. Performance measurement provides a unique perspective and set of data which would not otherwise be available.
Provides focus	The nature of business and operations has become so dynamic and multifaceted that often employees struggle to know where to focus their attention. By measuring specific activities, management sends a clear message of what is to be prioritised throughout the firm.
Communicates what is expected	Measuring certain processes or actions helps to reinforce the expectations of management, allowing employees a clear understanding of what their roles are in achieving overall strategy.
Facilitates accountability	Accurate and thorough measurement systems allow management and employees to be held accountable for their actions.
Improves objectivity	Employees are generally far more open to objective and constructive criticism based on facts provided from performance measurement, rather than on subjective opinions.
Informs goal setting	When performance is consistently measured, the information gathered from the process can be used to inform future goal

	setting, making them more relevant and achievable.
Improves execution	In order to achieve goals, the firm requires good measurement systems to guide execution.
Promotes consistency	Measurement allows for variation to be identified and eliminated, resulting in improved quality.
Provides feedback	Measurement provides feedback from actions and processes which will inform and guide management decisions.
Encourages alignment	By measuring overall performance as well as specific tasks, the firm can better communicate between business units and ensure that alignment is achieved.
Informs decision making	Management need rely less on intuition and more on facts supplied by the process itself.
Facilitates problem solving	Measurement allows management to see beyond the symptoms of problems to the actual source thereof.
Allows for early warning signals	Issues can be identified before they become serious problems and hinder the process.
Improves understanding	Measurement allows for a deeper analysis of the process, experiences can be converted into learning and knowledge supplied throughout the firm.
Enables prediction	Process data is accumulated and patterns can be identified which can inform predictions of future performance.
Improves motivation	Employees are encouraged by their ability to track their progress in achieving goals in a non-threatening manner. This allows for pride, enthusiasm and healthy competition.

Many performance measurement frameworks have been developed over the years starting with DuPont's pyramid of financial ratios which listed various ratios including Return on Assets, Leverage Ratio and Net Profit Margin and linked them directly with Return on Equity (Neely, 2004). This framework was harshly criticised, as financial performance measures do not take into account the effects of the business environment, changes in technology, changes in consumer needs and general strategy implementation (Neely, 2004). Also, the main focus of the framework is on costs and performance history, rather than future performance opportunities and long-term focus (Neely, 2004).

The need for a more rounded approach resulted in the development of performance measurements that take non-financial measures into account, such as the Performance Matrix designed by Keegan, Eiler and Jones in 1989. The matrix categorises measures as being either internal or external and cost or non-cost in nature; and while it may be simple and not very comprehensive, it does provide valuable feedback to management regarding measurement direction (Neely, 2004).

Wang Laboratories then introduced the SMART pyramid (Strategic Measurement and Reporting Technique), which builds on the internal and external measurement focus and introduces the concept of measuring at all levels of the business, ensuring that the overall corporate strategy is actively pursued through short-term business-unit centred goals (Neely, 2004).

Fitzgerald et al. (1991) cited by Neely (2004) focussed on service industries and, as a result, designed a framework that splits measures into two distinct groups, these being results (financial performance) and determinants of results (quality, strategy, resource allocation, etc.). This approach takes into consideration the importance of understanding what drives performance in order to improve it (Neely, 2004).

The Balanced Scorecard developed by Kaplan and Norton has possibly become the most popular tool used to measure performance as it offers a comprehensive set of measures against which a business can assess itself (Meredith & Shafer, 2002). As Kaplan and Norton (1996) shown in Figure 1, Chapter 1. There are four key areas of measurement, namely financial, customer, internal business and learning and growth.

The Balanced Score Card (BSC) acknowledges and includes the financial perspective introduced by DuPont as it quantifies the success of strategy implementation by examining the effects on net profit (Kaplan & Norton, 1996). It also measures the overall economic effect of past actions in an attempt to inform future decision-making; in addition to this, it provides a measure of cash flow liquidity and sales growth (Kaplan & Norton, 1996).

The customer perspective facilitates the identification of key customers and markets in which the firm hopes to/does already operate and measures performance in achieving growth in these areas (Kaplan & Norton, 1996). Measures typically include customer satisfaction, customer retention, percentage of new customers and growth in, or retention of, market share (Kaplan & Norton, 1996). This section also allows for the measurement of specific "value propositions" that the firm hopes to provide for the client in an attempt to maintain their loyalty and support (Kaplan & Norton, 1996:26). These could possible include above average lead times, timely delivery, a personalised experience, or the promise of leading technology and innovation (Kaplan & Norton, 1996).

The internal business perspective allows management to identify and isolate the "critical internal processes" needed for the business to retain and increase their customer base, as well as financially perform in line with shareholder expectations (Kaplan & Norton, 1996:27). This section is where the BSC breaks away from other frameworks generally focuses on analysing and measuring the performance of existing processes (Kaplan & Norton, 1996). While the BSC approach encourages the user to identify and develop new processes to achieve customer satisfaction and financial performance (Kaplan & Norton, 1996). Another notable difference is that most frameworks focus on measuring and improving the critical processes that satisfy the customers of today with current products and services (short-term value creation), while the BSC provides a platform that also creates new products and services for the customers of tomorrow (long-term value creation) (Kaplan & Norton, 1996).

The final perspective is learning and growth. This section assists management in identifying the infrastructure needed to allow for long-term growth and continual improvement (Kaplan & Norton, 1996). Unfortunately the speed of developments in technology and the dynamic nature of customer needs means that businesses must constantly upgrade their collection of skills and facilities in order to remain current and relevant (Kaplan & Norton, 1996). The BSC assists management in detecting gaps between current employee skills, system capabilities and process performance and in identifying what is required to maintain and improve performance in the future (Kaplan & Norton, 1996). Possible ways of closing these gaps include staff training, upgrading facilities and improving the efficiency of processes (Kaplan & Norton, 1996). As is done in the customer section, generic measures are used to establish employee satisfaction, retention, performance and training, as well as the main drivers necessary to achieve and maintain them (Kaplan & Norton, 1996). These drivers can include these: the availability and timeous delivery of information to employees regarding process function and customer feedback; the ability of employees to track their own progress in achieving short-term goals; and a system that shows how well employee incentives assist in achieving the overall goals of the business (Kaplan & Norton, 1996).

3.4 Quality

Chapter 3: Literature review

Defining quality has always been a complicated exercise due to the fact that every individual has a unique understanding of what acceptable quality is versus unacceptable quality. No two person's opinions are ever exactly the same. For this reason Crosby (1979:17) explains that quality should simply be defined as "conformance to requirements". In this way, the various requirements of all involved can be reduced to one agreed upon set; and whether or not they are met can be continually measured. Any non-conformance found is considered to be the "absence of quality".

Juran (1998:223) adds to this definition by saying that requirements must be focussed and relevant, stating that quality is "fitness for use".

Tummala and Tang (1994:11) describe strategic quality management as being the following:

"…a comprehensive and strategic framework linking profitability, business objectives, and competitiveness to quality improvement efforts with the aim of harnessing the human, material and information resources organization-wide in continuously improving products or services that will allow the delivery of customer satisfaction."

Garvin (1988:40) defines quality using five principle approaches, summarised in Table 5.

Table 5: Garvin's five definitions of quality (Garvin, 1988)

Garvin's five definitions of quality	
Transcendent	Quality is is absolute and recognisable anywhere in the world. Quality items are timeless, enduring and resistant to changes in fashion or taste. Quality cannot be defined precisely but it is something that we learn to recognise through experience.
Product-based	This definition views quality as a variable which can be determined and measured. Goods are measured for quality according to the amount of a desirable characteristic present.
User-based	User-based definitions rely on the concept of what is considered high quality, interpreted by each different individual. Customers have varying needs and a quality product or service is one which satisfies these individual needs. This view is admittedly subjective and not very robust.
Manufacturing-based	This definition focuses on the supply side of transactions incorporating engineering and manufacturing requirements echoing the definition given by Crosby (1979) of conformance to requirements. Any deviation from requirements results in bad quality.
Value-based	Value-based approaches look at prices and costs incurred, explaining that quality is achieved when requirements are met and the product is offered at a reasonable price. There is little use in designing and producing an exceptionally high quality product or service, only for it to be completely unaffordable to the customer.

Garvin (1998:49) goes further to explain that there are eight dimensions to quality that can be considered when attempting to understand what quality is. They are summarised in Table 6.

Table 6: Garvin's eight dimensions of quality (Garvin, 1988)

Garvin's eight dimensions of quality	
Performance	Performance makes reference to the operating ability and characteristics of the product.
Features	These are the secondary characteristics that accompany the basic function of the item.
Reliability	This looks at the chances of the product breaking or malfunctioning within a predetermined period of time.
Conformance	Here the question of whether the design and operating ability of the product meets the quality standards set.
Durability	This is the length of product life expected from the product versus actual product life.
Serviceability	Serviceability looks at the ease, convenience, and speed of repair, when necessary. The consideration here is not only whether the item can be repaired, but also how long it will take.
Aesthetics	Relates to how the product looks and feels to the touch, how it tastes or smells and whether any of these are pleasant. This measure is very subjective, as what is seen as beautiful by one person can be interpreted as unattractive by another.
Perceived quality	It is often the case that the consumer makes purchases without having all the information at hand regarding the product they are considering. In this case, such information must be communicated to the consumer through graphics, advertisements, brand names and marketing campaigns which establishe a perceived quality before the purchasing decision takes place.

3.4.1 Philosophies of quality

Various philosophies of quality have been developed. Some of the most popular are summarised below.

3.4.1.1 Deming

Deming proved himself to be a visionary leader through his major contribution to the "quality revolution" in Japan after World War II, when assigned there as a representative of the Economic and Scientific Section of the U.S. Department of War (Hill, 2005:395; Melnyk & Denzler, 1996; Rungtusanatham, Ogden & Wu, 2003). He imparted the value of statistical control and variance reduction in manufacturing to the executive management of top companies. These companies were at the time attempting to pick up the pieces of industry after the devastating bombing experienced during the war (Rungtusanatham et al., 2003; Melnyk & Denzler, 1996). In doing so, Deming earned the title of "the father of quality" (Pycraft et al., 2003).

Deming explained the importance of, and implemented tools such as statistical process control to examine key processes and understand the reasons for high versus low quality outputs (Hill, 2005). His understanding of and respect for statistics were greatly informed by the works of Walter Shewhart. Deming insisted that variation from processes is a vital cause of problems experienced daily (Melnyk & Denzler, 1996). Deming explained that a variance causes the process to be unpredictable and less controllable, thus management should focus efforts on finding the sources of variance and eliminating them in a process of continual improvement (Rungtusanatham et al., 2003; Melnyk & Denzler, 1996). He distinguished between controlled and uncontrolled variances, as well as common and special causes variances (Melnyk & Denzler, 1996).

Deming also took the stance that achieving quality production is the responsibility of top management and that it must be enforced down the organisational structure to affect every worker on the floor, irrespective of title or responsibility (Hill, 2005). In order to guide management in achieving this, Deming (1986:23) wrote the following fourteen instructions, as shown in Table 7:

Table 7: Deming's fourteen points for management (Deming, 1986)

	Deming's fourteen points for management
1	Establish a culture of continual improvement of service and product: all employees must be aware of the vision of the business and the overall commitment to quality.
2	Adopt the new philosophy for economic stability: everyone must understand that defects, waste, mistakes, poor quality materials, poor training and average management will not be tolerated.
3	Cease dependence on mass inspection to achieve quality: the focus must shift from detecting poor quality to preventing it.
4	End the practice of awarding business on the basis of the price alone: a new mindset ragarding costs must be developed and other variables considered before the cost of input when sourcing suppliers.
5	The system of production and service provision must be continously improved. Quality and productivity must be ever improved in order to reduce costs.
6	Institute training on the job: employees must be trained in the new quality theory and variation reduction methods.
7	Adopt and institute modern methods of supervision and leadership: the focus of management on supervision must be replaced with leadership, innovation and assistance in achieving the new quality objectives.
8	Drive out fear: encourage employees to question, offer advice and point out problems as they see them.

9	Break down barriers between departments and employees: the decentralised management approach must be replaced with a wholly involved workforce who understand and value their contribution to overall quality, rather than short-term departmental targets.
10	Eliminate the use of slogans, posters and exhortations: instead of putting resources into superficial motivation efforts such as posters and slogans, management must ensure that all employees have the necessary tools and guidance to achieve what they set out to do.
11	Eliminate work standards and numerical quotas: the focus of achievement should be on improved quality and not attaining quantified profit targets which, when met result in decreased effort.
12	Remove barriers that rob the hourly worker of the right of pride in their workmanship: all employees must be aware of what good work is, quality materials must be provided and all activities valued and encouraged.
13	Encourage education and self-improvement for all: employees must be continuously trained on developments in quality theory, tools and application.
14	Define top management's permanent commitment to ever-improving quality and productivity: top management must lead by example and make tangible efforts to ensure that instructions 1-13 are implemented and achievable.

In addition to the above instructions, Deming (1986) also warns against the following as being detrimental to achieving quality:

- Lack of consistency: Top management's commitment to quality must be unwavering and zero tolerance must be shown for any deviation.
- Concentration on short-term profits: Management must focus on long-term planning and improving quality, rather than make decisions based on short-term goals.
- Overreliance on performance appraisals: Such systems can result in rivalry, fear and short-term decision-making. They do not allow for consistency of purpose of teamwork.
- Job-hopping: Managers should not be rotated to different departments frequently as, while this does encourage a diversified understanding, it fails to allow for specialisation and long-term planning.
- Overemphasis on visible figures: Qualitative and quantitative information must be analysed by managers in order to judge performance.

3.4.1.2 Juran

Juran was part of the team that went to Japan to lecture on quality with Deming; and, like Deming, Juran was also awarded the Second Order of the Sacred Treasure by the Emperor as a result (Melnyk & Denzler, 1996).

Juran's (1998) definition of quality as 'fitness for use' incorporates the idea that a product can meet specifications perfectly but not be at all appropriate and even dangerous for the customer. His definition evolved into five characteristics that products and services must embody in order to achieve quality (Melnyk & Denzler, 1996). He also introduced the concept of variations in quality and asserted that not all products and services require the same level of quality in order to completely satisfy the consumer (Juran, 1998). The five characteristics include:

- Quality of design: The design of products must be thorough and planned, with materials of a high quality.
- Quality of conformance: The product must achieve the ambitions of the design.
- Availability: The product must at all times be readily available for use by the consumer.
- When breakdowns are experienced, there should be easy access to maintenance and repairs must be ensured.
- Field use: This relates to the state of the product once it reaches the customer; it involves substantial storage, packaging and reliable delivery.

As can be seen from the characteristics discussed above, Juran took a comprehensive approach to quality which begins in the design phase of the product or service and continues through to supplier relationships, process design and control, operations management, inspection, delivery and customer service (Juran, 1998).

Juran's approach to quality was direct and hands-on, creating support and instruction for those involved in the manufacturing process (Melnyk & Denzler, 1996). He was more inclined to work within existing systems than to urge drastic cultural changes (Meredith & Shafer, 2002). In order to appropriately convince top management of his theories, he developed what is known today as the cost of quality (Juran, 1998). He insisted that straightforward accounting costs did not provide a true reflection of the situation and emphasised that the opportunity costs of manufacturing, identifying, mending or

replacing defect production should be included (Melnyk & Denzler, 1996). Juran (1998) identified four main types of costs, these being:

- Internal failure costs: This includes the costs of finding defects before output is delivered to the consumer, such as waste, modifications, overruns and inspection.
- External failure costs: This refers to costs incurred after the customer has received delivery of the product such as complaints, returns, refunds, loss of reputation and repairs.
- Appraisal costs: These are the costs incurred to ensure that the products produced are of a high standard and includes materials receiving, production, storage and completed inventory inspections and associated staff and equipment.
- Prevention costs: These are the expenses incurred to avoid waste and decrease failure costs and includes planning, education, process analysis and continuous improvement.

Juran was of the opinion that failure costs are far higher than prevention costs, which means that working towards achieving quality is cheaper than ignoring it (Melnyk & Denzler, 1996).

Juran reinforced many concepts introduced by Deming, including the necessity of top management commitment to quality. He also insisted that management embody the "quality habit" (Melnyk & Denzler, 1996:310). He explained that, to do this, goals must be set to achieve improved quality, actions plans developed to achieve them, responsibilities clearly defined and bestowed and that rewards should be based on achieving quality, rather than quotas (Melnyk & Denzler, 1996).

3.4.1.3 Crosby

Crosby asserted that quality management will result in future saving and that the cost of efforts made today to ensure quality will be recovered tomorrow by the savings incurred as a direct consequence thereof (Melnyk & Denzler, 1996). In short, he claims, "quality is free" (Crosby, 1979). Unlike Deming and Juran who advocate eliminating waste by conducting inspections, Crosby encourages a stance of zero tolerance to defects (Tummala & Tang, 1994). In doing so, Crosby outlined the following four laws named the "absolutes for quality management" (Crosby, 1979:61):

- Quality is conformance to requirements, not goodness: Quality is only achieved when the product or service meets or surpasses customer expectations, so these must be clearly identified and communicated.
- Quality systems amount to prevention: To improve quality, current operations must be examined and problems identified and eliminated using statistical process control.
- Zero defects define the performance standard: All products and services must be designed, manufactured and delivered with the goal of achieving zero defects.
- Measurement of quality is the price of non-conformance: In order to control quality, it must be measurable in terms of profit lost when quality is not achieved, essentially the price of non-conformance.

Like Juran, Crosby took the approach of explaining that most companies have little idea of how much money they spend on quality, or because of the lack of it (Pycraft et al., 2003). He explains that the cost of quality is approximately 15-20% of sales per annum and the savings associated with implementing quality management in order to gain the attention of strategic management (Hill, 2005).

Crosby (1979:133) encouraged management to understand where their companies were on the road to quality achievement and to pursue improvement continuously. He compiled the following 14 steps to guide management in that journey, as shown in Table 8.

Table 8: Crosby's fourteen steps towards quality (Crosby, 1979)

	Crosby's fourteen steps
1	Management commitment: managers must lead by example and tangibly show their commitment to improving quality.
2	Quality improvement team: a dedicated group of individuals must be given the authorisation to run quality training and facilitate corporate change. They must have direct access to strategic management and are responsible for developing quality-related policies and planning.
3	Quality measurement: the quality improvement achieved by each activity within the company must be measurable.
4	Cost of quality evaluation: the costs of both conformance and non-conformance must be measurable and any differences identified; and opportunities provided for improvement.
5	Quality awareness: the quality improvement team mentioned above must facilitate effective means of communicating the quality motive to all within the company setting.
6	Corrective action: The team must identify problems and assist in solving them alongside the appropriate level of management.
7	Zero-defects planning: the focus must be moved from fixing problems in production, to completely eliminating them.
8	Employee training: every single person employed by the company must be trained in how to improve quality through their work and responsibilities.
9	Zero-defects day: Crosby recommends that an annual day be celebrated as the anniversary of the adoption of a zero-defects attitude and that this day should mark an improved effort by all.
10	Goal setting: the necessary goals to achieve a state of zero defects must be set.
11	Error cause removal: employees must be made to feel confident to identify and offer reasons why their activities are not achieving zero defects, as well as find solutions and future preventions.
12	Recognition: employees must be publically encouraged and congratulated when quality goals are met.
13	Quality council: Crosby suggests that a council of quality professionals be established as a platform and forum to express and solve quality issues faced by industry.
14	Repeat: the entire process must repeat continuously to ensure constant improvement.

3.4.1.4 Ishikawa

Ishikawa was the main role player in facilitating the adoption of quality in Japan (Watson, 2004). He was involved in converting what Deming and Juran brought to Japan as theory into practice, within the specific cultural context (Watson, 2004; Tummala & Tang, 1994). Unfortunately the trend in Japan at the time was to over-complicate the quality tools by focussing too much on statistics. Ishikawa understood the importance of employee involvement and as a result, played a vital role in simplifying and clarifying

the quality initiative (Pycraft et al., 2003). Ishikawa believed that management should give employees autonomy over their efforts and play the role of guiding them where improvement is necessary (Watson, 2004). Over and above the Ishikawa diagram discussed later, he developed six main principles to assist quality efforts (Watson, 2004; Tummala & Tang, 1994).

- It is fundamentally important that all employed by the business understand why quality control has been implemented and what the quality objectives are.
- The intricacies of the quality system must be explained to all levels of employees in a manner in which they understand in order to achieve buy-in.
- The continuous improvement cycle must be ever running throughout the business over a minimum of three to five years in order to achieve activity standardisation. Process examination, including statistical analysis, must take place and supplier relationships developed.
- Top management should set long-term quality objectives and identify the activities needed to achieve them.
- A high level of motivation must be achieved within the organisation; and employees should carry out their activities with confidence and understanding of what their contribution is.

From the six principles above, Ishikawa went on to explain the four ways in which the Japanese approach encourages leadership to take responsibility for quality (Watson, 2004). They are as follows (Watson, 2004; Tummala & Tang, 1994):

- Market-in quality: There is a major competitive edge to adopting quality when the focus of the business is to achieve or over deliver on customer expectations. Ishikawa moved the focus of quality from the business perspective, to the customer perspective.
- Worker involvement: Ishikawa was the founder of quality circles and his belief in across the board employee involvement is what drove him. He believed that all activities must include the identification, correction and prevention of problems that will negatively impact on the customer.
- Quality begins and ends with education: Ishikawa made it clear that, in most cases, employees were not to blame for poor quality, but rather only contributed one fifth or less of this. Having said that, he emphasized the importance of

training and, more importantly, educating employees, as this would improve their life experiences and give them the tools to understand why quality needs to be prioritised. He urged employees of all levels to constantly question data and the instruments that collected it.

- Selfless personal commitment: Ishikawa believed that by improving the quality of the way management and employees work together, the quality of life of all involved will also increase. He emphasised that, to achieve true quality, there was a need for complete buy-in on a personal level, by all involved.

Other noteworthy contributors discussed in the literature (Pycraft et al., 2003; Tummala & Tang, 1994) include Armand Feigenbaum, who explained that quality development, maintenance and improvement should be implemented within an organised system. Another key contributor is Taguchi, who focussed on improving quality in the design of products and services using statistical control methods. He also defined quality according to loss experienced by the customer when bad quality is experienced.

3.4.2 Improvement

According to Harrington (1995), if an organisation is not improving, it is not remaining constant, but rather it is falling behind the competition. Govender (2013) reinforces this sentiment by saying that it is crucially important to safeguard business systems and processes from becoming unproductive and non-value adding. A system designed today may be dynamic and perfectly suitable to the environment, but whether it will still be relevant in a year's time is debatable. Especially if not updated and adapted when necessary. All operations and activities have the potential to be improved, whether designed with the quality intention in mind, or not (Pycraft et al., 2003). When attempting improvement initiatives, it is important first to understand what your current performance is, and whether it is already above average, average, or below average (Pycraft et al., 2003). To establish this, current performance must be measurable and compared to the needs of the consumer (Pycraft et al., 2003). According to Pycraft et al. (2003), there are five basic performance objectives that must be met to satisfy customer needs, namely cost, dependability, flexibility, quality and speed. These dimensions are graphically represented in Figure 13.

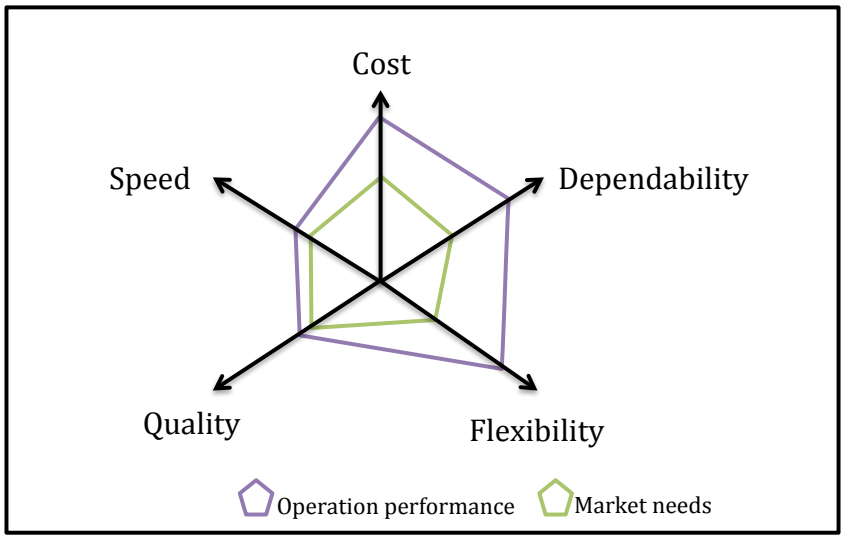

Figure 13: Polar diagram showing five major performance objectives (Pycraft et al., 2003)

The dark area shows the needs of the market, while the lighter area represents the operation's ability to meet these needs. As can be seen from the example illustrated above, the quality needs of the market are almost completely satisfied by the operation; however, the operation underperforms when it comes to dependability. Pycraft et al. (2003) note that each objective is evaluated using measures such as these:

- Quality: percentage defects, number of complaints, waste levels, requested repairs and customer satisfaction ratings.
- Speed: the actual versus budgeted lead times for various activities, from placing the order to delivery of the product.
- Dependability: percentage of late deliveries, percentage of overtime relative to the schedule, percentage downtime and percentage of complaints satisfactorily resolved.
- Flexibility: design time, customisation delay, machine re-setup time and time to increase/decrease capacity.
- Cost: budgeted costs versus those actually incurred, percentage waste of materials and human labour, efficiency and total cost per hour.

Once the above have been measured, the performance of the operation is traditionally compared to predefined standards, these being historical, target, competitor or absolute performance standards such as zero-defects (Pycraft et al., 2003).

A common form of operation measurement is benchmarking where the operation is compared to a similar successful setup in an attempt, firstly, to judge current

performance; and, secondly, learn from the comparative operation (Pycraft et al., 2003). Benchmarking can involve varying degrees of scope, depending on the needs of the organisation and the operation itself. Internal benchmarking compares operations, or segments of operations, within the same organisation, while external benchmarking compares the operation in question with similar operations in a different organisation (Pycraft et al., 2003). Competitive benchmarking is a comparison between operations in competing organisations and non-competitive benchmarking compares organisations operating within different industries (Pycraft et al., 2003). Benchmarking can focus on realised performance of the five objectives (quality, speed, dependability, flexibility and cost) or on practices, such as inventory control, process layout, the ordering of activities, etc. (Pycraft et al., 2003).

There are various approaches to improvement, the two most notable being breakthrough and continuous improvement, as shown in Figure 14 (Harrington, 1995; Martins & De Toledo, 2000; Pycraft et al., 2003).

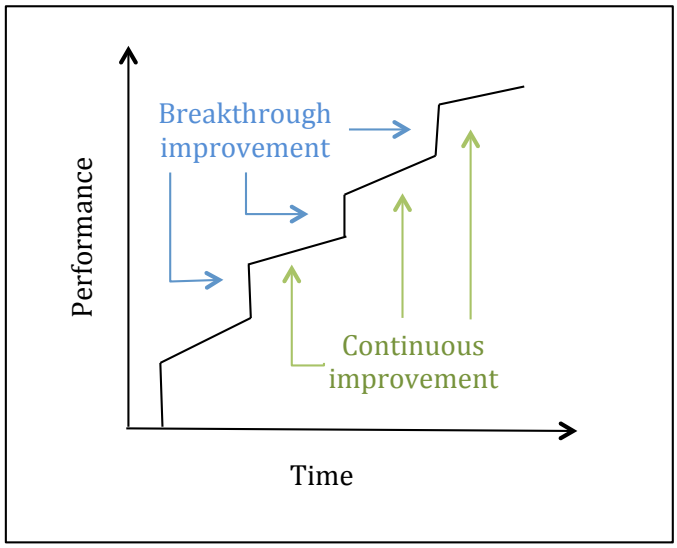

Figure 14: Breakthrough and continuous improvement (Harrington, 1995)

Breakthrough or innovation-based improvement relies on a substantial change in how the operation functions (Pycraft et al., 2003; Harrington, 1995). This change is usually very expensive and capital intensive, such as occurs when expanding a factory or completely replacing key equipment (Pycraft et al., 2003). The change experienced is often immediate, resulting in a notably increased rate of performance (Pycraft et al., 2003). Unfortunately, these changes are often jarring on the process and the people

involved, as such refurbishment often requires the existing facilities to be shut down for a period of time (Pycraft et al., 2003). A common approach is business process re-engineering (BPR), which involves redefining key business processes around the natural flow of information, materials or consumer needs (Pycraft et al., 2003). It removes functions as the focus and replaces functions with the actual process needed to achieve what is desired (Pycraft et al., 2003).

Continuous improvement on the other hand is far subtler, as the increase in performance is smaller in increments (Martins & De Toledo, 2000; Pycraft et al., 2003). Bhuiyan and Baghel (2005:761) define it as being,

"A culture of sustained improvement targeting the elimination of waste in all systems and processes of an organisation. It involves everyone working together to make improvements without necessarily making huge capital investments."

It entails improving existing infrastructure and systems increasing efficiency and effectiveness of processes (Pycraft et al., 2003). The advantage of smaller improvements is that they can be followed by further small improvements without causing delays in existing setups (Pycraft et al., 2003). The focus here is not the size of each step in improved performance, but rather that improvement is continuous and gains momentum (Pycraft et al., 2003). Continuous improvement is the basis of the improvement initiative, while breakthrough improvement is only initiated when needed (Harrington, 1995). Making use of breakthrough improvement might get an organisation to the top, but it will not keep it there for very long, while continuous improvement may not facilitate large leaps in improvement, but will sustain them (Harrington, 1995).

3.4.2.1 Kaizen, the Japanese approach to continual improvement

The concept of the Kaizen model was first introduced by Masaaki Imai in his book *The Key to Japan's Competitive Success,* first published in 1986. Kaizen is the Japanese word for "continuous improvement", and has become a popular tool used by management around the world (Smadi, 2009). Imai (1986) defines Kaizen, in terms of the workplace, as being the steady and ever improving of business processes actions. In its simplest

form, the Kaizen approach facilitates many support activities (Khan, 2011). It emphasises these aspects: employee training; high quality materials as inputs; and appropriate supervision over employees to ensure that they are on the right track and to provide them with valuable feedback (Khan, 2011). Popular Kaizen activities include identifying problem areas, developing and implementing remedies, designing and adopting the long-term goal of continuous improvement and streamlining administrative work (Khan, 2011). According to Imai (1986), an improvement must be made every day to the business, whether large or small; and everyone in the firm must see this goal as their responsibility. There are five important principles outlined by Imai (1986), which should be considered when implementing Kaizen into the work place. These are shown in Table 9.

Table 9: Five principles when implementing Kaizen (Imai, 1986)

Five priciples to consider when implimenting Kaizen	
Processes and results	The flow of work must be broken down into processes and each process studied for areas of improvement.
Putting quality first	Kaizen focuses on three main areas, these being quality, cost and delivery. He explaines that quality is very often determined by the customer, based on perception of the character of the product and must always be prioritised above the other two.
Quantitative versus qualitative information	The model demands that processes are measured and that the statistics derived must be considered more highly than gut feel.
Internal versus external customers	Imai encourages all employees to perceive the next step in their process as the customer, albeit an internal customer. By doing this a cycle of improvement begins as all processes strive to impress their internal customer and by extension ensure the satisfaction of the external customer.
Visual management	The role of visual management should not be underestimated as it allows for problems to be made visible when they occur, prompting all involved to timeously find a solution and implement it. It will also go a long way in preventing similar problems from reoccurring. Kaizen emphasises the importance of showing current performance against targets in a visual manner to all involved in the processes and to top management.

Continual improvement involves constantly analysing and reanalysing the intricate mechanisms of an operation. To facilitate this fundamental activity, Deming (1986: 88) developed the PDCA cycle. Figure 15 shows the elements of the PDCA cycle.

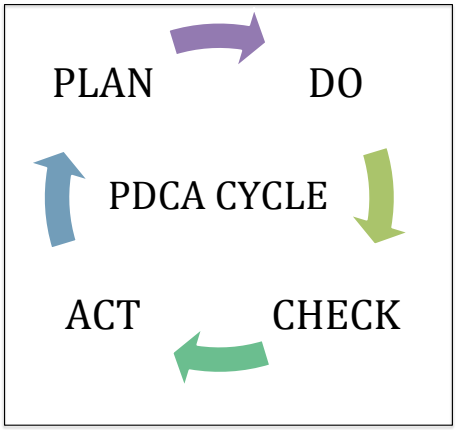

Figure 15: PDCA cycle (Deming, 1986)

This cycle includes the activities of planning, doing, checking and acting.

- Planning activities is the collection of information and the analysis of the current situation to establish where areas of improvement lie so as to develop a change strategy (Pycraft et al., 2003).
- Doing involves implementing the strategic change decided upon above, which could include micro PDCA cycles to resolve arising problems (Pycraft et al., 2003).
- Checking has to do with evaluating whether or not implementation has been successful.
- Acting is the action taken, depending on whether the implementation has been successful. If implementation was successful, then what has been learned from the exercise is documented and the actions standardised to be applied to other areas of the business or operation. If implementation was not successful, then lessons to be learned from the experience are extracted and considered when starting the cycle again, as shown in Figure 16 (Pycraft et al., 2003).

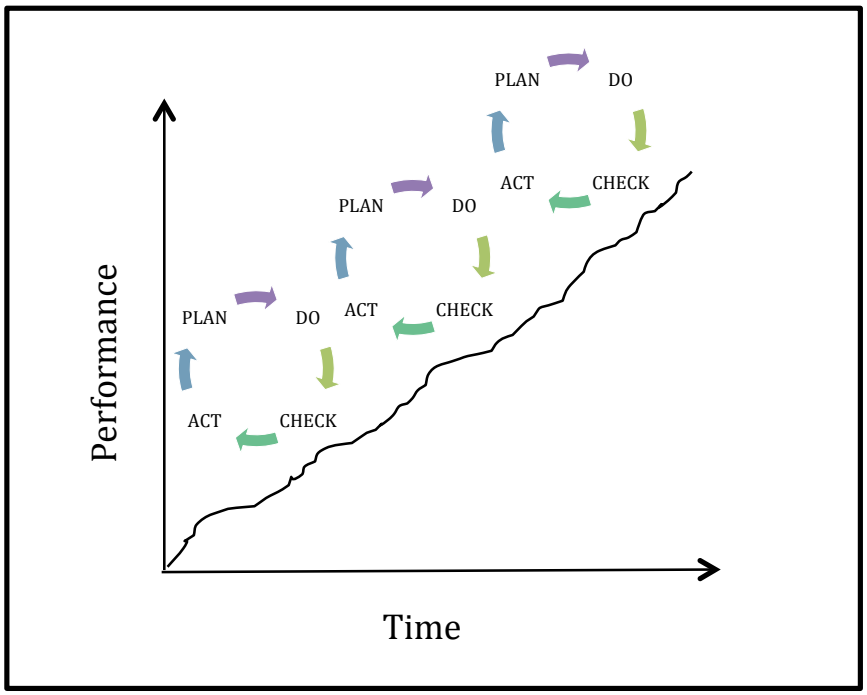

Figure 16: The PDCA continuous improvement cycle (Pycraft et al., 2003)

In order to begin the PDCA cycle, the operation or process must be examined through data collection for signs of areas for improvement. The seven tools traditionally used to collect this data are flow charts, checklists, histograms, Pareto charts, scatter diagrams, Ishikawa diagrams and control charts (Krajewski & Ritzman, 1999).

The flow chart shows a simplified graphical overview of process flow by documenting the sequencing of activities and noting inspection points (Hill, 2005). The subjects of flow charts can vary from being information, material and persons (Hill, 2005). As shown in Figure 17, various shapes are used to differentiate decision-making activities from operation and inspection points (Hill, 2005).

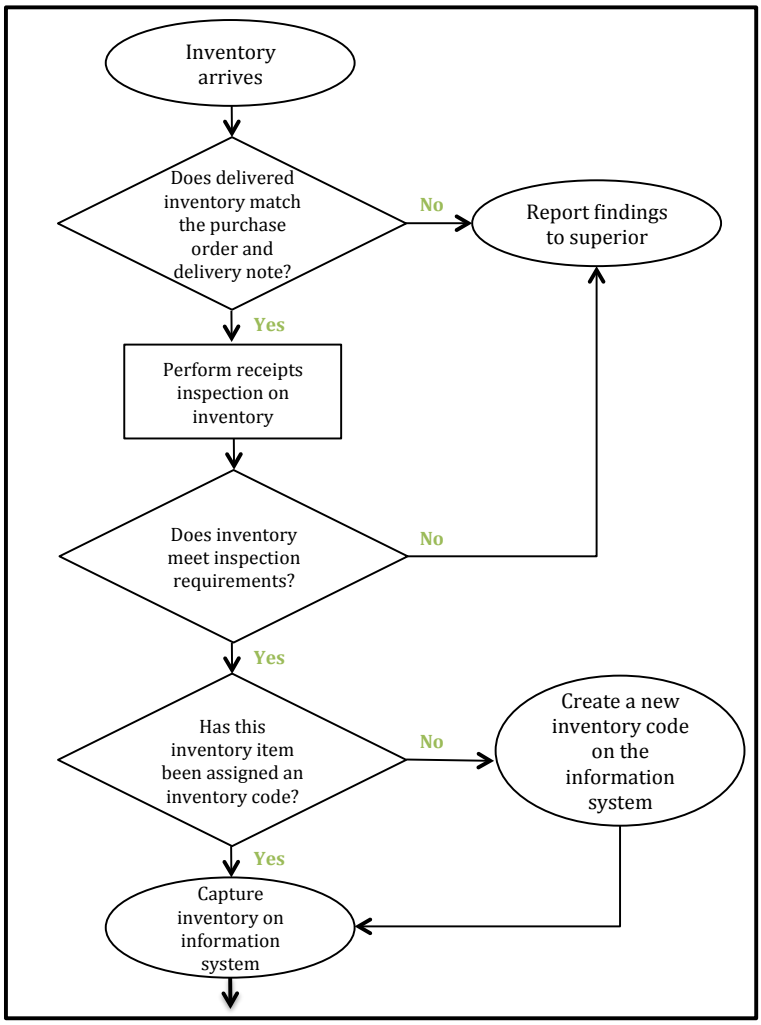

Figure 17: Example of a flow chart (Krajewski & Ritzman, 1999)

The checklist is a spread sheet designed to document the number of times a certain condition occurs during, or as a result of, the operation or process. Such conditions can include anything from defects to positive quality attributes (Krajewski & Ritzman, 1999). The example illustrated in Figure 18 shows the number of times certain defined defects occur during a weekly cycle:

Daily defects check sheet						
Defect type	Monday	Tuesday	Wednesday	Thursday	Friday	**Total**
Type A	1					**1**
Type B		2	1	1	1	**5**
Type C	3					**3**
Type D					2	**2**
Type E	1					**1**
Type F			4			**4**
Type G						**0**

Figure 18: Example of a checklist (Krajewski & Ritzman, 1999)

An example of a bar chart and histogram is shown in Figure 19. The histogram can be used to visually display the information collected on the checklist. It presents the frequency distribution of predefined characteristics, illustrating the central tendency and dispersion of the data collected. The bar chart shows the frequency of characteristics answered on a strictly yes/no basis (Krajewski & Ritzman, 1999).

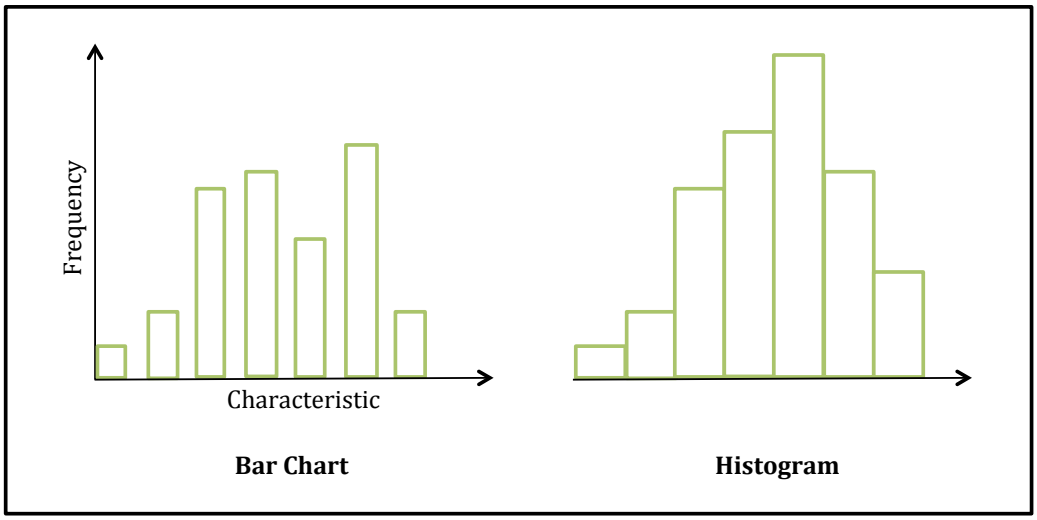

Figure 19: Example of a bar chart and histogram (Krajewski & Ritzman, 1999)

After using the bar chart and histogram to identify the main areas of improvement, management must prioritise which issue to tackle first. A valuable tool to inform this decision is based on the 80-20 rule, that is, that 80% of the problem is often caused by 20% of the influences involved (Krajewski & Ritzman, 1999). The extrapolated idea is that focussing on the fundamental influences (20%) can result in the elimination of 80% of the problem experienced, thereby saving the time and effort which would have been spent analysing all the influences (Krajewski & Ritzman, 1999). The Pareto chart is used to identify the 20% of fundamental influencers and, as illustrated in Figure 20, comprises a bar chart that organises characteristics in order of frequency, but that has an additional vertical axis measuring the cumulative percentage of the frequency (Krajewski & Ritzman, 1999). The resulting frequency curve clearly identifies the fundamental 20% on which to focus (Krajewski & Ritzman, 1999):

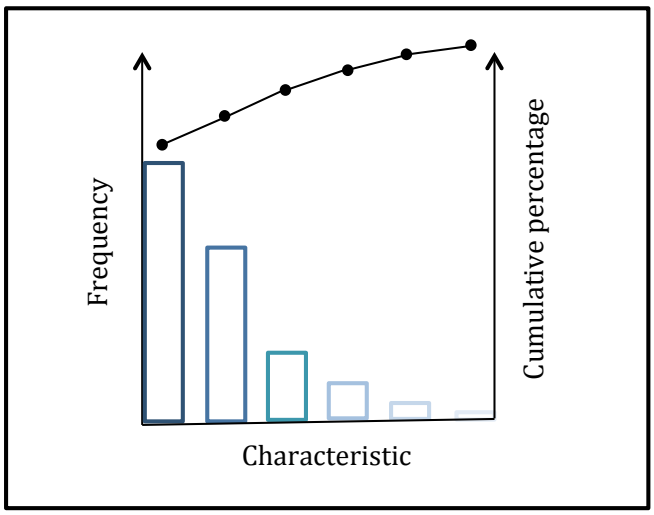

Figure 20: Example of Pareto chart (Krajeski & Ritzman, 1999)

Each quality problem identified must be the result of a single or various causes. To organise the examination of possible causes, the Ishikawa diagram can be used (Krajewski & Ritzman, 1999). This diagram, also known as the 'cause-and-effect or fishbone' diagram, is shown in Figure 21. The quality problem or effect is depicted at the front of the diagram while all possible root causes are branched off in categories. These are then further broken down into subcategories to the degree required.

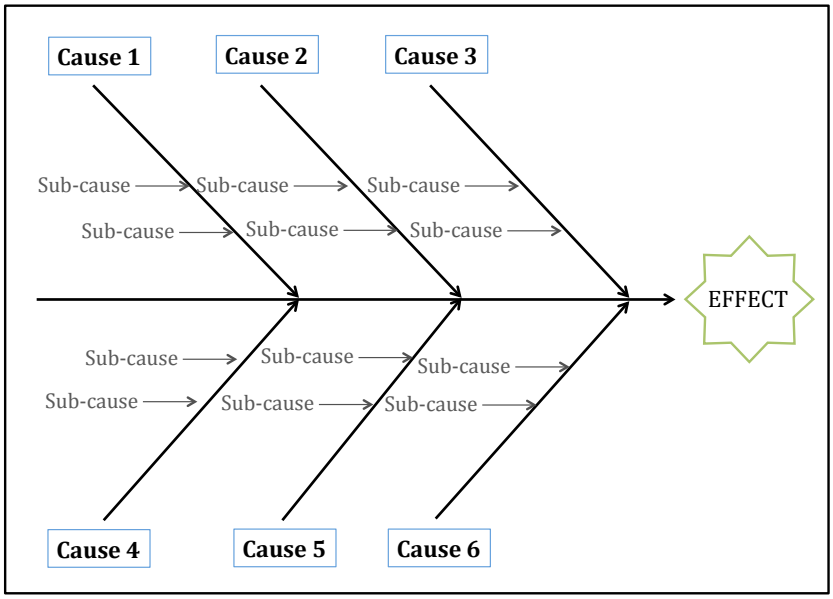

Figure 21: Example of an Ishikawa diagram (Krajewski & Ritsman, 1999)

Once the possible causes of the problem have been identified, the probability of the cause is analysed. A scatter diagram can be very helpful as it illustrates the relationship, or lack thereof, between two variables (Krajewski & Ritzman, 1999). Figure 22 below shows an example of the relationship between employee training and the number of defects produced. In this example, there seems to be a positive relationship between the two, because as employee training increases, the percentage of defects decreases, confirming the relationship between the two.

Figure 22: Example of a scatter diagram (Krajewski & Ritzman, 1999)

Statistical process control and specifically control charts can be used throughout the operation or process to establish whether output is conforming to requirements (Hill, 2005). An average or mean is calculated and acceptable levels of deviation both above and below the mean are determined, formally known as upper and lower control limits. The process output is then plotted on the graph as shown in Figure 23. If the process produces output that falls between the upper and lower control limits but not exactly on the mean, it is acceptable, as there is always normal variation present in a process (Hill, 2005). If, however, the process produces output that falls outside of the control limits, then the process is out of control, quality cannot be assured and an intervention is necessary (Hill, 2005).

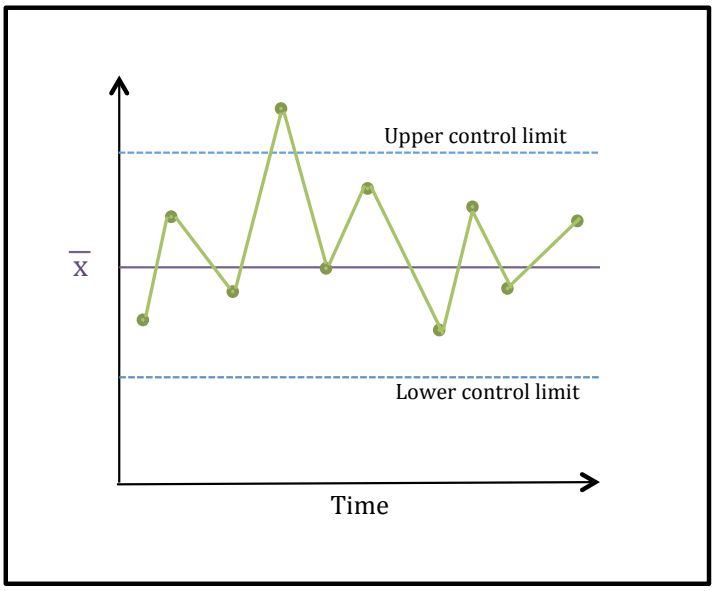

Figure 23: Example of a control chart (Hill, 2005)

According to Harrington (1995), for a company to keep up with global trends and competition, it needs to apply both breakthrough and continuous improvement side by side. A business that is starting improvement initiatives should focus on continuous improvement in order to build a strong foundation, after which they should start looking at breakthrough improvements to push their operations into the next level (Harrington, 1995).

3.4.3 Total Quality Management (TQM)

Total quality management has evolved as the need for quality has increased globally (Hill, 2005; Magd & Curry, 2003). Quality tools and theories developed by the likes of

Shewart, Deming, Juran, Crosby and Feigenbaum slowly gained popularity and, after a while, became a management style and strategy rather than a mere approach to reduce waste (Magd & Curry, 2003). This transformed management style became formally known as Total Quality Management and, as the name suggests, involves building quality into every activity and aspect of the business, its staff and operations (Hill, 2005). Jeffries, Evans and Reynolds (1996: 15) define TQM as being:

"…a comprehensive and integrated way of managing any organisation in order to meet the needs of the customers consistently and achieve continuous improvement in every aspect of the organisation's activities".

TQM has also been described as being a philosophy impacting on the way businesses are managed and, as such, has developed certain key characteristics which separate it from other management philosophies (Hill, 2005). These characteristics are as follows (Hill, 2005):

- Commitment and leadership from the top-down: it is essential that strategic management believe in the quality principle and lead in a manner which promotes and encourages the initiative by providing essential resources, training, and support.
- Planning and executing the programme: the fundamental change in focus and culture needed to facilitate TQM requires considerable proactive planning and foresight, building quality into the long-term strategy of the business and ingraining it in all activities.
- Using tools and approaches: the quality tools and approaches previously discussed will need to be implemented and continually updated as business circumstances change to facilitate continuous improvement.
- Education and training: employees must be trained in the new approaches and taught how to use quality tools effectively. They must also understand the greater concept and strategy in order to understand where their work fits in and what their contributions are to quality as a goal (Hill, 2005). To achieve this, a formal education programme must be implemented and managed (Hill, 2005).
- Involvement and teamwork: a key success factor is the buy-in of employees and management, so teamwork and cooperation must be fostered and encouraged.

Management should work to empower employees to take on the autonomy required by the philosophy.

- Measurement and feedback: employees must be acknowledged and rewarded for the successes they achieve. It is important to make sure that they understand what their contribution is to quality. Part of this should involve comparing results to key internal and external targets, such as benchmarking.
- Culture changes: the behaviour and attitude of staff will need to evolve.

Unfortunately, there have been many instances globally and across industries where TQM programmes have not been successful (Martins & De Toledo, 2000; Anderson, Lawrie & Savic, 2004). According to Martins and De Toledo (2000), possible reasons for this may be: poor quality planning; incomplete application of programmes; a lack of quality management and support, a focus on what has been achieved rather than pushing to accomplish more; a lack of consistency with strategy direction; and a failure to keep gaining momentum.

3.4.4 Six Sigma

Six Sigma is a programme built on the principles of TQM, but it encourages management to work towards quality while at the same time pursuing process-improvement using statistical and other tools (Melnyk & Denzler, 1996; Anderson et al., 2004). The initiative was named as such due to the core principle being to ensure that all operations and processes produce output which is either six sigma above or below the mean (Anderson et al., 2004). The Six Sigma challenge is to achieve 3.4 defects per million transactions. Motorola first attempted this in the late 1980s when they applied this concept to product design, manufacture and sales (Hill, 2005). Pande, Neuman and Cavanagh (2000: xi) describe Six Sigma as being,

"A comprehensive and flexible system for achieving, sustaining and maximising business success. Six Sigma is uniquely driven by a close understanding of customer needs, disciplined use of facts, data, and statistical analysis, and diligent attention to managing, improving, and reinventing business processes."

The various successes promised by the programme include, but are not limited to, reduced costs, improved productivity, an increase in customer base and retention,

reduction in lead times and waste, corporate culture changes as well as improved service and product development (Pande et al., 2000).

Pande et al. (2000:11) have noted specific benefits to adopting the Six Sigma way. They are as follows:

- Generates sustained success: Six Sigma encourages continuous improvement in what they call the "closed-loop system".
- Sets a performance goal for everyone: no matter what position an employee holds or how differing their targets, everyone is focussed on satisfying customer needs and assessing operational performance. However, unlike before, the goal of Six Sigma is to achieve a goal of 99.9997 % defect-free production.
- Enhances value for customers: Six Sigma demands that the concept of value according to the customer be carefully analysed, understood and delivered profitably in every instance.
- Accelerates the rate of improvement: the exponential rate of development in technology has resulted in customer demands for improvement becoming increasingly sophisticated. Six Sigma adopts various well-proven tools from various industries to assist businesses in enhancing improvement initiatives.
- Promotes learning and "cross-pollination": Six Sigma looks to stimulate knowledge development and idea sharing throughout the various levels of the organisation.
- Executes strategic change: the pursuit of continuous improvement of improvement results in new product development, market diversification, redevelopment and upgrades in facilities and acquisitions. Six Sigma's approach is that, by knowing the current processes inside and out, adjustment to changing market conditions and being responsive to opportunities become easier.

The methodical Six Sigma approach is, firstly, to *define* the process at hand and thoroughly understand the supplier-input-process-output-customer relationships (Senapati, 2004); secondly, to *measure* process variables using data collection techniques and ascertain process stability (Senapati, 2004); thirdly, to *analyse* the process using graphs and other tools; and fourthly, to *improve* the process using experimentation and simulation (Senapati, 2004). The fifth step is to draw up a strategy

for controlling the process; and, lastly, the benefits of re-engineering the process must be reported (Senapati, 2004).

The Six Sigma leadership system can be broken down into six themes being: genuine focus on the customer; data and fact-driven management; process focus, management and improvement; proactive management; boundary-less collaboration; and the drive for perfection (Pande et al., 2000).

3.4.5 Formalised quality initiatives

Reorganising activities within an organisation to make quality a priority takes a great deal of time and monetary investment. It is for this reason that businesses that have made the transitions become very particular about the supplier that they source and with which they build relationships (Hill, 2005). There is no use in creating a quality-driven setup in house, only to purchase poor quality inputs that result in defects and customer complaints. In order to establish a certain standard of recognised quality, several systems for evaluating the ability of an organisation to design, produce and deliver products and services to meet specifications have been created (Hill, 2005).

3.4.5.1 ISO 9000 standards

The International Organisation for Standardisation (ISO) is an independent association established in 1947 for the purpose of publishing internationally agreed upon standards on significant matters (Hill, 2005; Anderson et al., 2004). One of these standards is the ISO 9000 series, which defines the basic requirements for a quality management system and business quality across the globe (Hill, 2005; Tummala & Tang, 1994; Anderson et al., 2004).

To gain ISO 9000 certification, an audit is performed to ensure that all the requirements laid out in the standards are met (Hill, 2005). ISO 9001 is specifically extensive and offers standards for managing management responsibility, the quality system, document control, design control, purchasing, process control, inspection, corrective action, training and internal quality audits, to mention but a few (Hill, 2005).

3.4.5.2 Malcolm Baldrige National Quality Award

The Malcolm Baldrige National Quality Award is a US government sponsored award established in 1987 in the USA (Hill, 2005). This award attempts to acknowledge and urge quality and productivity improvements by recognising exceptional organisations and assisting in transferring their experience into best practices (Hill, 2005; Anderson et al., 2004). It has also set standards for the assessment and supervision of quality within organisations, the facilitation of changes in corporate culture and continuous improvement (Hill, 2005; Anderson et al., 2004). The award is facilitated annually by the National Institute of Standards and Technology and entails independent reviews, site inspections and certain judges' opinions. Three important aspects are encouraged by the award: quality awareness as a strategy to improve profitability; understanding what is required to achieve quality; and sharing the knowledge generated from quality systems through the organisation (Tummala & Tang, 1994).

The award is granted to up to two recipients in the service, manufacturing and small business sector (Hill, 2005). There are seven categories and criteria for performance excellence, including leadership, strategic planning, customer and market focus, measurement, analysis and knowledge management, human resource focus, process management and business results (Hill, 2005; Tummala & Tang, 1994).

3.4.5.3 European Quality Award (EQA)

Since 1992 the EQA has been awarded by the European Foundation for Quality Management, involving over 850 member countries (Hill, 2005; Tummala & Tang, 1994).

Each company first gets evaluated on a national scale; the winners then get entered into the EQA competition (Hill, 2005). The EQA has various categories which, as in the case of the Baldrige Award, are evaluated in terms of approach, development and results (Hill, 2005; Anderson et al., 2004). The broad categories are leadership, policy and strategy, people, partnerships and resources, processes, customer results, people results, society results and key performance results (Hill, 2005; Tummala & Tang, 1994).

3.5 Visual management

According to Liff and Posey (2004), visual management (VM) is system of improvement that focuses employees on what is most important for job completion as well as for overall business success. It allows for a more tangible understanding of company vision, ethics, targets and philosophy, as these elements are constantly displayed before employees (Liff & Posey, 2004). VM transforms data about target customers and operations performance into graphic representations thereof, which is far easier to understand and more difficult to ignore (Liff & Posey, 2004). Ad Esse Consulting (2007:1) define VM as a "lean technique" that is implemented to ensure that anyone who walks into the organisation's work area, whether knowledgeable of the type of business and processes or not, can quickly identify what is being done, understand it to a greater or lesser extent, then clearly ascertain what is under control and what is not. They go on to explain that using visuals, including images such as illustrative diagrams, photographs and organisational charts, is the simplest and most efficient method of communicating what is required. VM is the process of making this critical information available, both for the benefit of operators who can evaluate themselves, and also for everyone to see what their level of performance is (Red Lion, 2011).

Tezel, Koskela and Tzortzopoulos (2009) note that VM tactics are not a new concept and were first documented as being used in The Egyptian Royal Cubit up to 4,500 years ago and by Chinese General Sun Tzu ca. 600 B.C., who used visual prompts to direct his army.

The visual workplace is often closely linked to the Japanese 5S that was originally developed as a philosophy to approaching successful everyday life in Japan, but was formally acknowledged as a management approach to business just after World War II (Kobayashi, Fisher & Gapp, 2008). The 5S comprise five key elements, namely seiri (organisation), seiton (neatness), seoso (cleaning), seiketsu (standardisation) and shitsuke (discipline); and implementation entails using visual methods such as "re-tagging" for seiri and "signboard strategy" for seiton (Kobayashi et al., 2008:249).

Visual controls have most commonly been used in the manufacturing industry and specifically in production systems to improve efficiency and detect problems (Santos,

Powell & Hinks, 2001). According to Santos et al. (2001), the most well known visual controls include:

- Kanban: there are two types of Kanban being production-ordering and withdrawal. The first entails identifying the type and quantity of parts needed from the previous process; and the second indicates the type and quantity of parts that the process to follow will withdraw from the current process. This is often done using specific cards or containers to hold the required goods (Ohno, Nakashima & Kojima, 1995).
- Call light: this device is used to alert certain persons of their needed presence. Traditionally, different colours light up to indicate the need for the services of a specific level of employee, such as supervisor, manager or specific type of worker.
- Andon: this is a practice named after the Japanese word for 'lantern' and entails an entire process being mapped on a presentation board. When the area where the process has been halted lights up, this informs the whole floor of where the problem lies geographically.
- Digital display panels: this communicates pertinent information such as the speed of production and the production targets for the day versus progress.
- Visual controls in poka-yoke devices: these are devices that are programmed to detect certain pre-programmed occurrences and provide a visual signal when a defect is detected.
- Bordering: this entails colourfully demarcating certain areas according to the activity designated to take place there, or where and how stock or tools are to be packed. This allows for immediate identification of irregularities.

The elements in a business affected by visual management are vast and displayed in Figure 24.

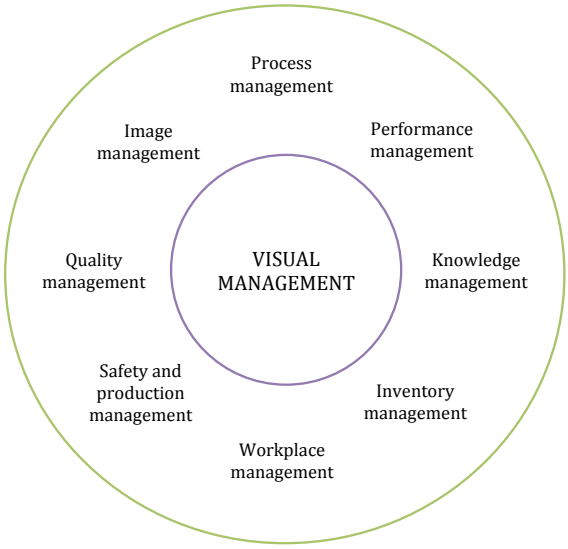

Figure 24: The reach of visual management implementation (Tezel et al., 2009)

The functions of VM according to Tezel et al. (2009) include:

- Transparency: each process must be identifiable and its purpose and output clearly communicated to all stakeholders, including other processes.
- Discipline: Rules, practices and predetermined procedures must be respected and followed by all (Pink, 2011:60).
- Continuous Improvement: this involves a culture of cooperative efforts to stop all waste and sustain improvements at minimum capital cost (Bhuiyan & Baghel, 2005:761).
- Job facilitation: this is an initiative to improve working conditions and efforts for those involved in routine work, using visual communication.
- On-the-job training: instituting an environment of continuous learning, including feedback mechanisms, formal training and mentor relationships.
- Creating shared ownership: employee identification with the organisation/ activity and their attachment to projects must be encouraged (Moorhead & Griffin, 1989:93).
- Management based on facts: management decisions should be taken after consulting information derived from the statistical analysis of process and on reliable sources of current developments in the field.
- Simplification: the information to be communicated must be in its simplest form to ensure correct interpretation thereof.
- Unification: the traditional organisation divisions must be broken down and a community created with a joint vision and investment.

According to Liff and Posey (2004), the generally anticipated outcomes of implementing VM systems are vast. This includes renewed interest by employees who can track their performance and develop their skills through the various training programmes. Costs often reduce as the VM system exposes gaps and improves awareness regarding waste and rework, while the customer is made the central theme linking employee efforts to customer satisfaction (Liff and Posey, 2004). Liff and Posey (2004) propose the following process for implementing a VM initiative, as shown in Table 10.

Table 10: The implementation process of visual management (Liff & Posey, 2004)

The Implementation Process of Visual Management		
1	Planning	The first step in the process entails identifying and fine-tuning the mission, vision and key objectives of the business. The long-term and short-term goals identified to achieve objectives must be clear and measurable as they form the foundation of the initiative. During this phase the key members of staff must be educated on the topic of visual management.
2	Developing the framework	The business must be properly prepared and equipped with the necessary resources to achieve its vision and mission, and be open to this specific concept of change. The rest of the organisation receives training on the fundamentals of visual management and the required organisational changes are identified.
3	Designing the flow and layout of work	The physical working spaces are considered and the flow of processes mapped, upgrading the management systems where necessary. Physical furniture, fittings and equipment are inspected for appropriateness and the positioning of metrics and results outputs is decided upon. After this, the employees are considered, ensuring that they understand what their duties are and the ways in which they will be held accountable.
4	Presenting data and enabling customer presence	This phase entails making employees aware of the visual information provided, using cues and signals. The path travelled by the products and their completed stages throughout the process are displayed and their association with the client strengthened. The performance of each individual is calculated and displayed in recreational and lunch rooms.
5	Informing employees	The employees are divided into task teams and managed as such. Data concerning each team is compiled and made available in the form of key performance indicators which are kept simple and continuously updated. In this way, staff are not inundated with information, but are comfortably plugged into the process and their accomplishment of goals, clearly understanding what their contributions are.
6	Renewing the process	This is final step and involves taking the time to analyse the performance of the system and make any required adjustments. The organisation would have had to sustain great levels of change and outdated elements must be identified and replaced as the system matures.

Galsworth (2005) adds that VM takes instructions and guidelines, which were traditionally communicated in manuals, and builds them into the physical work environment through signage and feedback systems. In doing so, employees are able to complete their work with less supervision and increased autonomy. She (2005:1) explains that VM can only be accomplished in a "visual workplace". This is an

environment that is equipped with visual technology that provides information and draws attention to certain happenings. The visual workplace is aimed at engaging with the employee to achieve an environment that self informs, organises, controls and improves itself. When a visual work environment is achieved, every employee will have direct and immediate access to information regarding their duties, directing them to produce timeous and high quality results (Galsworth, 2005). Information is built into the physical work area (Galsworth, 2005). The implementation of careful controls, tools and equipment can provide the workforce with information on how to safely and effectively use these, when they need to be serviced or repaired and even where they must be stored for swift retrieval (Galsworth, 2005). Galsworth (2005) explains that freeing data and information from filing cabinets, electronic folders and from even the minds of managers and transferring it to the employee should become the main focus of the VM crusade. Information can no longer be held hostage by those who hold power, but should rather become freely available to all, to use to inform daily decision-making (Galsworth, 2005).

Galsworth (2005) developed the Eight Building Blocks of visual thinking to aid the implementation of VM, as summarised in Figure 25.

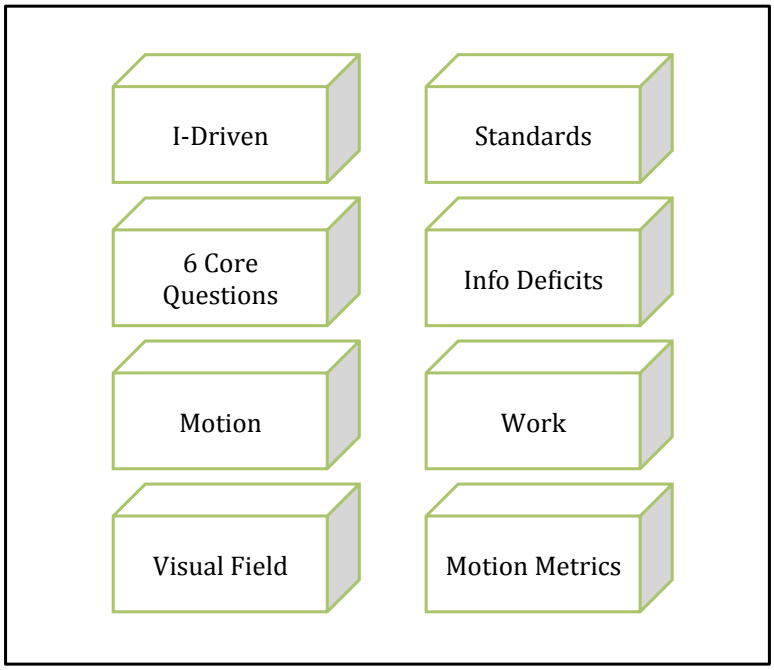

Figure 25: The eight building blocks of Visual Thinking (Galsworth, 2005)

She (2005) describes a visual thinker as someone who:

> *"…recognizes motion and the information deficits that cause it - and knows how to eliminate both through solutions that are visual".*

The first building block is "I-Driven Change" which recognises the fact that, in most cases, people have many questions that arise throughout their workdays, some of which are asked whilst others are not (Galsworth, 2005:22). In cases where they are not asked, Galsworth (2005) explains, the employee probably makes up answers to the question themselves, or lives without the answer. Either way, this is potentially very dangerous. The visual workplace looks to answer all questions, voiced or otherwise (Galsworth, 2005). According to Galsworth (2005:23-24), there are two "driving questions", these being, "What do I need to do?" and "What do I need to share?". The first question communicates that it is important to establish what the employee needs to know and understand before they can efficiently and effectively do their work (Galsworth, 2005). This can be anything from knowing what the next step in the process is, or simply knowing where the tools are that are needed to complete the task (Galsworth, 2005). The second question addresses the issue of what other people need to know about that person's work in order for them to successfully complete theirs (Galsworth, 2005). In this way, people are encouraged to share their knowledge with others, building on the information base of the business as a whole (Galsworth, 2005). The focus here is on the "I" element. VM aims to empower individuals, making them independent and deciders of their own actions and improvement ideas, removing the need for outside approval or authorisation (Galsworth, 2005:27).

The second building block is "Standards". This can be split into technical and procedural standards (Galsworth, 2005). It is important to communicate what value-adding activities look like to the workforce (Galsworth, 2005). People need to know what their work is measured against. Technical standards are the details included in technical drawings, including information such as the dimensions and tolerances of both the process and product specifications (Galsworth, 2005).

Procedural standards involve instructions on how to achieve the dimensions and tolerances described in technical standards (Galsworth, 2005). Each step in the process

to producing the perfect product or service must be detailed (Galsworth, 2005). Standards explain what is expected to happen and how to achieve it; and, by making them visual, the visual workplace goal is achieved (Galsworth, 2005).

The third building block is the "Six Core Questions" which directly informs the standards mentioned above (Galsworth, 2005:33). These questions include Where, When, Who, What, How and How many? By answering these questions visually and making the answers available directly at the "point of use", the standards become built into the relevant processes and greater work environment, limiting time waste (Galsworth, 2005).

The fourth building block is "Information Deficits" which represents the instance where information is sought by an employee, but is not available when or where needed (Galsworth, 2005). This lack of information has a negative impact on key performance indicators and the business cycle as a whole, resulting in costs that were neither expected nor budgeted for (Galsworth, 2005). In order to identify such information deficits, Galsworth (2005:37) advises that one seeks to identify the "motion" caused by them.

The fifth building block is "Motion" which Galsworth (2005:38) describes as "moving without working". This is undoubtedly the greatest enemy to performance. Motion takes place when employees wander, wonder, search for answers or randomly provide them themselves (Galsworth, 2005). It is any task that an employee is forced to do in order to complete their allotted work that is neither elective nor avoidable (Galsworth, 2005). It is "moving and not adding value" (Galsworth, 2005:44). The key is to task employees with identifying their personal motion and taking responsibility for it by offering solutions. In this way, the road to continuous improvement is paved (Galsworth, 2005).

The sixth building block is "Work". Galsworth (2005) stresses the importance of defining the term "working" in contrast to "motion". Essentially, as derived from the definition of motion, "working" involves "moving and adding value" (Galsworth, 2005:44). Efforts must be made to add value, as it does not happen on its own (Galsworth, 2005).

The seventh building block is "Value Field", which involves identifying where employees are positioned, when they exert effort and add value (Galsworth, 2005). By identifying the value field, it becomes simpler to diagnose motion (Galsworth, 2005).

The final building block is "Motion Metrics", which is simply a measurement of an employee's motion (Galsworth, 2005). Each individual must be given the task of tracking and timing their instances of motion in order to identify which actions are causing the biggest time waste (Galsworth, 2005).

In order to facilitate an organisation's transformation to a visual workplace, Galsworth (2005:99) has developed the "Implementation Pathway", as shown in Figure 26 below.

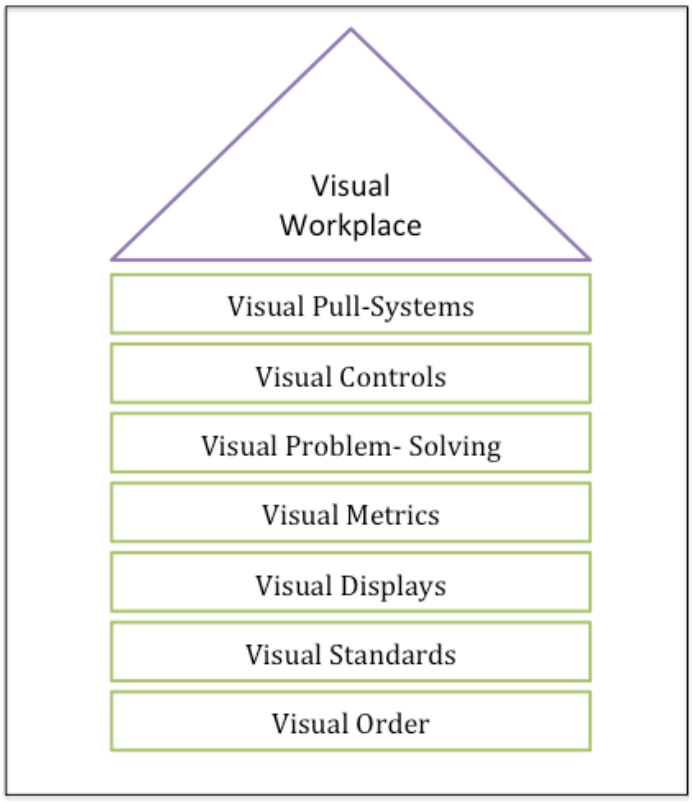

Figure 26: The pathway to the visual workplace (Galsworth, 2005)

The first step is to create visual order, otherwise known as "the visual where" and "automatic recoil", throughout the business (Galsworth, 2005:101). This function is wholly the responsibility of employees working on the factory floor (line-associates) and involves implementing the 5S, as discussed previously (Galsworth, 2005). Galsworth (2005:103) has offered an alternative interpretation to the traditional 5S this being: to

sort through/ sort out; scrub the workplace; secure safety; select location; and an additional component of sustaining the 5S habit. The overall goal is to organise the physical working environment so that it is capable of communicating visual information. Then to implement "visual location information", such as line outlines, preferred location and the identification of every single object on the work floor, so that it can effortlessly be returned to where it should be (Galsworth, 2005). The "sorting" activity involves the individual identifying all the tools that they need to do their work and removing everything else from the work area (Galsworth, 2005). After this, the workplace is cleaned to ensure that all exteriors can hold the visual information necessary (Galsworth, 2005). The "secure safety" action entails area operators personally identifying and proposing methods to mitigate risk; and where additional support is needed, the organisation's safety committee must be notified (Galsworth, 2005). When selecting locations, the relevant employees must determine where workplace objects and equipment must be placed in order to improve workflow and minimise motion (Galsworth, 2005). "Setting locations" once a location has been selected, must be decided by drawing a border around the area when the object must be placed when not in transit. This can be applied to the floor, walls, roof, cupboards and shelves (Galsworth, 2005).

The second step is to provide visual standards and displays. Doing so seeks to answer the remaining five core questions, namely When, Where, Who, What, How and How many? (Galsworth, 2005). While line employees are encouraged to participate, engineers and supervisors are responsible for taking the lead in this area, as it is their primary task respectively to develop, communicate and supervise the implementation thereof (Galsworth, 2005). Standards are put in place to illustrate to employees how work is to be properly completed, and must be improved continuously (Galsworth, 2005). Engineers and supervisors are required to convert technical and procedural standards into visual stimulants readily available at the point of use (Galsworth, 2005).
Visual displays are a simple but powerful communication device that provide employees with information that they need and nothing else (Galsworth, 2005). This can range from a very simple spreadsheet drawn up by a supervisor in order to know who is working where and when. Or it can be personalised for each individual according to their information needs, such as: has the previous stage in the process released the

product to my stage - yes or no? (Galsworth, 2005). The display must communicate vital information immediately and simply.

The third step is the responsibility of supervisors, managers and executives and involves providing visual metrics and problem-solving (Galsworth, 2005). Visual metrics provide more than just performance measurement, as in the case with the Balanced Scorecard mentioned previously. They also provide insight into the cause of good/poor performance (Galsworth, 2005). These metrics only record information that can be used to improve processes and often contrast two sets of data, such as actual versus planned, or previous versus current (Galsworth, 2005). In this way, problems can be immediately identified and acted upon, as visual metrics must be displayed for all to see in an attempt to focus improvement, identify and track the causes of problems and to encourage further improvement activities (Galsworth, 2005).

Visual problem-solving takes the weak standards identified by visual metrics and makes them visible so as to facilitate company-wide identification of possible causes and the development of successful solutions (Galsworth, 2005).

Visual controls is the fourth step. The controls often driven by top associates, supervisors and technical staff (Galsworth, 2005). Visual controls manage the specifications such as size and quantity by integrating them into the physical workplace in an attempt to control the actions of employees (Galsworth, 2005). In this way, they provide answers for the last core questions, namely, How Much and When the needed precision should be added to enhance performance (Galsworth, 2005). Examples of such controls include packing lines indicating the maximum height, after which stacking becomes dangerous; or maximum volumes of equipment (Galsworth, 2005). Another level of visual control is found in the pull system where tools, such as minimum or maximum level indicators, can automatically inform materials management of the need for stock or otherwise (Galsworth, 2005). As mentioned before, Kanban is another pull system tool; and lighting has also been known to signal the needs of the process very successfully.

The final step is visual guarantee, also known as a poka-yoke system. This involves creating an environment where the correct actions are guaranteed (Galsworth, 2005).

Galsworth (2005) uses the example of a petrol pump to illustrate a visual guarantee, in that there is only one way to replace the pump after use: either it is carefully slid into its slot in the machine, or it is not put away at all. Thus there is no option but to replace it safely, avoiding spilling the highly unstable liquid. The staff involved on this level range from quality practitioners, production floor employees, associates, designers and process engineers.

Galsworth (2005) insists on the value of implementing VM and provides a personal experience as an example of the magnitude of improvements to be expected. She (2005) was involved in implementing VM in a stamping plant in Michegan. This company had not implemented a lean conversion and experienced improvements in lead time, quality and delivery time of up to 15-20% after implementing the technologies of the visual workplace.

3.6 Conclusion

This literature review has focussed on the areas of strategy formulation and implementation, performance measurement, improvement quality and VM in an attempt to provide a foundation for the conducted research to be discussed in Chapter Five.
From this analysis of literature it is clear that VM has the ability to enhance various activities within the business as it is closely follows the theory of performance measurement, quality and improvement. The focus of VM is to visually free information in order to empower all employees, allowing them to do their work properly.

A theoretical synthesis of the literature presented in this chapter has been compiled and is represented by the model in Figure 27.

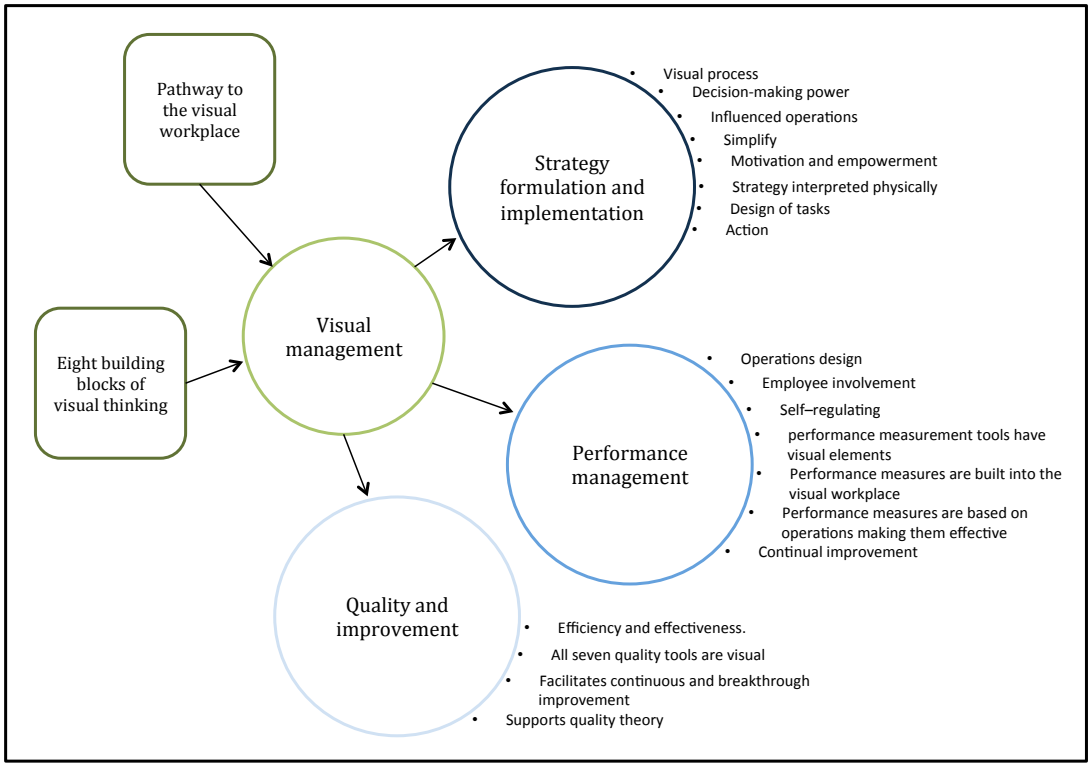

Figure 27: The model derived from theoretical synthesis

Visual management has various potential influences on the core activities of a business. For example visually formulating corporate strategy using flow charts and pictures to describe where the business hopes to be in the future can encourage right-brain thinking in those individuals involved. Sometimes people find it easier to express themselves visually, rather than verbally as it is simpler and there is less pressure to be eloquent and impressive; a stumbling block underestimated by most. Accessing the right brain often results in the creative thinking needed to establish an edge on competition.

The visual workplace encourages employee involvement in strategy development as the operation itself informs strategy to some extent. This results in a shift in decision-making power for traditional top-down organisations to a more balanced input situation. VM also insists on translating strategy into actionable tasks for each and every employee whether manager or cleaner. This encourages focus, teamwork and motivation resulting in a greater unified workforce. All tasks, by extension, are designed and managed in line with strategy avoiding the case of non-value adding efforts.

The impact of VM on performance management is far less subtle and thoroughly explored in the literature. Operations are designed visually and according to the rules and principles of the visual workplace, eliminating a lot of guesswork and trial and error. Visually drawing the operation allows for creative thinking and the simplification of complex processes and relationships. As mentioned above, VM insists on employee involvement building work experience into designs. Once the visual workplace has been established and has matured it can begin to become self-regulatory, relieving pressure from the operations management function.

Performance measurement is a fundamental element of VM and is organically built into operations as required by the visual workplace. The ethos of continuous improvement within the visual workplace facilitates the assurance of the effectiveness and efficiency of performance measures. Measurements as well and measurement equipment are double checked, serviced and correctly calibrated.

VM assists the quality motive as the core principles presented in the literature for both are strongly correlated. In essence, both strive to improve the effectiveness and efficiency of company wide efforts in order to streamline internal functions and provide the customer with high quality goods and services.

The seven quality tools are all visually driven and improvement strategies are often graphically portrayed. As mentioned before, continuous improvement lies at the heart of VM and the visual workplace allows for and encourages breakthrough improvements when necessary.

As discussed in Chapter one and in light of the theoretic synthesis completed above, the flow of core business activities can be described as being firstly strategy formulation, then strategy implementation. After which operations are designed and once running, must be managed. The ability of operations to achieved corporate strategy is then measured and the results of this are fed back into the strategy formulation activity in order for appropriate adjustments to be made. This process is presented in Figure 28 below and specifically shows the supporting role that VM plays throughout the activities. The essence of this figure will be the foundation for the research conducted and presented in Chapter 5.

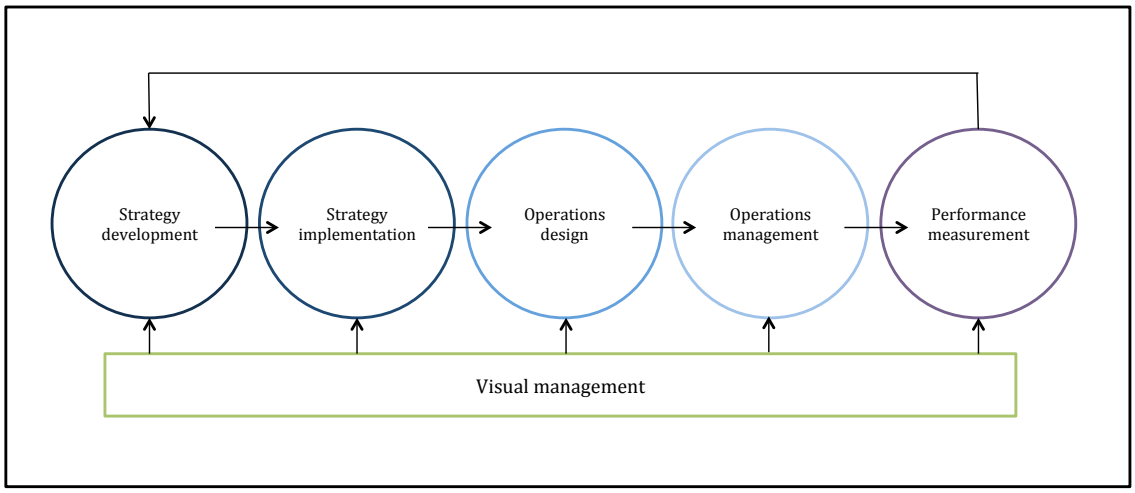

Figure 28: The key activities in a business supported by visual management

Chapter 4: Research design and methodology

This chapter is the fourth phase of the research.

Figure 29: The fourth phase of the research

4.1 Introduction

There are many research methodologies and designs that are used for various types of research. Yin (1994:2) explains that research design is "the logic that links data to be collected (and the conclusions to be drawn) to the initial questions of a study".

Cooper and Schindler (2012:127) describe the essentials of research design as being:

- "An activity- and time-based plan";
- The plan is focussed on answering the research question;
- A guideline for choosing sources and "types" of information;
- An opportunity to understand and explain the various relationships between the variables in the study; and
- A formalised approach for research activities.

This chapter will describe a research process that was designed to align with the researcher's purpose. This process was adapted from the works of Saunders, Lewis and Thornhill (2003), Mouton (2009) and Cooper and Schindler (2014).
The final design and methodology was decided upon as a result of a structured process of elimination after considering all the options available.

The process implemented was as follows:

1) Decide on a research philosophy.
2) Discuss whether the study will be empirical or non-empirical in nature.
3) Define the purpose of the study.
4) Consider whether the study will be inductive or deductive.
5) Explore the topical scope.

6) Establish the level of control.
7) Select primary versus secondary data.
8) Establish whether the study will be qualitative (textual) or quantitative (numeric).
9) Consider the time frame.
10) Map the research strategy.
11) Define the data collection methods to be used.

4.2 The research philosophy

There are three general approaches to the research process, these being positivism, interpretivism and realism (Saunders, Lewis & Thornhill, 2003).

Positivism is usually associated with research into the natural sciences. The researcher is primarily an 'objective analyst' who observes given instances and asserts certain truths after examining the data, attempting to do so without bias (Saunders, Lewis & Thornhill, 2003:83). The findings are often generalisable truths and methodology applied is typically highly structured. There is also a certain focus on statistical analysis (Saunders, Lewis & Thornhill, 2003:83).

Interpretivism adopts the stance that the business environment is far too complex and dynamic for generalisations to be relevant and instead prefers to attempt to provide insight regarding the intricacy of social interactions (Saunders, Lewis & Thornhill, 2003). This approach emphasises the importance of understanding the underlying motives of people's actions in order to understand them (Saunders, Lewis & Thornhill, 2003). Each person will interpret their environment and involvement in activities in a unique way, which will inevitably directly affect their actions (Saunders, Lewis & Thornhill, 2003). In this approach the researcher attempts to explore and understand the 'subjective reality' of the participants in order to explain their purposes and actions (Saunders, Lewis & Thornhill, 2003:84).

Realism involves the basic concepts introduced by Interpretivism but goes a step further by trying to ascertain, firstly, whether a certain reality endures alongside people's varying interpretations (Saunders, Lewis & Thornhill, 2003); and, secondly, whether

there are 'stimuli' such as environmental and social forces which affect all people in a similar manner, whether or not they are aware of it (Saunders, Lewis & Thornhill, 2003: 84). This approach thus involves trying to identify what drives the individual while also focusing on identifying and understanding what social forces are at play (Saunders, Lewis & Thornhill, 2003).

This study is underpinned by the philosophy of Realism as it will focus on the effects of VM on strategy development and implementation, operations design, operations management and performance management.

4.3 Empirical versus non-empirical studies

Empirical studies generally tend towards establishing truths by collecting and analysing data; by contrast, non-empirical studies concentrate more on the meaning of concepts and the main theories within debates, offering a narrative rather than certain truths. The various types of research for each option are displayed in Figure 30 below.

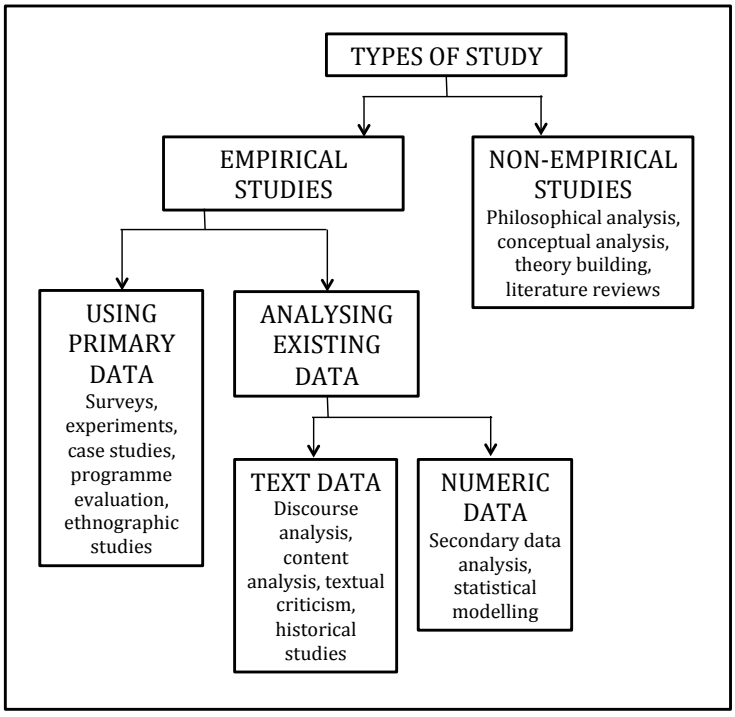

Figure 30: A typology of research design types (Mouton, 2009)

Empirical research generally involves a quantitative enquiry, involving numeric analysis of primary or existing data. In the case of primary data, the researcher herself or himself

collects the data through various means, including surveys, experiments, case studies, etc. Analysing existing data entails studying already captured data in an attempt to find meaning and answers. The data can be either textual or numeric, but often involves a combination of the two and includes, but is not limited to, discourse analysis, content analysis, textual criticism, statistical modelling and other secondary data analysis techniques (Mouton, 2009).

Non-empirical research is often qualitative in nature and focuses on gaining an acute understanding of certain strategic concepts, interactions, relationship and issues. Questions are used to inquire as to meaning, plausibility and suitability, rather than to find and substantiate facts, as is the case with empirical research (Mouton, 2009).

For the purposes of this study, both empirical and non-empirical research will be conducted, with each research question considered separately.

4.4 Purpose of the study

Cooper and Schindler (2014) explain that there are generally three types of study available, these being reporting, descriptive and causal; and that the choice of study depends on the objectives to be achieved.

A reporting study involves summarising and re-presenting data or information with the purpose of providing greater understanding, or for the generation of comparable statistics (Cooper & Schindler, 2014).

A descriptive study is concerned with the 'who, what, where, when or how much' within a preselected situation, investigating the finer details of an occurrence (Cooper & Schindler, 2014).

A causal-explanatory study seeks to identify why a situation has occurred and how various elements impact on one another; while a causal-predictive study focuses on attempting to foresee the effect of one element upon another when change is experienced (Cooper & Schindler, 2014).

Saunders, Lewis and Thornhill (2003) add a fourth option, namely exploratory studies which are used to establish 'what is going on' and to develop new understanding. This generally entails the research direction being flexible and adjusted accordingly as new information is discovered (Saunders, Lewis & Thornhill, 2003).

This study will incorporate all four approaches, as the angle of each research question will be considered separately.

4.5 Deductive versus inductive

Saunders, Lewis and Thornhill (2003) assert that a study can either be deductive or inductive in nature.

Deductive studies entail compiling a theory or claim and subjecting it to scientific-like testing (Saunders, Lewis & Thornhill, 2003). There are five stages to the research process (Saunders, Lewis & Thornhill, 2003, citing Robson, 1993:19), these being:

1) Deducing a hypothesis, which is a 'testable' claim of the effect of one element/s on another/others.
2) Expressing the hypothesis in measurable terms, identifying methods of measurement and what the expected outcome will be.
3) Testing this expressed hypothesis using experimentation or other empirical investigation techniques.
4) Analysing the results of the experiment, concluding whether the claim has been proven, or considering possible modifications.
5) Modifying the theory if necessary.

The cycle then begins again at point one in order to verify the theory further (Saunders, Lewis & Thornhill, 2003).

Inductive research follows a different sequence, in that information is first collected in order to fully grasp the extent of situations, after which a theory is developed (Saunders, Lewis & Thornhill, 2003). Advocates for this approach criticise the deductive method for being constrained by 'rigid methodology', not allowing for the consideration of the influence of other elements (Saunders, Lewis & Thornhill, 2003:87). Inductive research often involves a small number of participants and focuses on the context of situations,

using qualitative research methods and various forms of data collection (Saunders, Lewis & Thornhill, 2003).

This study will be primarily inductive in nature.

4.6 Scope of the topic

In this section, there will be a review of Cooper and Schindler's (2014) consideration of statistical studies versus case studies. Statistical studies involve collecting data in order to gain insight into a specific population's characteristics by using the detail collected from the sample (Cooper & Schindler, 2014). Often this type of study involves a hypothesis that is tested, and generalisations that are made from specific findings derived from numeric sources based on the "representativeness of the sample and the validity of the design" (Cooper & Schindler, 2014:128).

In case studies, a deeper circumstantial analysis is performed on fewer subjects, with the researcher seeking information regarding the effects of subjects on one another and their environments and vice versa (Cooper & Schindler, 2014). There is a heavy reliance on qualitative data, making a hypothesis possible but quite difficult. It allows for a detailed level of investigation, the findings of which can inform problem-solving, establish effectiveness and efficiency and contribute to the development of strategy (Cooper & Schindler, 2014).

This study will lean toward the case study structure.

4.7 Level of control

4.7.1 Primary versus secondary data

The relationship between the type of study and the nature of the data involved is examined more carefully in Figure 31, where the various design options are mapped.

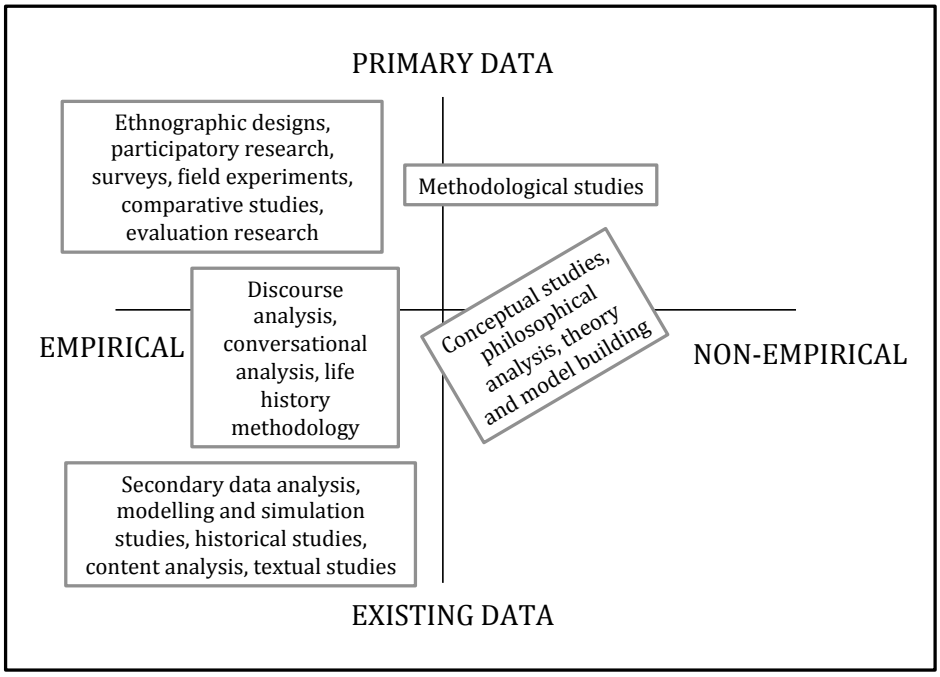

Figure 31: The relationship between the choice of study and the type of data (Mouton, 2009)

Empirical studies, through the collection of primary data, generally include ethnographic designs, participatory research, surveys, experiments, etc. Discourse analysis, conversational analysis and life history methodology include the collection of data and the analysis of existing data. Secondary data analysis, modelling and simulation studies, as well as historical studies, fall purely into the arena of empirical studies, using existing data. Interestingly, it can be seen that, in reality, research often fails to fall neatly into categories, as in the case with conceptual studies, philosophical analysis, theory and model building. These types of approaches can be empirical or non-empirical (depending on the nature of the research) and can involve primary data collection in combination with a consideration of existing data (Mouton, 2009).

This study makes use of both primary and secondary data.

4.7.2 The level of control

Cooper and Schindler (2014) identify two research designs when considering the researcher's level of control and influence over variables, these being experimental and ex post facto. In an experiment situation, the researcher sets out to control the variables in play in order to establish their effects on one another (Cooper & Schindler, 2014). In an ex post facto design, the researcher exerts no control over the variables so as to rule

out the threat of bias, and merely observes what happens and reports on it (Cooper & Schindler, 2014).

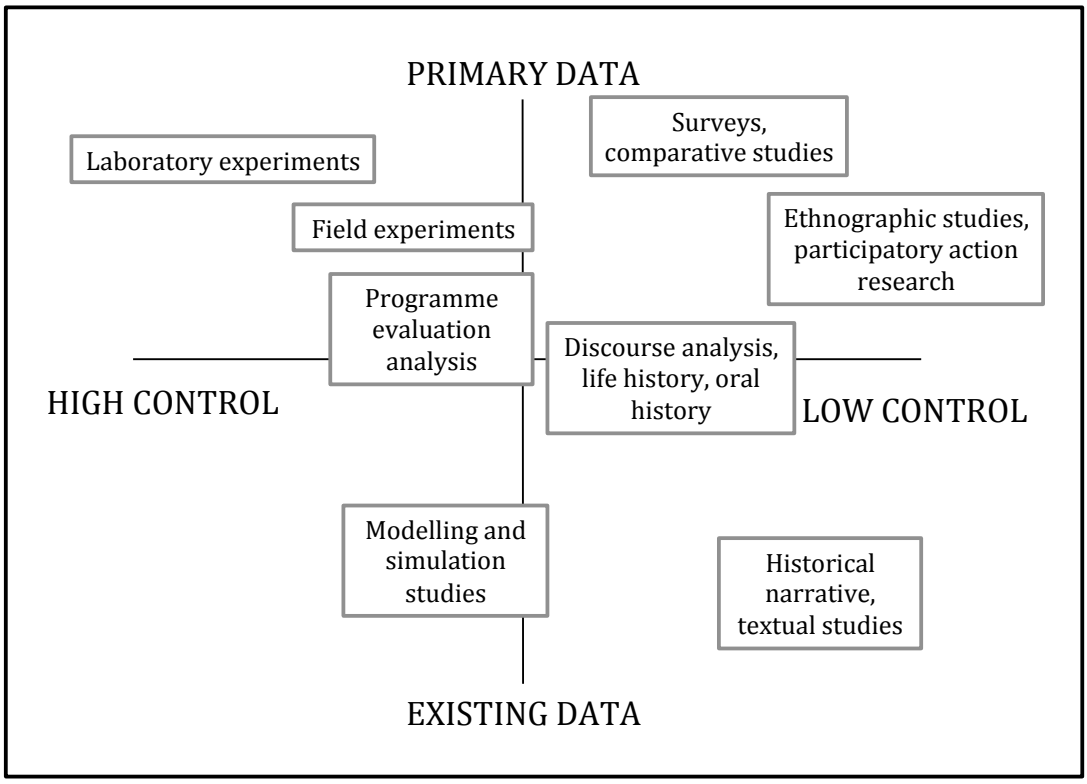

Figure 32: The relationship between the type of data and the related level of control (Mouton, 2009)

The direct consequences of the choice of primary versus existing data, in terms of control, is mapped in Figure 32 above. Laboratory experiments allow a high degree of control, while field experiments, modelling and simulation offer less control. Surveys and discourse analysis offer minimal control, while participative action research, narrative and textual studies offer even less (Mouton, 2009).

This study will offer a low level of control as it will involve literature reviews, content analysis and individual in-depth interviews.

4.8 Quantitative (numeric) versus Qualitative (textual) methodologies

Quantitative research is focussed on measuring certain instances such as customer satisfaction, the accumulation of knowledge, attitudes towards issues or success rates (Cooper & Schindler, 2014). The questionnaire is the most popular methodology in this category but is not the only option to answer questions such as 'how much, how often,

how many, when and who' (Cooper & Schindler, 2014:147). The data collected often involves responses to questions that are carefully organised and presented in statistical formats for purposes of analysis (Cooper & Schindler, 2014). Quantitative research often involves testing a theory, while qualitative research focuses on building theory but not necessarily testing it (Cooper & Schindler, 2014).

Qualitative research is appropriate when the research question goes beyond asking what happened and why, rather looking at the meaningfulness and interpretations of experiences, unveiling motives and drivers (Cooper & Schindler, 2014). The research question tries to explain 'how and why' certain situations occurred rather than their frequency or impact (Cooper & Schindler, 2014). The most common research approaches used in this situation are case studies, ethnography, grounded theory and action research (Cooper & Schindler, 2014:145).

This study will be predominantly qualitative in nature and will involve literature reviews, content analysis and individual in-depth interviews.

Interviews are the most common data collection method used in qualitative studies (Cooper & Schindler, 2014). The contributors selected for in-depth interviews were chosen, not because they possess representative opinions, but rather because of their personal experience in the field (Cooper & Schindler, 2014). The interviews were recorded using a Dictaphone and were later transcribed and summarised for the purposes of analysis (Cooper & Schindler, 2014).

A list of the people interviewed for this research is summarised in table 11.

Table 11: Interviewees

Interviewees	
Name	**Occupation**
Dr Bosman	CEO of a strategy consulting firm and company director at Vodacom. Mr Bosman holds a PhD in Industrial Engineering.
Mr Kennon	Academic and consultant for start-up firms with a focus on operations and funding. Mr Kennon holds a M.Sc.(Eng) Industrial Engineering.
Mr Ng'etich	Academic and holds a Mtech: Quality.
Mr Snyman senior	CEO of the Gauteng Tooling Initiative. Mr Snyman holds a B.Sc. (Eng) and a MBA.
Mr Snyman junior	Academic and consultant for start-up firms with a focus on operations and funding. Mr Kennon holds a M.Sc.(Eng) Industrial Engineering.
Mr Thiart	Consultant at Blue Skye visual management consultants. Mr Thiart holds a BCom Hons (Logistics management).
Mr van der Spuy Brink	Academic and strategy consultant. Mr van der Sput Brink holds a B.Sc.(Hons) Geology and a MBA.
Mr van Zyl	General manager Business Improvement at EXXARO. Mr van Zyl holds a M.Sc.(Eng) Engineering management.

4.9 Time horizon

There are generally two options available to the researcher regarding a time horizon, the first being a cross-sectional study, and the second, a longitudinal study (Saunders, Lewis & Thornhill, 2003). Cross-sectional studies focus on a particular situation at a specific predetermined period of time and often involve the use of questionnaires or interviews, depending on whether the study is qualitative or quantitative (Saunders, Lewis & Thornhill, 2003). Longitudinal studies, on the other hand, monitor change and advancement over an extended period of time (Saunders, Lewis & Thornhill, 2003).

This study will adopt a cross-sectional strategy due to time constraints.

4.10 Research strategies

There are many strategies to choose from when conducting research. Table 12 below summarises some of the most popular options.

Table 12: Research strategies (Mouton, 2009)

Research Strategies	
Empirical	
Ethnographic research: Participant observation studies	This strategy is typically qualitative and focuses on developing a detailed understanding of a group or person with specific reference to their environment, lifestyles and common practices.
Ethnographic research: Case studies	This study is also most often qualitative and involves studying a smaller group of fewer than 50 people.
Participatory/ action research	Also qualitative in nature, this study seeks to better understand the subjects of the research with a particular focus on empowering and improving the social conditions of the people involved.
Surveys	A quantitative study that attempts to present a 'broad overview' of a sample representing the greater population.
Comparative, cross-cultural and cross-national studies	This study seeks to draw distinct similarities and differences between various instances such as economies, cultures, businesses, and even individuals.
Experimental designs	Quantitative in nature, this research represents a causal study of several instances conducted under strictly controlled conditions achieved by using laboratories within which to stage the experiments.
Field/natural experimental designs	Quantitative research that attempts to provide a 'broad overview' of a sample representing the population, in a natural rather than laboratory setting.
Evaluation research: Implementation evaluation	This study aims at determining whether an intervention has been appropriately effected as it was designed to be.
Evaluation research: Experimental and quasi-experimental outcome studies	In this case the research attempts to establish whether an intervention has been successful, and whether the hoped for results have been achieved.
Evaluation research: Qualitative and empowerment evaluation	This is a qualitative study that focuses on the performance of initiatives in their natural environment with specific reference to the implementation rather than success of achievements.
Statistical modelling and computer simulation studies	This research involves building and validating models which replicate real world situations, using statistical techniques. The generated data is then compared to actual data for validation purposes.
Secondary data analysis	Usually quantitative, this approach involves analysing existing data to test theories or to validate developed models.
Content analysis	Research that involves examining documents including words, illustrations, diagrams or messages of any other kind.
Textual analysis, hermeneutics, textual criticism	The examination of written words and their meaning.
Discourse and conversational analysis	Similar to textual analysis, this study focuses on understanding specific words within the greater context of conversations etc.

Historical studies/ narrative analysis	The aim of this research is to establish the happenings of the past in their order of occurrence.
Life history methodology	This research focuses on a very small group of people (in most cases one individua)l and attempts to capture the personal history of the individual/s as retold by them.
Methodological studies	Research which attempts to invent new procedures for data collection.
Non-empirical studies	
Conceptual analysis	The study of the meaning of specific words or phrases by researching and considering all the definitions available.
Theory-building or model-building studies	The development of original theory or a model to better explain a certain situation.
Philosophical analysis	The consideration of opinions for and against specific issues, often developing new contributions to 'the meaning of life' and related ethics.
Literature reviews	An examination of the existing body of literature on a certain topic with specific focus on key opinions and recurring issues.

This study will use a combination of the content analysis and literature reviews as research strategies.

4.11 Alternate methods of data collection

Cooper and Schindler (2014) explain that there are two processes that can be used to collect data. The first is 'monitoring' and involves the researcher analysing and examining the actions of a participant without drawing responses from the people involved. The researcher merely documents his or her observations (Cooper & Schindler, 2014). In the case of this study a literature review will be conducted and the content of documents will be analysed.

The second option is a 'communication study' where the researcher specifically asks questions of participants with the intention recording their responses (Cooper & Schindler, 2014). This study will make use of one-on-one interviews with industry experts.

4.12 Chosen research methods

The reason for selecting these research methods lies in the nature of the research questions. Each question, and by extension, each sub-question, cannot necessarily be adequately answered using the same research method.

Table 13 below shows the research questions, the research design and methods used to answer the research questions.

Table 13: Research methods for each question

RESEARCH QUESTION	RESEARCH METHOD
How does VM create value within an organisational setting?	
How is VM traditionally implemented within an organisation?	Literature review and interviews
In what ways has VM been applied creatively?	Literature review and interviews
What type of improvement does VM typically enable?	Literature review and interviews
What magnitude of improvements can be expected?	Literature review and interviews
Can VM aid in strategy development and the implementation thereof?	
How can VM facilitate strategy design and implementation?	Literature review and interviews
What advantage is gained by using VM in strategy design?	Literature review and interviews
How does VM impact on employee motivation when implementing the designed strategy?	Literature review and interviews
What magnitude of improvements can be expected	Literature review and interviews
In what ways can VM improve the operations design process within an organisation?	
How can VM facilitate operations design within an organisation?	Literature review, interviews and content analysis
What advantage is gained by using VM in operations design?	Literature review and interviews
What magnitude of improvements can be expected?	Literature review and interviews
How could VM methods impact on operations management activities?	
How can VM facilitate operations management within an organisation?	Literature review and interviews
What advantage is gained by using VM in operations management?	Literature review and interviews
What magnitude of improvements can be expected	Literature review and interviews
Can VM improve the effectiveness and efficiency of performance measurement?	
How can VM facilitate performance measurement within an organisation?	Literature review and interviews
Will VM methods improve the effectiveness of performance measurement?	Literature review, interviews and content analysis
Will VM methods improve the efficiency of performance measurement?	Literature review, interviews and content analysis
What magnitude of improvements can be expected	Literature review and interviews

4.12 Conclusion

This chapter has described the various options available when considering research design and methodology. This study has adopted the philosophy of Realism as it focuses on the effects of VM on the above mentioned business functions. Both empirical and non-empirical research is conducted and each research question is considered separately. The purpose of the study is reporting, descriptive and causal explanatory. The study is primarily inductive in nature and leans towards the structure of a case study. The research makes use of both primary and secondary data and is predominantly qualitative in nature involving literature reviews, content analysis and individual depth interviews as research methods. The research conducted and presented in Chapter 5 will follow the process described in figure 33 below.

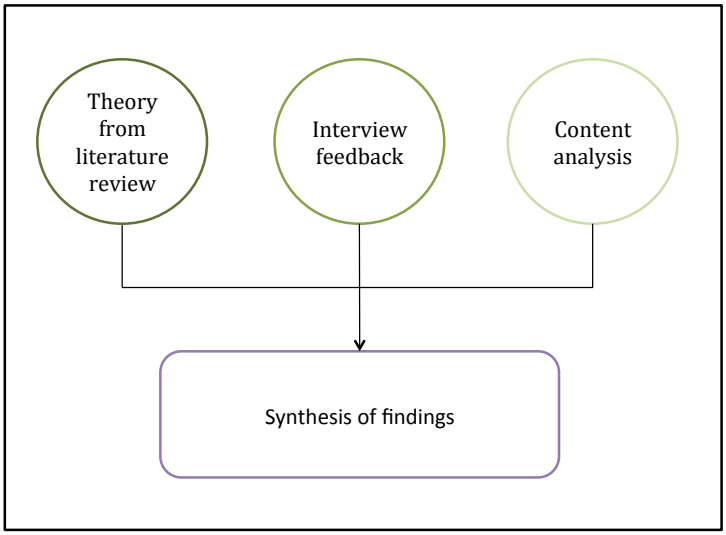

Figure 33: The research process

Chapter 5: Findings

This chapter is the fifth phase of the research.

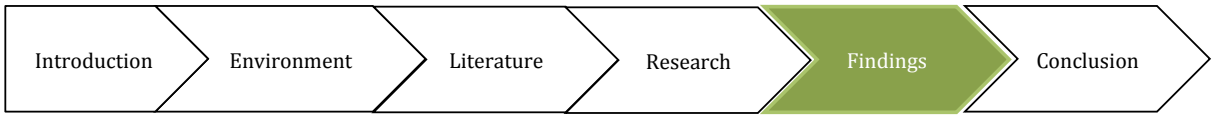

Figure 34: The fourth phase of the research

5.1 Introduction

This chapter will attempt to answer the research questions set out in Chapter 1 using the research methods discussed in Chapter 4. For convenience, the research questions have been visually summarised in Figure 35 below.

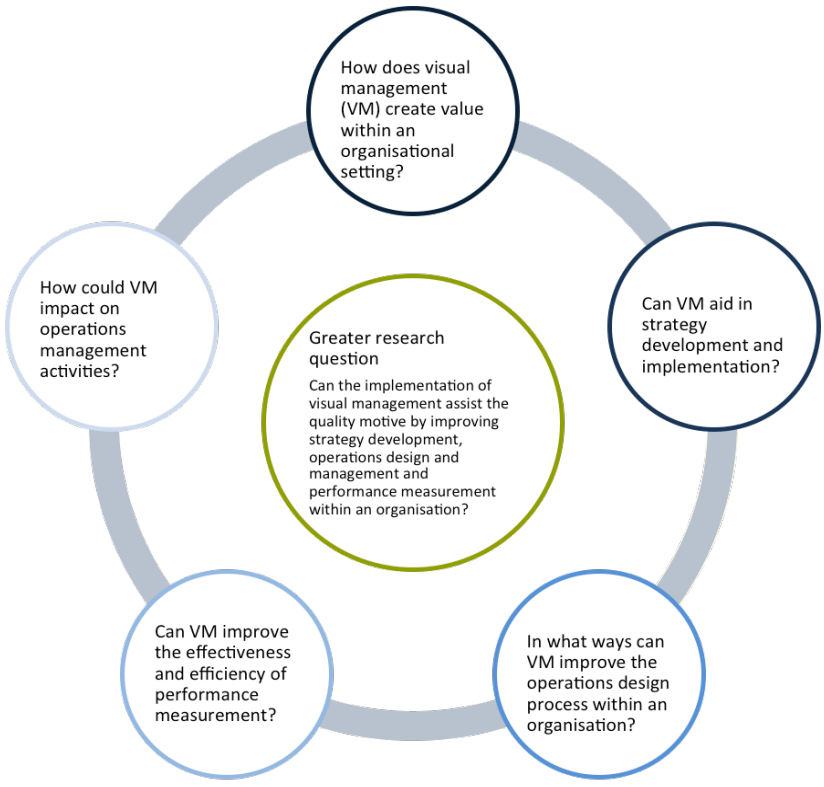

Figure 35: A summary of the research questions posed in this study

5.2 Research Question 1:
How does VM create value within an organisational setting?

5.2.1 How is VM traditionally implemented within an organisational setting?

Theory-based answer

According to the theory presented in Chapter 3, VM was originally developed to solve problems and inefficiencies experienced in industrial operating environments such as factory floors. It was implemented in order to convey a large body of detailed information, usually housed in reports and the minds of management, to those employees who needed it, in order to properly complete their designated tasks. The volume of information was reduced by simplifying it, summarising it and making these summaries directly available at the point of use in the form of pictures, schedules, check sheets or signs.

The visual workplace silently and simply communicates how to effectively and efficiently utilise the business's facilities and equipment. Almost every item, including tools, equipment, the floor, walls and the ceiling, provides information regarding what an item is to be used for, and when or where it is to be stored. This minimises the need for employees to waste time and effort having to search outside their immediate work areas for answers from manuals or management.

Interviewee feedback

Interviewees generally agreed that VM was first implemented on the factory floor.

Generally VM has not been widely implemented in small businesses in South Africa. Many businesses use graphs and other basic visual tools to display performance, but they are not given priority and often get filed away before any contribution can be gained.

Two interviewees felt that it was important to note that the VM function is often outsourced as the required expertise is very rarely held within the business itself. They explained that, in most cases, an efficiency problem is identified from within the business and a consultant brought in. This consultant, together with the internally nominated champion, then implements the concepts of VM.

One interviewee felt that, traditionally, VM was implemented as a method of coercion and reprimand, used primarily in order to note when performance levels fell below targets. Employees responsible for these sections of the process would then be blamed. VM was rarely applied to upper levels of management or the general administration function where it was desperately needed.

Another interviewee took a unique angle and explained that VM is an age-old approach. It was first recorded as having been implemented in Mesopotamia and the Great Dynasty period as a means to procure and manage resources, plan the future and complete construction projects. Other examples of VM used throughout the world include these: the Egyptians building of the pyramids; the Chinese in labour organisation and management; and the Greeks when achieving automation. In most cases, VM was used as a means to ensure the sustainability, efficiency and effectiveness of valuable and potentially scarce resources.

The final interviewee chose to interpret the question in terms of corporate big businesses, the likes of whom are listed on leading international securities exchanges. His response was heavily influenced by the reality faced by these businesses. In most cases, actions in these businesses are aligned to achieve short-term targets, so anything that may delay this achievement is not often embraced. Performance is commonly measured against EBITDA (earnings before income tax, depreciation and amortisation) and methods such as VM to improve efficiency and effectiveness of operations are seldom applied, unless a direct numeric impact on EBITDA can be estimated. Financial impact is the main measure in these cases and 'soft factors' such as improved employee motivation is not likely to convince future investment. Although often unintentional, VM has been endorsed by many businesses; however, it is not a concept that has been overtly utilised.

Today VM is applied in many fields, one of the main ones being Systems Engineering. It is used to represent various strategic approaches using visuals to closely depict process flow, allowing for more creative and innovative thinking.

5.2.2 In what ways has VM been applied creatively?

Theory-based answer

According to the theory presented in Chapter 3, VM has been applied to many different scenarios within contrasting industry settings. While having been focussed on factory floor operations, VM has made its mark in service industries and traditional office settings. Examples provided of creative VM application include its use in hospitals, banks, retails stores, airports, school administration and classrooms, tertiary education institutions, government offices and operations, as well as home businesses.

Interviewee feedback

The interviewees answered in a similar vein, adding examples and scenarios which had either impacted upon them, or with which they were personally involved.

The first example provided was the international fast food industry and how many of these businesses have built VM into the foundation of operations. Specific reference was made to how the kitchens are organised and run. Uniquely designed food racks are used not only to house the prepared food, but also to indicate capacity and when certain volume limits have been met. Instructions on how to operate machines or carry out key tasks are visually communicated using signs and posters hung at the point of use. Safety warnings and instructions are similarly displayed to ensure that the work environment remains safe and respected.

The second example was in the case of planning, building and managing the simulator of a Pebble Bed Modular Nuclear Reactor in South Africa. The biggest problem experienced there was re-design time. As a solution, a single process flow was designed using VM tools; and the system was carefully explained to all who worked within the process so that possible bottlenecks could be identified. This intervention resulted in a decrease in re-design time from months to less than one week.

The third example where VM was implemented was the Gauteng Tooling Initiative (GTI), which is a non-profit organisation whose focus lies in stimulating and supporting the tool, dye and mould making industry in Gauteng. VM was harnessed in these operations areas where storage containers and shelves were specifically designed to hold certain

materials and communicate remaining quantities signalling when more should ordered. Visual instructions indicating how equipment is to be operated, was made available at point of use and safety instructions were graphically portrayed.

The fourth example was in a life insurance company in South Africa. Although the process was predominantly paper-based, it was modelled on the typical processes found on factory floors. The associated principles of not allowing a document to progress to the next stage in the process until it had been adequately completed and checked for correctness resulted in far fewer failed claims. Coloured boxes were used to house documents and communicate the next step in the process. This colour coding also allowed for different types of documents to be distinguished from one another at a glance.

The fifth example where VM was creatively applied was in the technology industry in South Africa. Here the most notable visual tool used was a large dashboard mounted in the kitchen area. This dashboard displayed the exact progress of each developer and, more specifically, where each of them was in their various sprint cycles. The board also showed the progress of cross-disciplinary programming teams allowing for healthy comparison and competition.

The sixth example involved applying VM in the boardroom when determining the strategic direction of the business and making the necessary decisions to achieve target. Various visual tools can be used as guides when conducting meetings to ensure that conversation remains focused on creating and achieving corporate strategy.

The seventh example provided was within the education sector and emphasises how successful visual teaching has been in achieving remarkable results as it encourages whole brain thinking. It is being discovered that most learners need more than speech and words to understand and simulate information.

The eighth example is VM used to assist in project strategy mapping and internal marketing initiatives within the business. This entails mapping current projects on storyboards allowing direction and focus to be identified at a glance. In the case of a

small business, the vision and direction of the business is translated into a visual representation and displayed in prominent areas for clients and employees to see.

Finally, the historical implementation of VM was considered. Such management could be found as early as 4000 and 5000 BC, when ancient accounting systems recorded transactions and process flows became common practice. VM became the basis for recording the required planning, organising and controlling of actions and projects.

In today's context, VM methods have shifted from being focussed on operations, to regulating and assisting higher levels of management with their daily activities.
Figure 36 summarises creative applications of VM organised in no particular order or ranking.

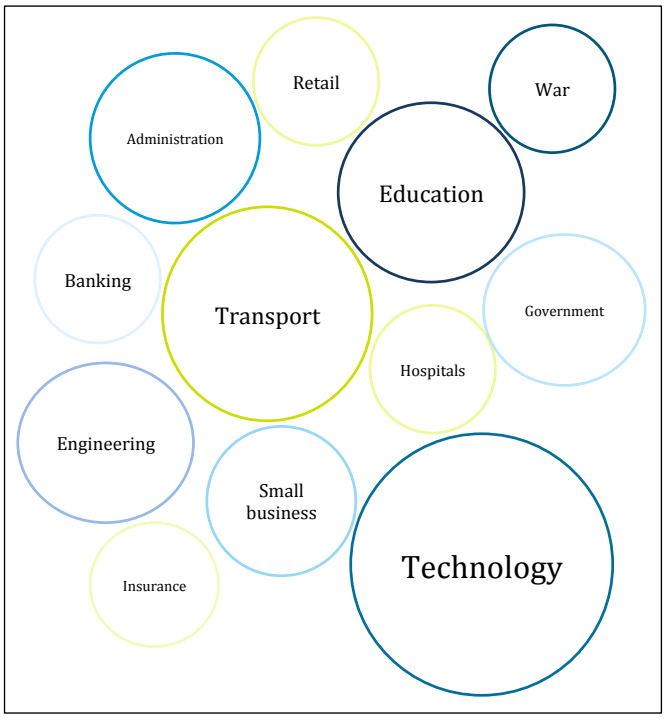

Figure 36: Examples of creative applications of visual management

5.2.3 What type of improvement does VM enable?

Theory-based answer

According to the theory presented in Chapter 3, VM enables the following improvements:

- The main benefit of instituting VM and a visual workplace is that information and answers to pertinent questions are made visible and are freely available to those who need them.
- VM facilitates the identification of problems and problem areas that are generally caused by information deficits. When people feel insecure at work, they generally tend to hide their mistakes rather than admitting to them and finding solutions.
- Advanced VM systems and a fully functional visual workplace will also provide solutions to certain problems; and, if problems are not solved in their entirety, then VM will assist those employees involved in finding an appropriate solution.
- VM helps to identify and eradicate motion which, as indicated in the literature review, is the primary enemy of efficiency and the starting point for quality improvement and lean initiatives. *As mentioned previously, "Motion takes place when employees wander, wonder, search for answers or provide them (Galsworth, 2005). It is any task that an employee is forced to do in order to complete their allotted work that is neither elective nor avoidable (Galsworth, 2005). It is "moving and not adding value" (Galsworth, 2005:44)".*
- VM provides instant and complete information on how to perform tasks and what the technical standards are. In this manner, VM improves conformance to rules by employees and specifications by products.
- The employee is empowered by the "I" philosophy and has authority over identifying their personal motion and finding ways of reducing it. All the information that they need is directly before them, which encourages on the spot problem solving, autonomy and self-regulation.
- VM supports the flow of work and information.
- VM allows for the goals and objectives of management to be converted into work instructions and targets, which facilitate the alignment of top management strategy and employee actions.

Interviewee feedback

The interviewees reinforced these views by discussing how, on a strategic level, VM helps to focus the organisation, using various tools such as flow charts. Using Value Analysis and Value Engineering, it directs, improves and streamlines activities towards achieving corporate strategy.

VM results in a complete shift in mind-set throughout the organisation. Information that is traditionally hidden in documents is now freely available at the point of use, removing ambiguity and confusion. Information is simplified and streamlined so that everyone can understand it.

VM can be used to motivate and empower employees by rewarding good work and encouraging continuous development. In this manner, a culture of learning and self-improvement is achieved. It is important to include employees in the design of their tasks and how they are measured, as it allows for buy in and possibly even suggested improvements. People become less inclined to hide their mistakes and rather focus on possible solutions.

Employees are far more likely to respond positively to a self-imposed goal than to one that is a top-down order, allowing for the development of self-directed work teams. VM allows for a new level of employee autonomy, responsibility and accountability, as there is no excuse for not following clear self-set directions.

VM also assists employees without formal education to enter the workplace and successfully contribute to operations by relying on visuals for guidance and thorough training for development.

VM allows individuals to measure themselves against themselves, without negatively impacting on another employee. When people understand how they are being measured, they are more likely to meet performance targets and invest in their personal development.

Lastly, VM assists the group identity, encouraging people to work together to achieve the greater goal.

5.2.4 What is the magnitude of the improvements to be expected?

Theory-based answer

As recorded in the literature review, improvements in lead time, quality and delivery time of up to 15-30% can be expected when implementing the technologies of the visual workplace.

Interviewee feedback

All of the interviewees agree that the improvements gained from implementing VM are significant. However, the magnitude to be expected is very difficult to estimate; and, if attempted, should be considered on a case-by-case basis. Generally speaking, the implementation of VM must be in the financial interests of the business and its impact on the EBITDA calculated. Having said that, it cannot be denied that non-monetary benefits are just as important, if not more so in the long term. VM allows for improved process flow, efficient use of resources and better time management, essentially improving the economic wellbeing of the organisation.

One interviewee offered their experience of the Gauteng Tooling Initiative (GTI). In this case, before the VM intervention, delivery time was over one month late. After implementing VM and assigning a champion from within the business to run the project, delivery time was reduced to a couple days.

Another example provided was of an insurance company in South Africa which brought wrongful claims down by 60% after implementing VM. Employees themselves were asked to identify the major causes of wrongful claims and to find ways to reduce them or prevent them from occurring. The fact that they were directly involved in the process allowed them to quickly identify causes. They understood that they would be measured according to these occurrences, encouraging them to remedy their actions immediately and accordingly.

5.2.5 Summary of findings

It is clear from the research that VM has made a strong impact both on the factory floor and through its progression into various other types of businesses and industries. VM tools allow for a visual representation of situations, otherwise not achievable. It improves overall communication and facilitates problem-solving using approaches such as Value Stream Mapping. The improvements to be expected from VM are significant and range from improved focus to employee motivation, as shown in Figure 37.

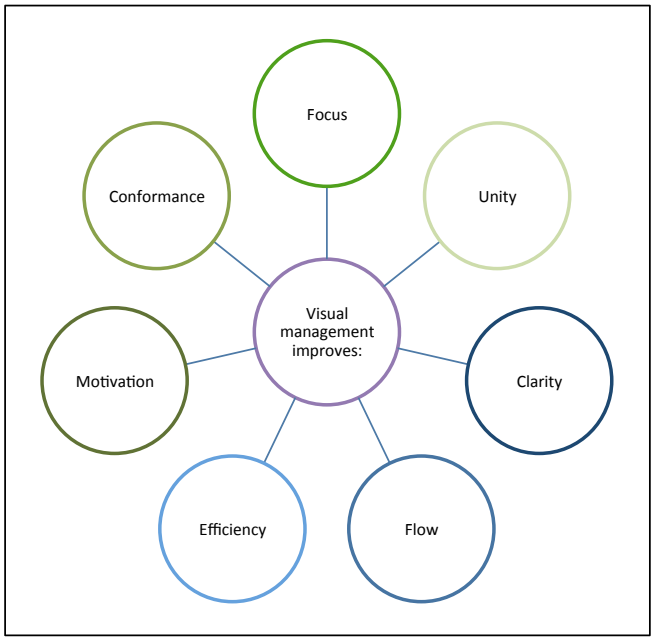

Figure 37: A summary of improvements to be expected when implementing visual management

The research has shown that VM improves company-wide focus by translating corporate strategy, goals and objectives into working targets and building action plans into operations. It allows for unity across various levels of the business. The process informs strategy design and employees are involved in deciding how strategy will be implemented, bridging and possible removing the divide between strategic management and workers.

VM allows for improved clarity, as employees are involved in ascertaining what information is needed to complete their jobs. This information is then visually displayed and available at the points of use. As a result, every person knows exactly what to do and how to do it.

When operations are designed and managed visually, an improved flow in information and production is achieved, avoiding the costs of unnecessary delays. Efficiency is also greatly improved as measurements and standards are built into the visual workplace, allowing for deviations to be swiftly identified and remedied. Employees and management begin to work together to improve performance and eradicate motion.

Motivation is greatly improved when implementing VM, as employees are empowered by the "I"-Philosophy. They develop pride in their work and are rewarded for achievements. Employees are required to design their own work areas, essential

activities and key performance measures, providing them with the necessary autonomy to accept responsibility.

Greater conformance to specifications is experienced across the business. The process is carefully designed, building in standards and performance measures to timeously identify variances. Working instructions for key activities and the operation of machinery and equipment are made abundantly available to ensure that employees do their jobs correctly.

5.3 Research Question 2: Can VM aid in strategy development and implementation?

5.3.1 How can VM facilitate strategy design?

Theory-based answer

According to the theory presented in Chapter 3, implementing VM and creating a visual workplace is a decision to be taken by top strategic management. If this approach is chosen, successful implementation will require complete buy-in and dedication from management and employees throughout the organisation. Top executive support is vital and the need for them to lead by example, great. VM will require a shift in power for many traditional top-down organisations, as operational decisions are made by those on the factory floor and not by strategic management. A careful balance must be achieved where the concepts of bottom-up and top-down leadership structures are merged to create an organisation that operates freely and reacts swiftly to change within the distinct framework and strategic intent of the business as a whole.

To achieve this new level of leadership, the overall strategy of the organisation must be altered to facilitate this type of growth. It need not change focus, but it must adapt appropriately. The first notable difference will be the importance of translating and integrating strategy into the physical workplace context. A mere glance should be enough for an employee to understand what is expected of them, how to achieve it and how their contribution assists in achieving strategic goals. Strategy must be kept simple and be properly communicated, rather than being over complicated and scarcely understood.

Once achieved, the visual workplace will constantly collect and, to some extent, interpret data points and convert them into valuable information that is used to inform strategy development and facilitate improvement in the face of continuous economic change.

Problems and issues are quickly identified, allowing for swift amendments to strategy if necessary. The reliance on top management to solve operational problems will be considerably reduced, allowing them to keep their focus strategic. The great divide between the factory floor and planning table will be reduced and the needs of all employees better communicated and met.

The actual process of strategy development can also be converted into a more visual process (and the literature has shown that is has been to some extent in the past) using flow charts, mind maps, colours, targets, progress measures and comparisons of planned versus actual results over time, making the necessary changes clearer to identify and their effect traceable. When using visual tools in strategy development, whole brain thinking is achieved, using both hemispheres of the brain and allowing for creative and holistic thinking.

Interviewee feedback

The interviewees reiterated what was said in the theory, saying that the visual workplace constantly collects data from the process, using controls and metrics to do so. Some advanced systems can take data collection to the next level by interpreting and creating valuable information. This information can be used by strategic management to inform strategy design. In this manner, strategic decision-making is based on actual and accurate data from the process itself, not on personal hunches, opinions or popular theory. In some cases, top management have no indication of profits until the year-end when financials are compiled. Generally this does not allow for informed and effectual decision making.

Some go as far as to say that VM is a strategic imperative and is essential to the learning organisation. The availability of information from the factory floor allows for the gap between strategic management and operations to be reduced, if not completely eliminated. Unfortunately, there is a large limitation to this as the type of operational environment to be measured plays a large role in the quality of information provided, as

well as the intervals at which it is made available. The factory setting allows relatively precise measurements, whereas performance in the consulting industry is far more difficult to establish. The performance of a power plant must be measured by the millisecond to allow for a timeous reaction to problems, as failure to do so can be disastrous.

As the VM system matures, it will begin to answer basic operations questions that are traditionally made by operations managers. This will free up their time to think more strategically, moving the burden of responsibility down the organisation. One of the interviewees referred to the concept of how learning drives strategy and VM enables learning (Senge, P. M. 1990. *The fifth discipline: The Art and practice of the Learning Organisation.* New York: Currency and Doubleday.).

Another interviewee explained how they themselves use VM when designing corporate strategy within their company. In their case, they make use of visual strategy boards placed in a specifically defined strategy development room. Each board is given a separate wall and displays one of three criteria. The first concentrates on uncertainties facing the business and what is expected in future. The second details company goals and objectives; and the third board shows the plans for achieving goals and objectives. All discussions relating to strategy are held in this particular room and newly discovered information is categorised according to the three boards. This helps to define the nature of meetings and discussions, ensuring that everything considered and adds value. If a topic does not conform to one of the three boards, it is immediately abandoned. Once strategy is designed, VM can help to simplify it into actionable tasks understood by everyone throughout the organisation, irrespective of language or educational barriers. This mitigates the situation where top management sets vague non-financial targets that are unintelligible to the rest of the organisation.

5.3.2 What advantage is gained by using VM in strategy implementation?

Theory-based answer

According to the theory presented in Chapter 3, the entire concept of VM, visual thinking and the visual workplace is based on the notion of improving performance and, by extension, achieving strategic goals and objectives. The visual workplace focuses on

improving the communication of strategy from those who design it, to those whose daily activities achieve it. While starting with the basics of organisation and control on the factory floor, the business becomes better equipped to achieve goals set by management. Every task is considered and aligned with the greater strategy in mind. Any activity that does not add value and which, by extension, does not bring the business closer to achieving its objectives, is scrapped and replaced by one that does. Specific visual order, standards, metrics, controls and guarantees are developed in line with corporate strategy and implemented to improve overall performance.

Interviewee feedback

The interviewees confirmed what was said in the theory by explaining that strategy implementation involves management motivating employees to complete certain actions and adequately communicating what is expected of them. VM greatly assists in communicating strategic goals to all levels of employees.

Once strategy is designed, VM can help to simplify it into actionable tasks understood by everyone throughout the organisation, irrespective of language or educational barriers, using tools like The Balanced Scorecard, flow charts and graphs. This mitigates the situation where top management sets vague financial targets, unintelligible to the rest of the organisation.

The achievement of plans can be publicly displayed using visual tools such as display boards, allowing employees to see their progress and amend their actions accordingly. The problem of 'out of sight out of mind' is no longer a threat, as everyone has access to all the information they need to remain focussed and up to date with what is happening.

VM is a wonderful project management tool. It constantly measures and displays measurements for all to see, signalling problems or when production falls behind. This harnesses social pressure and encourages remedial action.

There is often far greater buy in when employees are involved in designing processes under the direction of corporate strategy. They understand what the company goals are and what their contribution is to achieving them. In many ways, VM unifies the workforce. Company strategy is filtered down through the organisation and not merely

adopted by employees. Everyone is shares a common understanding of goals and requirements, and entrepreneurial business units are provided with much needed autonomy.

5.3.3 How does VM impact on employee motivation when implementing corporate strategy?

Theory-based answer

According to the theory presented in Chapter 3, one of the eight building blocks of visual thinking is the "I-Driven Change" which makes a point of providing all employees with independence to identify their own improvement initiatives in line with what the organisation hopes to achieve on a strategic level. People are generally far more inclined to work towards goals that they set for themselves, within an environment that they personally regulate and keep in order. According to their individual needs and the needs of their work. Each person is encouraged to identify what information they need to know in order to do their work, the tools and equipment needed, and where these are to be stored. In this way, people grow confident in their daily activities and more willingly take on responsibility. Their motivation to improve performance is often greatly improved as they are given the associated autonomy along with the responsibility.

The second element to the "I-Driven approach" is the "need to share element" which facilitates teamwork and unifies the business operations into one clear motive. Once they have established their direct needs for completing assigned tasks, employees are encouraged to think about what others might need to know and how to share this information with them, collaborating to improve operations as a whole. When people are given the power of information, they themselves feel powerful, which has a positive impact on overall company culture.

Interviewee feedback

The interviewees added that it is inherently human and natural for employees to act within their own best interests; and that they are often hesitant to share their knowledge and expertise with others. VM addresses this issue by making all information available to everyone, allowing for equality and transparency. People begin to work together as teams, combining their skills and a relationship of trust is built between management and employees.

Information is not only made freely available, but it is provided in a purely visual format to avoid language and education barriers. This is quite significant, as it has been found that approximately 80% of interpersonal human communication is visual, involving eye contact, facial expressions, hand gestures and general enthusiasm.

The 5S of VM allows people to take pride in their work areas by cleaning them and organising them appropriately. Requiring employees to manage their personal work areas and contribute to the design of their tasks results in people who thoroughly understand what is expected of them. When people understand what their job entails, they can work towards mastering it. They are motivated by targets partly set by themselves and often strive to perform even better than expected because they are not just following a set of management orders. In this way, traditional company vision and mission statements are converted into peer plans, peer objectives and peer progress, all of which are simple and number orientated.

There are often initial teething problems when implementing VM, as most traditional employees are used to being followers and so struggle to step out of the 'left brain' mentality and lead themselves as well as others. VM gives employees on all levels the opportunity to understand what their personal contribution is to achieving overall strategy. It allows them to focus their efforts on the key elements that impact on their job satisfaction and personal needs as described in the Maslow Hierarchy.

Ideally the culture of the organisation should motivate strategy; and strategy should motivate tactics, at which point VM should be introduced.
The system should, in time, reach a point where employees have the training and attitude to feel confident enough to 'just do it', rather than wait for management to give orders. People innately want to do well and develop themselves and might personally increase their challenges and targets at work.

The interviewees advised that it is a good idea to facilitate a "quick hit" target that can be achieved within a day or two to illustrate that change is immediate and significant.

A summary of the factors impacting on employee motivation is shown in the Ishikawa diagram presented in Figure 38 below.

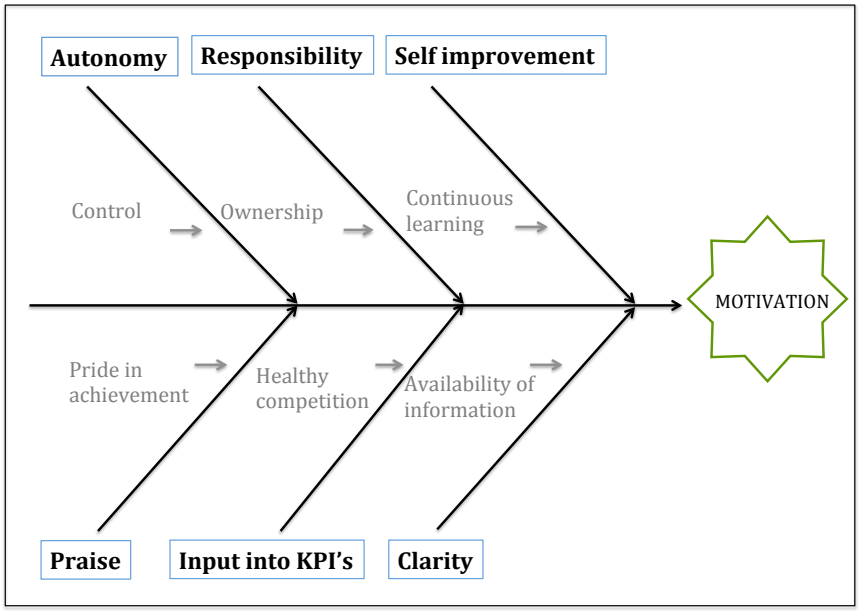

Figure 38: Factors that impact on employee motivation

5.3.4 What is the magnitude of the improvement to be expected?

Theory-based answer

The theory presented in Chapter 3 did not offer an indication of the magnitude of improvement to be expected.

Interviewee feedback

The interviewees generally agreed that, while improvements to strategy development, implementation and employee motivation are significant, they cannot easily be estimated or measured.

5.3.5 Summary of findings

The research makes it clear that VM facilitates strategy design by making the process thereof visible using tools such as strategy boards, flow charts and road maps. By physically drawing when developing strategy, managers access the right side of their brains allowing for creative and holistic thinking.

The visual workplace continuously measures and assesses the performance of the process, providing top management with valuable and correct information generated by

operations. This information can be used to inform decision making, rather than relying on personal opinion, hunches or popular theory.

The visual workplace eventually begins to manage itself, allowing operational managers more time to think strategically and inform the process of strategy design, bringing knowledge and expertise from the factory floor into the boardroom. Figure 39 below summarises important factors influencing strategy design in the visual workplace.

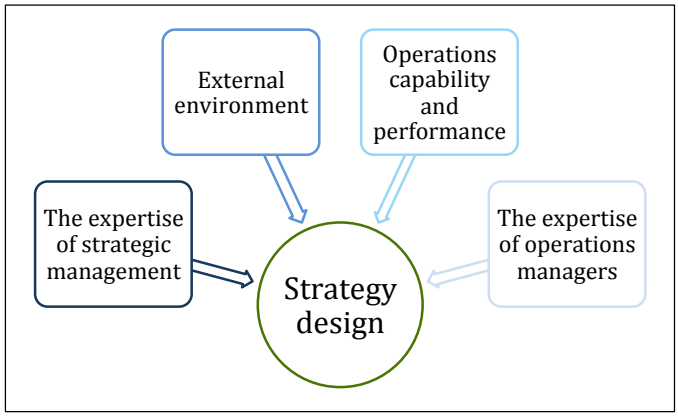

Figure 39: Factors influencing strategy design in the visual workplace

Visual tools and thinking such as the Balanced Scorecard can also help to translate corporate strategy into simple actionable tasks that are built into the design of operations, essentially building strategy into operations and the workplace.

VM facilitates the efficient and effective communication of corporate strategy throughout the organisation, explaining how each individual contributes towards achieving set goals, motivating efforts and unifying action.

VM greatly improves employee motivation by allowing employees to:

- Identify the information and other resources necessary to complete their jobs;
- Design and manage their own work areas;
- Design their activities, and
- Be involved in setting KPIs.

  The result is that the employee is given the appropriate autonomy to match their responsibilities.

The visual workplace makes a note of publicly acknowledging good work and encourages ideas for improvement. It also makes sure that everyone in the business understands what his or her personal contribution is to achieving corporate strategy.

5.4 Research question 3: In what ways can VM improve the operations design process within an organisation?

5.4.1 How can VM facilitate operations design?

Theory-based answer

According to the theory presented in Chapter 3, when the organisation commits to converting to a visual workplace, the overall design of operations will most likely need to be changed. Galsworth (2005) provides a VM implementation pathway that directly informs how operations should be designed. Design should be driven by the core questions of where, when, what, who, how and how much. Figure 40 shows the visual pathway to be adopted when designing operations for the visual workplace:

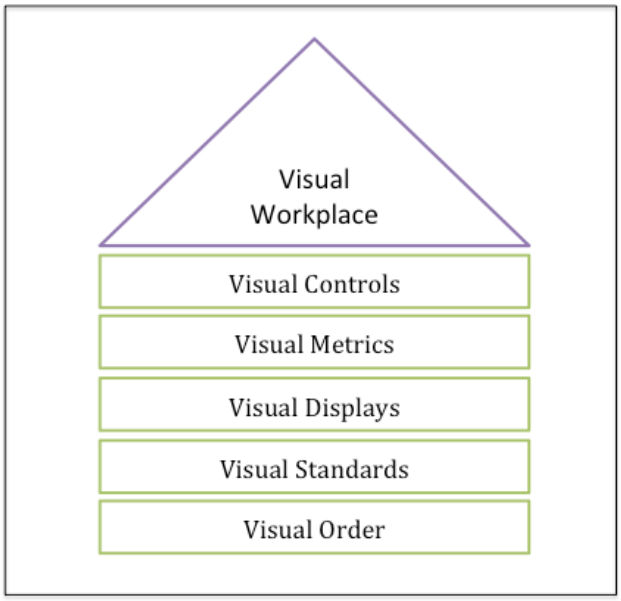

Figure 40: The pathway to the visual workplace (Galsworth, 2005)

To begin with, a visual order that allows for automatic recoil must be established and worked into the design of operations. This entails organising the workplace in such a way that it is capable of communicating visual information by cleaning it and drawing out visual locations on the floor, walls, cupboards, shelves etc. for all manner of items. Each item must hold an ID and an indication of its preferred location. Attention must be paid to ensuring employee safety.

Standards must be developed and displayed in the work area showing employees exactly how they are expected to complete their tasks, visually conveying technical and procedural standards.

Displays showing vital information to those who need it must also be made available. These can range from simple floor plans showing where each employee should be, or provide answers to questions such as, “Has the product been released to my stage in the process?”

Visual metrics (measures) must be provided showing more than performance measurement, as possible insight into the causes of good/bad performance may also be needed.

Visual controls must be implemented to manage the required specifications such as maximum inventory levels, heights for stacking, or volumes of materials used. Other methods of the pull system, such as Kanban and coloured lighting methods, are also to be integrated.

Finally the activities, which absolutely cannot be completed incorrectly, must be designed with a visual guarantee (such as the petrol pump example - no other way but the right way to put it away after use).

Interviewee feedback

The interviewees’ comments on the topic were very similar. When a visual workplace is implemented, it in itself imposes various demands that will directly impact the design of operations. Such demands include automatic recoil systems, demarcation and identification of key activities, the display of targets against system performance as well as visual metrics and controls. By following the ideals of the visual workplace, the process of operations design will become streamlined and improved.

There are many visual tools available for this activity, including Work Study Analysis, Value Engineering, flow chars and check sheets. Using simulation in the design of operations is just as advantageous as it brings operations ‘to life’, allowing for ideas to

be implemented and tested without having to incur a large capital investment. It facilitates the identification of key relationships throughout the process, as well as of general trends, steering the designer away from focussing solely on certain areas or details.

The activity of designing operations becomes a learning activity where employee suggestions are considered, implemented and the success thereof measured. By doing so, good working practices are established among workers and non value-adding steps are eliminated. Drawing out the process allows for complex elements to be simply explained.

5.4.2 What advantage is gained by using VM in operations design?

Theory-based answer

According to the theory presented in Chapter 3, all levels of employee, most importantly those working on the factory floor, are encouraged to participate in operations design. Each individual is given the scope to identify their needs and improve their workflow by eliminating motion. They define the information that they need at hand and what tools or equipment are needed to complete their work. The task of designing operations is thus taken out of the hands of strategic management to some extent, and given to those who are affected by it every day of their work lives, tapping into an enormous wealth of day-to-day knowledge. In this way, operations design becomes effective and efficient, as it is designed and moulded to the needs of the organisation as a whole by those both implementing and achieving strategy.

The concept of motion metrics also helps to inform further operations design once the visual workplace has been achieved. This is done through collecting data points and comparing these to what was planned, showing where problems lie and information deficits exist. The organisation ends up being designed and managed organically from data outputs produced by the system itself.

Interviewee feedback

The interviewees agreed that physically drawing the flow and floor plans of operations forces the individual to shift reliance from the left side of the brain, to the right. The right side of the brain encourages creative and holistic thinking, allowing employees to see the process as a whole. Using visuals to plot the process will allow the identification

of potential bottlenecks, waste and non value-adding steps in the process and mitigate expenditure in the long-term, keeping customers satisfied.

VM in operations design focuses on those involved and allows for certain areas to be targeted, if necessary. It improves clarity of operations and ensures that everyone understands each step in a process. The visual workplace insists on high standards of employee awareness and training regarding safety and related standards, resulting in a safer workplace.

The design of operations can be greatly improved by involving employees as their hands-on experience may help to streamline activities and identify issues that management may have overlooked. Each individual should be given the scope and authority to identify their needs regarding their role in operations. They should ascertain exactly what they need to do their work, which will positively influence workflow. In this manner, each employee can be held responsible for eliminating wasted time and movement.

The traditional management styles, where only a hand full of people make all the decisions for everyone else, is replaced by a system where decision making responsibilities are evenly distributed throughout the organisation, reducing wasted time and misunderstandings. In so doing, the operations function becomes a democracy where employees are motivated to achieve targets because they were involved in setting them, rather than merely doing what they are told when they are told (and often only when someone is watching them).

5.4.3 What is the magnitude of improvements to be expected?

Theory-based answer

The theory gathered in the literature review did not offer an indication of the magnitude of improvements to be expected.

Interviewee feedback

The interviewees generally agreed that, while improvements to operations design are significant, they can not easily be estimated or measured.

Content analysis

One of the interviewees documented their implementation of VM at GTI, as discussed earlier, and provided information and photographs.

The photographs in Figure 41 below were taken of the factory floor both before and after VM was implemented. The improvement is remarkable. The whole area was cleaned and carefully organised. Yellow lines were painted on the floor to indicate different workspaces and operational areas, for which specific people were made responsible. One step in the process could now be distinguished from another.

Figure 41: The factory floor at the Gauteng Tooling Initiative before and after visual management was implemented

Figure 42 depicts a different situation provided by the same interviewee. In this picture, we see various working areas of a factory bordered by the yellow lines like those in Figure 41. All the pipes containing electric cabling along the walls are painted red to indicate their danger. The workbenches have been adapted to optimise space and standardise the manner in which they are generally ordered. In the middle of the floor is a mobile tool shelf that outlines every tool showing where it must be replaced after use. This helps workers to immediately identify at a glance whether or not the tool they are searching for is there, saving them time wondering and searching. On the walls, there are also clearly displayed images and signs that provide relevant information, such as safety precautions or instructions.

Figure 42: Additional example of the visual workplace

5.4.4 Summary of findings

The research indicates that the prerequisites of a visual workplace will directly inform the design of operations. Various visual tools are available to assist in operations design including check sheets, flow charts and simulation models. Visually designing operations stimulates right-brain thinking, which allows for creative and holistic thinking. The design process essentially becomes a learning process where various scenarios can be considered and implemented within the structure of a model rather than in real life situations. In this way, bottlenecks and other problems can be identified and solved before they occur.

Using a visual approach when designing operations assists in keeping everyone involved focussed on achieving corporate strategy by aligning individual actions and the process as a whole.

The requirement that all employees involved in operations contribute to the design thereof allows for hands-on understanding and experience that may have been overlooked by management. This understanding and experience can now be integrated, improving effectiveness and efficiency. In this manner, strategic thinking filters down the organisational structure, realigning autonomy to those who carry the responsibility. This improves overall buy-in and motivates employees to achieve their targets.

5.5 Research question 4: How could VM impact on operations management activities?

5.5.1 How can VM impact on operations management?

Theory-based answer

According to the theory presented in Chapter 3, the visual workplace becomes self-regulatory when properly implemented, thus reducing the pressure on the operations management function. The employees responsible for operations management can come to rely on the system and focus their efforts more strategically by looking for areas for improvement, driving the continuous improvement initiative. They can spend more time supporting operations staff and assisting them in managing their section of the work floor, encouraging employee autonomy and improving motivation.

At the same time, employees will have more time to converse with strategic management, providing valuable insight and feedback and thereby reducing the gap between strategy development and implementation. Operating managers will spend less time regulating work flow and micro-managing workers, enabling employees to respond swiftly to problems which may arise, providing them with a motivating element of power over their actions.

Interviewee feedback

The interviewees explained that the visual workplace demands cleanliness and order, which makes managing operations far easier than previously. The walls and the floor are carefully demarcated to show maximum capacity levels for elements such as inventory or rework.

A visual workplace explains where all employees should be at a given time, what they should be doing and whether or not targets are being met. Everyone has access to the same information, ensuring that everyone knows what is occurring, ultimately aligning actions. The fact that everyone was involved in the design of operations, means that they all understand how a process works and thus they can prepare in advance, making all necessary resources available at the point of use.

Over time, the system will begin to manage itself, making use of built-in tools such as Kanban and visual metrics to identify bottlenecks and when the process is behind

schedule. This will allow for swift responses to problems. An advanced system could even begin to answer the question of 'why'? VM will provide a more holistic view of the business, making it easier to manage the individual parts.

The operations function will no longer require a high level of human management, as the system will manage itself while empowering employees. The day-to-day activities of operations managers will change, as they will no longer need to focus all their attention on monitoring the system and employees. Instead, they will have more time to interpret information generated by the system in order to make strategic level decisions.

Current resources and infrastructure will be more economically and efficiently managed, avoiding the need for possible capital investments to improve output.

5.5.2 What advantage is gained by using VM in operations management?

Theory-based answer

According to the theory presented in Chapter 3, as long as the relevant standards, controls, metrics and guarantees are in place, the information produced by the system will assist managers in identifying weak areas, information deficits and dips in employee morale. Accordingly, it becomes very important for operations managers to ensure that all visual standards, controls, metrics and guarantees are properly implemented, maintained, calibrated and continuously improved to ensure that information derived from the process is relevant and reliable.

Interviewee feedback

The visual workplace makes available to employees all necessary information to do their job visually, bridging language and educational gaps. This provides employees with autonomy and the confidence to solve problems as they arise, without having to run all decisions by the manager. The direct consequence is that operations managers will have more time to invest in training and supporting staff to enable creative and reliable decision-making. Allowing them to manage rather than constantly addressing and solving one crisis after the next.

The system continuously compares performance against targets and displays the current status to all employees. When employees are empowered to trust the system

and work together, they often jump into action when a problem arises in their section, long before a manager has the chance to assess the situation. They often respond immediately when a problem arises, allowing the consequences of deviations to remain small rather than becoming disastrous. The business is able to give clients reasonable delivery times and expectations based on the system itself, rather than on estimates or guessing. Also, resources are more efficiently managed and utilised. Production is planned around the capacity of machinery and equipment, avoiding idle down time.

Employees become their own project managers by taking ownership of their work. Some even go to the length of ensuring that the suppliers to their section deliver quality and on time in an effort to guarantee no delays on their watch. They feel more motivated because their efforts are acknowledged and valued.

Employees begin to value clear communication and working together. They understand that efforts must be aligned if they are to add value. The different work teams often develop healthy competition amongst themselves, increasing their challenges over time. Thus there is a change in mind-set facilitated by VM, which often results in people delivering higher standards of work and delivering work on time, because they understand and endorse the ways in which their work is measured.

5.5.3 What is the magnitude of the improvements to be expected?

Theory-based answer

The theory gathered in the literature review did not offer an indication of the magnitude of improvements to be expected.

Interviewee feedback

The interviewees generally agreed that, while improvements to operations management are significant, they could not easily be estimated or measured, and should be done on a case-by-case basis.

One interviewee offered an example experienced at the Gauteng Tooling Initiative. In this case, orders were often up to a month late, but after appointing a VM champion, orders were completed within a matter of days.

Another example offered was the case of a plastic injection-moulding initiative. This business managed to free up one million rand merely by clearing and organising their inventory stores using the 5S of VM.

5.5.4 Summary of findings

The research has shown that the visual workplace is a largely self-regulating system, reducing much of pressure on the operations management function.

Requirements such as cleanliness and order, clear standards and continuous measurement make managing this function simpler. The need to visually display pertinent information, identifying variances and possibly suggesting solutions allows the system to directly inform employee actions, thereby facilitating swift response times and mitigating potential conflict issues due to language differences and differing literacy levels. This relationship is shown in Figure 43.

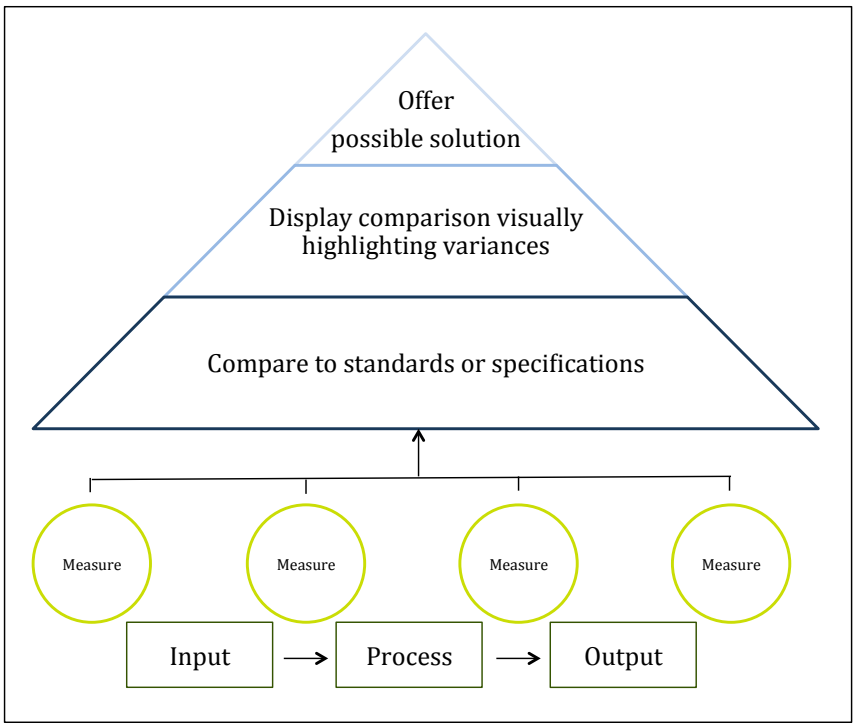

Figure 43: The self-regulating visual workplace

When the visual workplace is well established and reliable, operations managers can shift their focus from controlling operations to analysing and interpreting information derived by the system. Their key activity shifts from being responsible for collecting data from the process, to ensuring that the VM system is operating effectively and

producing valid and reliable information. They can put more time into seeking opportunities for improvement, supporting employees in their tasks and motivating them to achieve their goals. It will also allow them more time to collaborate closely with strategic management when reviewing company strategy.

5.6 Research question 5:
Can VM improve the effectiveness and efficiency of performance measurement?

5.6.1 How can VM facilitate performance measurement within and organisation?

Theory-based answer

According to the theory presented in Chapter 3, performance measurement is one of the key elements in VM and the visual workplace. Most traditional performance measurement tools already involve a visual approach, making use of tables, check sheets and flowcharts, Du Pont's pyramid, Keegan, Eiler and Jones's (1989) performance matrix and the SMART pyramid, to mention a few. Applying VM will increase the emphasis on performance measurement and improve its reliability.

Interviewee feedback

The interviewees reiterated these points, noting that the visual workplace organically builds performance measurement into the system. These measurements can be used to guide management and employees when deciding upon Key Performance Indicators (KPIs). When employees are involved in designing operations, they should also be included in deciding upon performance measurements. This will ensure that they understand how they are going to be measured and that they will feel motivated to achieve targets that they have helped to set.

Content analysis

Visual tools can be used to explain how KPIs are derived and can be helpful when involving various stakeholders for feedback and suggestions. An example of this is shown in Figure 44. Such tools can also greatly assist the administration function in keeping track of what has been achieved and where any delays are experienced.

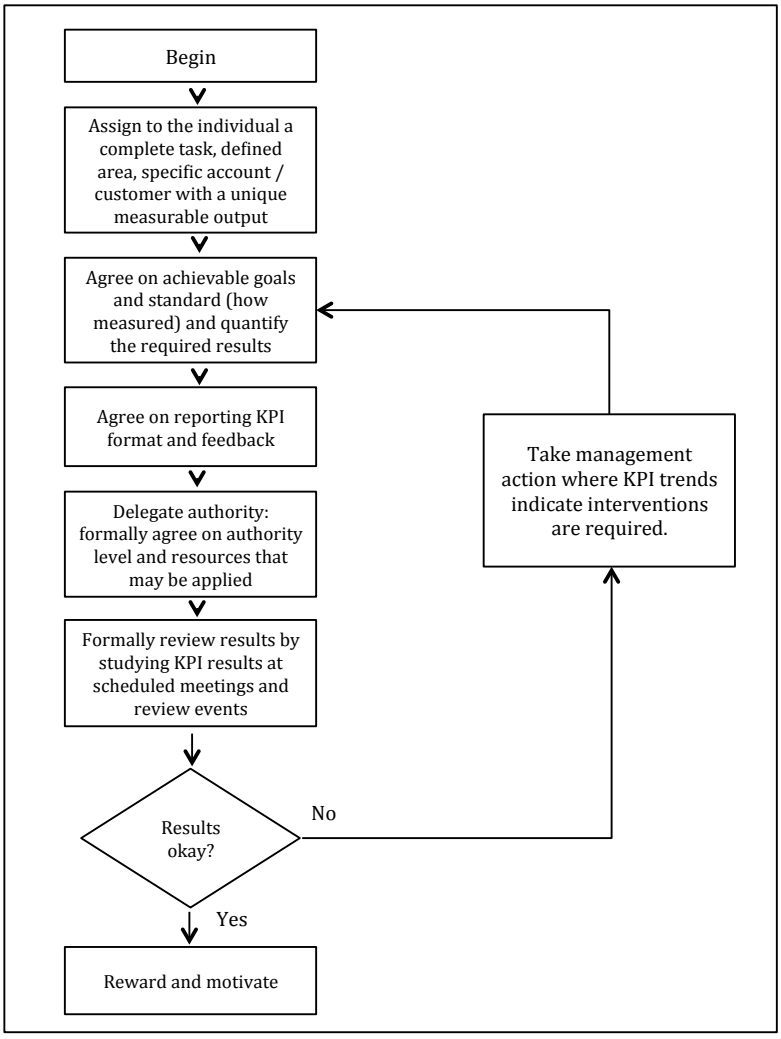

Figure 44: The process of setting KPIs at the Gauteng Tooling Initiative

5.6.2 Will VM methods improve the effectiveness of performance measurement?

Theory-based answer

According to the theory presented in Chapter 3, if the procedure suggested by Galsworth (2005) for achieving a visual workplace is implemented, the necessary performance measurements will organically make themselves known as each step is pursued.

Creating visual order will facilitate a clear understanding of the greater process and its vital inputs, value-adding steps and flow.

By carefully planning and setting locations for tools, equipment and operations, performance measurements for everyday activities becomes easier to identify, such as rates of recoil and missing items, where before they may not have been considered at all.

The visual workplace continuously collects, interprets and presents information, making it easy to identify which of the measures are non-value-adding or redundant.

The visual standards supplied will allow for valid comparison to actual figures. The visual metrics applied in stage three of implementation include elements of performance measurement, but go beyond this by providing possible solutions for problems arising.

Interviewee feedback

The interviewees explained that various visual tools are used to ensure that the correct tasks are being measured, and that popular and generalised measures are not being used just for the sake of doing so. The SMART VM tool stands out as being helpful in achieving this. Data collected from the system is visually displayed in the form of graphs, showing whether targets have been met, and how far off the process is from achieving them. Using graphs to display performance information generally has a better chance of communicating progress to employees, as the brain interprets visual representations more easily than raw data. By continuously being made aware of how the process is performing, employees can adjust their actions accordingly.

The system also measures continuously and not just at the end of the process, as is the case in many businesses. This allows for variances to be identified immediately and remedial action to be taken before the whole process is delayed or stopped. If something goes wrong in the process, but the KPIs remain unaffected, then it is a clear indication that the incorrect factors are being measured.

Employee involvement will help to identify key operational measures on a practical level, rather than relying solely on strategic management's measures, which often tend to rely heavily on financial ratios. In this way, operational and financial measures are considered in parallel, providing a clear idea of the constituents of ideal performance.

Content analysis

An interviewee provided an example of such a visual display. It is taken from his interaction with the Gauteng Tooling Initiative and is displayed in Table 14 below. This check sheet details the tasks of each employee and the resources needed to complete them. There is a dedicated column showing whether or not particular tasks have been

successfully completed, and whether on time or not, using different colours and markers for clarity. This display allows for swift interpretation, improved management and transparency.

Table 14: An example of a log of employee tasks a the Gauteng Tooling Initiative

Project Owner	HS				USER (Who am I)?	Henk		Completed				Overdue				Due today				New date					
GTI - PEOPLE ASSIGNED TASKS					11-Nov			1		2		3		4		5		6		7		8		9		10	
								22-Oct		23-Oct		24-Oct		25-Oct		26-Oct		27-Oct		28-Oct		29-Oct		30-Oct		31-Oct	
Item	Issue	Owner	Client	Actions	Deliverable / Task Complete?	Status	P Date	P	A	P	A	P	A	P	A	P	A	P	A	P	A	P	A	P	A	P	A
1	GTI financial systems and cost codes not OK for reporting required. 1.CC Monthly Cume 2.Orders Monthly Cume 3.Monthly Meetings	*Neil*	Henk	1. Agree structure with Betty and Dixon. 2. Do 1 months cost allocations based on revised structure. 3. Make assessment of suitability.	1. The agreed structures is acceptable and agreed workable by both the parties. 2. One month information has been entered as test. 3. New bookkeepers start operating from 11 Nov 2014.	In progress	18-Nov																				
2	Tradestream is interested in establishing exactly how the tooling cluster can function with specific reference to the MCEP program for clusters.	*Hendrik*	Henk	1. Find examples of successful MCEP funded clusters. 2. Share the financial model with Tradestream. 3. Make a presentation to Tradestream 4. See how Tradestream can play a role in setting up a cluster/incubator	1. Three successful MCEP funded clusters have been identified 2. The concept financial model has been shared with Tradestream 3. A presentation has been made to Tradestream 4. A concept agreement is in place how Tradestream can cooperate.	In progress	17-Nov																				
3	The Taiwanese tooling suppliers wishes to sell more equipment in South Africa. Funding is the key. Discuss cooperation possibilities with bank of Taiwan and Taiwanese tooling suppliers in South Africa.	*Toko*	Henk	1. TOKO to make an appointment with Megan 2. Discussions needs to be initiated with Taiwan machine tool suppliers 3. Presentation made to and discussions with Taiwan Bank in SA. 4. Make a communication / marketing document if results are positive	1. Contact has been made with Megan 2. Machine-tool supplier meeting scheduled 3. Taiwan bank meeting scheduled 4., Negation/marketing document complete	In progress	14-Nov														1					1		
4	Complete the minutes of the TASA Executive meeting and produce an action plan.	*Neil*	Henk	1. Complete minutes of meeting. 2. Make an action plan for follow-up actions from the meeting.	1. Minutes of the meeting is complete and reviewed by chairperson. 2. Action items are listed with responsibilities and due dates.	Late	22-Sep	2																			
5	Establish exactly the benefit to the TOOLMAKING fraternity under the AIS and APDP programmes	*Henk*	Henk	1. Find the person that can give me the correct information (contact NAACAM, Roger Pitot)) 2. Make appointment and get the facts in meeting	1. Correct Person Identified 2. Meeting Scheduled 3. Results written up	In Progress	08-Nov	2															1				
6	Cluster action plan broken down into a detailed budgeted plan complete.	*Henk*	Hester	1. Current workshop results studied in detail (by Henk). 2. Produce mind maps for ED and clustering. 3. Create Gant chart and budget. 4. Make presentation at board meeting.	1. Mind maps are complete. 2. Can Gant chart and budget complete. 3. Presentation for board meeting complete.	Not started	08-Nov											1	1							2	2
7	IDC (apparantly) Funds Tooling on a revolving credit basis. Find out how to unlock this.	Peter	Henk	1. Meet with Retha Breed 2. Make proposal how to unlock funding for TASA Membership.	1. Meet IDC 2. Deliver Proposal.	Not started	07-Nov															1		2			
8	GTI office takes over the National TASA Secretariat?	*Henk*	Vusi	1. Vusi has agreed responsibility transfer with previous TASA chairman - now National Secretary. 2. List of all activities to be run by the national secretary agreed in writing at TASA National Board. 3. List all incomplete (legal?) take over activities/actions required for responsibility transfer.	1. Responsibilities have been identified. 2. Action plan against each responsibility with responsible person and client. 3. Planning document forms part of the TASA National Board Meeting reporting.	Open issue-no date																				
9	TASA Gauteng Executive Committee Resolutions: Plan to execute these resolutions	*Henk*	Vusi	1. Agree a constitution/charter that drives the TASA initiative. (Adoption and communication of current document). 2. Get the legal structures to reflect principles in constitution/charter. 3. To ground work to create TASA National office. 4. Assist with letters to TASA National Chairman.	1. TASA National Constitution / Charter is complete. 2. Legal framework is in place. 3. Various entities constitutions reflects the spirit of the Constitution / Charter. 4. A plan for discussion is on the table for the TASA National office.	Open issue-no date																				

5.6.3 Will VM methods improve the efficiency of performance measurement?

Theory-based answer

According to the theory presented in Chapter 3, VM applies the values of continuous improvement throughout the workplace, ensuring that performance measurements are constantly checked for validity and correctness, and the measurement equipment properly calibrated and serviced.

Interviewee feedback

The interviewees generally agreed with the above, adding that because the system measures performance continuously, the efficiency of performance measures will be considered far more frequently than is generally found. The frequency of data collected and documented will allow for outliers to be identified almost immediately. The cause of

the outliers can then be established to determine whether the process or the measure is at fault. An average performance curve can be generated over time to allow for a visual assessment of measures and progress. Various other visual management tools are available for this purpose, one of the most popular being OEE (Overall Equipment Efficiency) that is a product of: machine-time-availability less downtime, expected quality and actual performance.

Content analysis

The master chart provided by GTI (see Figure 38 below) is plotted using information from the check sheet shown in Table 14. Employees are required to indicate on the check sheet whether certain tasks have been completed and give an indication of when this was done. The graph in Figure 38 shows the targets for completion and plots the rate of completion as per the spreadsheet. Using the graph allows the VM champion to check progress and completion for accuracy across the two visual tools.

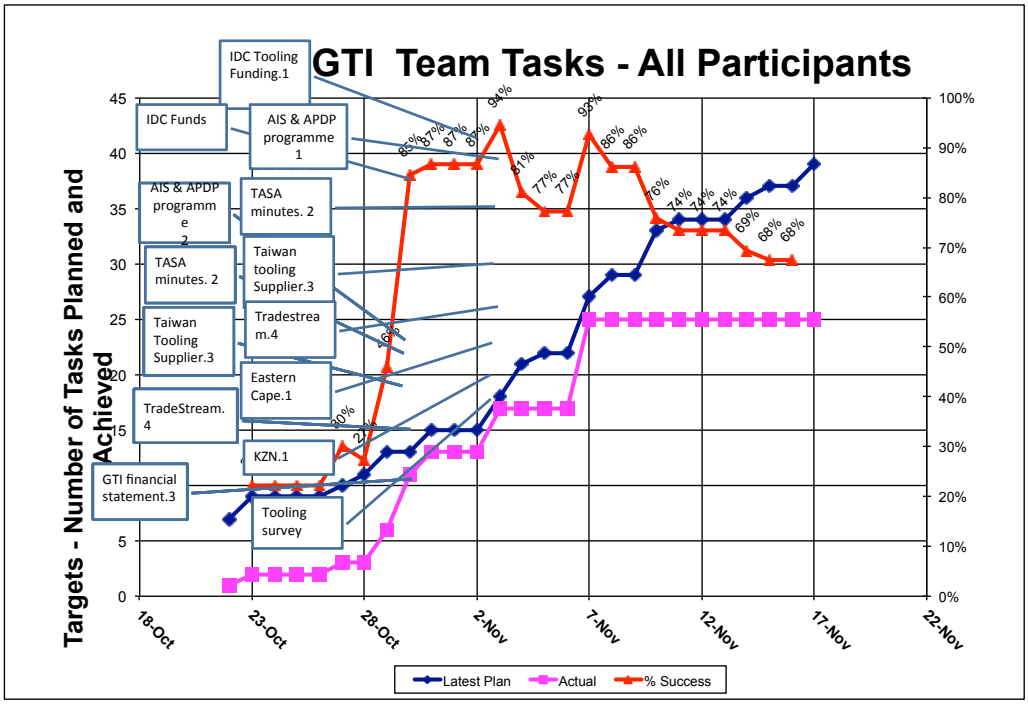

Figure 45: The employee task progress chart at the Gauteng Tooling Initiative

5.6.4 What is the magnitude of the improvements to be expected?

Theory-based answer

The theory reflected in the literature review did not offer an indication of the magnitude of improvements to be expected.

Interviewee feedback

The interviewees generally agreed that, while improvements to operations management are significant, they cannot easily be estimated or measured.

5.6.5 Summary of findings

The function of measuring process performance is prioritised in the visual workplace. All key activities are continuously measured and monitored to ensure that the process performs, as it should. Employees are required to assist when designing operations, during which they also give input on what elements are to be measured and what the standards should be. This ensures that their hands-on experience from operations is built into how these are measured.

The measures, which are organically built into the workplace can be used by strategic management to inform their choice of KPIs. This allows for traditional ratios and measures to be combined with operational ones, resulting in well-rounded performance measurement.

The effectiveness of performance measurement is enhanced by the visual workplace as the process itself informs what is measured, rather than opinions, hunches and popular theory. The system continuously measures performance throughout the process, displaying it prominently in the work area, allowing for problems to be quickly identified and solved as they occur and not later.

The visual workplace promotes continuous improvement, encouraging employees and management to check measurements for validity and correctness, while ensuring that all measurement equipment are appropriately calibrated and serviced.

5.7 Conclusion

In light of the findings of this research, it can be said that the implementation of VM does assist the quality motive by improving strategy development, operations design and management and performance measurement within an organisation. The findings show recurring advantages of VM across the business activities discussed including the importance of the availability of information where it is needed; the employee

empowerment facilitated; the improved business-wide performance and finally how drawing and visuals stimulates right-brain thinking and the impact of this creative thought. It can therefore be concluded that start-up businesses and strategic business units within a greater organisation, can benefit from improved quality when VM is properly implemented.

Chapter 6: Conclusion and recommendations

This chapter is the final phase of the research.

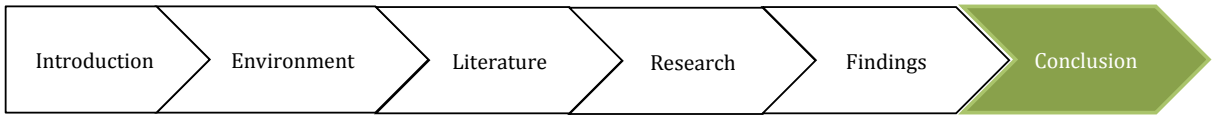

Figure 46: The final phase of the research

6.1 Introduction

This chapter will show the contribution that this thesis has made, and will discuss the possible implications thereof.

6.2 The greater research question

This study posed the following question:

> Can the implementation of VM assist the quality motive by improving strategy development, operations design and management and performance measurement within an organisation?

6.3 Findings

This study adopted the philosophy of Realism as it focused on the effects of VM on the predefined business functions. Both empirical and non-empirical research were conducted and the purpose of the study was reporting, descriptive and causal explanatory, as each research question was considered separately. This study was primarily inductive in nature and leans towards the structure of a case study. The research makes use of both primary and secondary data and is predominantly qualitative in nature involving literature reviews, content analysis and individual depth interviews as research methods.

Five research sub-questions were extrapolated from the main research question and are presented in Figure 47.

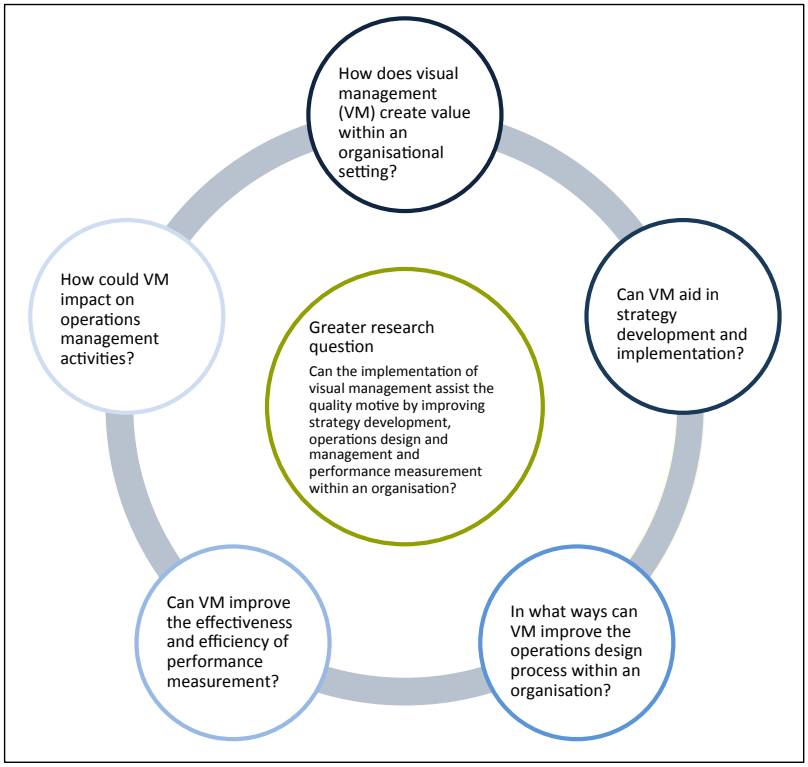

Figure 47: The research questions posed by this study

A summary of the research findings for each question is presented below.

6.3.1 Research question 1: How does VM create value within an organisational setting?

The research has made it clear that VM has been around in one form or another for many hundreds of years. In the context of the business environment, VM originated in the industrial setting, primarily in the organising and controlling of activities on the factory floor. Since then VM has progressed into various other business functions and several other industries.

VM adds value to core business activities by visually presenting information regarding individual tasks, the operation as a whole and the results of performance measurement on various levels. This ultimately improves communication between management and workers, amongst workers and between the operation and those managing it. VM allows

for detailed problem solving and informs strategy formation and implementation. Its purpose is to convert vision and mission statements into actionable tasks understood by each and everyone. VM insists on employee involvement on all levels of the business, building in first-hand experience. The fact that all information needed to perform all tasks is displayed for everyone to see, eliminates secrecy and encourages transparency. The workforce is unified as sharing skills and knowledge is the ordinary and greatly rewarded. Individual autonomy and empowerment are of utmost importance.

The design and management of operations are supported and improved, building visual thinking into these activities. Performance measurement efforts are streamlined and informed by the process itself. Employees are involved in setting their own targets and by doing so, are motivated to achieve them and possibly even supersede them.

6.3.2 Research question 2:
Can VM aid in strategy development and implementation?

The research found that strategy development can be greatly improved and assisted by VM. Visually formulating strategy using flow charts, Ishikawa diagrams and pictures encourages right-brain thinking, which is generally creative and holistic.

The visual workplace constantly monitors operations and presents the results visually for all to see. This allows for the swift identification and elimination of variances. The capability of operations is well understood and can be used when formulating strategy, somewhat removing reliance on hunches and gut feel. Employees are included in strategy design, which bring hands-on experience into the equation.

Various well-established visual tools have been developed over the years to assist in implementing corporate strategy, the most popular arguably being the Balanced Scorecard. VM assists in translating strategy into actions for every employee from top management to cleaning staff.

The visual workplace motivates employees by allowing them to: identify all the tools and information that they need to perform their tasks; take ownership of their work areas; design their activities and to have input when their KPIs are defined. Good work is publically acknowledged and rewarded while possible ideas for further improvement

are encouraged. Every person in the visual workplace understands exactly what is expected of them and specifically how to perform their tasks. All employees no matter their position are made aware of what their contribution is to achieving overall corporate strategy allowing people to feel valued and included.

6.3.3 Research question 3: In what ways can VM improve the operations design process within an organisation?

According to the research findings, the prerequisites of the visual workplace will directly inform the design of operations eliminating a great deal of trial and error. As in strategy design, using visuals will allow for increased right-brain thinking encouraging creative ideas and opportunities for problem solving. By physically drawing the flow chart of operations, or building a simulation model, various scenarios can be tested before operations take physical shape. VM improves organisation-wide focus streamlining and unifying operations design inline with strategy. VM encourages employees to contribute to operations design, bringing a new dimension and practical angle.

6.3.4 Research question 4: How could VM impact on operations management activities?

The research has shown that once well established, the visual workplace is a largely self-regulating system, taking a lot of pressure off the operations management function. This is achieved by implementing visual order, simple standards, displays, metrics and controls within the workplace. This in turn allows for problems to be swiftly identified and solved almost immediately mitigating down time or the process being stopped altogether. Everyone in the visual workplace understands their role in the operations process allowing them to respond when problems arise in their area. In this way all employees manage operations, not just the operations manager.

The role of the operations manager shifts from collecting and interpreting process data, to ensuring that the visual system is operating properly. He/she needs to make sure that performance measures are producing relevant and reliable data and information. These managers can then possibly have more time to invest in their employees, assisting them

in their activities and personal development. In this way, managers focus on managing and not just solving one problem after another. VM also allows operations managers the time and freedom to liaise with strategic management regarding operations and strategy design, building their accumulated hands-on experience into these high-level activities.

6.3.5 Research question 5:
Can VM improve the effectiveness and efficiency of performance measurement?

According to the research, the activity of measuring process performance is greatly prioritised in the visual workplace. Crucial stages in the process are identified, monitored and continuously measured. Employees working on the process are organically included in the choice of their personal KPIs as they assist in designing the operation and identifying key areas for measurement. Once employees understand and contribute to how they are measured, they can direct their actions accordingly allowing for improved autonomy and motivation.

Strategic management can use the measures established in the visual workplace as a guide when deciding upon company KPIs allowing for a well-rounded measure of performance combining internal operational indicators with other financial measures and ratios.

The visual workplace promotes continuous improvement and encourages employees and management to check measurements for correctness and validity, while ensuring that all measurement equipment are properly calibrated and serviced. In this manner the effectiveness and efficiency of performance measures are maintained.

6.3.6 Summary of findings

In light of what has been discovered in the research, it can be said that the implementation of VM does assist the quality motive by improving strategy development, operations design and management and performance measurement within an organisation. It can be concluded that start-ups and strategic business units

within the South African context can greatly benefit from the improved quality achieved using VM techniques.

6.4 Proposed impact on the current body of knowledge

This research supports the literature on VM as presented by Bhuiyan and Baghel (2005), Galsworth (2005), Kobayashi, Fisher and Gapp (2008), Liff and Posey (2004), Santos, Powell and Hinks (2001), and Tezel, Koskela and Tzortzopoulos (2009).

It adds to the literature on quality, as it offers an alternative explanation for the power of quality tools and motives.

Finally, this research contributes to the literatures on strategy, and performance management as it explains the importance of visual design, management and implementation on the success of these activities.

6.5 Proposed implications of the research

VM and the visual workplace offer a number of solutions to the business community in South Africa. VM has the ability to support any commercial venture, from the humble entrepreneur and start-up, to the independent strategic business unit within their large corporations.

In order to gain the full benefit of VM and the visual workplace, it is very important that senior management endorse it, whether management is that the business owner, the senior manager of a business unit, or the board of directors in a company. However, there is nothing stopping employees with resistant management to implement parts of VM within their workspaces and amongst themselves.

VM suggests a new modus of communication that transcends a specific grouping of people, such as one based on education, location, language, culture, wealth, vocation, industry or level of management. Virtually any person with the ability of sight stands to benefit from communicating and being communicated with, visually. This is specifically relevant in the South African context where there are eleven official languages and a huge disparity in levels of education. It is, however, important to be considerate to cultural sensitivities when using visuals and implementing VM.

Specific benefits present themselves in the academic context. Scholars and teachers alike who struggle to teach and learn in the traditional manner can be taught to exploit their potential by visually investigating and explaining their work. In this way thet can possibly include more people with language or learning disabilities in research initiatives.

VM can accordingly be applied to research efforts in organising, prioritising and scrutinising data and information, assisting in the maintained relevance of formal academic research in the future age of effortless online information access.

In conclusion any person or legal entity that hopes to improve the efficiency and effectiveness of their efforts, stands to benefit from exploring VM as a solution.

6.6 Suggested further research

As a result of this study, it has become clear that there is a great need for the establishment of a model that measures the magnitude of improvements experienced when implementing VM. Throughout the course of this study, the benefits to be expected cannot be overestimated; however, a numeric impact on financial performance measures such as EBITDA has been very difficult to establish or prove. Future research in this direction can financially validate the effects of VM making it easier to convince management of its worth.

6.7 Implications for personal research practice

The author of this research has gained greatly from the process of compiling this thesis. I have improved my understanding of the research process and developed greater respect for the strength and grace of knowledge.

6.8 Conclusion

While this research has uncovered in part the answers to the research questions, there is still unlimited scope for future learning. The power of VM is undeniable and the only limit to its success and reach is the boundary of human creative thought.

Chapter 6: Conclusion and recommendations

VM encourages a balanced approach to leadership taking into consideration factors such as employee motivation, company-wide focus, improved communication, as well as the costs and impact on EBITDA. It encourages employee involvement and a work environment that is transparent facilitating healthy working relationships and teamwork. VM can be applied in any business situation irrespective of management philosophy and leadership style. It is not contained or restricted by management theory as it simply improves overall communication irrespective of what the message is.

The strength of VM lies in its focus to simplify and communicate. It liberates information from the confines of computer files and physical folders and makes it accessible to all who need it. At the same time, it supports individuals, helping them to understand what is expected of them, what the greater operation entails and what their role is in achieving success. Most impressive of all is that VM does this irrespective of differences in education, language, culture, background, literacy and personal experience.

At the heart of it, VM changes thought processes from thinking 'What should I do now?', to thinking, I have enough training, understanding, information, autonomy and responsibility to **just do it**!

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Appendix: Interview transcripts

Interviewee: Dr Bosman

The greater Research question

Can the implementation of visual management assist the quality motive by improving strategy development, operations design and management and performance measurement within an organisation?

Research question 1: how does visual management (VM) create value within an organisational setting?

1.1 How is VM traditionally implemented within an organisational setting?

Generally speaking big businesses are goal orientated and work to achieve set targets within very strict time periods either: weekly, monthly, quarterly, six monthly or annually. In most cases the majority of efforts are focused on achieving short-term targets and anything, which may delay the process, is not easily embraced. Performance is primarily measured against EBITDA (earnings before income tax, depreciation and amortisation). That is generally the primary and most important target. There is not a great deal of focus on improving the efficiency and effectiveness of operations unless a direct and quantifiable impact on EBITDA can be proven.

Visual management will generally not be endorsed and implemented by the board of directors unless the impact on the bottom line (EBITDA) can be demonstrated using actual figures, ROI (return on investment) estimates and forecasts of associated risks. The advantage of the "soft factors" such as employee motivation etc. is in most cases not very highly regarded. Visual management has not been endorsed by many businesses, and when it has, it has been arbitrary and in most cases unintentional. It is not a concept that has been overtly utilised.

1.2 In what ways has VM been applied creatively?

I agree that visual management has been successfully integrated into other industries and workspaces such as hospitals, banks, retails stores, airports, classrooms and administration functions. The role of visual management and specifically learning, within education has been praised noting that not all learners are left-brain thinkers and need more than speech and words to understand and simulate information.

1.3 What type of improvement does VM enable?

The interviewee did not provide an answer.

1.4 What is the magnitude of the improvements to be expected?

This is a very difficult question to answer. The magnitude of improvements can only really be estimated on a case-by-case basis.

Research question 2: can visual management aid in strategy development and implementation?

2.1 How can VM facilitate strategy design?

Using visual management techniques will assist in translating the high-level language and conceptualisation of strategy into simple tasks and action plans that can be thoroughly understood by every level of employee irrespective of language and education barriers. It provides a platform for and encourages creative thought and problem solving from all levels of employees.

Strategy design should based on the analysis of actual figures and information resulting in fact driven decision making, rather than gut focussed. The visual workplace constantly measures operations and compares performance to targets, providing a reliable base of information to inform decisions. Unfortunately the type of environment plays a large role in type and quality of information and intervals in which it is gathered. A factory floor setting allows for clear and precise measurements, whereas in the consulting environment, individuals and the process are generally monitored weekly at the most. In the context of a power station, measurement must be implemented per millisecond in order to allow for a timeous reaction to problems that may arise, as failure to do so can be disastrous.

2.2 What advantage is gained by using VM in strategy implementation?

Visual management allows for greater trading focus and when properly implemented removes emotions and bias from decision making. It also has quite a unifying element in some cases.

The balanced score card can be used to move from strategy maps to developing objectives and performance indicators, projects and key performance indicators which can be decided upon based on information from the factory floor or the popular measures used by the JSE.

2.3 How does VM impact on employee motivation when implementing corporate strategy?

Visual management gives employees on all levels the opportunity to understand what their personal contribution is to achieving overall strategy. It also allows employees to focus on the key elements that impact on their job satisfaction and needs (Maslow hierarchy). The visual workplace involves including employees in the design of their tasks and how they will be measured. In this way employees know exactly what is expected of them and work towards achieving it.

2.4 What is the magnitude of the improvement to be expected?

The interviewee did not provide an answer.

Research question 3: in what ways can VM improve the operations design process within an organisation?

3.1 How can VM facilitate operations design?

By using simulation, visual management brings operations to life allowing for various ideas to be implemented and tested without having to incur the capital cost of doing so in the real world.

3.2 What advantage is gained by using VM in operations design?

By using visual representations of operations, possible bottlenecks and other problems can be identified before actually experienced and mitigated. It helps when zooming in on issues or areas in the process where necessary and assists in focussing the design team. Employee involvement allows for hands-on experience to be built into the design of operations bringing different levels of experience to the fore.

3.3 What is the magnitude of improvements to be expected?

The interviewee did not provide an answer.

Research question 4: how could VM impact on operations management activities?

4.1 How can VM impact on operations management?

The various measures and control built into the visual workplace assists operations management to perform their tasks. It allows for swift identification of problems and the implementation of solutions.

4.2 What advantage is gained by using VM in operations management?

Visual management allows for improved monitoring and control. The visual workplace takes over many of the management roles, allowing for operations managers to focus on supporting and assisting staff in their activities. It also encourages operations managers to think more strategically and holistically about the system, sharing the responsibility of strategy thinking more evenly throughout the organisation.

4.3 What is the magnitude of the improvements to be expected?

The interviewee did not provide an answer.

Research question 5: can VM improve the effectiveness and efficiency of performance measurement?

5.1 How can VM facilitate performance measurement within and organisation?

Visual management assists strategic management when deciding on what should be measured.

5.2 Will VM methods improve the effectiveness of performance measurement?

Continual measurement is fundamentally built into the visual workplace. These operations-based measures can be used to inform KPIs along with the theory of constraints to some extent. And it can be used in combination with popular financial measures and ratios, allowing for parallels and trends to be identified.

5.3 Will VM methods improve the efficiency of performance measurement?

The key measure of efficiency is often an indication of waste such as: wasted time, materials and physical effort. The visual workplace constantly measures the main activities in the system and compares them to targets, allowing for outliers to be swiftly identified and the causes remedied. The fact that measurement is continuous

means that results are checked regularly and any incorrect measurements, identified and fixed along the way.

5.4 What is the magnitude of the improvements to be expected?

The interviewee did not provide an answer.

Interviewee: Mr Kennon

The greater Research question

Can the implementation of visual management assist the quality motive by improving strategy development, operations design and management and performance measurement within an organisation?

Research question 1: how does visual management (VM) create value within an organisational setting?

1.5 How is VM traditionally implemented within an organisational setting?

In most cases the organisation will be advised by the consultant that visual management is necessary to improve operations and a champion is nominated from within the business to facilitate the change along with the outsourced team.

1.6 In what ways has VM been applied creatively?

I was personally involved in implementing VM in the technology industry. The most notable visual tool was a big dashboard displayed in the kitchen area showing the exact progress of each developer, and where they were in their sprint cycles. The progress of cross-disciplinary teams was also displayed, giving an indication of the bigger picture and how one team was progressing versus all the others.

1.7 What type of improvement does VM enable?

The principle introduced by Taylor in the Scientific method that you can control only what you can measure, is particularly appropriate, even in the modern age. If people know how they are measured or evaluated, they will work towards achieving the set targets. VM allows individuals to measure themselves against themselves and facilitates self-improvement by lifting the bar without throttling anyone. The use of SPRINT and SCRUM measuring systems is specifically relevant. Once people thoroughly understand what they are doing, they can propose possible improvements and in so doing, become the designers of the system. In this way, the buy in to the system is far greater as it is not a top-down order but rather a self-imposed goal. VM greatly encourages self-directed work teams.

Nothing kills morale quicker than giving people responsibility without the appropriate authority, which happens when employees are not included in the design of processes for which they are responsible for.

1.8 What is the magnitude of the improvements to be expected?

It's incredible. By implementing measurement in the before mentioned insurance case, wrongful claims decreased by 60%. Employees were asked to identify the major causes of wrongful claims and find methods to reduce them. The fact that employees knew that they were being measured drove the action of reducing wrongful claims. Employees were included in the design of the processes for which they were responsible, so they knew exactly how they were being measured and how to properly perform. The causes of wrongful claims were identified and measured on an individual basis.

Research question 2: can visual management aid in strategy development and implementation?

2.1 How can VM facilitate strategy design?

Peter Senge, author of 'The art of the learning organisation', explains how learning drives strategy and VM enables learning.

VM allows strategic management to have a very good idea of what is happening on an operational level on the factory floor, which can be used to directly inform strategy development. The great divide between top management and what is actually happening operationally is lessened as valuable and reliable information is fed upstream to those who are determining strategic and operational direction. As the VM system matures, it will start to provide answers to basic operational questions, which are traditionally made by operations management. This frees them up to think more strategically and by so doing passes the responsibility of strategy on throughout the organisation. Essentially allowing strategic management to make decisions based on sound internally generated information, taking into account the external environment.

Strategic management can make better decisions if they are provided with better information that they are sure that they can trust. However there is limitation in that the information that management receives, was set by them in a previous meeting where they decided upon the VM goals, without considering known and unknown unknowns.

2.2 What advantage is gained by using VM in strategy implementation?

VM allows for strategy to be filtered down through the organisation, rather than merely being adopted by employees. It allows for everyone to be on the same page and provides entrepreneurial business units with autonomy. There are often teething problems as most employees are very used to following and struggle to step outside of the left brain mentality and lead themselves as well as others.

2.3 How does VM impact on employee motivation when implementing corporate strategy?

Once employees fully understand what their job entails, they can master it and even begin to find ways to improve on it, thereby contributing to the building of the system. In this way they buy into improvement strategies as it is developed by them and not in a disconnected manner passed down from top management.

Culture should motivate strategy, and strategy should motivate tactics and that is where VM comes in. Strategy is adopted and the way that employees become motivated to do so is by understanding exactly what their role is, however minute, in achieving company strategy.

2.4 What is the magnitude of the improvement to be expected?

In the plastic injection moulding example, just by following the 5S concept of cleaning up and organising their stores, they managed to free up R1 million rand.

Research question 3: in what ways can VM improve the operations design process within an organisation?

3.1 How can VM facilitate operations design?

The empowerment provided to employees by the VM system facilitates them getting involved and bringing hands-on experience to the table. Management must insist that the relevant employees working on the process or managing that part of the system be involved when designing operations. In this way several individuals sit down and discuss and describe how they go about completing their tasks. A best practice can be designed by themselves, which can then be implemented and revised over time.

3.2 What advantage is gained by using VM in operations design?

By designing operations visually, one can easily identify potential waste and non-value adding steps in the process, which will save the business money in the long term.

3.3 What is the magnitude of improvements to be expected?

The interviewee did not provide an answer.

Research question 4: how could VM impact on operations management activities?

4.1 How can VM impact on operations management?

It allows for a more holistic view of the business, making it easier to manage the individual parts effectively.

4.2 What advantage is gained by using VM in operations management?

By removing the human element from operations management, personal opinions are eliminated and replaced by actual facts produced by the system. This allows operational management to shift their focus more towards facilitating their employees' activities and assisting where they can provide advice, guidance and an example of what is expected.

When things go wrong, the system immediately identifies it and alerts those necessary of the issue, allowing deviations to remain small, rather than devastating. This by extension allows remedial efforts to be reasonable rather than extreme and often punitive in nature.

4.3 What is the magnitude of the improvements to be expected?

The interviewee did not provide an answer.

Research question 5: can VM improve the effectiveness and efficiency of performance measurement?

5.1 How can VM facilitate performance measurement within and organisation?

When employees are involved in designing operations, the measurements of performance should also be established and aligned with the operations design. In this way people not only completely understand how they are to be measured, but are

actually responsible for setting the performance measures. Employees experience an element of control over their work, when this is done and it makes them feel comfortable and confident.

VM helps to align the actions of all employees and operations to achieve company strategy.

5.2 Will VM methods improve the effectiveness of performance measurement?

Use the SMART principle, which is a VM tool. VM will help top management to understand what the important elements are which need to be measured within their very specific situations, rather than using popular and generalised measures just for the sake of doing so.

The VM system itself will inform what should be measured. If something goes wrong in the process, but the KPIs remain unaffected, then it is a clear indication that the wrong things are being measured.

5.3 Will VM methods improve the efficiency of performance measurement?

The frequency of data collected and analysed will make any errors in measurement easy to identify and rectify as they arise. In this way, the measurements are ensured to be correct as they are so often checked and documented. An average performance curve can be generated over time, rather than one measurement taken at a random time to satisfy the performance measurement function.

5.4 What is the magnitude of the improvements to be expected?

The interviewee did not provide an answer.

Interviewee: Mr Thiart

The greater Research question

Can the implementation of visual management assist the quality motive by improving strategy development, operations design and management and performance measurement within an organisation?

Research question 1: how does visual management (VM) create value within an organisational setting?

1.1 How is VM traditionally implemented within an organisational setting?

VM was first implemented on the factory floor in industrial businesses. VM has not been widely implemented in small businesses in South Africa. If anything, excel graphs are printed in order to identify major trends. But in most cases the information is filed away that unfortunately often leads to out of sight, out of mind.

1.2 In what ways has VM been applied creatively?

VM has been used to assist in project strategy mapping and internal marketing within businesses environments. Current projects are mapped on storyboards allowing direction and focus to be identified at a glance. The visual aspect creates energy and get's employees excited about company projects.

Blue Skye Consulting conduct workshops with their clients where company vision and direction is brainstormed and described in words. From this they design a large-scale visual representation of this and hang it in a prominent area in the entrance of the client's premises. Allowing all visitors to the client a clear understanding of what the business is about.

1.3 What type of improvement does VM enable?

Converting information and the progress of the process into visuals is a powerful improvement to communication in the work place.

Drawing pictures while conducting workshops helps to focus and get the message across to the audience in a simple and uncomplicated manner. It also encourages audience participation.

VM allows employees to communicate more efficiently and provides the platform for self-development, often resulting in them providing a greater contribution to the business. It improves employee morale and attitude, and creates a synergy within departments improving the results of teamwork.

It is important to identify all the areas for improvement within the business, but to choose the most pressing to begin with. Once that has been resolved, the next improvement initiative can be instituted. This focuses efforts making them streamlined and simple to understand for all.

1.4 What is the magnitude of the improvements to be expected?

Measuring the magnitude of improvements is very difficult as in most cases improvements are only experienced over the long term. Generally, overtime, an upward trend of improvements in quality, overtime, efficiency etc. Many of the improvements experienced are described as being soft elements such employee morale that is very difficult to measure in financial terms, but very important none the less.

Breaking the VM motive into projects could assist in estimating the magnitude of improvements experienced and short term KPIs can be set and used to establish progress.

Research question 2: can visual management aid in strategy development and implementation?

2.1 How can VM facilitate strategy design?

Implementing strategy mapping making use of tools such as the Balanced Scorecard greatly assists in designing strategy. Drawing flow charts and diagrams allows people to think creatively and encourages participation from all involved. Sometimes people find it easier to express what their ideas of the future hold by drawing, rather than speaking.

2.2 What advantage is gained by using VM in strategy implementation?

Strategy is often described in the vision and mission of the business. It is then broken down into objectives to be achieved in the long and short term using tools such as the Balanced Scorecard. VM allows for the fulfilment of objectives to be measured and tracked allowing everyone involved the opportunity to see whether strategy is being implemented and achieving what was hoped.

2.3 How does VM impact on employee motivation when implementing corporate strategy?

The positive impact of VM on employee motivation and morale is great. VM allows for a greater transparency between management and employees which results in greater trust between the two. Employees are involved in setting targets allowing for greater buy in. These targets and their achievement is made visual allowing employees to know exactly how they are performing allowing for them to alter their behaviour should they chose to. People feel as though their actions are contributing to a greater purpose. Employees are included in decision-making processes and they feel that their opinions and suggestions are heard.

2.4 What is the magnitude of the improvement to be expected?

The interviewee did not provide an answer.

Research question 3: in what ways can VM improve the operations design process within an organisation?

3.1 How can VM facilitate operations design?

The answer to this question is very similar to the answer in question 2.1. The core expectations of operations often brainstormed in workshops. These words are then converted into visually described process using flow charts and other visual tools.

3.2 What advantage is gained by using VM in operations design?

Drawing out the steps in a process allows certain aspects to be zoomed in and elaborated upon. Possibly identifying problems or opportunities that would have been otherwise missed. It allows the process to broken down into separate parts, each of

which can be estimated in size and contribution. Drawing allows for complex elements to be simply explained.

3.3 What is the magnitude of improvements to be expected?

The interviewee did not provide an answer.

Research question 4: how could VM impact on operations management activities?

4.1 How can VM impact on operations management?

VM focuses operational activities by measuring performance, comparing it so standards and immediately displaying the results. Sometimes triggers are built into the process alerting when performance targets are not being met.

4.2 What advantage is gained by using VM in operations management?

VM allows operations managers the opportunity to move from "putting out fires all day" to actually managing. VM begins to run the workplace and provides all necessary information at a glance. VM provides valuable information for decision-making removing reliance on hunches.

4.3 What is the magnitude of the improvements to be expected?

The interviewee did not provide an answer.

Research question 5: can VM improve the effectiveness and efficiency of performance measurement?

5.1 How can VM facilitate performance measurement within an organisation?

Performance measurement is a core activity in VM, and these measurements can be used to measure performance. The visual workplace allows everyone involved to be up to date with progress.

5.2 Will VM methods improve the effectiveness of performance measurement?

VM facilitates communication, allowing management and employees to decide what is important to measure based on the operation.

5.3 Will VM methods improve the efficiency of performance measurement?

People are often responsible for gathering information from the process in small businesses. There is far less reliance in equipment and machinery.

In the manufacturing environment, various visual tools can be used to make sure that performance is efficiently measured. An example of one is the OEE (Overall equipment efficiency) that is a product of: machine-time-availability less downtime, actual quality and actual performance.

5.4 What is the magnitude of the improvements to be expected?

The interviewee did not provide an answer.

Interviewee: Mr Ng'etich

The greater Research question

Can the implementation of visual management assist the quality motive by improving strategy development, operations design and management and performance measurement within an organisation?

Research question 1: how does visual management (VM) create value within an organisational setting?

1.1 How is VM traditionally implemented within an organisational setting?

VM is an old age approach that has been used in strategic planning since as far back as the Mesopotamia and Great Dynasty period. These periods among others were marked by warfare and innovation, even more so during industrialisation. VM was used in the planning of strategy for warfare and particularily the procuring and managing of related resources using visual tools such maps. It was also used in business planning, construction and various other related activities. VM has been used throughout the ages by various nations across the globe, for example there is suggestion that the Egyptians made use of VM during pyramid construction; the Chinese, in labour management and the Greek in automation in an attempt to ensure sustainability and the effective and efficient use of resources.

Today VM is applied in various fields, one of the main ones being the field of Systems engineering. Systems analysts depend heavily on representing their strategic approaches using symbolic visuals that closely depict a typical business process flow. They do this to identify, highlight and propse innovative and creative means of improvement.

1.2 In what ways has VM been applied creatively?

Organisations started implementing VM more rigorously around 4000 and 5000 B.C. During this time ancient systems of recording inventories, loans, taxes, and business transactions became common practice. Symbols and models representing business activities and process flows were presented on makeshift tables, or the wall in order to illustrate possible action plans. During this time, the Egyptians began applying the concepts of planning, organising, and controlling in large projects such as the

construction of the pyramids. By 1100 - 350 B.C., the specialisation of labour was to be found in China, and the use of assembly lines was growing in popularity in Greece.

Today VM is applied in all business areas. The shift from operational to higher management level application is notable. In the past VM existed at a very operational level, including only very low levels of management. Unlike the yester years, most strategic decisions and reporting formats today are entirely based on VM representations. It is an accepted standard practice, even as far as saying it is mandatory, to present strategic plans in VM form.

1.3 What type of improvement does VM enable?

VM speaks for itself. When the approach is used, certain beneficial aspects derived from effective and efficient use of resources are obvious. VM is based on simplicity, clarification and economy. Simply put the use of VM allows not only the presenter of information but the management team and those listening, to derive full comprehension of the message without the need to go into detailed and unnecessary explanations. VM allows for the clarity of information where ambiguity from the use of written and explanatory methods of message transfer would be cumbersome. Among others, the following shows some benefits accrued from the use of VM;

- *VM brings to an organisation the much needed clarity of information.*
- *It improves communication using symbolic and graphical representations.*
- *It allows for core business functions to be plainly and affordably mapped using visual tools such as Flow Charts*
- *Allows the innovative and creative means of developing improved business practices maing use of tools such as Value Analysis/Engineering (VA/VE).*

1.4 What is the magnitude of the improvements to be expected?

A business is about making money and as such VM should be able to push this point home. As mentioned earlier VM must be economical, not only in its application but in its results.

VM must improve a company's bottom line. Application of improved methods of working using methods such as 'Work Study flow charting techniques' have shown to improve a company's bottom line through its improved flow of the system, better use of

resources and better time management. One can measure a VM's ability to deliver through its improved economic well-being of a company.

Research question 2: can visual management aid in strategy development and implementation?

2.1 How can VM facilitate strategy design?

Strategy is all about high level planning in order to achieve a long term goal. In this respect the goal would be generally speaking achieving a sustainable market leadership. As such clarity and certainty is important. VM aims to achieve focus on what is necessary to achieve optimum results. If we consider the concept of LEAN and it's role in VM, it ensures that the goal of minimising waste is achieved through highlighting areas of 'critical control' within a system. These control points stand to impact the organisation tremendously in achieving its ultimate goals, an example being high throughput. VM creates a visual representation not achievable in any other form of communication or problem solving situation using tools such as Value Stream mapping approaches. VM also allows one to clarify the modes of communication from organisational structure development and in developing interdependency maps within the system, among other uses. In conclusion, there are various ways VM plays a fundamental role in strategy design.

2.2 What advantage is gained by using VM in strategy implementation?

As mentioned above, among others, VM has a critical advantage in the following ways;

- *Improved organisational structures*
- *Clarity of information and resource flows within a system*
- *Better training at various levels of the organisational structure*
- *Improved health and safety documentation and improved awareness initiatives.*
- *More effective and efficient modes of data and information representation.*
- *Time management*
- *Improved limited resource management*

2.3 How does VM impact on employee motivation when implementing corporate strategy?

The success of corporate strategy relies on the level of buy-in from all stake holders and one limitation in this respect is the level of awareness that the strategy receives among all the stakeholders.

For instance, the current 2014 South Africa Postal Office (SAPO) strike, is marginally as a result of poor organisational structuring and reporting, among other reasons. With the right organisational structure, staff members are able to understand the level of influence each contribute to the company. VM in this case would be able to clearly highlight the various roles played by each staff member, reporting and accountability levels and ultimately the ability to adequately measure their performance. This is vital to motivating staff through rewarding and accountability of activities executed by staff. Currently no clear definition of accountability exists, as a result SAPO's strategy to extinguish this strike is largely hampered.

Other forms of employee motivation derived from VM are:

- *Improved performance measures (KPI's).*
- *Clear company strategies that develop achievable and high impact Company vision, mission, goals and objectives in that order.*
- *Increased positive impact of quality control initiatives.*
- *Optimised skills training.*

2.4 What is the magnitude of the improvement to be expected?

The magnitude of improvements derived from the use of VM may be categorised into two forms being internal and external. Both of which influence an organisations throughput.

External forms of improvements would manifest through the growth in company market share. VM improves the external components responsible for contributing to the long term goals of an organisation. This manifests itself in the impact on supply chain management resulting in increased profits through streamlining the flow of goods and services throughout the system. Which ultimately generates higher throughput.

Internal impacts may take the form of improved employer moral, increased output, lower waste, higher utilization of resources. In general the performance indices generated from internal functions of an organisation are experienced.

Research question 3: in what ways can VM improve the operations design process within an organisation?

3.1 How can VM facilitate operations design?

There is a knowledge area commonly termed as Operations Research which aims at designing organisational systems to better understand how to generated higher throughputs. This field of study makes very impressive use of VM in a myriad of ways. One very unique way is combining mathematical computations in the design of operation process flows. Another is Work Study, which makes use of a high degree of VM in the research, design and implementation of operations within an organisation. Yet another knowledge and skill area, is the use of VM in Value Engineering (VE), which focuses on product development when designing the operational requirements needed in the production of the product.

3.2 What advantage is gained by using VM in operations design?

The fact that VM forms a major part of process documentation using tools such as Value Stream mapping and value engineering, cannot be argued away. VM is fundamental in the foundational, intermediary and final stages of these applications. There are a number of advantages gained by using VM, these are but a few;

- *VM creates a platform to understand current operational flows.*
- *VM allows for the initial & final problem solving approaches to take shape.*
- *VM is key in communicating the presentation stages necessary in processes undertaken by various operational applications.*
- *VM saves time and resources that would have otherwise been spent trying to document and understand the business processes.*
- *VM is responsible for paving the way for applications in various fields such as Information Technology (IT) using agile-'scrum', Industrial Engineering (IE) using VA and Management Systems such Management Information Systems (MIS).*

3.3 What is the magnitude of improvements to be expected?

The magnitude of improvements derived from the use of VM in operations design would be;

- *Reduced system queries as a result of improved decision making across management structures as defined by optimised MIS systems.*
- *Increased customer satisfaction through improved VE / SCRUM approaches.*
- *Higher throughput and reduced process resource waste as a result of better product quality derived from improved value stream mappings.*

Research question 4: how could VM impact on operations management activities?

1.1 How can VM impact on operations management?

Businesses are designed with three main functioning areas that facilitate organisational throughput;

- *Production and Operations: The role of management here relies on how well they optimise the use of four core resources in order to achieve high performance and contribute to the organisation's throughput, i.e. ;*
    - *Labour: the company needs various skills at its disposal. VM results in a rich labour resource through better communication portals using visual instructions, training and pro-active organisational structures.*
    - *Machines & Equipment: Using VM to develop better maintenance and operational planning initiatives, improved user interfaces, data collection and query mechanisms.*
    - *Materials: Using VM to develop better production planning systems e.g. MRP and BOM tools, quality control applications to mention a few.*
    - *Lastly, the Method or Process: VM applies itself here, in the design and development of process flows through better Work Study approaches, System and subsystem design etc.*
- *Marketing and Advertising. n/a*
- *Finance. n/a*

1.2 What advantage is gained by using VM in operations management?

- *Improved production planning and resource utilization*
- *Increased product quality, by optimising quality management approaches.*
- *Builds a knowledge based work force, skilled in various aspects of their work.*

- *Focuses efforts on the critical areas of the production process.*
- *Ensures objectives are met timely and effectively.*

1.3 What is the magnitude of the improvements to be expected?

The magnitude of this form of VM involvement shows the measure of improved:

- *Machine performance; high utilisation means optimum usage.*
- *Labour performance; better time management and working instructions.*
- *Total productivity; higher throughput as a result of optimum resource utilization.*

Research question 5: can VM improve the effectiveness and efficiency of performance measurement?

1.1 How can VM facilitate performance measurement within and organisation?

Performance measurement relies on some form of measurable variable. By creating a better understanding of the organisations goals, VM facilitates the development of the organisation's measureable variable. Identifying critical control points (CCPs) using VM, may be measured through understanding the dimensions of quality expected at this process areas. Other VM facilitated measures include;

- *Improved lead times; Process mapping through Value Stream Mapping.*
- *Higher throughput; Work Study through systematic logical understanding of the work.*
- *Higher product quality; Quality control measures through better VM practices.*

1.2 Will VM methods improve the effectiveness of performance measurement?

Effectiveness by definition is 'doing something the right way / in the right manner'. Most organisations are unable to clearly formulate correct organisational measurement variables due to a lack knowledge of the process & organisational goals. VM brings clarity of the process and core business and as such identifies the measurable factors relevant in achieving the set individual work objectives.

1.3 Will VM methods improve the efficiency of performance measurement?

Yes. Ultimately with the advent of technological tools such as information technology, tablets and BIG data becoming common work place instruments, the ability to harness VM's capabilities is gaining ground. VM as mentioned allows for a faster and more cost

effective means of identifying, developing and implementing ways of optimising systems and business operations. In essence 'doing it the right way' is improved when VM clarifies what is to be done.

1.4 What is the magnitude of the improvements to be expected?

Again. Performance measurement relies on some form of measurable variable. Creating an understanding of 'what is to be done' and 'how it is to be done', facilitates the ability to measure ones achievement of these two areas. The magnitude of VM to achieve improvements is notable in a number of ways already mentioned previously;

- *Process times.*
- *Process throughput.*
- *Customer satisfaction.*
- *Skill development.*
- *Product quality.*
- *Psychological well being.*

Interviewee: Mr Snyman senior

The greater Research question

Can the implementation of visual management assist the quality motive by improving strategy development, operations design and management and performance measurement within an organisation?

Research question 1: how does visual management (VM) create value within an organisational setting?

1.1 How is VM traditionally implemented within an organisational setting?

Visual management started on the shop floor and was used as a method of coercion and reprimand by management, highlighting the cases where employees' performance falls below the desired levels. It wasn't really taken and applied to the higher levels of management or the administration function. It was implemented to enhance communication on the shop floor.

1.5 In what ways has VM been applied creatively?

Many of the fast food businesses in South Africa and abroad make use of visual management in their kitchen and general operations areas. Specific food racks have been designed and manufactured to communicate and physically hold specific quantities of products in order to establish when the ideal capacity has been reached. Instructions on how to use machines, and how to correctly cook certain elements of the products are made visual and hung at the point of use. Safety instructions are also graphically portrayed and displayed where necessary.

Visual management has been used in developing the Pebble Bed Modular Nuclear Reactor to plan, design, build and manage the simulator.

It has also been used by the Gauteng Tooling Initiative (GTI) which is a not for profit company that aims at revitalising the tool, dye and mould making industry in Gauteng.

1.6 What type of improvement does VM enable?

Visual management facilitates an entire shift in mindset. It collects information from the operation and the activities of the people facilitating operations.

Visual management is also a tool for employee empowerment and development. It can be used to motivate and reward individuals and teams for good performance and efforts. By making the information, which is usually stored away in filing cabinets or the minds of management, visually and abundantly available, it moves to the forefront of each employee's heart and mind, driving their efforts. It creates a new dimension of accountability and responsibility. It makes problems visual, but also guides problem solving efforts allowing employees themselves to develop solutions and track the success thereof facilitating a feeling of pride, achievement and reward.

Visual management motivates employees to finish their work according to set targets and even ahead of time in some cases. This is because they realise that they are being measured and understand the measurement process to the point where they streamline their actions accordingly.

Another mentionable dynamic when implementing visual management methods, is that people without formal education can be successfully trained to perform specific tasks and by so doing, add value to the economy and improve their lives, relieving poverty in their individual contexts.

1.7 What is the magnitude of the improvements to be expected?

In the case of GTI, the turnover time was over a month late, and since implementing visual management and assigning a champion (Toko) was reduced to a couple of days. The factor is not easily measured and should be considered on a case-to-case basis, but it can be said that the magnitude of improvement to be expected is significant.

Research question 2: can visual management aid in strategy development and implementation?

2.1 How can VM facilitate strategy design?

Visual management is a tool to measure and track the performance of processes and employees. By implementing a visual workplace, controls and metrics are built into the system at pivotal points and will provide actual and reliable information upon which strategic management can base future decision-making. Reducing reliance on popular theory, opinion, management's feelings, and eliminating the divide between the factory

floor and strategy development. Decisions become based on facts and truth, and the results thereof can be visually tracked for success.

2.2 What advantage is gained by using VM in strategy implementation?

The strategy can be broken down into a number of actions plans using visual management techniques such as flow charts and graphs. By extension the achievement of the action plans can be mapped and measured using visual management techniques so that the process of achieving strategy can be managed and measured visually much like the process is. This allows for insight and motivation for employees when they see their progress towards achieving corporate strategy. Often a significant change in employee attitude and morale is experienced.

2.3 How does VM impact on employee motivation when implementing corporate strategy?

Generally people act within their best interests and are hesitant to share their knowledge and experience. Visual management begins by making all information needed by everyone freely available and displaying it in prominent areas, removing the element of secrecy and privy information. In this way people stop seeing themselves as a stand-alone individual, but rather as a valuable member of a successful team striving towards reaching self-set goals and targets. Displaying targets and when they have been met or superseded in front of everyone also allows employees to feel pride in their achievements in the presence of their peers, which allows for immense personal motivation. Visual management redefines communication in response to the recent realisation that up to roughly 80% of human communication is visual. It has been acknowledged that there is more to communication than just what a person is saying. Their eye contact, facial expressions, hand gestures and overall enthusiasm play a large role in communicating what they are trying to say. By visually communicating with employees, management can be sure that they better understand what is being said, and as a result will act accordingly, increasing satisfaction on both sides.

One of the driving forces of visual management is that employees should be involved in designing their work areas, stations and tasks, contributing to the design of the overall process itself. By doing this each employee understands exactly what is expected of them and they have a certain amount of autonomy over how they complete their tasks.

Rather than receiving orders and being forced to act accordingly (see KPI documentation.) In the same manner, employees should be involved in deciding upon KPI's in order to achieve buy in. In some cases employees will set tougher KPI's and draw motivation from striving to achieve them, as they are self-set and a personal challenge. The result is that the whole organisation designs a visual management system to suit their specific needs.

2.4 What is the magnitude of the improvement to be expected?

Significant.

Research question 3: in what ways can VM improve the operations design process within an organisation?

3.1 How can VM facilitate operations design?

The visual workplace in itself imposes various demands that will directly impact on the design of operations. These include automatic recoil systems, demarcation of activities, the display of targets and system performance, as well as visual metrics and controls alike. Just by following the requirements of a visual workplace, the process of operations design will be streamlined and improved.

The importance of involving employees in the design process when implementing visual management can fundamentally improve the design of operations by using the first-hand experience of workers to identify possible problems that might have been overlooked by management design teams.

Asking everyone involved in designing the process to physically draw it out, forces them to shift reliance from the left to the right side of their brains, which allows for more holistic thinking. It allows them to see the process as a whole as well as the key relationships between stages and components, instead of focussing on specific small area details. This often encourages the identification and avoidance of potential problems before operations are physically established.

Every process, making up the greater operation must be carefully considered and standards must be set against which performance can be measured. If a process cannot be visually measured and displayed, in other words if there is no target set for

the process, then it cannot be controlled and its inclusion in the greater operation should be seriously reconsidered. When designing operations, the question of how the performance of each section will be measured is a driving force when selecting the employee or team to take responsibility for the section.

3.2 What advantage is gained by using VM in operations design?

By including all levels of employees in the design process, specifically those working on the factory floor, each individual is given the scope and autonomy to identify their needs regarding their role in operations. In this way each person can be made responsible for eliminating wasted time and movement; something which they are far more likely to sincerely attempt to do as they are involved in the process and not merely carrying out orders. They can define exactly what they need in order to do their jobs and can positively inform the flow of processes. The traditional methods management where only a hand full of people make all the decisions for the rest, is replaced by more forward thinking approaches where the design of operations is, to some extent, made the responsibility of those with specific day-to-day operating knowledge and experience. The operations function becomes a democracy, where employees are motivated to achieve targets because they were involved in setting them, rather than merely making sure they do as they are told whilst being watched and losing interest when not.

3.3 What is the magnitude of improvements to be expected?

In the GTI example, the following are pictures taken of the situation before and after visual management was implemented on the factory floor. The improvements are astounding. The area was cleaned up and carefully organised. Yellow lines were painted on the floor to indicate different working spaces and operational areas. One step in the process could now be distinguished from the others. The final picture shows a separate situation where the power of visual management and order can be clearly seen. In this picture we also see various working areas demarcated with yellow lines, pipes and electric lines are identified and painted red to alert caution. The workbenches themselves were adapted to optimise space and standardise where and how tools are kept at various benches. There is a dedicated mobile tool rack in the middle of the floor ensuring that tools are properly stored and replaced after use, showing outlines of where tools are to be placed. This also assists in identifying when a

specific tool is missing, saving time and effort. Picture three also clearly shows the use of visual displays and signs against the walls, providing safety information and other instructions.

Research question 4: how could VM impact on operations management activities?

4.1 How can VM impact on operations management?

The visual workplace demands cleanliness and order, which makes managing operations far easier. The walls and floor are carefully demarcated to show maximum inventory levels and levels of waste and rework. Everyone on the factory floor understands the flow of the process and can initiate preparation for the next stage beforehand by making all the necessary resources available at the point of use. The system essentially begins to manage itself, making use of Kanban and indicating bottlenecks and when targets are not being met. Even possibly providing suggestions as to why. The every day activities of operations managers will change drastically as they are no longer required to run around being a watch dog, as well as ascertaining the success of the process. Resources and infrastructure are far more economically managed, avoiding the need for possibly unnecessary additional capital investments (the brewery loading example). In the visual workplace, everyone has access to the information that they need to do their job, providing them with autonomy to solve problems as they arise. This frees up the operational manager's time to focus on assisting and motivating employees and to engage in more creative strategic problem solving.

4.2 What advantage is gained by using VM in operations management?

The fact that employees are involved in designing the operation and setting their own targets makes them more likely to feel personal pride in achieving what they have set out for themselves. When the system measures and displays to all that the process is behind, the people responsible for that section will often jump into action to correct what is causing the problem. They can even begin to anticipate problems before they occur allowing for a timeous solution to be found. They take ownership of their work, become their own project managers and sometimes even make efforts to ensure that suppliers to their process deliver quality inputs on time to ensure no delays on their watch. They take responsibility of their demarcated work areas and it becomes a simple task to identify when someone is not pulling their weight, or where responsibility lies. In this manner employees manage themselves as directed by the system and don't need operations managers to instruct and supervise their every move. The different work teams develop a healthy competition amongst one another, which motivates them to improve and maintain the edge. In some cases employees have been known to set stricter targets than management would, as they wish to challenge themselves and prove their worth to the system and in achieving corporate strategy.

This change in thinking has resulted in people delivering higher standards of work on time, because they know that they are being measured and buy in to the measurement itself. People also learn the value clear communication and working together in teams. They begin to understand that efforts need to be joined and inline with one another in order to add value.

4.3 What is the magnitude of the improvements to be expected?

Before a visual management champion was appointed (Toko) at GTI, orders were up to a month late, however with her intervention they were completed within a matter of days. The magnitude of improvements to expected is significant.

Research question 5: can VM improve the effectiveness and efficiency of performance measurement?

5.1 How can VM facilitate performance measurement within and organisation?

In the visual workplace, various measures are already built into the system and can be used to guide management when deciding upon KPIs.

Using visual tools such as check sheets and flow charts the process of how KPIs are set can be explained and illustrated to all stakeholders, including the employees themselves (see KPI documentation).

Visual management also assists the administration function of management assisting in keeping track what has been done and checked, and what still needs to be achieved and monitored.

5.2 Will VM methods improve the effectiveness of performance measurement?

Various visual measurements and controls can be used to make sure the correct tasks are being measured. The data collected by the system can also be visually displayed in the form of graphs showing whether or not targets have been met. This form of communication using graphs to convert data into information has a far better chance of being interpreted and understood by employees, than lists of data.

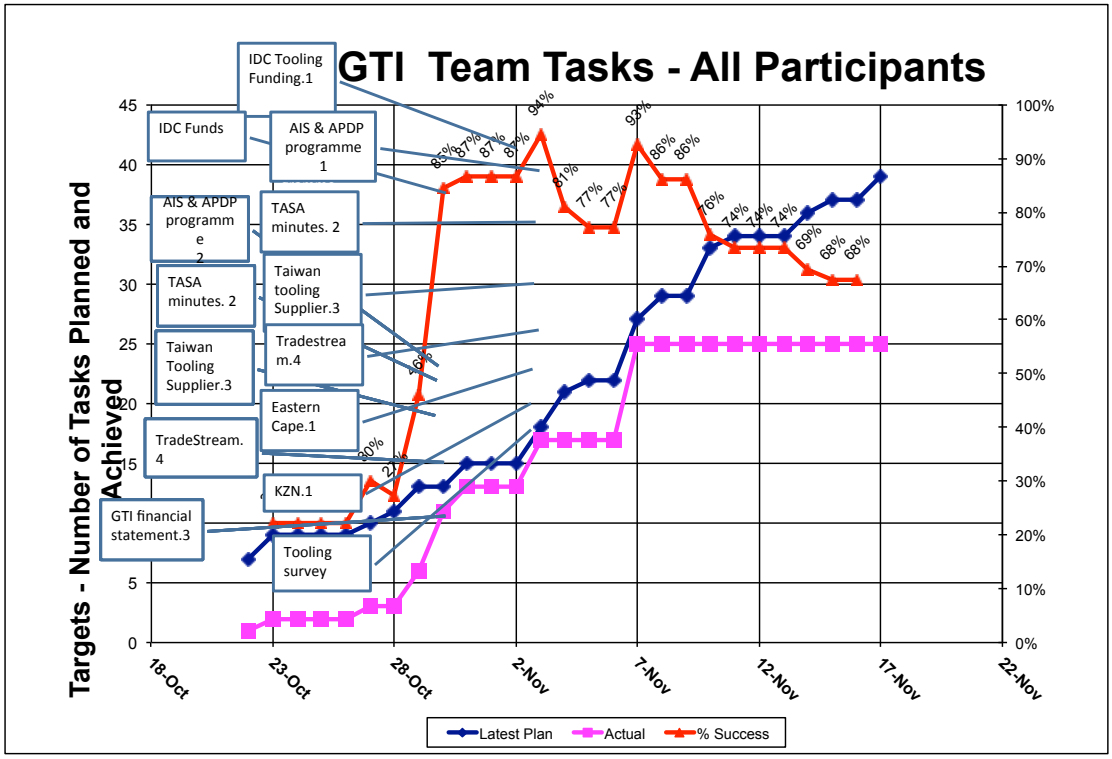
An example of such visual displays is the spreadsheet used at GTI shown below. It details set tasks for each employee and what they will need to do so. It also shows whether tasks have been successfully completed on time, or whether they are late.

Project Owner	HS		USER (Who am I)?	Henk		Completed		Overdue		Due today		New date	
GTI - PEOPLE ASSIGNED TASKS			11-Nov			1	2	3	4	5	6	7	8	9	10
						22-Oct	23-Oct	24-Oct	25-Oct	26-Oct	27-Oct	28-Oct	29-Oct	30-Oct	31-Oct

Item	Issue	Owner	Client	Actions	Deliverable / Task Complete?	Status	P Date	P	A	P	A	P	A	P	A	P	A	P	A	P	A	P	A	P	A	P	A
1	GTI financial systems and cost codes not OK for reporting required. 1.CC Monthly Cume 2.Orders Monthly Cume 3.Monthly Meetings	*Neil*	Henk	1. Agree structure with Betty and Dixon. 2. Do 1 months cost allocations based on revised structure. 3. Make assessment of suitability.	1. The agreed structures is acceptable and agreed workable by both the parties. 2. One month information has been entered as test. 3. New bookkeepers start operating from 11 Nov 2014.	In progress	18-Nov																				
2	Tradestream is interested in establishing exactly how the tooling cluster can function with specific reference to the MCEP program for clusters.	*Hendrik*	Henk	1. Find examples of successful MCEP funded clusters. 2. Share the financial model with Tradestream. 3. Make a presentation to Tradestream 4. See how Tradestream can play a role in setting up a cluster/incubator	1. Three successful MCEP funded clusters have been identified 2. The concept financial model has been shared with Tradestream 3. A presentation has been made to Tradestream 4. A concept agreement is in place how Tradestream can cooperate.	In progress	17-Nov																				
3	The Taiwanese tooling suppliers wishes to sell more equipment in South Africa. Funding is the key. Discuss cooperation possibilities with bank of Taiwan and Taiwanese tooling suppliers in South Africa.	*Toko*	Henk	1. TOKO to make an appointment with Megan 2. Discussions needs to be initiated with Taiwan machine tool suppliers 3. Presentation made to and discussions with Taiwan Bank in SA. 4. Make a communication / marketing document if results are positive	1. Contact has been made with Megan 2. Machine-tool supplier meeting scheduled 3. Taiwan bank meeting scheduled 4., Negation/marketing document complete	In progress	14-Nov												1						1		
4	Complete the minutes of the TASA Executive meeting and produce an action plan.	*Neil*	Henk	1. Complete minutes of meeting. 2. Make an action plan for follow-up actions from the meeting.	1. Minutes of the meeting is complete and reviewed by chairperson. 2. Action items are listed with responsibilities and due dates.	Late	22-Sep	2																		
5	Establish exactly the benefit to the TOOLMAKING fraternity under the AIS and APDP programmes	*Henk*	Henk	1. Find the person that can give me the correct information (contact NAACAM, Roger Pitot)) 2. Make appointment and get the facts in meeting	1. Correct Person Identified 2. Meeting Scheduled 3. Results written up	In Progress	08-Nov	2														1					
6	Cluster action plan broken down into a detailed budgeted plan complete.	*Henk*	Hester	1. Current workshop results studied in detail (by Henk). 2. Produce mind maps for ED and clustering. 3. Create Gant chart and budget. 4. Make presentation at board meeting.	1. Mind maps are complete. 2. Can Gant chart and budget complete. 3. Presentation for board meeting complete.	Not started	08-Nov											1	1					2	2
7	IDC (apparantly) Funds Tooling on a revolving credit basis. Find out how to unlock this.	Peter	Henk	1. Meet with Retha Breed 2. Make proposal how to unlock funding for TASA Membership.	1. Meet IDC 2. Deliver Proposal.	Not started	07-Nov														1			2		
8	GTI office takes over the National TASA Secretariat?	*Henk*	Vusi	1. Vusi has agreed responsibility transfer with previous TASA chairman - now National Secretary. 2. List of all activities to be run by the national secretary agreed in writing at TASA National Board. 3. List all incomplete (legal?) take over activities/actions required for responsibility transfer.	1. Responsibilities have been identified. 2. Action plan against each responsibility with responsible person and client. 3. Planning document forms part of the TASA National Board Meeting reporting.	Open issue-no date																				
9	TASA Gauteng Executive Committee Resolutions: Plan to execute these resolutions	*Henk*	Vusi	1. Agree a constitution/charter that drives the TASA initiative. (Adoption and communication of current document). 2. Get the legal structures to reflect principles in constitution/charter. 3. To ground work to create TASA National office. 4. Assist with letters to TASA National Chairman.	1. TASA National Constitution / Charter is complete. 2. Legal framework is in place. 3. Various entities constitutions reflects the spirit of the Constitution / Charter. 4. A plan for discussion is on the table for the TASA National office.	Open issue-no date																				

5.3 Will VM methods improve the efficiency of performance measurement?

Visual tools can be used to check that measurements taken are correct. In the above spread sheet example, employees are required to indicate whether and when certain tasks have been completed. This sheet is directly linked to the master chart (shown below) that plots the rate of completion of tasks against the targets set. In this way progress and completion is double checked for accuracy.



5.4 What is the magnitude of the improvements to be expected?

The interviewee did not provide an answer.

Interviewee: Mr Snyman junior

The greater Research question

Can the implementation of visual management assist the quality motive by improving strategy development, operations design and management and performance measurement within an organisation?

Research question 1: how does visual management (VM) create value within an organisational setting?

1.1 How is VM traditionally implemented within an organisational setting?

The function is generally outsourced and not often an expertise held within the organisation itself, unless they have an industrial engineering department. Someone within the business will alert top management to a problem, and to solve it a consultant is often brought in.

1.2 In what ways has VM been applied creatively?

I applied it personally to a life insurance company. I created a single process flow for all documentation. The process was treated similarly to one that could be found on the factory floor. I also applied the principles of VM of not allowing a document to proceed on to the next stage until it is properly completed. I made use of coloured boxes at the end of each stage of the process, to house forms that successfully made it through the various steps and to distinguish between the different types of forms.

The second example provided was the Pebble Bed Reactor case. Here the biggest issue was re-design time. As a solution they implemented VM principles in an attempt to reduce the design-change time. A single process flow was created and the result of this was that the re-design time was reduced from months to less than one week. They achieved this partly by ensuring that all employees thoroughly understood the process in order to identify current and potential bottlenecks.

1.3 What type of improvement does VM enable?

VM facilitates and encourages continuous learning because it allows for empowerment, as people are less confused and more confident because activities are defined and understood by all. Everyone knows what to do and how to do it properly through training and visual aids at the point of use on the work floor. This makes identifying and

eliminating variances easier as there is no excuse for not following clear directions. Many people believe that VM primarily benefits management, however it actually provides a greater opportunity for employees as a whole by insisting on their joined empowerment. It removes ambiguity and encourages accountability and transparency. People who are working well will be acknowledged as doing so, which further motivates them and inspires others to do the same. VM assists the group mentality and encourages people to work together to achieve a greater good.

It also mitigates the situation where an employee is given a job to perform, but not given the power and say to do so. In such situations, employees receive negative feedback and feel reprimanded because targets are not being met, yet they have very little say over how the work is done. By including the employee in designing the process, these issues are minimised as the employee is given the necessary autonomy to take on the responsibility.

1.4 What is the magnitude of the improvements to be expected?

It's incredible. By implementing measurement in the before mentioned insurance case, wrongful claims decreased by 60%. Employees were asked to identify the major causes of wrongful claims and find methods to reduce them. The fact that employees knew that they were being measured drove the action of reducing wrongful claims. Employees were included in the design of the processes for which they were responsible, so they knew exactly how they were being measured and how to properly perform. The causes of wrongful claims were identified and measured on an individual basis.

Research question 2: can visual management aid in strategy development and implementation?

2.1 How can VM facilitate strategy design?

VM is a strategic imperative and aids the learning organisation. It allows strategic management to have a very good idea of what is happening on an operational level on the factory floor, which can be used to directly inform strategy development. The great divide between top management and what is actually happening operationally is lessened as valuable and reliable information is fed upstream to those who are determining strategic and operational direction. As the VM system matures, it will start to provide answers to basic operational questions, which are traditionally made

by operations management, freeing them up to think more strategically. In this manner the responsibility of strategic thinking and design is more equally distributed throughout the organisation. Essentially allowing strategic management to make decisions based on sound internally generated information, taking into account the external environment. There are many cases in business where top management are not aware of whether a profit is being generated from operations until then end of the year when financials are drawn up, which makes strategy development a futile activity as how can one forge the path forward, when where we are now is not established or understood.

2.2 What advantage is gained by using VM in strategy implementation?

VM is a wonderful project management tool. Constantly measuring and displaying measures, reminds employees of company goals and targets. In so doing avoids the "out of sight, out of mind" reality often experienced in businesses. There is no longer an excuse for not knowing whether you are on track or not. If you are behind schedule, it will be clear for all to see, it is a social pressure that will ultimately encouraging action.

By involving employees in the design of processes, and guided by company strategy, a greater buy-in is facilitated. The activity becomes a learning process. Employees make suggestions for how things should be done, these are then implemented, measured and the success established. In this way, good working practices are established and non-value adding steps eliminated, ultimately creating a system that employees have assisted in building.

2.3 How does VM impact on employee motivation when implementing corporate strategy?

Once the employee fully understands what their job entails, they can master it. Employees even begin to find ways to improve on it, thereby contributing to the building of the system and achieving continuous improvement. In this way they can completely buy into improvement strategies as it is developed by themselves and not passed down from top management in a disconnected manner.

It is a good idea to facilitate a "quick hit" target that can be achieved within a day or two to illustrate to employees that change is immediate and effective. The attempt is to ease possible teething problems and achieve a greater buy-in and enthusiasm.

Employees are empowered to design their own work environments and set their own targets. People innately want to do well, not sit around and do nothing, so they will inevitably increase their challenges as they progress. The 5S of VM allows people to take pride in their work areas by cleaning it up and organising it as they feel is most appropriate.

2.4 What is the magnitude of the improvement to be expected?

Great.

Research question 3: in what ways can VM improve the operations design process within an organisation?

3.1 How can VM facilitate operations design?

The empowerment of employees by the VM system facilitates them getting involved and bringing hands-on experience to the table. Management must insist that the relevant employees working on the process or managing that part of the system, be involved when designing operations. In this way several individuals sit down and discuss and describe how they would go about completing their tasks. A best practice is then established by them, which can then be implemented and self-revised over time.

3.2 What advantage is gained by using VM in operations design?

By designing operations visually, one can easily identify potential waste and non-value adding steps in the process, which will save the business money in the long term.

When a person is encouraged to draw, the right side of the brain is dominant. The right hemisphere of the brain allows for creative "big picture" thinking and has a far more holistic approach than the generally more dominant left-brain. In this way employees begin to think about the process as a whole unit and better understand their personal contribution to its success. It also allows them to identify waste on a more holistic level, rather than getting stuck in the details of their personal functions.

3.3 What is the magnitude of improvements to be expected?

The interviewee did not provide an answer.

Research question 4: how could VM impact on operations management activities?

4.1 How can VM impact on operations management?

If the VM system is successfully implemented, operations will not need a very high level of human management, as essentially the system will manage itself by empowering employees individually. The result is that operations managers have more time to interpret information generated by the system to make more strategic level decisions.

4.2 What advantage is gained by using VM in operations management?

Waste is quickly and efficiently detected and eliminated. The business is able to give clients reasonable delivery time estimates based on information generated by the system, and not just theory or averages. This in turn results in clients feeling satisfied with the service and remaining loyal to the business. Employees are generally happier and more motivated because their efforts are acknowledged and valued, and work towards achieving goals through methods, which they themselves designed. The business can quickly identify and redirect when production goes off target, in an effort to produce their product or service in the decided upon method.

The type of management required from operational managers shifts focus from the operations themselves, to the employees facilitating operations. The managers then play the role of supporting employees in their activities, to ensure that they complete their tasks correctly.

Any deviations are immediately made visible to all employees putting pressure on them to take action. The fact that all activities are so clearly defined and actions are transparent, means there is little room for the blame game or pretending not to have been aware of the situation.

4.3 What is the magnitude of the improvements to be expected?

The interviewee did not provide an answer.

Research question 5: can VM improve the effectiveness and efficiency of performance measurement?

5.1 How can VM facilitate performance measurement within and organisation?

When employees are involved in designing operations, the measurements of performance should also be established and aligned with the operations design. In this way people not only completely understand how they are to be measured, but are actually responsible for setting the performance measures. Employees experience an element of control over their work, when this is done and it makes them feel comfortable and confident.

VM helps to align the actions of all employees and operations to achieve company strategy.

5.2 Will VM methods improve the effectiveness of performance measurement?

VM encourages continuous measurement throughout the system, and not just at the end of the process. This enables variances and deviations to be timeously identified and fixed, without having to delay or stop the process. Employee involvement will help target key operational measures on a practical level, rather than just those suggested by top management who may tend to rely very heavily on financial ratios.

5.3 Will VM methods improve the efficiency of performance measurement?

The VM system itself involves measuring various variables, the efficiency of which will be tested as the system is run and the process completed on a daily basis. The frequency of data collected and analysed will make any errors in measurement easy to identify and rectify as they arise. In this way, the measurements are ensured to be correct as they are so often checked and documented. An average performance curve can be generated over time, rather than one measurement taken at a random time to satisfy the performance measurement function.

5.4 What is the magnitude of the improvements to be expected?

The interviewee did not provide an answer.

Interviewee: Mr van der Spuy Brink

The greater Research question

Can the implementation of visual management assist the quality motive by improving strategy development, operations design and management and performance measurement within an organisation?

Research question 1: how does visual management (VM) create value within an organisational setting?

1.1 How is VM traditionally implemented within an organisational setting?

The interviewee agrees with the following theory.

VM was originally developed to solve problems and inefficiencies experienced in industrial operating environments such as factory floors. It was implemented in order to convey the large body of detailed information, which was traditionally housed in filing cabinets and the minds of management, to those employees who need it in order to properly complete their designated tasks. The volume of information was defeated by simplifying it, summarising it and making small bits of it available directly at the point of use using pictures, schedules or signs to do so. In essence the visual workplace is one, which silently communicates how to effectively and efficiently utilise it. Tools, equipment, the floor, walls and the ceiling all provide information about what is to be used when or housed where and in what quantities, negating the need for employees to have to look outside their immediate environment for answers from manuals or management.

1.2 In what ways has VM been applied creatively?

The interviewee agrees with the following theory.

Visual management has been applied to many different scenarios within various contrasting industry settings. While having been focussed on factory floor operations, VM has made it's mark on the office setting and service industries alike. Examples according to Galsworth (2005) of creative VM application include the use in hospitals, banks, retails stores, airports, school administration and classrooms, tertiary education institutions, government offices and operations as well as home businesses.

1.3 What type of improvement does VM enable?

The interviewee agrees with the following theory.

- The main benefit of instituting visual management and a visual workplace is that information and answers to pertinent questions is made visible and feely available to those who need it.
- It facilitates the identification of problems and problem areas that generally end up being caused by information deficits. When people feel insecure at work they generally tend to hide their mistakes rather than admitting to them and finding solutions.
- Advanced visual management systems and a fully functional visual workplace will also provide solutions for certain problems, and if not in entirety, then will assist those employees involved in finding an appropriate solution.
- VM helps to identify and eradicate motion, which as determined in the literature review is the primary enemy of efficiency and the starting point for quality improvement and lean initiatives. *("Motion takes place when employees wander, wonder, search for answers or provide them (Galsworth, 2005). It is any task that an employee is forced to do in order to complete their allotted work that is neither elective nor avoidable (Galsworth, 2005). It is "moving and not adding value" (Galsworth, 2005:44)")*
- VM provides instant and complete information on how to perform tasks and what the technical standards are. In this manner, VM improves conformance to rules by employees and specifications by products.
- The employee is empowered by the "I" philosophy and has authority over identifying their personal motion and finding ways of reducing it. All the information that they need is right in front of them, which encourages on the spot problem solving, autonomy and self-regulation.
- VM supports the flow of work and information.
- It allows for the goals and objectives of management to be converted into work instructions and targets, which facilitate the alignment of top management strategy and employees actions.

1.4 What is the magnitude of the improvements to be expected?

The interviewee agrees with the following theory.

According to Galsworth's (2005) personal experience in a stamping plant in Michegan, a company which has not implemented a lean conversion could expect improvements in lead time, quality and timeous delivery of up to 15-30% when implementing the technologies of the visual workplace.

Research question 2: can visual management aid in strategy development and implementation?

2.1 How can VM facilitate strategy design?

The interviewee agrees with the following theory.

Implementing VM and creating a visual workplace is a decision to be taken by top strategic management. If this approach is chosen, it will require complete buy-in and dedication from employees throughout the organisation to implement successfully. As explained by the various quality gurus, top executive support is vital and the need for them to lead by example great. It will require a shift in power for many traditional top-down organisations as operational decisions are made by those on the floor, in the situation, and not by the executive. A careful balance must be achieved where the concepts of bottom up and top down leadership structures are merged to create an organisation that operates freely and reacts swiftly to change within the distinct framework and strategic intent of the business as a whole. To achieve this, the overall strategy of the organisation must be altered to facilitate this type of growth. It need not change focus, but it must be adapted appropriately. The first notable difference will be the importance of translating and integrating the strategy into the physicality of the workplace. A mere glance should be enough for an employee to understand what is expected of them, how to achieve it and how their contribution assists in achieving strategic goals. Strategy must be kept simple and be properly communicated, rather than being over complicated and scarcely understood.

Once achieved, the visual workplace will constantly collect and to some extent interpret data points and covert it into valuable information which can be used to inform strategy development and improvement in the face of continuous economic change. Problems and issues are quickly identified allowing for swift amendments

to strategy if necessary. The reliance on top management to solve operational problems will be considerably reduced, allowing them to keep their focus strategic. The great divide between the factory floor and planning table will be reduced and the needs of all employees better communicated and met.

The actual process of strategy development can also be converted into a more visual process using flow charts, mind maps, colours, targets, progress measures and comparisons of planned versus actual results over time, making the necessary changes clearer to identify, and their effect traceable.

When using visual tools in strategy development, whole brain thinking is achieved, using both hemispheres of the brain and allowing for creative and holistic thinking.

2.2 What advantage is gained by using VM in strategy implementation?

The interviewee agrees with the following theory.

The entire concept of visual management, visual thinking and the visual workplace is based on the notion of improving performance and by extension achieving strategic goals and objectives. The visual workplace focuses it's intention on improving the communication of strategy from those who design it, to those whose daily activities achieve it. While starting with the basics of organisation and control on the factory floor, the organisation becomes far better equipped to achieve the goals set by management. Each and every task is considered and aligned with the greater strategy in mind. Any activity which does not add value, and by extension bring the business closer to achieving it's objectives, is scrapped and replaced by one which does. Specific visual order, standards, metrics, controls and guarantees are developed in line with corporate strategy and implemented to improve overall performance.

2.3 How does VM impact on employee motivation when implementing corporate strategy?

The interviewee agrees with the following theory.

One of the eight building blocks of visual thinking is the "I-Driven Change" which makes a point of providing all employees with independence to identify their own improvement initiatives in line with what the organisation hopes to achieve on a

strategic level. People are generally far more inclined to work towards goals which they set for themselves, within an environment that they personally regulate and keep in order according to their individual needs and the needs of their work. Each person is encouraged to identify what information they need to know in order to do their work as well and the tools and equipment needed and where they are to be stored. In this way people grow more confident in their daily activities and become more willingly take on responsibility. They have all the information they need to perform their work. Their motivation to improve performance is often greatly improved as they are given the associated autonomy along with the responsibility. The second element to the "I-Driven approach" is the "need to share element" which facilitates teamwork and unifies the business operations into one clear motive. Once they have established their direct needs for completing assigned tasks, employees are encouraged to think about what others might need to know and how to share this information with them, collaborating to improve operations as a whole. When people are given the power of information, they can't help but feel powerful in their own right, which directly attributes to overall company culture.

Interviewee adds that employees should have the training and attitude to feel confident enough to 'just do it', rather than wait for management authorisation.

2.4 What is the magnitude of the improvement to be expected?

The interviewee did not provide an answer.

Research question 3: in what ways can VM improve the operations design process within an organisation?

3.1 How can VM facilitate operations design?

The interviewee agrees with the following theory.

When the organisation commits to converting to a visual workplace, the overall design of operations will most likely need to be changed. Galsworth (2005) provides an implementation pathway that directly informs how operations should be designed. Design should be driven by the core questions of where, when, what, who, how and how much.

To begin with, a visual order that allows for automatic recoil must be established and worked into the design of operations. This entails organising the workplace in such a way that it is capable of communicating visual information by cleaning it and drawing out visual locations on the floor, walls, cupboards, shelves etc for all manner of item. Each item must hold an ID and an indication of it's preferred location. Attention must be made to ensuring employee safety.

Standards must be developed and displayed in the work area showing employees exactly how they are expected to complete their tasks visually conveying technical and procedural standards.

Displays must also be made available showing vital information to those who need it, these can range from simple floor plans showing which employee should be where, or answers to questions such as "Has the product been released to my stage in the process?".

Visual metrics (measures) must be provided showing more than performance measurement, but also possible insight into the causes of good/bad performance.

Visual controls must be implemented to manage the specifications to be met such as maximum inventory levels, heights for stacking or volumes of materials used. Other methods of the pull system are also to be integrated such as Kanban and coloured lighting methods.

Finally the activities, which absolutely cannot be completed incorrectly must be designed with a visual guarantee (the petrol pump example-no other way but the right way to put it away).

3.2 What advantage is gained by using VM in operations design?

The interviewee agrees with the following theory.

All levels of employee, most importantly those working on the factory floor, are encouraged to participate in operations design. Each individual is given the scope to identify their needs and improve their workflow by eliminating motion. They define the information that they need at hand and what tools or equipment is needed to

complete their work. The task of designing operations is taken out of the hands of strategic management to some extent, and given to those who are affected by it every day of their work lives, tapping into an enormous wealth of day-to-day knowledge. In this way operations design becomes effective and efficient as it is designed and moulded on the needs of the organisation as a whole, from those implementing strategy, to those achieving it.

The concept of motion metrics also helps to inform further operation design once the visual workplace has been achieved. This is achieved by collecting data point and comparing it to planned, showing where problems lie and information deficits exist. The organisation ends up being designed and managed just as it needs to from data outputs produced by the system itself.

3.3 What is the magnitude of improvements to be expected?

The interviewee did not provide an answer.

Research question 4: how could VM impact on operations management activities?

4.1 How can VM impact on operations management?

The interviewee agrees with the following theory.

The visual workplace becomes self-regulatory when properly implemented, thus taking a lot of pressure off this function. The employees responsible for operations management can come to rely on the system and focus their efforts more strategically by looking for areas for improvement, driving the continuous improvement initiative. The can spend more time supporting operations staff and assisting them in managing their small part of the work floor encouraging autonomy and improving motivation. At the same time, they will have more time to converse with strategic management providing valuable insight and feedback, reducing the gap between strategy development and implementation. Operating managers will spend less time regulating the work flow and managing workers enabling them to swiftly respond to problems which may arise providing them with a motivating element of power over their actions.

4.2 What advantage is gained by using VM in operations management?

The interviewee agrees with the following theory.

As long as the relevant standards, controls, metric and guarantees are in place, the information produced by the system will be more than enough to assist managers in identifying weak areas, information deficits and dips in employee morale. The role of this line of management shifts from attaining information on production towards interpreting and acting upon self-generated data points generated from the system. Accordingly it become very important for operations managers to ensure that all visual standards, controls, metrics and guarantees are properly implemented, maintained, calibrated and continuously improved to ensure that information derived from the process is relevant and reliable.

4.3 What is the magnitude of the improvements to be expected?

The interviewee did not provide an answer.

Research question 5: can VM improve the effectiveness and efficiency of performance measurement?

5.1 How can VM facilitate performance measurement within and organisation?

The interviewee agrees with the following theory.

Performance measurement is one of the key elements in visual management and the visual workplace. Most traditional performance measurement tools already involve a visual approach making use of tables, check sheets and flowcharts including Du Pont's pyramid, Keegan, Eiler and Jones's (1989) performance matrix and the SMART pyramid to mention a few. Applying visual management will increase the emphasis on performance measurement and it's reliability.

5.2 Will VM methods improve the effectiveness of performance measurement?

The interviewee agrees with the following theory.

- If the procedure suggested by Galsworth (2005) for achieving a visual work place is implemented, the necessary performance measurements will organically make themselves known as each step is pursued.
- Creating visual order will facilitate a clear understanding of the greater process; it's vital inputs, value adding steps and flow.
- By carefully planning and setting locations for tools equipment and operations, performance measurements for everyday activities becomes

easier to identify such as rates of recoil and missing items, where before they may not have been considered at all.

- The visual workplace continuously collects, interprets and presents information, making it easy to identify which of the measures are non-value adding or redundant.
- The visual standards supplied will allow for valid comparison to actual figures.
- The visual metrics applied in stage three of implementation include elements of performance measurement but take things a step further by providing possible solutions for problems arising.

5.3 Will VM methods improve the efficiency of performance measurement?

The interviewee agrees with the following theory.

Visual management applies the values of continuous improvement, throughout the workplace, ensuring that performance measurements are constantly checked for validity and correctness, and the measurement equipment properly collaborated and serviced.

5.4 What is the magnitude of the improvements to be expected?

The interviewee did not provide an answer.

Interviewee: Mr van Zyl

The greater Research question

Can the implementation of visual management assist the quality motive by improving strategy development, operations design and management and performance measurement within an organisation?

Research question 1: how does visual management (VM) create value within an organisational setting?

1.1 How is VM traditionally implemented within an organisational setting?

The interviewee did not provide an answer.

1.2 In what ways has VM been applied creatively?

Visual management is heavily relied upon when determining strategic direction and making decisions. It is used as a guide for meetings and ensures that everything discussed remains focussed on creating and achieving corporate strategy.

1.3 What type of improvement does VM enable?

Visual management helps to focus the organisation from strategic management through to workers on the factory floor. It directs and streamlines activities towards appropriately setting and achieving corporate strategy.

1.4 What is the magnitude of the improvements to be expected?

It is difficult to provide a number, but the benefits are great.

Research question 2: can visual management aid in strategy development and implementation?

2.1 How can VM facilitate strategy design?

Visual management is used in the form of display boards on the walls of the strategy room. The first wall displays uncertainties and what's expected to happen in the future, the second about company objectives and goals and the third details the plan to achieve goals and objectives. All strategy discussions are held in this room and newly discovered information is categorised according to the three walls. This helps to define the nature of discussions and guide conversation making sure that everything that is dealt with is value adding.

2.2 What advantage is gained by using VM in strategy implementation?

Strategy implementation has to do with motivating employees to complete certain actions, and properly communicating what is expected of them. Visual management greatly assists in communicating corporate strategy and related goals and objectives to all levels of employees, making sure that each person understands what their role is towards achieving it. Employees can then streamline their efforts to achieve what is expected of them. When common goals are displayed in prominent places, they draw to the forefront of employee thinking, reinforcing expectations and actions.

2.3 How does VM impact on employee motivation when implementing corporate strategy?

All employees involved in specific processes are involved in designing them and target, goals and objectives are created together and not from the top down. In this way there is greater buy in from all involved and concepts such as peer plans, peer objectives, and peer progress which are number orientated, replace traditional company vision and mission statements. People understand what is expected of them and how they will be evaluated by being given extremely clear direction. A good visual management system will allow for each employee to understand what his or her personal impact is in achieving corporate strategy.

2.4 What is the magnitude of the improvement to be expected?

The nature of strategy design and implementation makes it difficult to estimate the magnitude of improvement.

Research question 3: in what ways can VM improve the operations design process within an organisation?

3.1 How can VM facilitate operations design?

The interviewee did not provide an answer.

3.2 What advantage is gained by using VM in operations design?

The interviewee did not provide an answer.

3.3 What is the magnitude of improvements to be expected?

The interviewee did not provide an answer.

Research question 4: how could VM impact on operations management activities?

4.1 How can VM impact on operations management?

A visual workplace explains where employees should be at a given time, what they should be doing and whether peer set targets are being met. It allows for everyone to have access to the same information ensuring that all employees are on the same page and working together. It aligns actions to achieve strategy.

4.2 What advantage is gained by using VM in operations management?

Visual management speeds up the process of communication crossing language and educational barriers. Problems are quickly identified by the system allowing reactions to be more swift and effective.

4.3 What is the magnitude of the improvements to be expected?

The interviewee did not provide an answer.

Research question 5: can VM improve the effectiveness and efficiency of performance measurement?

5.1 How can VM facilitate performance measurement within and organisation?

The visual workplace builds various measures into the system, which can be used to assist general performance management efforts. Performance measurement is essentially an element of visual management.

5.2 Will VM methods improve the effectiveness of performance measurement?

Visual management makes the results of performance measurement visible for all to see, motivating employees to streamline their actions in order to achieve targets.

5.3 Will VM methods improve the efficiency of performance measurement?

The interviewee did not provide an answer.

5.4 What is the magnitude of the improvements to be expected?

The interviewee did not provide an answer.