Title:

Personality Profiling and Project Success Factors: A study in the Transportation and Operations department of an organisation.

Presented to the Department of Mechanical Engineering in partial fulfilment of the degree of Master of Philosophy in Engineering Management

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ABSTRACT

The use of personality profiling in various fields, industries and sectors has increased over the last decade. The applications of profiling vary and include assessments that evaluate the suitability of a candidate for a work opportunity or how conducive the personalities of team members are to achieve their objectives. In the discipline of project management, personality profiling has been applied to match project managers to projects, an approach that contributed to achieving project success.

The organisation in focus in this case study implemented personality typing in 2012 and the results have shown that since the inception of personality typing an improvement in health, environment and safety metrics was observed. However, the results have also indicated that the implementation of personality typing has had no effect on other project success metrics such as project cost and schedule attainment.

This research study critically investigates the factors that affect the ability of project managers to achieve project success and the way in which personality profiling affects these factors. This study is conducted as a case study in the Transportation and Operations (T&O) department of the organisation.

Literature on the origin and details of personality typing, its prevalence in the work place and which personality types are more likely to achieve project success are discussed. Furthermore, literature on the factors which typically influence the ability to achieve project success are presented.

In this study, a qualitative research design and case study methodology was adopted. The primary means of data collection was semi-structured interviews. The data generated was analysed using qualitative data analysis using the compare and contrast principles of grounded theory.

Six factors were found to influence the project manager's ability to achieve project success: the effect of the organisational policies and procedures; the project manager's leadership abilities; the contractor's performance level; the health of relationships with stakeholders; the planning effectiveness and compliance and the effect of external factors. Secondly it was found that personality typing has a predominantly positive influence on these factors and project success.

This dissertation concludes with a discussion of the findings and its implications, the limitations of the study, practical recommendations for the organisation and recommendations for further studies.

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Thank you.

Franco de Vries

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CHAPTER 1: Introduction

A number of factors are considered to impact the successful execution of projects. These factors include for example, having top management support, an effective project plan, having the right project team and the project manager's personality (Pinto and Prescot, 1988; Cohen, Ornoy & Keren, 2013). Project success is highly dependent on the ability of project managers to successfully navigate their way through the relevant factors present in their context. The project manager him or herself has certain competencies and personality traits that have the ability to influence their success (Bedingfield & Thal, 2008).

A number of researchers have stated the importance of the project manager to the success of a project. Brown and Eisenhardt (1995) found that the project leader critically affects both process performance and product effectiveness. Cohen et al. (2013) cites Bredillet (2008 and 2010) and states that the project manager not only affects project success, but is an important factor related to project success. Therefore, the project manager is central to project success and his/her personality type would therefore have an influence on the probability of achieving project success.

Bedingfield and Thal (2008) are amongst those who investigated the effect of personality on project success. The findings indicated that the project managers with conscientious and openness (to experience) personality traits are more likely to achieve project success (Bedingfield and Thal, 2008). Conscientiousness refers to the desire of an individual to execute a task well and thoroughly whilst openness refers to an individual's intellectual curiosity, creativity and preference for variety and innovation.

Cohen et al. (2013) conducted studies on the relationship between a project manager's personality type and the success of their projects. The study showed that project managers are more willing to make decisions with limited data, but will conduct a thorough analysis if a small amount of data is available (Cohen et al., 2013).

It is difficult to accurately attribute project success to the project manager's personality type as there are many known and unknown factors which affect project success, besides personality typing. Furthermore, personality type does not reflect an individual's ability, intelligence, emotions or normalcy (Cohen et al., 2013). Personality type is one of the many complex components of personality. There are also other factors such as the effect of the organisation, which have to be considered in terms of achieving project success.

This chapter will address the purpose and scope of the study, provide contextual background for the case study and will present the research question. The chapter will conclude with a summary of the chapters that make up the dissertation.

1.1 Case Study: AMEP Transportation and Operation (T&O) department

The organisation in focus in this research dissertation has implemented personality typing and ascertained the dominant personality profiles of all employees in the International Products (IP) regional business unit. The IP region includes employees in the Asia-Pacific (AP) and Africa, Middle East and Pakistan (AMEP) regions. This dissertation focuses on the project managers in the AMEP Transportation and Operations (T&O) department.

The organisation, of which the T&O department forms part of, is a multinational corporation within the oil and gas sector in more than 180 countries. The organisation employs approximately 65,000 people globally and is regarded by many as having world class processes and procedures covering most of its business operations. In terms of project execution, the organisation is regarded as a balanced matrix organisation. The project manager has a full-time role and he/she has part-time project management resources as team members. Figure 1 is an illustration of an example of the project manager in relation to his/her project resources. It should be noted that the matrix was drastically simplified in order to illustrate the point.

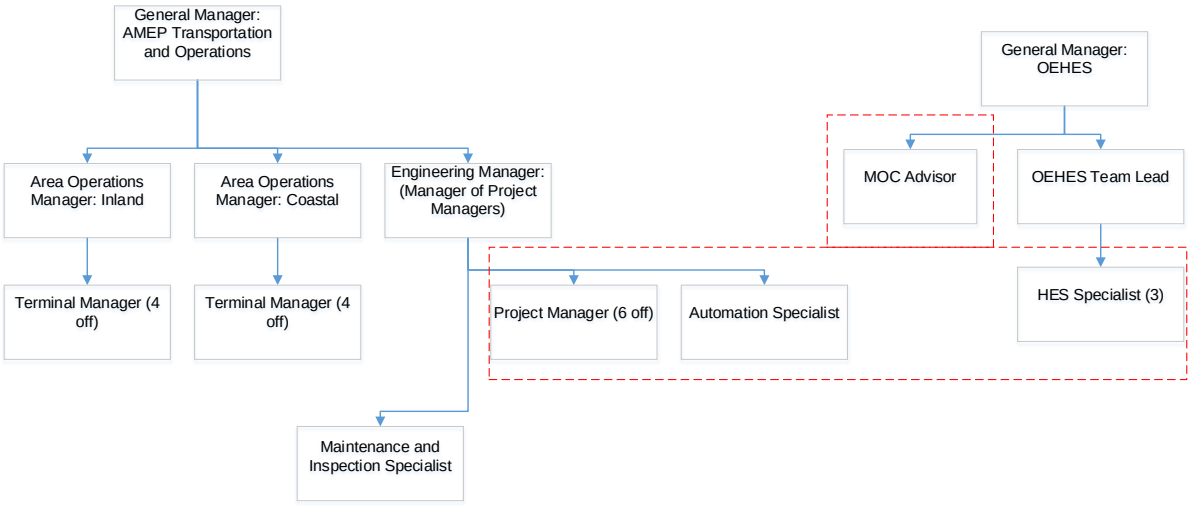

Figure 1: Demonstration of cross functional team with reporting lines *(developed from company document, 2013)*

The composition of the project team is determined by the need and/or requirement of the project. The only resource which would typically stay relatively constant is the Health, Environment and Safety (HES) specialist and the project team may consist of members from business units outside of the AMEP region. Therefore the project manager works with a variety of team members from across business units depending on the suitability and availability of resources.

Terminal managers are typically the project managers' clients as all projects are executed at the fuel depot/terminal which is managed by the terminal manager.

The T&O department's mandate is the safe receipt, storage and distribution of finished petroleum products such as petrol and diesel to fuelling service stations and large industrial customers. The product is received via pipeline into large above-ground storage tanks and piped to loading gantry facilities. Tanker trucks are refuelled at these loading facilities. The trucks offload the products into service station underground storage tanks or the storage tanks of other customers such as manufacturing facilities, commercial farmers and factories. The profit model is based on purchasing millions of litres of finished petroleum products at a low price and selling these products in smaller batches at a higher price. The organisation's storage depots have millions of litres of storage capacity, with advanced pumping and piping systems to ensure that this process is successfully achieved. The storage depot's equipment

is managed with the assistance of sophisticated computer systems which perform many functions such as metering product volumes, starting or shutting down pumps or ensuring that tanker truck vehicles are electrically earthed prior to loading.

The T&O's engineering support department executes projects within the Africa, Middle East and Pakistan (AMEP) region. These projects are categorised as Regulatory Compliance Projects, Health, Environment and Safety (HES) Projects and Strategic Projects. Each of these is explained below:

Regulatory Compliance Projects

Regulatory Compliance Projects refer to projects which are required to ensure that the organisation's operations comply with the organisation's internal processes and/or local legislation. For example, the installation of vapour recovery units is required to minimise the emission of petroleum vapour into the atmosphere whilst loading a tanker truck. The organisation needs to comply with various rules and regulations in order to operate legitimately. Non-compliance may result in the organisation not being allowed to do business in the country.

Health, Environment and Safety (HES) Projects

Health, Environment and Safety (HES) Projects refer to projects which are required to mitigate a HES risk or to protect the organisation's assets. For example, the installation or upgrade of firefighting equipment is required to protect the organisation's employees, assets and the public against the effects of fires and explosions.

Strategic Projects

Strategic Projects refer to projects which are required to increase the organisation's storage capacity or to acquire a stronger business presence in an area or region. For example, the construction of a 10 million litre capacity above-ground storage tank for the storage of a new product which will be introduced to the local market.

The organisation treats the importance of HES differently to the traditional project success factors such as project schedule, budget and quality achievement. In terms of HES metrics, the organisation has established impartial criteria on how to classify injuries and incidents based on the severity and this classification is recorded in the organisation's "Incident and Classification Policy" (company document, 2015). In project execution, incidents are classified under "Work-Related Personal Injury", "Environmental", "Fire and Explosions" and "Reputational Losses". Refer to Appendix A for definitions of these incidents. All losses (incidents) and near-losses are investigated prior to the incident classification exercise and these are tracked and reported on a monthly basis. Consensus regarding the project schedule and budget is reached and agreed upon during the project approval phase, however, these agreements are not enforced and are usually surpassed by the project's HES performance (the number and severity of incidents).

In T&O, the project manager is expected to manage a number of projects concurrently, which causes logistical problems especially when these projects are positioned in various locations. The organisation's project management system requires project managers to be

present at the project construction sites as certain project milestones are being pursued. Consequently, project managers are required to travel regularly to sites located in Southern Africa, at least two times per week on average. The organisation's project execution system requires the involvement of various stakeholders and it is challenging to assemble all stakeholders for a potential meeting at a given time due to busy travelling schedules and other responsibilities and commitments.

In most cases, an extension of the project plan will result in an overall cost increase. The organisation only considers a project as having exceeded the project budget once the project contingencies funds (usually 10% of the project value) have been exhausted and only if the additional costs cannot be justified. For example, if the contractors incurred additional costs in order to strengthen safety related precautions, these costs are automatically justified, regardless if it was planned for or not.

The organisation has comprehensive quality standards based on its own research and development and leveraging global best practices. Quality compliance is not tracked by the business, as projects are repetitive in nature and the same contractors are mostly used. It is generally expected that the contractors are familiar with the organisations standards, codes and specifications in terms of quality. Furthermore there have been very few incidents of which the root cause was found to be quality related.

In most projects the tender documentation would specify the organisation's standards, codes and specifications. In terms of HES, quality and cost, the organisation's requirements are deemed to be well defined and established; however, the contracts with project service providers very rarely include targets, penalty clauses and or service level agreements (SLA).

Similarly, the agreed schedule does not typically form part of the contract documentation, in fact, in many cases project schedules are received by the project managers during the project construction phase.

Despite the organisation's approach on quality, cost and schedule, its return on equity (ROE) is one of the most important performance metrics. Project quality, cost and schedule affect the size of the organisation's capital investment and the longevity of such investment. These factors therefore affect the organisation's profitability ratio.

1.1.1 The role of project managers in T&O

The T&O project managers execute projects formulated and captured in the T&O annual capital expenditure (CAPEX) plan. The needs analysis and justification stages of projects which do not from part of the CAPEX plan are initiated by the project manager. The project manager defines the scope and deliverables of these projects and seeks approval from T&O leadership. Once approved, the project is added to the CAPEX plan and project progress is tracked.

Each project manager is allocated a geographical area within which he/she manages projects. A project manager is responsible for executing all projects for all fuel terminals and depots which fall within this allocated area. Consequently, a project manager might manage multiple projects at one or more facilities consecutively or in parallel, depending on the project objectives.

The projects are of a repetitive nature but vary in terms of scope and size. The type of project generally remains similar from location to location. Refer to Appendix B which contains information on the typical details of projects being executed.

The project manager is responsible for managing projects in accordance with the organisation's established processes and procedures, which include project scoping, planning, method statements and risk assessments. Projects are of a technical nature and the project managers are qualified engineers who typically held engineering roles within the oil and gas sector in the past. Project managers are expected to engage, influence and acquire support from diverse stakeholders with varying needs, requirements and objectives. These stakeholders vary from terminal managers, to project contractors to service station owners. A project manager would typically manage project crews at various locations and may appoint project managers or project engineers depending on the nature and size of the project or depending on the project manager's availability.

The project manager is accountable for achieving project success as defined during the project initiation phase. Project success is narrowly defined as project completion within the planned time frame, budget and quality parameters specified at or during the initiation phase.

1.1.2 The Implementation of personality typing

The organisation implemented personality typing in 2012. Personality typing refers to the psychological classification or grouping of different individuals by their personality (Brown & Reilly, 2009). The personality typing process focused on in this dissertation is a program called e-colours and this process entails the identification of the dominant personality attributes of an individual and the barriers which prevent him or her from identifying risks or to act in a specific way. With the knowledge of their own personality type and personality typing in general, the resultant change in behaviour is expected to lead to improved communication, collaboration and team cohesion and ultimately improved business results.

Four main personality types of e-colours are classified and identified through 4 primary colours namely red, yellow, blue and green. Each of these colours represents a dominant personality trait: red is for a "doer", yellow is for a "socialiser", green is for a "thinker" and blue is for a "relator". The colour combinations of employees are established by using an online assessment which involves uncovering the individual's underlying preferences and traits. A person's personality type is classified through the top two personally traits. For example, if results of the assessment show that an individual scored high as a blue ("relator"), followed by green ("thinker"), the individual's personality type would be blue-green. This personality type is referred to as a "thinking relator". Refer to Figure 2 which displays an overview of the four main personality types. Refer to Appendices C and D which provides additional information on e-colours basics and user guidance respectively.

The implementation of e-colours followed specific steps and guidelines. Initially employees were requested to establish their own personality types through the use of an internet based assessment, thereafter employees were trained on the different personalities with its associated potential limiters and strengths and finally, the personality typing principles were integrated into the day-to-day activities of employees.

The e-colours program utilises a web based tool named the Personality Diversity Indicator (PDI) to establish an individual's two dominant personality traits. The PDI is an introspective questionnaire which attempts to ascertain how the individual perceives the world and himself/herself in it. The questionnaire consists of multiple choice questions and answering all questions is compulsory. Refer to Appendix E for a sample of the PDI.

Employees received training in order to introduce them to e-colours as well as regular periodic refresher training and knowledge sharing sessions. Employees were trained on the potential strengths, limiters and behaviours associated with each of the four main personality types. Subsequent training included topics such as barriers to personal performance, communication effectiveness and collaboration. A common theme throughout the training was for employees to make conscious behavioural changes appropriate to the situation. The e-colour training sessions were administered in a fun and innovative manner with charismatic facilitators and humorous participation by the organisation's senior leaders.

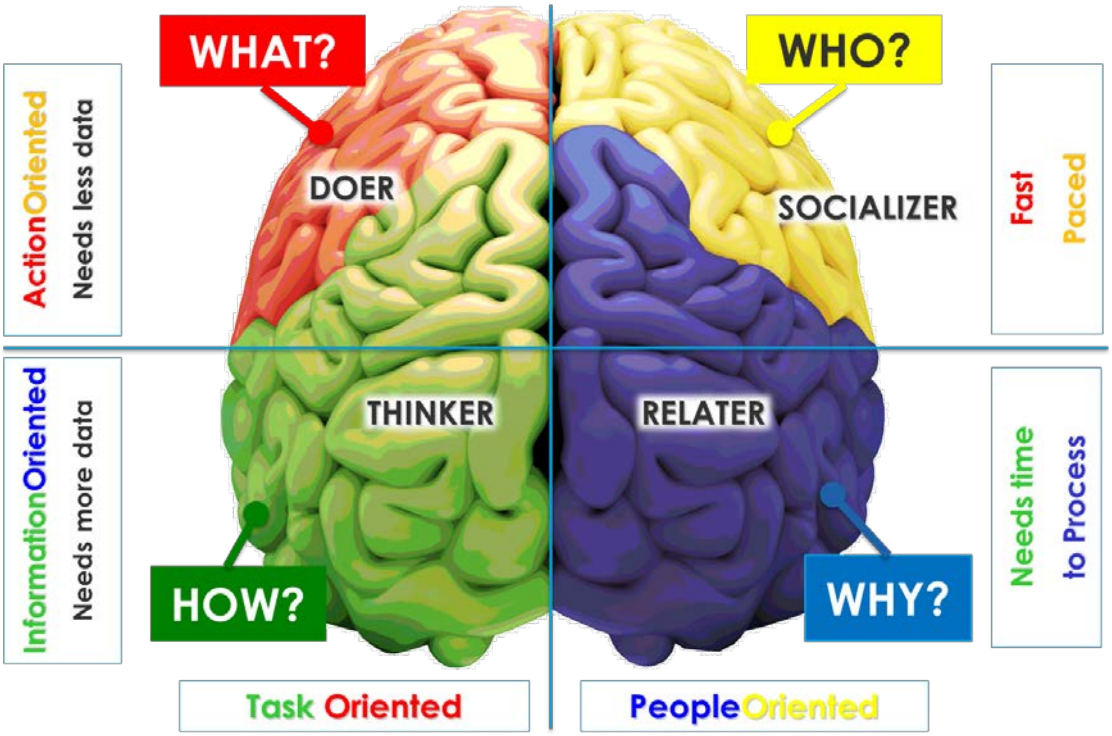

Figure 2: Overview of the four main e-colours personality types. *Reprinted from International Products e-colours & PI Pocket Book (Equilibria Inc., 2015)*

Many employees accepted and bought into the principles of e-colours and began practicing this new knowledge. The organisation has further developed tool sets and invested in skills development to ensure that colleagues with a certain colour combination are approached according to their personality type profiles. Smaller departmental group sessions were facilitated to introduce topics on how to intervene and to disrupt their own usual behaviour should such behaviour be undesired under the circumstances.

The organisation has fully adopted the principles of e-colours as the fact that it is customary for all meetings to commence with an e-colour themed Operational Excellence (OE) or

Safety Moment, has shown. A volunteer is requested to share a personal experience related to the safety topic of the day and a discussion on e-colours tendencies are intentionally integrated into the dialogue.

E-colours predict personality tendencies, but fail to take into consideration personal character which embodies personal beliefs, values, ethics, morals, commitments, moods and competencies. A tendency can be classified as a preference. A way of explaining this concept is right-handedness versus left-handedness. If your preference is your right hand it does not mean that you cannot or never use your left hand (Culp & Smith, 2001). It would simply mean that you tend to use your right hand for certain activities most of the time. Personal character influences our response to day-to-day relationships. The value generated by most personality typing processes, including e-colours, is derived from the renewed manner in which employees act with the knowledge of their own and others' personality types. This change in behaviour in most cases lead to improved team work (Varvel, Adams, Pridie & Ruiz Ulloa, 2004).

In conversation, many of the organisation's employees are of the opinion that Health, Environment and Safety (HES) metrics in project execution have improved since the inception of e-colours whilst performance in other project success factors such as cost and schedule achievement has remained unchanged. This is interesting considering that the purpose of e-colours and many other personality typing tools are to improve collaboration, cohesion and communication amongst team members and others in general. One would therefore expect to see improvement in most aspects of an individual's performance, including project execution. The question is why the implementation of e-colours has not resulted in an improvement in project success factors.

With the positive HES results since the inception of e-colours, this program will more than likely be deployed to other regions. The results of this research might influence potential deployment and/or could potentially benefit the regions where personality typing is implemented.

1.1.3 The effect of Personality Typing on Project Performance

The project managers within the T&O department had completed the PDI tool, their e-colours have been established and they have completed the various related training modules. Project managers have also demonstrated a sound knowledge of personality typing and comprehension of behaviours associated with their personality type. The project managers have started arranging e-colours training sessions for some of their project contractors, engineering consultants and other project stakeholders.

The T&O leadership team members (senior departmental managers) were in agreement that Health, Environment and Safety (HES) metrics in project execution has improved since the inception of e-colours. Evidence of this is the numerous safety accolades awarded to various project teams in recent years. Further analysis of project performance within the engineering team from 2009 to 2014 has confirmed that HES has shown steady improvement since the inception of e-colours, whilst performance in other project success factors such as cost and schedule achievement have either remained constant or decreased. Refer to Figure 3 for a graphical depiction of T&O's performance in terms of HES, schedule and budget achievement.

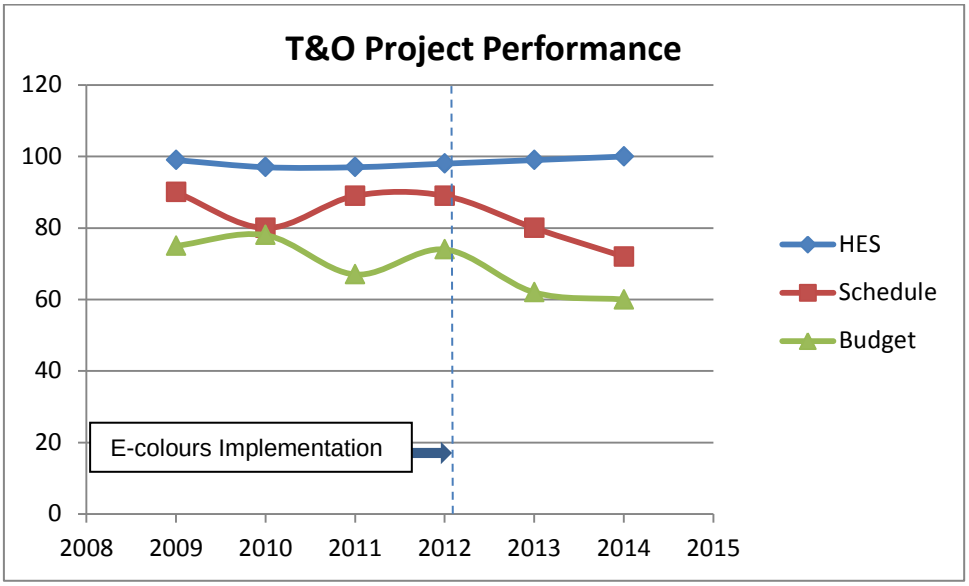

Figure 3: T&O Project Performance (2009 – 2014) *(developed from company document, 2015)*

Figure 3 displays a general upward trend in the HES metric and a general downward trend in the schedule and budget achievement metric. The data therefore does not conclusively confirm that the implementation of e-colours had an effect on the considered project success factors.

An interesting aspect when comparing both schedule and budget graphs, is that no improvement occurred in 2014, which was not anticipated. If the intention of the personality typing tool is to improve communication, collaboration and team cohesion it should be expected that these project success factors should improve as a result.

An interview with the organisation's e-colours champion has revealed that his perception and that of senior management is that the implementation of e-colours has improved the organisation's HES overall performance. They were however, unsure as to its impact on areas such as projects, manufacturing, sales, and value chain optimisation and as such were exploring how e-colours can be tailored to different areas of the business.

1.2 Summary and Research Questions

Ultimately achieving project success is the main objective of any organisation as it brings about the associated return on investment. There are various factors which influence the project manager's ability to achieve project success such as the effectiveness of the project plan, handling organisational bureaucracy and ability to do effective trouble shooting. These factors may or may not be unique to the T&O project manager in his/her context but most of these factors would require engaging stakeholders. Thus, there would be an opportunity to utilise the principles of personality typing. Establishing these factors and the potential influence that personality typing has on these factors might provide new insights on how they can be mitigated or enhanced in an effort to achieve project success. This study will therefore focus on the following research questions:

1. Which factors affect the T&O project manager's ability to achieve project success?
2. How is personality typing perceived to influence these factors?

Answering these research questions may assist the organisation in customising e-colours programs and to acquire knowledge on personality typing for future implementation within the organisation's other regions.

1.3 Outline of this dissertation

Each chapter of this dissertation is briefly described below:

In Chapter 1, the topic of the study is introduced and the case study and research questions are presented.

Chapter 2 provides a literature review of the origin and background of personality typing, the definitions of project success, the relationship between personality typing and project success and literature on factors which influence project success.

Chapter 3 outlines the qualitative research design and case study methodology. The motivation is provided for the sample size of six project managers and methods of data collection and analysis are explained.

In Chapter 4 the research findings will be presented followed by a discussion on the findings.

Chapter 5 summarises and concludes the dissertation with recommendations for further study.

CHAPTER 2: Literature Review

In this chapter, the concepts of project success, the role of the project manager and personality typing are discussed by drawing on relevant literature. These three concepts are central to the research question and this research dissertation. This chapter concludes with literature discussing which personality types are more likely to achieve project success and other factors influencing project success.

2.1 Project and Project Management Success

Central to this research dissertation is the achievement of project success. De Wit (1988) argues that in any discussion (or definition) on project success the distinction between project success and project management success needs to be made. Cooke-Davies (2002) cites De Wit's (1988) definition of project success as the achievement of the overall objective(s) of the project and project management success as the achievement of the more traditional measures of performance such as cost, time and quality. It would appear though that these terms are used interchangeably throughout the development of literature on success in terms of projects.

Measuring project success was traditionally limited to measuring time, cost and quality and referred to as the "virtuous triangle" (Ika, 2009). Using the point of view of these three authors as a foundation, various researchers subsequently have expanded on these and formulated theories on what are considered as the achievement of project success. Baker, Murphy and Fisher (1974) added client satisfaction to time, cost and quality. Bacarini (1999), Lim & Mohammed (1999), Shenhar, Levy and Dvir (1997) identified additional success criteria namely, stakeholder satisfaction and the realization of the client's strategic objectives.

De Wit (1988) believed that the most appropriate criteria for success is the project objectives. According to Dvir, Sadeh and Malach-Pines (2006), most project managers regard their job as being successful when the project has been completed on time, within budget and to specifications, but that these measures may be misleading, incomplete or narrow. The idea that project success may differ according to the assessor's or the companies' objectives, brought about the initiation of multi-dimensional frameworks for the assessment of project success (Dvir et al., 2006). Dvir et al. (2006) cite Pinto and Mantel (1990) and Freeman and Beale (1992) as these researchers developed project success criteria based on the context of their research. Ultimately even these criteria can be considered as the achievement of the overall objectives of the project.

It would appear that "A Guide to the Project Management Body of Knowledge - Fourth Edition" (PMBOK) is aligned with De Wit's (1988) definition of project success. PMBOK defines project management as the art of applying techniques, tools, skills and knowledge to project activities in order to meet project objectives (Project Management Institute, 2009). Project management is an all-encompassing undertaking requiring each project process to be aligned, synchronised and connected with the other processes (Project Management Institute, 2009). Successful project management would entail the coordination and management of these interactive processes to meet project objectives.

2.2 The role of the project manager in relation to project critical success factors

Ika (2009) referenced Pinto's and Slevin's (1988) empirical work on project critical success factors and defines a critical success factor (CSF) as "a condition, event and circumstance that contribute to project results" (p.8). Muller & Jugdev (2012) developed critical success factors based on the work by Pinto, Slevin and Prescot and defined CSFs as "Project factors, which are the elements of a project which, when influenced, increase the likelihood of success" (p.758).

Pinto and Prescott (1988) devised the following critical success factors:

- Project Mission
- Top Management Support
- Project Schedule/Plan
- Client Consultation
- Personnel
- Technical Tasks
- Client Acceptance
- Monitoring and Feedback
- Communication
- Trouble-Shooting

Table 1 below was developed using various relevant literature sources and depicts a review of these critical success factors and the project manager's role related to each of these factors. By reviewing the project manager's role it can be determined in which areas the project manager needs to be generally competent in order to achieve project success.

Secondly the critical success factors can be compared to the factors which will be developed as part of answering the research question. This will also provide insight into the influence of the T&O project manager's context on his ability to achieve project success.

Table 1: The project manager's role in the CSFs

Critical Success Factor (CSF)	Project manager's role in the CSF
Project Mission Establishing the project mission is the generation and clarification of goals and general direction (Pinto and Prescot, 1988).	The responsibility of the project manager is to ensure that the project mission functions as a "banner that must be continually flown as a rallying point for (the) project team" (Pinto and Prescot, 1988) (p. 15).

Top Management support The motivation and willingness of top management to provide the required resources, project execution authority or power and general support (Pinto and Prescot, 1988)	A major finding from research conducted by Crawford and Nahmias (2010) was that supportive leadership assisted projects in achieving their goals. During the planning stage of the project the project team need to enlist top management support to commit organisational resources (Pinto and Prescot, 1988). The Guide to the Project Management Body of Knowledge - Fourth Edition (PMBOK) states that it is the responsibility of the project manager to request management support and to influence other stakeholders in order to obtain the required project resources (Project Management Institute, 2009).
Project Schedule/Plan Prescot and Pinto (1988) define this CSF as a "detailed specification of the individual action steps required for project implementation" (p. 7)	Dvir, Raz and Shenhar (2003) stated that although the project manager is responsible for the preparation and following of the project plan, there are some that claim that too much planning can inhibit the creativity of the project team.
Client Consultation Communication, consultation, and active listening to all impacted parties (Pinto and Prescot, 1988).	Depending on how the project reporting hierarchy is arranged, it is more than likely that the project manager would liaise with a client, be it internal or external to the company. These consultative engagements are not only to acquire the client's requirements but also to keep the client continually involved (Pinto and Prescot, 1988) and thereby establishing mutual accountability for the final product.
Personnel The recruitment, selection, and training (and coaching) of the necessary staff for the project team (Pinto and Prescot, 1988).	The effectiveness of the project team largely depends on whether the project manager can guide, assist and support the team to achieve their project goals (Turner & Muller, 2005).
Technical Tasks The availability of technology and expertise to complete the tasks related to the project (Pinto and Prescot, 1988)	The project manager may (need to) seek support from specialists in procurement activities and technical disciplines (Project Management Institute, 2009).
Client Acceptance The act of "selling" the final project to its ultimate intended users (Pinto and Prescot, 1988).	As mentioned under "Client Consultation" above, it is expected of the project manager to obtain endorsement ("buy-in") of the project deliverables by to the users.
Monitoring and Feedback Comprehensive feedback related to the project is required in a timely fashion	The project manager and team needs to encourage involvement from all stakeholders when developing (or adjusting) the project management plan (Project Management Institute, 2009).

Communication A communication network is needed in order to communicate with all stakeholders. Communication also needs to be facilitated between all stakeholders.	Guidance from the PMBOK is that the project manager needs to generate a communication plan which is a result of the process of determining stakeholder informational needs and defining communication approaches (Project Management Institute, 2009). The communication plan also lists stakeholders responsible for communication activities (Project Management Institute, 2009).
Trouble-Shooting Ability to address unanticipated crises and deviations from plan.	The PMBOK recommends that the project team conducts "what-if" scenarios in order to prepare contingency and response plans to mitigate the impact of unanticipated events (Project Management Institute, 2009).

From Table 1 it is interesting to note that "communication" is a critical success factor but also a component present throughout all the CSF's. This observation suggests that high proficiency in effective communication will help the project manager to achieve success. In their research, Pinto and Prescot (1988) further reaffirms the importance of monitoring and communication for successful projects.

Muller and Turner (2010) investigated the importance of a project manager's attitude towards their project and their leadership competencies for achieving project success. These leadership competencies were evaluated in terms of emotional quotient (EQ), managerial quotient (MQ) and intellectual quotient (IQ). The research concluded that leadership competences correlate directly with project success measures, especially MQ. Attitudes correlate directly with project success. Especially the attitude towards customer and end-user satisfaction correlates with the majority of success measures.

2.3 Background on Personality Typing

2.3.1 The origin of Personality Typing

Carl Jung was regarded by many as the originator of personality typing. In the early twentieth century, Jung developed a theory of "psychological archetypes" which states that people have a specific tendency to experience the world in certain ways (Brown & Reilly, 2009). Jung called these inner tendencies, "archetypes", which originated from the Greek word, "archetupon", meaning the "prime imprinter". "Prime imprinter", for example in manuscripts, means the original, the basic form or template for later copies. According to Jung, these archetypes function whenever there are no conscious ideas present, or when those that are present are impossible. The archetypes function as unconscious tendencies that "select" contents of unimportant origin and assimilate and integrate them (Danikowski, 2001). From his observations Jung found predictable and differing patterns of behaviour among people.

Jung identified many personality types but the "Thinking", "Feeling" (Relating), "Directing" (Doer) and "Intuitive" (Socialising) types were the most dominant types and he expanded some variations of these in subsequent research (Brown & Reilly, 2009). The e-colours personality types were derived from Jung's personality types. Another interesting finding by

Jung is the presence of “shadow” personalities. These are tendencies which are not normally displayed by a person but are triggered randomly or under certain circumstances.

2.3.2 Other Personality Typing Programs

Various researchers developed personality typing models and programs based on Jung’s theories. This dissertation is concerned with personality typing and how it relates to project success. Therefore, only the Myers-Briggs Type Indicator (MBTI) and the five factor model will be discussed in some depth as project success related to these types are documented well enough in order to demonstrate how it related to project success (Section 2.3.4).

2.3.2.1 The Myers-Briggs Type Indicator (MBTI)

Katharine Cook-Briggs and Isabel Briggs-Myers were interested in Jung’s theory on personality types and believed that by understanding their personality types, women entering the workforce after the Second World War could be helped in acquiring employment. Cook-Briggs and Briggs-Myers believed that by understanding their personality tendencies, women would be in a better position to identify suitable work opportunities (Brown & Reilly, 2009). In 1962, using Jung’s research on personality archetypes, Cook-Briggs and Briggs-Myers developed the Myers-Briggs Type Indicator (MBTI).

The MBTI is a personality typing tool that describes, in scientific terms, individual preferences according to Jung’s theory (Culp & Smith, 2001). The MBTI is similar to the Personality Diversity Indicator (PDI), but whereas the PDI distinguishes between 4 main personality types, the MBTI categorizes individuals into sixteen personality types. These personality types stem from four dichotomous types: (1) Extrovert (E) versus Introvert (I); (2) Sensing (S) versus Intuitive (N); (3) Thinking (T) versus Feeling (F); and (4) Judging (J) versus Perceiving (P) (Cohen et al., 2013). All possible variations of preferences in these 4 dichotomies produce 16 different combinations emphasising which of the two poles in each of the four dichotomies dominates in a person. Therefore 16 different personality types are defined. Each personality type can be assigned a 4 letter acronym of corresponding combination of preferences. Table 2 depicts how Cook-Briggs and Briggs-Myers ultimately defined the 4 dichotomies.

Table 2: MBTI personality types adapted from Coe (1992)

Extroversion (E)	**Introversion (I)**
Personality focused on the outside world, gets its motivation from interaction with other people and by doing things.	Personality focused on the inner world, gets its motivation from thought, information, ideas, and concepts.
Sensing (S)	**Intuition (N)**
Person decides based on facts and trusts palpable current facts, figures, and details.	Person decides based on intuition, relationships, and speculations.

Thinking (T) Person decides by logic and unbiased analysis of cause and effect. Decisions try to be objective without involving feelings, as much as possible.	**Feeling (F)** Person decides with emphasis on the expected effect upon feelings of others and the self. The decision may be based on gut feeling, tries to harmonize and satisfy others.
Judging (J) Person judges quickly and takes sides or decides, wants to be part of the game—not a spectator. More organized than spontaneous.	**Perceiving (P)** Person tries to be a spectator and leave themselves all the options open as long as possible. Very slow to judge.

The primary function of the MBTI is to make the personality types as devised by Jung understandable and meaningful as well as accessible to the users. For example, an individual's personality type combination might be referred to as "ENTP" which means that the individual is classified as an extroverted-intuitive-thinking-perceiving personality. The MBTI instrument has been tested extensively for validity and reliability and has become the most widely used instrument for non-psychiatric populations. According to Bradley and Herbert (1997), it is used extensively in business.

Coe (1992) says that a common misuse of the MBTI is to use the instrument as the only manner in which to select people for jobs. Coe (1992) cautions the MBTI users against using the instrument to exclude job candidates with the perceived incorrect personality type for particular jobs.

2.3.2.2 The Five Factor Model (FFM) or "Big Five"

The Five Factor model (FFM) is not based on the theory of any one particular researcher, but rather on language, and the "natural" system that people use to understand each other (Bedingfield & Thal, 2008). The traditional concept for research with the five factor model has been to request that people, who are regarded as subjects, to classify themselves or someone else using lists of trait adjectives that can be used to describe personality. These categories to which the adjectives seem to belong to are statistically grouped. For example, if someone using a list of traits selected the term "outgoing" to describe themselves, they usually also chose terms such as "social," "gregarious," "lively," "talkative" and other similar words. These terms have all been found to group together statistically into the factor known as Extroversion (Howard & Howard, 1995).

Through this statistical grouping the FFM can be described and measured using five broad dimensions namely extroversion, agreeableness, conscientiousness (or dependability), emotional stability (neuroticism), and intellect or openness to new experience (Bedingfield & Thal, 2008). Table 3 represents and overview of the FFM's different domains and sub-factors.

Table 3: Overview of the Five Factor Model. *Reprinted from Bedingfield and Thal, 2008*

The Five Factor Model			
Domains	**Sub-factors**	**Domains**	**Sub-factors**
Extroversion	Warmth Gregariousness Assertiveness Activity Excitement Seeking Positive Emotions	**Openness**	Fantasy Aesthetics Feelings Actions Ideas Values
Agreeableness	Trust Straightforwardness Altruism Compliance Modesty Tender-Mindedness	**Neuroticism**	Anxiety Angry Hostility Depression Self-Consciousness Impulsiveness Vulnerability
Conscientiousness	Competence Order Dutifulness Achievement Striving Self-Discipline Deliberation		

The “Extroversion” domain is compatible with the yellow e-colour (the socialiser) whilst the “Agreeableness” and “Conscientiousness” domains have elements which are compatible with the red e-colour (director/doer). The “Openness” domain includes elements from the yellow and blue e-colour (relator) as these E-colours are people orientated as opposed to task orientated.

2.3.2.3 Personality Typing based on Jung’s Four Main Types

Various researchers utilised the foundation laid by Jung to further develop the four main personality types. Although these researchers developed different naming conventions in order to contextualize the usage of personality types in their studies, the personality types are essentially based on Jung’s research. Refer to Table 4 for a summary of various researchers’ personality types compared to that of Jung’s. For further comparative purposes the corresponding e-colours description was added to Table 4.

Table 4: Other researcher personality types compared to Jung and E-colours

Sources	Personality Types			
Jung (1921)	Thinker	Feeler	Director	Intuitive
Myers & Briggs Myers	Introverted Thinker	Introverted Feeler	Extroverted Thinker	Extroverted Feeler
Merril and Reid (1981)	Analytical	Amiable	Driver	Expressive
Drucker (1995)	Thought Man	People Man	Action Man	Front Man
Alessandra and O'Connor (1998)	Thinker	Relator	Director	Socialiser
e-colours (Equilibria Inc., 2015)	Thinker (Green)	Relator (Blue)	Doer (Red)	Socialiser (Yellow)

2.3.3 Advantages and Disadvantages of Personality Typing Programs

Most of the various personality typing programs have similar objectives which bring about similar advantages and disadvantages. The general objective of personality typing is to provide a summary of aspects of personality which increases self-understanding and understanding of others. Another objective is to assist people in valuing others of a personality type different to theirs. A third objective is to highlight areas of personal development (Varvel, et al., 2004).

The achievement of these objectives is highly dependent on the effectiveness of various interdependent components needed for implementation. For example, an ineffective facilitator may conduct the personality assessment poorly leading to inaccurate or incorrect results. Consequently the results which determine dominant personality types may be skewed.

The most important theory from most personality typing programs is that there is no right or wrong preferences or personality types (Varvel, et al., 2004) and that every person uses all four main types at one time or another.

There are advantageous and disadvantages brought about by the need to use personality typing in certain situations. The advantages and disadvantages discussed below are the most important in the context of this dissertation.

2.3.3.1 Teamwork

According to Culp and Smith (2001), understanding individual preferences may identify potential shortcomings on a project team and may show the value of team diversity. This knowledge may also help the team to understand which situations will energise an individual and which situations will cause stress. However, it is important to note that although personality does play a role in team performance, it cannot predict the performance or effectiveness of a team (Varvel, et al., 2004). Instead, the individual knowledge and understanding of personality preferences can help to improve communication skills, trust, interdependence (of team members) and collaboration.

Personality typing knowledge is specifically useful when interacting with various stakeholders, but the nature of the team's purpose is an important consideration. For example, diversity is generally preferred in terms of team composition but say a team of software code checkers' purpose is to ensure that the code is correct, with little or no interaction or involvement with each other, knowledge of each other's personality types are less useful.

2.3.3.2 Leading and the Team

According to Coe (1992) knowledge of the team's personality preferences has improved personnel management in the following ways: "identifying leadership styles; training employees to work better with each other; resolving employee conflicts; and forming work teams that best complement each other" (p. 4).

2.3.3.3 Predicting behaviour

A specific problem with predicting behaviour is that the allocated personality type itself is unreliable in that people may not behave in accordance with the theorised strengths and shortcomings due to other factors. For example, Levi (2012) wrote about how his personality profile shows there is very little that compels him to want to be in front of people facilitating lectures, workshops and seminars and presenting to an audience in general. Yet, he has facilitated many workshops, keynote speeches and training seminars with great success. He tells that his objective in all situations is to achieve success which is fuelled by a desire to learn and share what he has learnt. This recount further suggests that personality type is a preference and can be overcome by a desire or objective which is deemed important enough to disregard one's own preferences.

2.3.3.4 Limitations of Personality Type Indicators

A disadvantage of the MBTI and other personality type indicators, including the PDI, is that it may not be very reliable.

Most personality typing indicators are self-reporting studies. A self-report study is a type of examination, assessment, evaluation, in which respondents read the question and select a response by themselves without human interference. As the questions are essentially constructed by a human, the question's structure or content may affect whether the reported information accurately measures the phenomena under review (McDonald, 2008).

According to Schwarz (1999), "self-reports are a fallible source of data, and minor changes in question wording, question format, or question context can result in major changes in the obtained results" (p. 93).

Self-reports also have the risk of 'response biases', which according to Paulhus (1991), involve "a systematic tendency to respond to a range of questionnaire items on some basis other than the specific item content" (p.17). For example, people often answer a question in such a way that presents them in a more favourable light, even if these responses are not a true reflection of how they actually think or behave (McDonald, 2008).

Another related concern regarding credibility of respondents is the theory that people respond more positively because we have a distorted outlook about ourselves (John &

Robins, 1994). In this view, it is the self-perceptions that incite the biased responses in the individual.

2.3.3.5 Common misuse of Personality Type Indicators

Some personality typing indicators such as the MBTI is sometimes misused because it is poorly understood. Many people using the MBTI do not sufficiently understand its limitations and its possible pitfalls, one of which is to unfairly stereotype people, thereby negatively affecting both morale and productivity. A common misuse of the MBTI is to use the instrument as the only manner in which to select people for jobs (Coe, 1992). Consequently, a candidate for a job might not be considered because compared to theory, his or her personality type may not be suitable for the project type.

2.3.4 Personality Types that are more likely to achieve project success

According to Turner & Müller (2005), nominating a project manager with a personality profile that matches the project he or she will be heading, is one of the most influential decisions for the success of a project.

Various other researchers have produced literature which theorised matches between personality type and project success in specific contexts. Appendix F depicts, i) the researcher(s) which conducted the study, ii) the associated theory on which personality typing are more likely to achieve project success and iii) the research context, reliability and rationale.

Table 5 has been generated in order to summarise the literature in Appendix F on personality types which are more likely to achieve project success and to correlate these to e-colour personality type characteristics.

Table 5: Summary of research on personality types which are more likely to achieve project success

Source	Personality Type	Correlated E-Colour
Cohen et. Al. (2013)	Sensing	Blue
Cohen et. Al. (2013)	Feeling	Yellow
Bedingfield & Thal (2008)	Conscientiousness	Green
Bedingfield & Thal (2008)	Openness	Yellow
Thomas (2006)	Feeling	Blue
Thomas (2006)	Intuitive	Yellow
Malach-Pines et al. (2009)	Openness	Yellow
Malach-Pines et al. (2009)	Risk Taking	Red
Malach-Pines et al. (2009)	Investigative	Green
Malach-Pines et al. (2009)	Enterprising	*
Malach-Pines et al. (2009)	Inventive	*

*Could not be correlated to only one e-colour

Table 5 suggest that the e-colour personality type more likely to achieve project success is yellow which is the socialiser personality type.

Based on the results above, Table 6 depicts which comparative personality type is more likely to achieve project success.

Table 6: Personality type more likely to achieve project success

Sources	Personality Types			
Jung (1921)	Thinker	Feeler	Director	Intuitive
Myers and Briggs	Introverted Thinker	Introverted Feeler	Extroverted Thinker	Extroverted Feeler
Merril and Reid (1981)	Analytical	Amiable	Driver	Expressive
Drucker (1995)	Thought Man	People Man	Action Man	Front Man
Alessandra and O'Connor (1998)	Thinker	Relator	Director	Socialiser
e-Colours (Equilibria Inc., 2015)	Thinker (Green)	Relator (Blue)	Doer (Red)	Socialiser (Yellow)

This is interesting as it is widely accepted that engineers would typically fall within the "Thinker" and "Doer" groups. In the paper entitled "Beyond Technicalities: Expanding Engineering Thinking", Beder (1999) emphasises the need and common trend where engineers are required to move away from traditional methods and venture into the realms of the "softer approach". Beder (1999) defines the "softer approach" as a broader more general approach considering not only basic engineering principles but also taking into account the social context in which they work. This approach is more commonly compatible with the socialiser personality type which is typically concerned with people's feelings. Companies are requiring more from their engineering employees than technical competence. The need is for engineers to be skilled in conducting critical analysis, to exercise ethical judgment and to assess the long-term consequences of their work (Beder, 1999).

In 1996, Australia's Taskforce on Educational Programs identified the following skills that an engineer will need in the year 2010, in addition to those already provided by a customary engineering education:

• Have effective communication skills

• Provide leadership beyond the technology

• Be more creative and innovative

• Be continuous learners and more flexible in new learning situations

• Be effective managers of people and systems

• Be accountable for the results of their decisions

• Partner and collaborate within their own profession and across professions (Johnson, 1996)

The results from the exercise to correlate the e-colour with the personality type most likely to achieve project success have been supported by Beder (1999) and Johnson (1996). In essence it would suggest that project managers with a socialising personality are more likely to achieve project success.

2.4 Organisational and external factors affecting project success

As mentioned previously, personality typing is not the only consideration for project success as there are many factors which may affect project success. Section 2.2 discussed critical success factors as it relates to the competencies of the project manager. Section 2.4 will discuss the effect of the organisation and factors which are deemed beyond the control or influence of the project manager (external factors). Only the most pertinent factors, critical to this research, will be discussed.

2.4.1 The effect of the organisation

A major finding from Crawford's and Nahmias's (2010) research on change management competencies is that organisational factors such as leadership support and a supportive culture assisted with the achievement of project objectives. Pinto and Prescott (1988) researched success factors and the applicability of these success factors over different stages of the project lifecycle. In this context, success factors are defined as project factors which, when influenced, increase the likelihood of project success. Critical success factors such as "Top Management Support", "Client Consultation", "Personnel (Selection and Recruitment)" and "Communication" are either related or influenced by the organisation.

The organisation in this case study has established project management processes and procedures to which all project managers have to comply with. Literature on these processes and procedures were obtained from the organisation's documents.

2.4.1.1 Management of Change (MOC) Process

The MOC process is initiated when the project has been approved through the organisation's various levels of management. The project manager initiates the MOC and coordinates and manages various activities to i) prepare the organisation for the change; ii) solicit and appoint MOC Team members and iii) coordinate and manage the MOC team to complete all the deliverables as determined by the MOC Team's risk assessment. As discussed in Section 1.1 the MOC Team may or may not from part of the project team. A typical example of how the organisation is prepared for the change might entail awareness and/or operational training sessions on new equipment. MOC deliverables usually entails stakeholder activities such as "Pre-startup Safety Reviews (PSSR)" and "Operational Readiness Reviews". The overall intent of the MOC process is to nullify or to mitigate all identified HES risks which can be caused by the project or which could affect the project (company document, 2015).

2.4.1.2 Project Development and Execution Process (PDEP)

The organisation's project management process, Project Development and Execution Process (PDEP), follows the lines of traditional project lifecycle formats but provides tools and milestone checks in a phased approach. The phases are i) identify and assess opportunities, ii) generate and select alternatives, iii) develop preferred alternative, iv) execute and v) operate and evaluate (company document, 2015)

The PDEP process is designed to achieve certain deliverables after every phase prior to advancing to the next phase of the project lifecycle. A Decision Review Board (DRB) is appointed as a committee to review, verify and validate the project deliverables and who provides approval to proceed to the next phase. Currently there is no formal manner in which critical success factors are assigned to projects nor is there a scientific manner in which critical success factors are assessed in order to ascertain the likelihood of achieving project success at the milestone of changing phases. The DRB's decision is based on the individual board member's feeling of comfort that adequate attention has been given to risk consideration. Risk is mostly perceived in a negative manner and an overemphasis on HES considerations may lead to procrastination and approval delays. This leads to delays and extensions of the project lifecycle and might even lead to a despondent project manager and/or project team. There is DRB oversight throughout the project lifecycle but this oversight is more intense in the phases preceding the execution phase.

The execution phase entails the actual start of project work on the project site. During this phase the project manager manages resources such as the project team, engineers, contractors and suppliers. The project manager also collaborates and provides progress reports to various stakeholders such as the DRB, the client(s) and operational representatives of the facility where the project is executed.

2.4.1.3 Other processes, procedures and policies

The organisation has various other processes in place predominantly to safeguard the organisation against HES related risks. The project manager needs to ensure that the project complies with these processes.

The organisation's Contractor Health, Environment and Safety Management (CHESM) process is a process which entails i) the selection of contractors on the organisation's procurement database and ii) safety review events such as auditing the contractor's safety systems on a periodic basis. If available contractors have poor safety ratings emanating from these reviews, they may not be selected for project execution leading to a delay in the project lifecycle. Safety reviews are also conducted during project execution and in more extreme cases a serious finding can result in a contractor being ejected from the project.

The organisation has a process called Managing Safe Work Practices (MSWP) which entails the selection and identification of contractor supervisors which have been accredited with the organisations safe work practices. The process stipulates that a contractor may not perform high risk activities if the contractor cannot make accredited supervision available for the activity. Activities such as working at heights (working above 1.3 m ground level), hot work (welding, grinding, flame cutting etc.), working in confined spaces and excavations are classified as high risk activities. These high risk activities have their own set of procedures which has to be complied with such as work permits, risk assessments, method statements, emergency plans, safety inspections, etc.

The organisation's "stop-work-authority (SWA)" policy empowers any individual to stop any project activity where he/she perceives such an activity as presenting an HES risk. The organisation's philosophy is that all individuals within the organisation as well as its contractors and service providers are exposed to hazards and should address the hazard proactively by asking questions or stopping the activity.

2.4.2 External Factors

External factors are defined as events which may affect project execution which is beyond the project manager's control or influence. External factors which are normally associated with construction projects such as inclement weather, industrial action (strikes, go slow, down tools, etc.), global/local raw material supply challenges and skills shortages affect project execution within T&O.

An external factor in the organisation's realm of influence is that of operational requirements. Keeping in mind that these projects are within live fuel depots, hot work project activities may not be done whilst the fuel depot is receiving fuel into large above-ground storage tanks. Project staff also has to abide by depot operations' fire drills and safety meetings. More importantly, no contractor may conduct work on site without a work permit being issued by the depot for the specific work activity in the specific area. This might lead to delays as the project may not be a priority to the individual issuing the work permits.

2.5 Conceptual Framework

The theories, philosophies and views accumulated about the factors which influence project success and the effect of personality typing are graphically depicted in figure 4. Figure 4 is an integrated representation to serve as a conceptual framework for this study. This is followed by a discussion on the links as established in the preceding chapters.

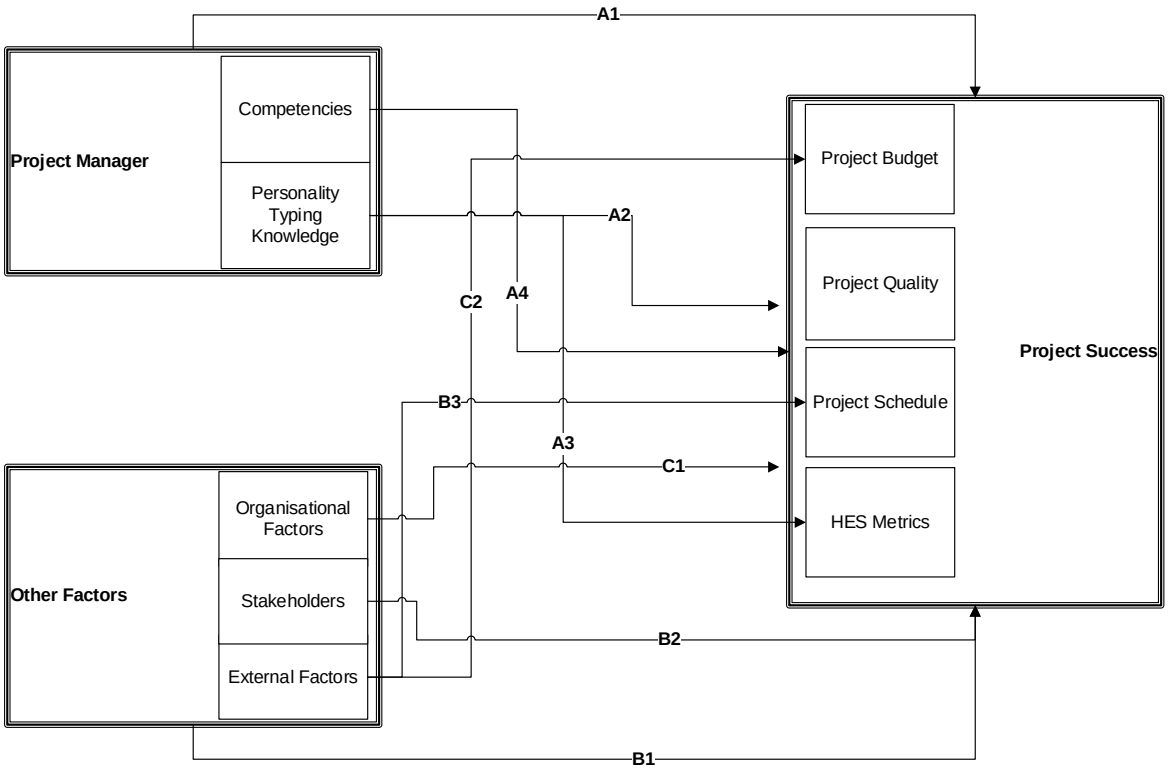

Figure 4: Conceptual Model

Link A1:

All sources consulted concurs that the project manager affects project success. In essence a project manager is appointed in order to execute the project. In Section 2.4 it was discussed that a socialiser personality type is more likely to achieve project success. The personality

type of the project manager, his knowledge thereof and his managerial competencies form part of the project manager's make-up holistically.

Link A2:

No literature which explicitly states that personality typing knowledge improves the likelihood of achieving project success, could be found. Personality typing knowledge in itself, when utilised and applied correctly can affect project success. Personality typing generally leads to improved stakeholder collaboration, which is essential for project success, especially in the context of this organisation. The project managers have to engage and work with many stakeholders in executing the project.

Link A3:

Since the inception of personality typing within the organisation, HES project metrics have shown steady improvement. The notion of the T&O leadership team is that personality typing has positively affected HES metrics in the T&O department.

Link A4:

In Section 2.2 it was made apparent that the project manager is required to have certain competencies to positively affect various factors in order to achieve project success.

Link B2:

Clients, which are project stakeholders, need to be satisfied for a project to be regarded as successful. Throughout Chapters 1 and 2 the importance of collaborating with stakeholders were emphasised consistently. PMBOK concurs that the project manager must influence various stakeholders to "ensure" a successful outcome of the project (Project Management Institute, 2009).

Stakeholders can affect the HES metrics unintentionally through negligence. It is unrealistic to expect that the project manager is in control of the mind-set of each and every worker on the project. An incident may or may not be directly attributed to the project manager's skills, competencies or the personality type.

Links B3 & C2:

In Section 2.4.2 it was discussed that external factors can delay the project and project delays usually result in an increase in cost. External factors can influence project success irrespective of the effectiveness of the organisation or the project manager. For example, the project may suffer a material shortage despite the project manager's effective planning or the organisation's buying power.

Links C1:

In Section 2.4.1 it was established that the organisation has various processes and procedures which should be complied with. Non-compliance to these processes and procedures may result in an audit finding and in more extreme cases a project might have to be recycled in order to comply. For example, the project management system, PDEP, needs to be followed strictly and progressing through the various phases of the project lifecycle requires leadership (or DRB) approval. This may lead to delays and extensions of the project

lifecycle and in many cases might even lead to a despondent project manager and/or project team.

In summary, the conceptual framework has highlighted what is known about personality typing and factors which influence the project manager's ability to achieve project success.

2.6 Conclusion

E-colours and other personality typing programs such as the MBTI are based on Jung's theories of personality typing. Various researchers utilised the foundation laid by Jung to further develop the four main personality types appropriate to the context.

An individual's personality type is a subconscious preference which becomes clearly visible and noticeable in the behaviour of the individual. Although generally reliable, a person's personality type is not always consistent but rather predominant and a personality can be assumed by an individual depending on the circumstances.

Personality typing programs hold disadvantages ranging from ineffectiveness due to poor implementation, to misuse and misinterpretation of the assessment results. Advantages such as understanding one's self and others generally lead to improved collaboration within the project team and with stakeholders. This improvement would logically increase the likelihood of achieving project success.

Project success can be defined in many ways, but would include the achievement of the required quality, project budget and the project schedule most of the times. However project success is defined in terms of what the organisation considers as project success. For example, the achievement of HES objectives is not considered part of the traditional definitions, but is the most important project metric for the organisation in this context.

Literature relevant and applicable to this research dissertation suggests that the socialiser personality type is more likely to achieve project success. This notion appears to be supported indirectly by researchers who advocate the need for engineers to acquire and develop "softer" skills.

A review was conducted on factors which when influenced, positively increase the likelihood of project success. These are referred to as critical success factors and the project manager (and his personality) plays a role in all these factors. Besides these factors, there are also organisational and external factors which can influence project success.

CHAPTER 3: Research Methodology and Methods

The design of this research study is guided by Maxwell's (2013) qualitative research design. Maxwell (2013) describes the qualitative research design as addressing a set of concerns that includes research goals, conceptual framework, research questions, methods and validity. While these research components such as the research goals, conceptual framework and research questions are dealt with in earlier chapters, this chapter provides the justification for the choice of qualitative research design and focuses on the methodology and methods used to answer the research questions. Ethical considerations for this research study and issues of validity and trustworthiness are also discussed.

3.1 Research Design

Qualitative research was selected as the research approach because in order to answer the research question, people's experiences or perceptions will be used as data and the nature of the variables or social phenomena investigated in this research study can best be understood through qualitative means (Morgan & Smircich, 1980).

The research questions require the uncovering of important constructs, variables and relationships which may affect the ability of the project manager to succeed. Qualitative research provides rich descriptions which may not be obtained through quantitative means (Partington, 2002). There are variables in this dissertation which could be assessed in a quantitative manner but assessing any variable in isolation would not add any value to this dissertation. For example, from literature it has been established that a yellow personality type is more likely to achieve project success. The conceptual framework (figure 4) has shown that whether the project manager's personality type is yellow or not, is of little consequence. The T&O project manager interacts with various variables such as inclement weather, changes in leadership, industrial strikes, etc. Understanding these variables and their relationships with one another will provide insight into information which can be utilised to the benefit of the organisation. Therefore, these beliefs, perceptions and subsequently formulated variables, will ultimately be unravelled through qualitative system dynamics modelling.

Maxwell (2013) believed that a good qualitative design, where the research components work together, promotes efficient and successful functioning. Figure 5 displays Maxwell's (2013) qualitative interactive research design model including the detail related to this dissertation. This will be followed by examples which demonstrate the appropriateness of this model for this dissertation.

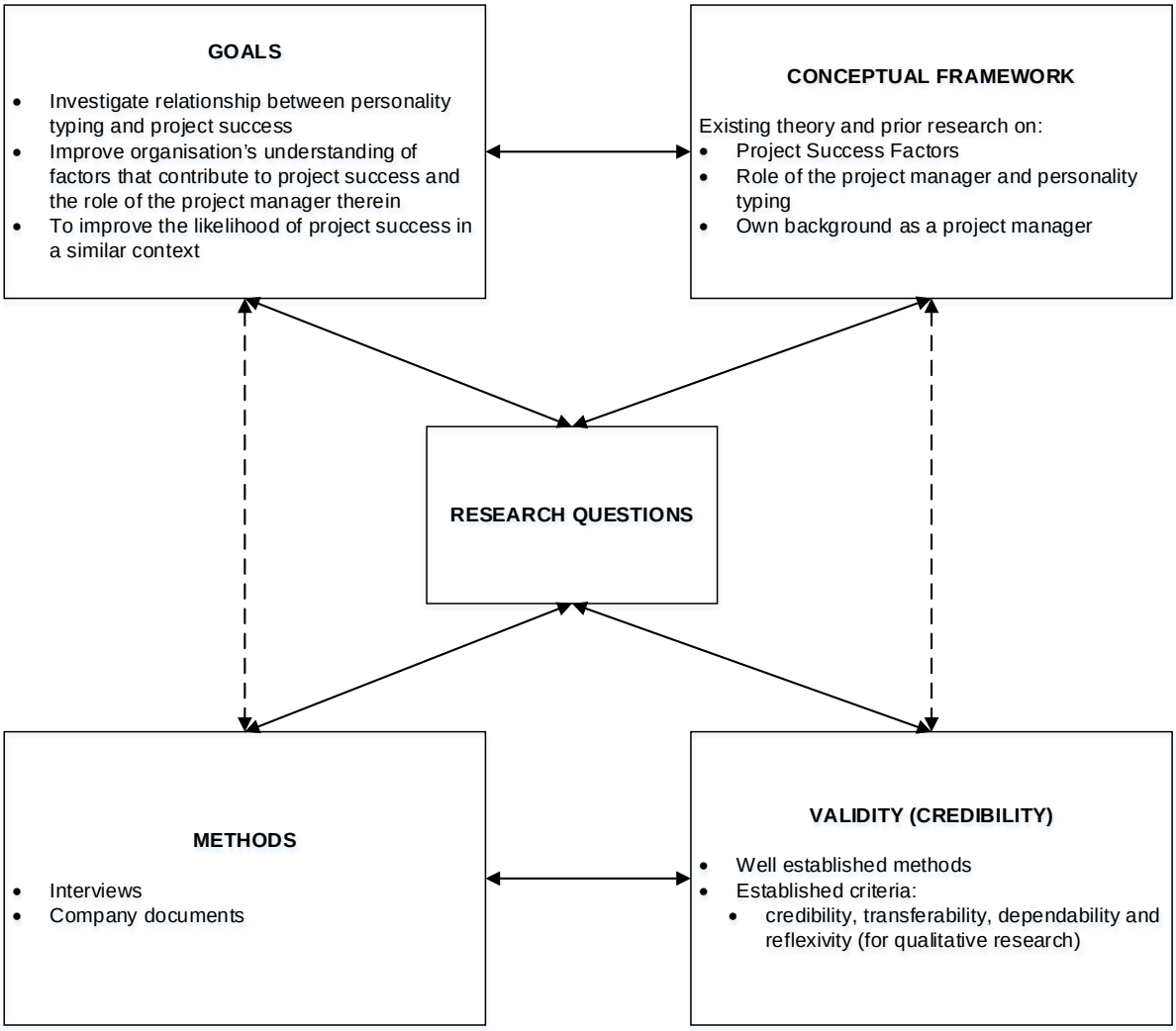

Figure 5: Research design adapted from Maxwell's interactive research design model (2013)

Relationship between research goals and the Conceptual framework

As indicated in Figure 5, the goals of this study includes the investigation of the relationship between personality typing and project success and the improvement of the organisation's understanding of factors that contribute to project success and the role of the project manager therein. Therefore, it is important to establish through literature sources what prior research has been done on project success; project management success; how organisations draw on personality typing to influence project success; and how these are understood in the case organisation.

Linking the Conceptual framework to the Research Questions

The organisation's project success metrics (besides HES) did not improve after the personality typing was implemented, which raised the questions why this is the case and whether personality typing had any influence. This led to the research questions that were formulated.

The relationship between research goals and methods

As indicated earlier, the research goals include the understanding of phenomena in a social setting for which qualitative methods were chosen. In addition, one of the goals is to potentially utilise the findings of this research to improve the likelihood of project success in a similar context. Interviewing was therefore the preferred method to obtain insights from the project managers who are currently in the situation.

Linking Methods with Validity

Through the use of qualitative interviews and company documents, the method provides rich, thick contextual descriptions intended to aid transferability to other contexts. Methods must be of such a nature that it makes it easy to validate, especially in the case of qualitative research. Therefore interview transcripts were developed and the research methods and quality of data were compared to criteria developed by Borrego, Douglas and Amelink (2009).

Linking the Research Questions to the Research Methods and Validity

The research questions will inform which research methods to utilise and determines which research validity criteria is appropriate.

Maxwell's (2013) model helps to make the design explicit where its strengths and limitations can be understood and indicates the iterative process of research.

3.2 Research Methodology: Case Study Method

Yin (2014) is one of the best known advocates of case study methodology and defines a case in "case study method" as an event, an entity, an individual or even a single unit of analysis. Case study methodology is an empirical investigation into current phenomenon within its real life system. Yin (2013) further emphasises that case studies should have clear research designs. The research design should cover the main research questions, definitions, parameters or units of the variables and links between the variables.

As cited by Noor (2008), Anderson and Anderson (1998) see case studies as "being concerned with how and why things happen, allowing the investigation of contextual realities and the differences between what was planned and what actually occurred" (p. 1602). Case study focuses on a particular issue, feature or unit of analysis and is not intended as a study of the entire organization (Noor, 2008).

Easton (2010) defines case study research as involving the investigation of one or a small number of social entities or situations and developing a holistic description through an iterative research process.

The case in this research dissertation is the experiences of the T&O project managers and their agency in establishing the factors which affects their ability to achieve project success and the effect of personality typing. The case study method was selected for this dissertation because it provides an opportunity to investigate the phenomenon in its real life context. Understanding the phenomena in its context is very helpful in implementing any recommendations in this and other similar contexts. Baxter and Jack (2008) explain that exploratory case study research is suitable to explore cases in which "the intervention being

evaluated has no clear, single set of outcomes" (p. 548). They also found that exploratory case study research, as defined by Yin (2014), can be useful to study an organisation's business processes (Baxter & Jack, 2008).

Yin (2014) states that there are three types of case study research namely exploratory, descriptive, and explanatory. The selection of these three types is based on specific conditions, one of which is the type of research question(s). If the research question focuses mainly on a "what" type question, either of two possibilities may apply. Firstly, some types of "what" questions are exploratory, the goal being to develop hypotheses and propositions for further study. The second type of "what" question is actually a form of "how many" or a "how much" area of enquiry, the goal being descriptive. In contrast, "how" and "why" questions are more explanatory (Yin, 2014).

The research questions in this dissertation involve both a "what" (which) and a "how" type question and this case study therefore employs both an exploratory and explanatory line of enquiry.

3.3 Research Methods

In this section the theories and approach to sampling and data collection and analysis will be discussed.

In terms of data collection, specifically interviewing, Yin (2014) emphasises the importance of interviews as a source of evidence for case studies. Yin's (2014) guidance is generally aligned with that of Easterby-Smith, Thorpe and Jackson (2012). Easterby-Smith et al. (2012) advise that interviewing is the main method to discover the perceptions of organisational members and highlights the importance of interview preparation, the skills of the interviewer, using laddering techniques and addressing interviewer bias.

If the intention is to "explain a phenomenon", Yin (2014) recommends stipulating a presumed set of causal links about it (p. 147). These links will be discussed in chapter 4 of this dissertation. Baxter and Jack (2008) cite Yin (2003) and advise that an explanatory case study would typically involve the explanation of presumed causal links in real-life interventions that are too complex for surveying or experimental strategies. The research data will therefore be coded (and decoded) culminating into a causal loop diagram which compares the presumed links with the links emanating from the data.

3.3.1 Sampling

Purposive sampling is a commonly used sampling technique where the researcher selects the most "productive" sample to provide potential answers to the research questions (Marshall, 1996). Marshall (1996) considers purposive sampling as "intellectual" compared to other sampling strategies as it requires the researcher's practical knowledge of the research area.

The purposive sampling strategy was used as the research questions require investigation into project management within the T&O department. The researcher was therefore directed to select participants on specific eligibility criteria in order to acquire a wide range of views.

The first requirement was that the participants were current project managers within the T&O department as these project managers had experience appropriate for the research questions and objectives. Participants were also selected so that the sample included variety in terms of age and years of experience, and coastal and inland located projects.

The aim was to establish the influence of personality typing on experienced individuals who may have developed tried and tested project management techniques as opposed to a relatively inexperienced individual who largely relies on project management techniques acquired through formal training.

Lastly, the sample included project managers managing projects in both the coastal as well as the inland areas. As presented in Appendix B, projects are executed across both coastal and inland locations and although these projects are similar there are nuances between these locations. For example, coastal depot bulk fuel receipts typically take longer than inland pipeline receipts. This means that the delay in project work at coastal depots during pipeline receipts would be longer. Another example is that it is common that more maintenance type projects are executed at coastal depots purely because the corrosion rates of static equipment such as bulk storage tanks and pipelines are normally higher in coastal locations.

This produced data from a group with a wide range of demographics from an age, experience and area of work perspective. Table 7 contains the biographical data of the participants.

Table 7: Biographical data of the participants

Project manager	**PM1**	**PM2**	**PM3**	**PM4**	**PM5**	**PM6**
E-colours	Green Blue	Green Red	Green Red	Red Green	Green Blue	Green Red
Age (years)	60	47	52	36	62	32
Project Management Experience (years)	21	2	16	3	14	5

It is interesting to note that all of the T&O project managers have a dominant green personality type and that the second most common e-colour is red.

3.3.2 Data collection

3.3.2.1 Theory on data collection

Easterby-Smith, Thorpe and Jackson (2012) advise that in-depth interviewing is the main method of data collection to discover the views, perceptions and opinions of individuals through the language they use. Interviews with the project managers were therefore the primary source of data.

Semi-structured interviews were selected because the researcher has some unavoidable presuppositions on the research topics naturally produced through literature review and observations. Secondly, as project managers were part of different projects, semi structured

interviews were preferred to structured or unstructured interviewing as the research questions require further exploration of a certain line of questioning, whilst other lines of inquiry needed to be abandoned (Easterby-Smith et al., 2012).

3.3.2.2 Steps to collect data

Step 1: Establishing contact with the participants

The participants were contacted and an overview of the study was provided during the discussion. Participants were requested to indicate their consent to participate. Limited information about the research study was provided in this overview so as not to influence the perceptions of the participants prior to the interview. Thereafter date and time of interviews were agreed upon and scheduled.

Step 2: Establishing interview questions

The interview questions were developed from the preliminary conceptual framework and the researcher's interest and experience of working in a project environment. For example, it was established that stakeholders affect project success. Questions two (Q2) and four (Q4) (see the full list of interview questions in Appendix G) respectively ask, "Describe your relationships with stakeholders before and after the implementation of E-colours" and "Which factors influence your ability to achieve project success?"

Short, open-ended questions were developed in order to, not only obtain insights but also to develop possible answers to the research question and to establish what the underlying mechanisms are which could potentially explain T&O's project metrics.

The questions were also structured in such a manner as to not make the answer obvious in order to reduce bias.

Step 3: Conducting the interviews

Each interviewee was given the opportunity to refuse to answer any particular question or to refuse participating altogether. This helped to ensure that the data collection only involved those that are truly willing to participate. Interviewees were encouraged to be frank and assured that there are no right or wrong answers. They were also assured of confidentiality and encouraged to talk freely about their experiences, thoughts and feelings.

Interviews were conducted with each of the six project managers. The duration of the interview were agreed upon with the project managers. The organisation's policies on data privacy did not allow for the audio recording of interviews and transcripts were generated through taking notes during and after the interview. The project managers reviewed their interview scripts for correctness upon conclusion of the interview.

Transcripts were marked with the date and time of interview and the interviewed project manager code (e.g. PM1).

3.3.3 Data Analysis

The data was analysed through qualitative data analysis using the compare and contrast principles of grounded theory. Grounded theory (Corbin & Strauss, 1998) describes a procedure of coding textual materials (e.g. a more inductive open coding process and a

more deductive axial coding process) and defining the codes with memos. The aim is to come to a theoretical model by means of an explorative process.

The transcripts were analysed separately and meaningful fragments, concepts and ultimately codes were developed through iterative comparing and contrasting of the data, the fragments, concepts and codes. These codes were grouped and categories developed. Then, the relationships between these categories were reviewed to i) establish the driver or core category and ii) to review the effect of personality typing. Figure 6 shows the coding process of the interview scripts followed by discussions on each step of the analysis.

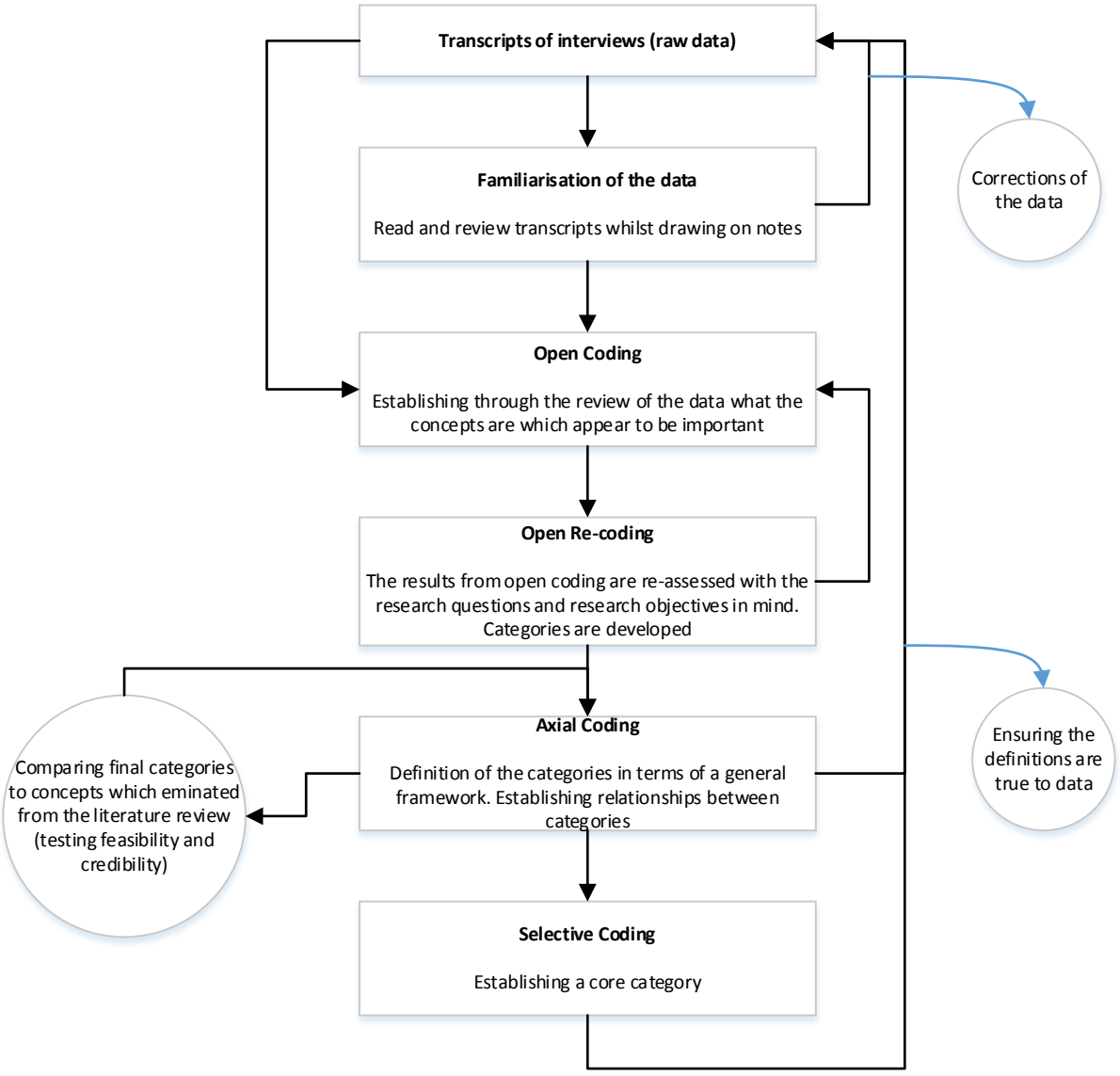

Figure 6: Coding process of interview scripts

3.3.3.1 Familiarisation of the data

The transcripts were read and re-read separately to understand the data holistically and to establish in general what is occurring. The data was corrected to be grammatically correct and to ensure the essence of the data was not lost. A research journal was started in which the researcher's thoughts pertaining to the data was captured.

3.3.3.2 Open coding

The transcripts were transferred using Microsoft Excel in order to organise the data logically. Thereafter the data was reviewed and the process of compare and contrast supported by memos saw key concepts or codes emerge. Table 8 is a sample of the open coding of a transcript with memo notes.

Table 8: Sample of open coding

Transcript:		PM3
Question 1	**Open Code**	**memo**
How have the implementation of E-colors affected you? It made me understand all personality types, and how to approach people differently. My e-colours are green-red and I'm a thinker and I look to think before I do, but I want to get things done. I'm a logical person and sometimes I over analyse. The problem is that people hide behind e-colours, because if he does not have a dominant red colours he says that he does things slower or not at all. In the old days the name of the game was performance and using time efficiently with great accuracy. I remember when I was a youngster, one of our managers use to say quite often "I don't care about how you are, how is the project?". Times have changed. I also use e-colours for my family - it helped me to understand my family. What concerns me though is the hiding behind e-colours. If you are maybe blue you cannot say that 1 + 1 does not equal 2 because you're not a logical thinker like a green!	Understanding all personality type Hiding behind e-colours Inappropriate use of e-colours? Understanding others	Note: everybody has all e-colours your type is merely your most dominant e-colours e-colours can be/is used as a tool to neglect certain or all aspects of your duties.

Codes were grouped in categories through the comparison of codes across the transcripts. To check the appropriateness of the categories, the categories were tested against the data by individual transcripts to verify that it is a true reflection of the data. This was an iterative process in order to formulate category names which are meaningful and representative of the transcripts. Refer to Appendix H for the open coded transcripts of all the project managers.

3.3.3.3 Axial Coding

The final categories were established with the supporting extracts from the data and memo notes. Table 9 is a snap shot on a formulated category with the supporting extracts and research journal notes. Refer to Appendix I for all of the formulated categories. Thereafter the relationships between categories are established.

Table 9: Example of formulated category with transcripts, codes and research journal extracts

Category	Extracts from transcripts and memo note
Organisational Policies and Procedures	Operational Requirements
	Project Management processes and Procedures Red tape, burocracy TIME CONSUMING
	Refinery . Other priorities which are more important such as running the refinery
	Procurement processes and procedures early payment is needed sometimes to keep the contractor going
	orders needs to be placed and approved is their weaknesses in the ariba or RFP process
	Requirement to spend CAPE secondary to project plan
	Contractor selection
	Leadership support? Internal politics
	Change Management this is not typically done as part of MOC
	Contractor pool size
	don't hold contractors accountability, e.g there are no penalty causes -(next line)
	if you have any major mishaps like IR or HES issues you will get klciked offsite quickly
	Only few contractors are trusted - sometimes PM will use contractor or supplier which is on database whilst this may not be the best or most appropriate contractor
	- difficult and time consuming to get a contractor on dbase
	Implemented e-colours just another thing to create excitement? (next slide)
	whats so bad about this - surely it must be good?
	Conflicting priorities of business units
	Scope creep there must also be addenda to contracts here
	Holding contractors accountable - penalty clauses
	Logistical challenges
	Staelite project managers, smaller group of PM's covering a large and wide area
	- moc requirements that all must be at one place to sign off documentation
	Training and development of PMs

3.3.3.4 Selective Coding

Through a procedural review of the relationships between categories, a core category was established. This core category influences all other categories and is considered the driver in the "story line".

In order to develop a common understanding on the meaning of each category, the categories were defined in terms of its dimensions to provide insight on the minimum and maximum influence or impact the categories may have on each other.

As mentioned in section 3.1, qualitative system dynamics modelling will be utilised to explore the relationships between the categories. At the core of system dynamics models are reinforcing and balancing causal relationships (Mirchi, 2013) usually in complex systems. A type of system dynamic modelling, namely causal loop diagrams (CLD), will be utilised to model the relationships between the categories.

3.4 Research Validity and Trustworthiness

Evaluation of quantitative and qualitative research has similar aims, and that is to establish that the results provide convincing evidence, sufficient to answer the research questions (Borrego et al. (2009). The claims made about any phenomenon have to be supported by evidence that these claims are trustworthy.

Borrego et al. (2009) define validity as when the project and instruments measure what is intended to be measured and quantitative researchers use internal validity methods to establish trustworthiness. Shenton (2004) cites Merriam (2004) and states that the qualitative researcher's equivalent concept to validity is credibility. Credibility in this context is defined as establishing that the research results are credible or believable. The term credibility is therefore used in this study in place of validity.

The effectiveness of the research methods in this dissertation and the quality of the data were compared against qualitative research criteria as developed by Borrego et al. (2009) namely, credibility, transferability, dependability and reflexivity (for qualitative data).

In terms of credibility, the research methods drawn on for data collection and analysis are well established as research methods. The researcher is familiar with the context, has knowledge of the organisation's culture and has established relationships with the interviewees. The respondents reviewed their interview transcripts to ensure that it is an accurate record and interpretation of their answers.

The research findings are unique to the organisation's context; however due to the rich descriptions of the context, the findings can be transferred to other business units within the organisation or to similar organisations. The research findings can be used to further explore personality typing and project management as research topics.

As discussed above, this research study was done in a specific context, with specific research techniques and with specific participants embedded in the context. If this research work is repeated, in the same context, with the same methods and with the same participants, similar results should be obtained. Researchers not directly involved with this study reviewed the data and findings (triangulation).

Both qualitative and quantitative research have shortcomings. The shortcoming of this qualitative study is related to the subjectivity of the researcher. The researcher is employed by the organisation and the project managers are the researcher's colleagues. The following topics as proposed by Shenton (2004) will be discussed to demonstrate activities undertaken to reduce the effect of the researcher's biases.

Interviewing Procedure

All the project managers were interviewed in the same manner, with the same questions and with the same allocated interview time. All interviewees reviewed their transcripts for correctness upon completion of the interview.

Demonstrating the audit trail

To demonstrate the audit trail, the sequence from interviewing to coding has been included as Appendices H - J in this dissertation. The researcher has also maintained a research journal to record notes, thoughts and interpretation of events and research data. This journal was used for memos in the analysis and was used to test potential biases.

3.5 Research Ethics

The researcher obtained information during the data gathering process from project managers who spoke freely with the expectation that their rights will be respected. As recommended by various reputable sources, the researcher adhered to the overarching requirement which all researchers should comply with: to respect the rights, values, opinions and feelings of the research participants.

Furthermore, this research did not discriminate against participation by individuals, or differentiate between participants, on the grounds of gender, race or ethnic group, age range, religion, income, handicap, illness or any similar classification.

Bell and Bryman (2007) studied and developed ethical considerations most appropriate to management research. This list of considerations is comprehensive but only ethical considerations most appropriate for this will be discussed in the following section.

Confidentiality and Anonymity

Similar to other social scientists, management researchers have growing pressure to protect the confidentiality and anonymity of the participants in order to avoid potential victimization (Bell & Bryman, 2007). Throughout the research process, the researcher aspired to honour the commitment made to the participants (Section 3.3.2 Data Collection), that their identity and contributions will not be shared with others except for academic examiners.

Harm to participants

Bell and Bryman (2007) describe this consideration as the need to ensure the physical or psychological wellbeing of the participant as the research process may be harmful in this regard. The feedback from all the interviewed project managers was that they enjoyed the interview and that it stimulated their thinking on personality typing.

Informed consent

Consent was obtained from the project managers as well as their supervisor. As discussed in Section 3.3.2 the project managers could opt to refuse participation.

Honesty and Transparency

The researcher communicated the objectives of this research and the project manager's role in achieving these objectives. The project managers reviewed their interview transcripts for correct recording and interpretation.

3.6 Conclusion

In this chapter, the motivations are provided for the qualitative research design. Maxwell's (2013) interactive research design model is used to explain the decisions in terms of the research approach selected.

Case study methodology was selected because this method typically entails the empirical investigation into the phenomenon within its real life system. This study is typically limited to a singular case or a particular issue, feature or unit of analysis. This research only focuses on the project managers in one of the organisation's business unit.

Data was collected through in depth interviewing, this data was analysed through qualitative data analysis using the compare and contrast principles of grounded theory. The findings will be modelled through a causal loop diagram to provide insight on the causal relationships between the variables.

The effectiveness of the research methods and the quality of the data were tested against criteria as developed by Borrego et al. (2009) namely, credibility, transferability, dependability and reflexivity.

In terms of research ethics, the researcher adhered to the requirement to treat all participants with fairness and to respect their rights.

CHAPTER 4: Findings and Discussion

In this chapter the preliminary findings from the analysed data is presented. Firstly, the categories which emanate from the data will be presented and described. This will be followed by discussions on the identification and analysis of the core category. Finally, these findings are discussed by drawing on literature.

4.1 Answering the research questions

The research questions raised in Chapter 1 are repeated below:

1. Which factors affect the T&O project manager's ability to achieve project success?
2. How is personality typing perceived to influence these factors?

It is important to note that because these categories emerged from the data as contributed by the interviewees, the combination of these categories and how they interact with each other is unique to the context of this case study. In the context of this research, these categories represent the factors which affect project success.

Table 10 presents the factors that emerged from the data for the case study T&O projects and the descriptions of each factor. The categories are further defined in Appendix J.

Table 10: Factors and factor descriptions

Factors		**Factor Descriptions**
1	Organisational Policies and Procedures	Project Managers need to be compliant with organisational policies and procedures. This is generally seen as a source of bureaucracy and subsequent delays in the project.
2	Project Manager's Leadership Abilities	The project manager executes projects through his/her project team and other stakeholders. The project manager must be able to lead the team and be effective with all associated competencies.
3	Contractor's performance level	The execution phase of the project holds the highest risk for HES incidents. The success of the project is highly dependent on the contractor's processes and procedures, supervision, technical competence, communication

		effectiveness and etcetera.
4	Health of stakeholder relationships	Successful projects require a collaborative approach from all stakeholders. In order for this to be possible, the relationships between stakeholders and the project manager and between stakeholders themselves need to be healthy.
5	Planning Effectiveness and Compliance	Developing an effective plan and obtaining and maintaining the project team's and other stakeholders' compliance to the plan.
6	External Factors	External factors are factors over which the project manager believes he/she has no control over. These range from high wind speeds, rain, extreme temperatures to local governance and protests.

These themes emerging from the study as factors can be seen to include agential factors pertaining to the project manager, organisational factors, and relationships between the environment and project manager.

As discussed in section 3.3, in answering the second research question, the effect of personality typing on these factors will be explained using a causal loop diagram.

4.2 Causal Loop Diagram (CLD)

The causal relationships between factors were reviewed and the "Effect of Organisational Policies and Procedures" emerged as the core or driving factor. Figure 7 shows a causal loop diagram (CLD) which graphically depicts the relationships between the factors. This is followed by a discussion on these relationships. "The Effect of Personality Typing" is not considered a variable but was introduced into the CLD to assess its influence on the variables. This assessment will provide answers to the second research question.

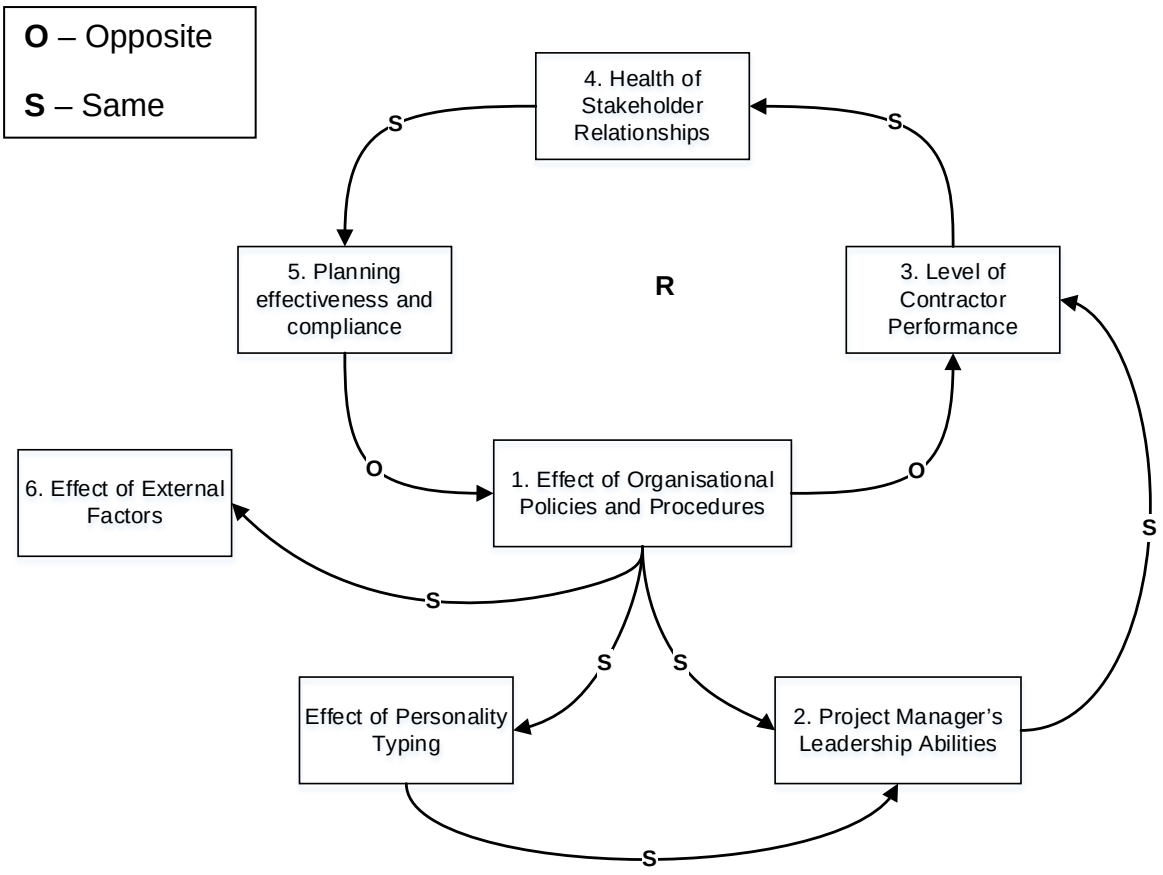

Figure 7: CLD of casual relationships between factors

The CLD shows a reinforcing loop (R) between variables 1, 3, 4, to 5 and back to 1. In a reinforcing loop the feedback loops often characterize continuing trends of growth or decline (Mirchi, 2013). For example, if the Organisational Policies and Procedures have a great effect, the contractor's performance level is low. If the contractor's performance is low the health of stakeholder relationship will be low and similarly planning effectiveness and compliance will be low as well. There is an opposite (O) relationship between planning effectiveness and compliance and the effect of the organisational policies and procedures. Hence, if the planning effectiveness and compliance is low the effect of the organisational policies and procedures will be high. The loop therefore has a "snowball" effect in that the effect of organisational policies and procedures continues on a high trend of growth. The opposite is also true in that if the effect of the organisational policies and procedures are low the other variables in the loop will be on the opposite side of their respective continuums resulting in the effect of organisational policies and procedures being low.

A CLD is useful in interpreting the various causal connections as a way of telling a "story of what might unfold" (Reynolds & Holwell, 2010) (P 33). The causal connections in the reinforcing loop will be reviewed in a manner which presents the story as told by the

research participants. This will be followed by discussions on the effect of personality typing on the variables.

The effect of organisational policies and procedures influence the contractor's performance level

PM4 said that the contractor is not held accountable when not complying with the project plan and only held accountable in terms of HES incidents. PM3 stated that the project managers work with the same contractors most of the time and PM5 said that the organisation does not have sufficient numbers of approved contractors to work on projects. As discussed in Section 1.3, the organisation invests time in the contractor's HES capabilities. With projects executed around live fuel storage equipment, the organisation relies on contractors to not cause major HES related incidents. The organisation does not have infinite internal resources and therefore utilises a small pool in order to maintain the ongoing contractor continuous HES assessments. The small pool is however, not conducive to healthy competition and high performance in areas other than HES.

PM1 said that the organisation's procurement policies and procedures were ineffective and recalled a project where the contractor was given three ultimatums. In PM1's opinion these events negatively affected the Kroonstad Tank Project. PM6 said that the organisational policies and procedures can also affect the selection of the contractor. PM2 recalled details of a project where the organisation did not compensate the contractor, but that this had no effect on the project.

The organisation's project management procedures require interaction between contractors and certain stakeholders such as the Terminal Operations team. In accordance with the organisation's policies and procedures, contractors need to apply and obtain work permits in order to conduct project work at the terminals. PM5 mentioned that the contractors experience many delays in the issuing of the permits and these delays are caused by the organisation's resources.

In essence, it appeared that the organisation's own internal policies and procedures were influencing the contractor's performance in that high HES performance is desired and rewarded whilst high performance in other areas are not facilitated.

The level of the contractor performance affects the health of stakeholder relationships

All the project managers concurred that the contractor performance was important to achieve project success. The project managers also appoint the contractors through the organisation's procurement process. PM5 and PM2 stated that the success of the project

hinge on whether the client is satisfied. Therefore, if the contractor performance is poor these will more than likely result in an unsuccessful project and damage the relationship between the project manager and the client. This will similarly lead to a poor relationship between the project manager and the contractor. Most stakeholders are generally satisfied and would want to be associated with a successful project. An unsuccessful project may potentially have the opposite effect where stakeholders are dissatisfied and general deterioration of relationships between stakeholders occurs.

PM4 was of the opinion that the contractor's performance must be good in terms of communication. This was corroborated by PM6 and PM2 who highlighted the importance of providing important feedback in a timely fashion. Good communication practices will more than likely result in healthy stakeholder relationships.

The health of stakeholder relationships influence the planning effectiveness and compliance

The project manager not only relies on stakeholders to provide input and feedback on the plan, but stakeholders have to share information with one another which are pertinent to the project plan.

PM4 raised the issues of accountability and that stakeholders were not held accountable for non-compliance to the plan. PM4 advised that some stakeholders intentionally provided incorrect information for their own perceived benefit. PM2 recalled an unsuccessful project where the project was not considered a priority by some stakeholders and the project subsequently exceeded the original budget and project time.

Throughout all of the transcripts there is evidence emphasising the importance of healthy relationships between stakeholders and between stakeholders and the project manager. PM6 stated that he observed on many occasions that the project quality was poor but that the client was still satisfied purely because a good relationship existed. PM1 has experienced that it was easier to achieve amicable agreement and to improve performance with improved stakeholder relationships.

In essence it would appear that if the stakeholder relationships are healthy they may i) interact more effectively with each other to improve the planning effectives, ii) provide better quality feedback and input on the plan and iii) comply with the plan purely because they have a good relationship with the project manager. All of these are feasible possibilities suggesting that good stakeholder health will contribute towards project success.

Planning effectiveness and compliance influence the effect of organisational policies and procedures

If the planning is effective and stakeholders comply with the plan, the perceived negative effect of the organisational policies and procedures can be mitigated or eliminated. The adverse sentiment on the organisational policies and procedures appears to be caused mostly by the organisation's procurement processes and procedures. PM1, PM2, PM3 and PM6 concurred on the ineffectiveness of procurement, citing procurement's "disconnect with the real world", delayed payments to contractors and lengthy processes. As mentioned before, PM1 was of the opinion that the procurement system encourages decreased contractor accountability.

On the contrary, PM3 recalled a project where all groups worked well together and PM1 mentioned that sometimes procurement helps to solve issues.

PM2 felt that engaging with procurement stakeholders is important as this helps to understand their requirements. This statement suggests that the project managers have some influence over the effect of the organisation's policies and procedures. If these policies and procedures are understood, the project plan can be developed taking into account potential delays, late contractor payments and even the time it takes to comply with the policies and procedures.

The effect of organisational policies and procedures influence the effect of personality typing

The organisation deployed personality typing and determined the manner in which it has become integrated in the day-to-day duties of all employees affected. An example of this was contributed by PM3 when he stated that every meeting is started with an e-colours moment which is intended to refresh and sensitise the meeting attendees to e-colours. This is an example of an innovation initiated by the organisation.

The effect of organisational policies and procedures influence the project manager's leadership abilities

The organisation's policies and procedures generally affect the project manager's leadership abilities in a positive manner. The organisation invests in the training and competency development of all project managers whether it is through compulsory or elective training programs. An example of a development and training program is the e-colours program. PM3 mentioned how the organisation's implementation of personality typing and the organisation's procedure of starting each meeting with an e-colours moment have helped

him to reflect on how he approaches situations. Furthermore, the organisation has project management procedures in place such as the Project Development and Execution Process (PDEP) and Management of Change (MOC) process (refer to Section 2.4.1). Both the PDEP and MOC procedures positively influence the project manager's leadership abilities in that it assists project managers in managing the project through the project phases. An example of this is that the MOC process requires preparation for the change of the project team and other stakeholders in a structured manner. Similarly, the PDEP helps the project manager to develop sourcing and contracting strategies to ensure that project funds are approved prior to appointing contractors and helps to achieve leadership support

The project manager's leadership abilities influences the performance of the contractor

All the project managers have pointed out that good contractor performance is critical to achieve project success. PM1 stated that "a contractor can make or break a project". PM3 stated that because the project managers work with the same contractor on most projects, it is in the best interest of the project manager to help the contractor to improve.

PM6 believed that project managers need to be more rounded whilst PM2 thought that e-colours helped him to understand and change his approach to get the best out of contractors.

The effect of organisational policies and procedures influence the effect of external factors

External factors such as inclement weather and depot bulk fuel product receipts (tanker ship and pipeline fuel receipts) cause delays. The manner in which onsite project execution teams react to inclement weather is guided by the organisation's Managing Safe Work Practices (MSWP) procedure and Stop Work Authority (SWA) policy (refer to Section 2.4.1.3). Furthermore, the organisational policies and procedures controls the timing of tanker ship and pipeline fuel receipts into the depot. Delays are caused by pipeline receipts because during the time of offloading the organisational procedure states that no hot work (refer to Section 2.4.1.3) may be conducted.

Personality types more likely to achieve project success

Considering that all of the T&O project managers have a dominant green (thinking) personality type, two project managers felt that red-green (doer-thinker) personality types would make better project managers. Red-green personality types are considered task orientated (Refer to figure 2 in Section 1.1.2). Three project managers felt that the yellow-

blue (socialiser-relator) personality types would make better project managers leaning towards the people orientated sphere. The latter project managers' reasoning was that project managers need to be more people orientated and need to connect with people on a social level. Ultimately, it is "people that make a project successful or unsuccessful" (PM5). Two project managers felt that the project manager needs to be more "rounded" and in terms of e-colours, need to master and exhibit all four colours equally and as required by the situation.

The effect of external factors on other factors

In viewing the CLD it may appear that the effect of external factors should form part of the reinforcing loop or should at least influence all factors. The data has shown that external factors have very little influence on the outcome of the project. External factors in the context is described as inclement weather and depot/terminal bulk fuel receipts and both these categories delay work, specifically hot work during projects. However, as stated by PM4, these delays are usually not long and normally have little or no impact on the project. Secondly, as discussed above, the external factor is not necessarily causing the delay, but rather the manner in which the organisation elects to react to the external factor may cause delays.

The effect of personality typing on the factors which influence the project manager's ability to achieve project success.

In order to formulate answers to the second research question the data was analysed to ascertain the perceived effect of personality on each of the factors:

- **The effect of personality typing on the project manager's leadership abilities**
  All of the project managers, with the exception of PM5, clearly stated that the knowledge of personality typing affected their leadership abilities in a positive way. For example, PM1 changed his behaviour and has a greater awareness of the personality types of others. PM2 said that e-colours helped him to build relationships and to stimulate and promote team work.

  PM5 stated that he was unaffected by e-colours and that it was merely another organisational initiative to generate excitement amongst employees. Secondly, it was implemented to demonstrate to top management that the organisation is making a change in order to improve business results.

- **The effect of personality typing on the health of stakeholder relationships**

  PM1 felt that his relationships with stakeholders improved after the implementation of personality typing and that it was easier to achieve amicable agreement, to avoid conflict and to improve performance. PM2 found that by knowing and understanding a stakeholder's personality type he was able to adjust his interaction with that stakeholder to align with their personality preferences. PM3 had a similar experience in that after the implementation of personality typing, with the new knowledge, he started using a different approach which improved his relationships.

  PM5 felt that the health of his relationships with stakeholders remained the same before and after the implementation of e-colours.

  PM6 stated that his relationships with his stakeholders improved not due to personality typing but due to internal reflection and continual learning. For every project PM6 develops a stakeholder strategy based on general past experiences and experiences with the specific stakeholder.

  PM3 and PM6 highlighted potential negative effects which personality typing may have on the health of stakeholder relationships. PM3 was of the opinion that certain people stereotyped themselves and others. For example, an individual used his/her e-colour personality type as an excuse for missing a deadline (PM3). In PM6's case, another example is the expectation of having a good relationship with only those with similar e-colours.

- **The effect of personality typing on planning effectiveness and compliance and contractor performance levels**

  Planning effectiveness and compliance, as well as the contractor's performance level have stakeholder relationship components. Other than the references to the health of stakeholder relationships discussed above, the project managers did not explicitly state that personality typing had an effect on these factors. However, PM3 was of the opinion that a blue-yellow (relator-socialiser) personality combination makes better project managers as it is likely that this combination would get the best out of contractors. Similarly, PM2, PM3 and PM4 emphasised the importance of stakeholders' (contractors included) compliance to the project plan and the importance of timely feedback. In summary, considering the findings in previous sections on how personality typing generally improved relationships with

stakeholders, this improvement will most probably lead to improvement in both factors

.

- **The effect of personality typing on the effect of organisational policies and procedures**

  PM1 emphasised the importance of maintaining the support of the organisation's leadership. PM2 added that it is best to engage stakeholders such as HES and procurement representatives to understand their requirements. The support of these stakeholder groups is considered important in order to remain compliant with organisational policies and procedures. As discussed in previous sections, the general perception amongst the project managers is that the organisational policies and procedures cause delays in the project. Furthermore, it has been shown above that personality typing has an effect (normally positive) on stakeholder relationships. It is therefore more than likely that these improved relationships might mitigate or negate the negative effects of having to comply with the organisations policies and procedures.

4.3 Discussion of the Findings

In the following section the research findings will be discussed by drawing on relevant literature.

4.3.1 The effect of organisational policies and procedures influences the contractors' performance level

The findings on the effect of organisational policies and procedures centred mainly on procurement, more specifically the qualification and selection of a sufficient number of contractors and the timely compensation of contractors (PM3, PM4 & PM5). These issues regarding projects are not uncommon. Ojeda and Reusch (2013) reviewed the PMBOK (Project Management Institute, 2009) guide and suggested that there is a need to enhance the PMBOK (Project Management Institute, 2009) knowledge area on procurement management with "sustainable procurement". They furthermore claim that the organisational procurement management structure should clearly segregate operational, tactical and strategic procurement (Ojeda & Reusch, 2013).

Like many other companies, the organisation in this case study has adopted the relatively new concepts of e-procurement, supplier validation and total cost of ownership (TCO). These concepts are not yet fully embedded in the Contractors' systems but contractors are expected to utilise these systems which they may find difficult to navigate (PM6).

Sawacha, Naoum and Fong (1999) studied the factors affecting safety performance on construction sites and found that the variables related to the organization policy are the most dominant group of factors influencing safety performance. The organisation in this case study relies on a small pool of contractors to execute projects. These contractors have to undergo what can be considered a comprehensive screening process which predominantly focuses on their capabilities in terms of HES. This screening is done before the awarding of contracts and continuously throughout the contract period. It would therefore appear that in pursuit of its target of zero incidents and injuries, the intent of the organisational policies and procedures is to improve the contractors' safety performance only.

4.3.2 The level of the contractor's performance affects the health of stakeholder relationships

As discussed in Section 1.1, the organisation considers a project, where an HES incident occurred, as unsuccessful. The contractor is usually at risk of incurring an injury to one of its employees. If it is perceived that the incident has been caused by the contractor, this is considered poor performance by the contractor and a general discontent of both the contractor and project manager is exhibited. This leads to a breakdown of relationships or puts strain on stakeholder relationships.

Arditi and Guanaydin (1998) found that the quality achieved in any (project) phase is contingent on the relationships between the manufacturer, the main contractor, the design team, the project manager and the client. This further suggests that if the contractor was to perform poorly, the health of these relationships will be affected.

4.3.3 The health of stakeholder relationships affects the project planning effectiveness and compliance to the plan

Unhealthy stakeholder relationships can potentially lead to an ineffective plan. A Guide to the Project Management Body of Knowledge - Fourth Edition (Project Management Institute, 2009) states that the stakeholder expectations need to be managed in order to influence their willingness to achieve the project goals (Project Management Institute, 2009). Secondly, PMBOK states that the first step in developing an effective plan is to obtain and manage inputs (Project Management Institute, 2009) from various sources and stakeholders. The state of the relationships amongst stakeholders and the project manager can therefore affect the project plan's effectiveness and compliance to the plan.

4.3.4 The planning effectiveness and compliance affects the effect of organisational policies and procedures

By planning effectively and maintaining compliance to the plan, the perceived negative effect of the organisation's policies and procedures can be mitigated. PMBOK makes provision for various ways and means to mitigate various risks to the project objectives (Project Management Institute, 2009). For example by planning more conservatively or building adequate float into the plan it might provide more leeway or flexibility in having to deal with delays caused by the organisation. Another example as suggested by PMBOK (Project Management Institute, 2009) is performing a "What-if Scenario Analysis" by using the plan and developing the most appropriate responses to counter potential delays (P.156).

4.3.5 The effect of the organisational policies and procedures affect the project manager's leadership abilities

Pinto's and Prescot's (1988) research showed that the project manager needs the organisation's top management support in terms of resources, required training, the availability of technology and expertise to complete the tasks related to the project. The organisation can potentially increase the project manager's leadership abilities simply by stipulating mandatory training. As discussed in Section 2.4.1.1, this is currently the case where organisational procedures makes it mandatory for project managers to attend training on how to manage change (Management Of Change (MOC)). The personality typing program in itself has become an organisational policy and it would appear that this program had a positive effect on the project managers' leadership abilities.

4.3.6 The effect of personality typing on the project managers' leadership abilities

In reviewing the role of the project manager in project critical success factors (CSFs) in Section 2.2, Table 1, it was found that the communication component is common throughout all the CSF's. To communicate effectively is a leadership ability which is considered critical to project success and this is reaffirmed by Pinto and Prescot (1988). One of the cornerstones of e-colours is aligning and adjusting communication styles and methods in accordance with an individual's personality preferences (refer to Appendix D).

Creasy and Anantatmula (2013) cites the works of various researchers and posit that traditional project manager skills do not lead to successful project outcomes as do interpersonal or "soft" skills. These "soft" skills include personality traits and attitudes. Furthermore project managers need to understand leadership competencies and his/her personality traits which compliments said competencies (Creasy & Anantatmula, 2013).

These assertions would suggest that personality typing does affect the project managers' leadership abilities.

4.3.7 The project manager's leadership abilities affect the contractor's performance level

According to Gosling and Mintzberg (2003) a leadership ability which the project manager requires is to have a collaborative mind-set. This mind-set can potentially improve the contractor's performance. Another ability which a project manager should have is to invest effort into experiencing the world as the contractor experiences it (Gosling and Mintzberg, 2003). By understanding the challenges which the contractor faces or the circumstances in which they operate the project manager can make meaningful changes.

Personality typing programs such as e-colours and the Myers-Briggs Type Indicator (MBTI) describes, in scientific terms, individual preferences according to Jung's theory (Culp & Smith, 2001). Some of the objectives of personality typing are to provide a summary of aspects of personality which increases self-understanding and understanding of others. Another objective is to assist people in valuing others of a personality type different to theirs. A third objective is to highlight areas of personal development (Varvel, et al., 2004). The findings have shown that the project managers believed that personality typing have improved their relationships with all people.

4.4 Conclusion

Chapter 4 has presented the findings from this research effort which culminated into answers to the research questions. The factors which influence the T&O project manager's ability to achieve project success were presented as well as how personality typing perceived to influence these factors. These discussions were supported by extracts from the transcripts and by citing relevant literature on the specific factor. Chapter 5 ends this dissertation by finally concluding the findings, by articulating potential areas of further research and to provide recommendations suitable to implement in the specific context.

CHAPTER 5: Conclusions and Recommendations

The purpose of this study was to identify the factors which influenced the T&O project manager's ability to achieve project success and to explore their perceptions of the influence of personality typing on these factors. In pursuing these objectives other interesting findings emerged from the study. This chapter will review the findings and its implications, the limitations of the study, practical recommendations for the organisation and finally concludes this dissertation with recommendations for further studies.

5.1 Reflection on the findings

From the factors which influence the project managers' ability to achieve project success, it would appear that the organisational policies and procedures is a major factor and exerts influence on all of the other factors. With effective planning and with adherence to the plan the effect of the organisation can be reduced or negated.

The conceptual framework (Section 2.5) graphically depicted literature gathered on what is known about the personality typing-project manager-project success dynamic. The factors emanating from the conceptual framework are generally compatible with the factors which resulted from the research data analysis.

It was found in both the literature review and discussion of the research findings that personality typing will more than likely affect the project factors in a positive manner and thereby increase the likelihood of achieving project success. However, from organisational data it was discovered that project success metrics, with the exception of HES, did not improve since the inception of e-colours. This research study found possible reasons for the variance between the research data and what has actually occurred in the department since deployment of the personality typing program.

5.1.1 Delay in Time

Since the deployment of e-colours there was a delay in terms of how quickly all employees were trained and became experienced with the associated terms, references and best practices. Secondly not all stakeholders have completed the e-colour training and development process. For example, until very recently project managers started arranging personality type training for only certain individuals (mostly leaders) in the contractor companies. Therefore, a feasible conclusion could be that insufficient time has elapsed in order for personality typing to become fully entrenched in the organisation.

5.1.2 Employee buy-in

From the findings it became evident that some employees were not convinced that personality typing provided any benefit in helping to achieve project success. These employees are more than likely not compelled to employ the best practices of personality typing and will not serve as advocates of the process either.

5.1.3 Personality typing misconceptions and incorrect use

From the findings it emerged that certain people stereotyped themselves and others based on perceived or allocated personality types. Although personality typing is relatively reliable, people do not always act consistently with their allocated e-colours.

5.2 Limitations of this study

This research study formulated answers to the research questions which were corroborated through literature and extracts from the interview transcripts. However, the following limitations have been identified:

This research study made use of a single case study and although this case study was true to the context, multiple case studies could potentially provide more insight on the phenomena being investigated.

Although all the T&O project managers participated in the study the sample size is still considered relatively small. More participants from other departments could have made the data richer and thereby provide a better understanding of the phenomena.

Despite these limitations, the research findings are transferable to other business units within the organisation or to similar organisations. This is made possible due to the rich descriptions of the context and the rich data accumulated throughout the research process. Furthermore, the research findings can be used to further explore personality typing and project management as research topics.

5.3 Recommendations for Organisations

From the findings of this research certain recommendations to generally improve project execution are contributed.

Both the project managers and the literature have suggested that project managers in this context need to develop the social side of their personalities. The literature has shown that a yellow (socialiser) personality type is more likely to achieve project success. Some of the project managers concurred and emphasised the need for project managers to be more rounded, meaning that they should develop their non-dominant personality traits. The

organisation can contribute by investing in training and development to strengthen non-dominant personality traits.

The findings of this research can inform the organisation on the recruitment of project managers for suitable projects or the recruitment of similar roles.

5.4 Recommendations for further studies

Every research effort has specified boundaries for investigation to provide possible answers to the research questions. No researcher has infinite time and resources to investigate and test each and every possible theory. To this extent, and in the context of this dissertation, the knowledge of the phenomena can further be expanded in further studies. This research only considers the project manager's viewpoints as data whilst there are many other stakeholders in the system. These stakeholders can potentially contribute data that can expand or contradict the data contributed by the project managers.

Only certain projects as raised by the project managers were discussed as part of the data collection process. A correlation between the project manager's personality type and the type of project in which he typically achieve success could potentially provide guidance on which project manager to select for which type of project.

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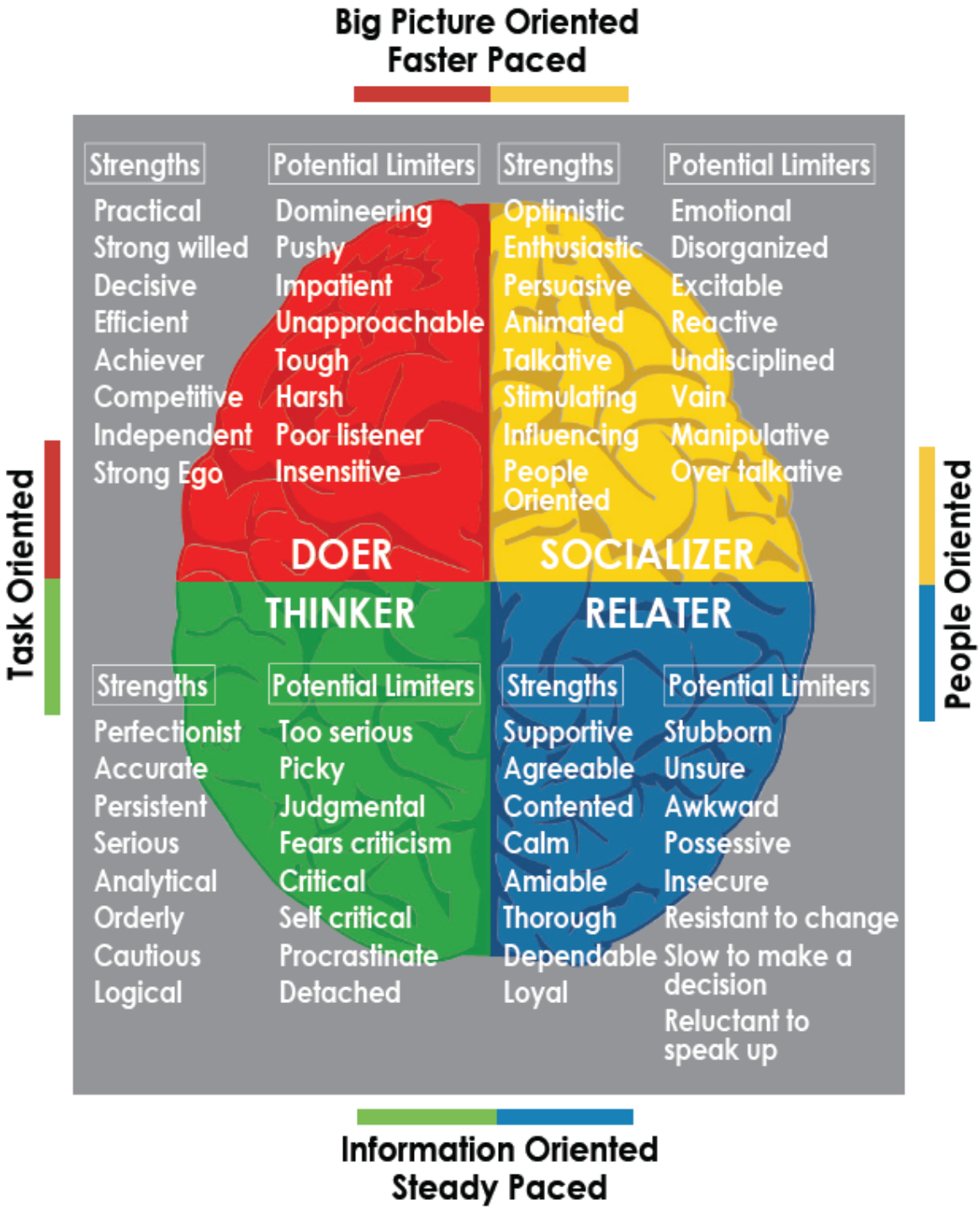
Appendix A: Incident Classification Definitions

Incident Classification	Definition
Work Related Personal Injury	A work-related personal injury refers to the injury of any individual whilst in the process of working on a project or where an injury can be directly attributed to a project.
Environmental Incident	An environmental incident is an incident where through the working of the project an uncontrolled release of harmful matter to the atmosphere occurs. In very rare cases environmental releases can be directly attributed to the execution of a project. Environmental releases are more common when equipment is incorrectly operated.
Fire and Explosions	A fire and explosion can occur during the construction phase of the project as in most cases projects are of a brownfield nature. A brownfield project refers to projects which are based on prior works or rebuilding works. In T&O's case, most projects are executed around live fuel storage and transferring equipment. Fuel is pumped into and out of bulk storage tanks on a continuous basis and considering that most of these tanks are atmospheric, the displaced flammable vapours are emitted into the atmosphere. Petrol vapours are denser than air and descend and collect at the lowest point. These vapours can be ignited by a spark or open flame.
Reputational loss	Reputational losses are incurred when the manner in which a project is executed, negatively affects the organisation's reputation. For example, when contractors are not paid on time and a decision is made by the contractors to employ industrial action.

Appendix B: Projects Information

Project Locations	Port Elizabeth, Cape Town, East London, Klerksdorp, Kroonstad, Gaborone, Dumela, Johannesburg, Pretoria
Average Project Budget	5 Million ZAR - 200 Million ZAR
Average Project Total Period	10 months
Average Total Manpower per project	42
Typical Project Team Disciplines	Mechanical Engineer (1), Process Engineer (1), Electrical Engineer (1), Automation Specialist (2), Procurement Advisor (1), Instrument Technician (1), Terminal Supervisor, HES Specialist
Major Stakeholders	Internal: The organisation's leadership, Terminal Managers, Value Chain Optimization, The organisation's Products and Sales (Retails Service Stations and Industrial and Commercial Customers), The organisation' Corporation External Project Contractors, Engineering Consultants, Local Government and Municipality, Local Fire Department, Environmentalists, Local Communities, Fleet Companies
Quality Standards	The organisation's Operational Excellence Management System
Project Information Systems	Systems Applications and Products (SAP) ® ERP Ariba ® 8th Edition Microsoft Project © 2008
Typical Project Scope	Construction, Refurbishments or Upgrades: Product Storage Tanks, Additive Storage Tanks, Tank bund floor and wall, Firefighting Systems, Office Buildings, Warehouses, parking lots, Underground storage tanks, Loading equipment, Plant Electrical Upgrade, Loading Hardware and Software upgrades Automation systems upgrades, Installation of new fueling systems (pumps, pipelines, valves, etc.), Introduction of new product line

Appendix C: E-colours: Basics



Appendix D: E-colours: User Guidance

When Working with Me (Collaboration)

Be clear, specific, brief and to the point Stick to business Present the facts logically Provide alternatives and choices for making decisions I see people as a resource to get the job done Appreciate I see everything as a task or a challenge	Plan interactions that support my visions / intuitions Use time to be stimulating and fast moving Leave time for relating and socializing Do not deal with details Ask for my opinions and ideas regarding people Give me space and continual feedback Let me work with other people
Prepare in advance taking time to be accurate Approach me in a straightforward way Support my analytical and thought-out approach Use a scheduled approach to implement action items If there is mutual agreement, follow through Provide solid, tangible, practical evidence	Start with a personal comment to break the ice Show sincere interest in me as a person Patiently draw out personal goals and work with me to achieve these goals Listen and be responsive Respect my integrity and honesty

If you want me to listen (Communication)

You should: Be clear, specific and to the point Stick to business Give logical benefits to key ideas	**You should:** Provide a warm and friendly atmosphere Give me a chance to speak Do not deal with a lot of detail Ask 'feeling' questions to draw comments

You should not: Talk about things that are not relevant to the issue Leave loopholes or cloudy issues Appear disorganized	**You should not:** Be curt, cold or tight-lipped Control the conversation Drive hard on facts/figures
You should: Prepare your case in advance Provide pros/cons with data Stick to business, speak about the task first Be accurate and realistic **You should not:** Be giddy, casual, informal or loud Push too hard or be unrealistic with deadlines Be disorganized or messy	**You should:** Begin with personal comment – Break the ice Present your case softly Be patient Ask “how questions” **You should not:** Be threatening Rush headlong into business Be domineering or demanding Force them to respond quickly

How to delegate to me

Give me bottom line expectations and then get out of the way Emphasize how the added responsibilities will increase my significance to others Only give me guidelines	Stress how the new task will give me more recognition from you Make sure you get a clear agreement from me on what needs to be done and how it should be done Establish check points and milestones

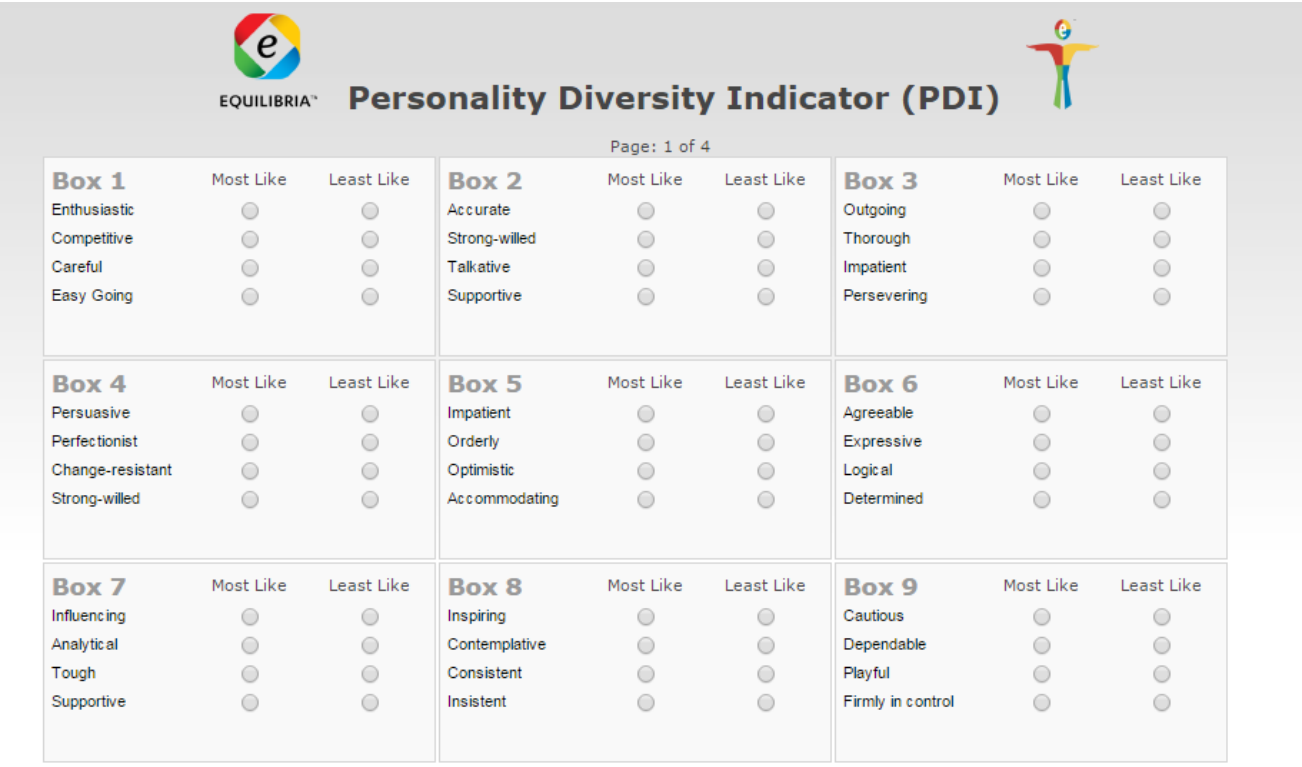
Explain the logic and why you need to split your work load Give me facts and figures showing why my help is needed Take time to answer my questions Give me time to explain the methodology used to complete the assigned task	Appreciate the value of my dedication Emphasize exactly what needs to be done Identify achievable deadlines Give me time to consider my options Explain why it needs to be done a certain way

Effective Forms of Recognition

Promotion Authority Control Involvement Concise feedback Money for my financial independence	A smile Nod of acknowledgement Pat on the back Recognizing my creativity Group recognition Money for my people
Specific feedback Appreciating my ability to analyse and perfect Autonomy A sincere discussion Formal recognition Money for my plans	Recognize me with my team Recognize me in private rather than in public Involvement Collaboration Ensure fairness Money to support my family

Tables developed with the permission of Equilibria Services, Ltd.

Appendix E: PDI Sample Questions



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Personality Diversity Indicator (PDI)

Page: 1 of 4

Box 1	Most Like	Least Like	Box 2	Most Like	Least Like	Box 3	Most Like	Least Like
Enthusiastic	○	○	Accurate	○	○	Outgoing	○	○
Competitive	○	○	Strong-willed	○	○	Thorough	○	○
Careful	○	○	Talkative	○	○	Impatient	○	○
Easy Going	○	○	Supportive	○	○	Persevering	○	○

Box 4	Most Like	Least Like	Box 5	Most Like	Least Like	Box 6	Most Like	Least Like
Persuasive	○	○	Impatient	○	○	Agreeable	○	○
Perfectionist	○	○	Orderly	○	○	Expressive	○	○
Change-resistant	○	○	Optimistic	○	○	Logical	○	○
Strong-willed	○	○	Accommodating	○	○	Determined	○	○

Box 7	Most Like	Least Like	Box 8	Most Like	Least Like	Box 9	Most Like	Least Like
Influencing	○	○	Inspiring	○	○	Cautious	○	○
Analytical	○	○	Contemplative	○	○	Dependable	○	○
Tough	○	○	Consistent	○	○	Playful	○	○
Supportive	○	○	Insistent	○	○	Firmly in control	○	○

Appendix F: Research on personality types likely to achieve project success

Source: Cohen et. Al. (2013)			
Personality Type which are more likely to achieve project success	**Research Context and Sample**	**Research Reliability**	**Research Validity/Rationale/Applicability**
Sensing – Feeling (SF) (in accordance with the MBTI)	280 managers with experience in project management, working in a variety of business areas: software, construction, banking, communications, food, engineering, security, transportation, and education.	The ISF combination is only 3% of the total project management population, but 22% of the general population. The success perception of these SF respondents is inflated compared to other groups because there were only 19 project managers in the SF group, which might not be a large enough group to establish the phenomenon.	Yes, this research applies to this case study. Personality typing based on Jung, project management sample (engineering), project success (budget, cost, schedule, quality, check again etc.)

Source: Bedingfield & Thal (2008)			
Personality Type which are more likely to achieve project success	**Research Context and Sample**	**Research Reliability**	**Research Validity/Rationale/Applicability**
Conscientiousness and Openness (in accordance with the Five Factor Model)	Project managers for the United States' Department of Defense (DoD). Only 37 project managers participated in this research, and three surveys were deemed unusable. There were slightly more military than civilian respondents. The sample seemed to represent an appropriate cross section, and respondents represented the appropriate level of experience to distinguish good project managers from less successful project managers.	Authors demonstrated the reliability of this research and concludes that the reliability was "very good"	Yes, this research applies to this case study
Source: Thomas (2006)			
Personality Type which are more likely to achieve project success	**Research Context and Sample**	**Research Reliability**	**Research Validity/Rationale/Applicability**
Feeling and Intuitive (in accordance with the	Subjects for this study were either participants in consulting engagements,	There is an inherent bias in the data towards those interested in	Research Validity/Rationale/Applicability

MBTI)	students in project management training sessions or participants in project management conferences. In general, the subjects for this study are entry level to mid-level project management personnel, who are drawn from a wide array of industries and organizations. In total, there were 482 respondents included in this study.	project management in general and towards the "soft" side of project management in particular.	could not be established
Source: Malach-Pines et al. (2009).			
Personality Type which are more likely to achieve project success	**Research Context and Sample**	**Research Reliability**	**Research Validity/Rationale/Applicability**
openness to experiences, risk taking, and being an inventor, investigative and enterprising (personality types derived from various sources)	289 Israeli project managers who managed projects performed in Israel during 2002 to 2007. The projects ranged in budget from several hundred thousand dollars to over a billion dollars and were performed in various industries including construction, agriculture, defence, commercial high-tech, software, and chemistry.	Research reliability was not discussed or demonstrated in the source	The success measures did not include budget or schedule achievement

Appendix G: Interview Questions

Question 1
How have the implementation of E-colours affected you?
Question 2
Describe your relationships with stakeholders before and after the implementation of E-colours?
Question 3
How do you define project success?
Question 4
Which factors influence your ability to achieve project success?
Question 5
Which organisational factors influenced the success of your projects and how?
Question 6
Between the following project phases which are you most comfortable with and why?
Project Initiation

Project Planning
Project Execution
Project Closure
Project execution:
Question 7
Between the following project phases which are you least comfortable with and why?
Project initiation
Project Planning
Project execution
Project Closure
Project Planning
Question 8
Name your two most successful projects and why?

Question 9
Name your two most unsuccessful projects and why?
Question 10
Which e-colour combination do you think make better project managers and why

Appendix H: Open Coded Transcripts

Transcript:	**PM1**
Question 1	**Open Code**
How have the implementation of E-colours affected you?	
I now understand my behaviour and with this knowledge I change my behaviour. I am also more aware of other people's limiters. I anticipate how people will be affected. E-colours has improved working with people.	Understanding own behaviour
	Changing own behaviour
	Awareness of others' limiters
	Working/Collaborating with people
Question 2	
Describe your relationships with stakeholders before and after the implementation of E-colours?	
I always leverage the organisation's standards. I am more aware and understand project stakeholders - what is it that they and we want to achieve. My relationships with stakeholders have improved. It is easier to achieve amicable agreement, to avoid	Awareness of stakeholders
	use of organisational standards

conflict, improve performance. It is important for stakeholders to understand what the project entails. Stakeholders must know that this guy is going to shoot straight and do what he needs to do to finish the project safely.	Understanding stakeholders
	Stakeholder relationships
	Stakeholders' understanding of the project
Question 3	
How do you define project success?	
Completing the project on time, budget in accordance with GO36 + 10%, not having any incidents during project execution. I have to manage what is within my control - I cannot be held accountable for things going wrong which is not within my control. Achieving milestone successes such as project environmental impact assessment (EIA) approval, making some equipment available when it is required for operations, might be during the project. Short term successes are important to motivate the team and to keep momentum.	Managing controllables
	Project Milestone achievement
	Team motivation and momentum

Question 4	
Which factors influence your ability to achieve project success?	Effect of operational requirements
Contractors, a contractor can make or break a project. External factors such as wind, rain, pipeline receipts, etc. Operational requirements - the terminal needs to operate.	Contractor performance
	Plant availability
Question 5	
Which organisational factors influenced the success of your projects and how?	
The organisation has a lot of red tape and burocracy. Leadership support is important and no project will even start, nevertheless be successful without leadership support. But you have to work hard at maintaining that leadership support. Stakeholder influence is always there, procurement helps solve issues but sometimes they cause	Effect of procurement processes and procedures
	Effect of red tape and burocracy

issues, some stakeholders mislead contractors due to lack of engineering expertise.	Importance of leadership support Stakeholder influence
Question 6	
Between the following project phases which are you most comfortable with and why?	
Project Initiation	
Project Planning	
Project Execution	
Project Closure	
Project execution:	
Execution is the most exciting part of the project. It is also usually the longest project phase, but it's great seeing the progress on site. Achieving milestones gives great satisfaction. It is also in this phase that most things can go wrong and that you have to deal with challenges with big consequences.	Job satisfaction

Question 7	
Between the following project phases which are you least comfortable with and why?	
Project initiation	
Project Planning	
Project execution	
Project Closure	
Project Planning	
It can have an influence on project, especially when you get it wrong. It is also the criteria which you will be measured against - it doesn't matter whether changes to the plan can be justified later, the original plan is what you will always be measured against.	Performance measurement
Question 8	

Name your two most successful projects and why?	
Klerksdorp Tank Project	
There was very good quality contractor work, some of the best quality I've ever seen. The job was completed within budget and we didn't have any incidents.	Contractor performance
Botswana Star Stop Project	Client satisfaction
The organisation got what they wanted, in that the equipment was to specification. Contractor was within budget and the quality was ok. We had a big water problem so we had to find water for hydrotesting. What worked well was that we applied the lessons from previous similar projects.	Applying lessons learnt
Question 9	
Name your two most unsuccessful projects and why?	
Kroonstad Tank Project	

We had a very disappointing civils contractor, despite being highly rated, they were just very poor. They had poor contractor supervision. Early in the project we experienced a tank ring beam disaster, this was caused by this contractor quality. I had delays which were beyond my control. Our procurement system is bad because we had to give the contractor 3 ultimatums and it messed us up.	Contractor performance
Inland Project 1	
We had industrial relations issues with contractor. There were low morale amongst staff and they were demotivated. We had to arrange early payment for the contractor to settle salaries. The entire crew resigned and an entirely new crew came on board mid-way through the project. The project went over schedule by a very long time.	Contractor performance
Question 10	
Which e-colour combination do you think make better project managers and why	
Red and maybe green	

Reds gets things done and a project manager has to take charge and get things done. Greens tend to like the detail and want all the information in order to make good decisions	

Transcript:	**PM2**
Question 1	**Open Code**
How have the implementation of E-colours affected you?	
It helped me to understand my own behaviour such as taking too long to make decisions when it can be critical. I like detail and I'm task orientated and this is typical of green-red e-colours. I like working on my own. E-colours helps to get team work going it showed me that sometimes a different approach is needed such as working one-on-one with someone to build relationships which encourages team work. I think with e-colours it helped me to understand people and that sometimes it's more valuable to chat in a social way with project team versus cracking the whip.	
	Building relationships
	Understanding others
	Understanding own behaviour
	Effect of different approaches
	Initiates Team work??

Question 2	
Describe your relationships with stakeholders before and after the implementation of E-colours?	
I now consider the stakeholder's personality type before approaching them, and I now use different approaches to traditional approaches. It helps to know the person's e-colours who you are dealing with. If the person is a yellow e-colour I can then expect that the person might want to talk about other things such as family, sports, politics before talking about the project. In such a case it's also for you important to first ask how you are doing before trying to get the stakeholder to pull his weight on the project.	Using different approaches
	Adjusting approach/behaviour
Question 3	
How do you define project success?	
Finishing the project on time, cost and to specifications. How many HES incidents you incur and whether your client is happy with the final result. If overruns occur it	Client satisfaction

does not necessarily mean that the project is a failure, it depends on the situation.	
Question 4	
Which factors influence your ability to achieve project success?	
External factors such as during pipeline receipts hot work cannot be done. There is also weather, good or poor contractors. If the feedback on the critical path activities are poor, you will have a skewed view on progress and where there may be problems.	Contractor performance
	External factors (wind, rain, etc.)
	Importance of accurate feedback
Question 5	
Which organisational factors influenced the success of your projects and how?	
Everything that you do must be justified through organisational process and these processes can be time consuming. Leadership support is most important and management and the business's buy-in. It's best to snake with stakeholders such as HES and Procurement so that you understand their requirements.	Time consuming processes
	Importance of leadership support
	Stakeholder buy-in

	Understanding Stakeholders' requirements
Question 6	
Between the following project phases which are you most comfortable with and why?	
Project Initiation	
Project Planning	
Project Execution	
Project Closure	
Project execution:	
You see the project flourish. And I love it when the contractors interact and when they work well together.	Contractor collaboration
Question 7	

Between the following project phases which are you least comfortable with and why?	
Project initiation	
Project Planning	
Project execution	Job satisfaction
Project Closure	Lack of faith in project plan
Project Planning	
I don't like it because there isn't really any satisfaction that you get from it, and sometimes it feels immaterial, as any one event can mess up the plan completely. Then we are playing catch-up all the time.	
Question 8	
Name your two most successful projects and why?	
Milnerton Jet Bay Upgrade	

We were under pressure from the beginning and there was a small window period in which a lot of work had to be done by the contractors and they made it. The project was completed within budget. All the stakeholders contributed to the success	Contractor performance
	Stakeholder contribution
East London Generator	Procurement processes and procedures
We had no issues. Every contractor performed. We had some procurement challenges - they didn't pay the contractors on time, but that didn't affect the project.	Contractor performance
Question 9	
Name your two most unsuccessful projects and why?	
Milnerton Slops	Lack of stakeholder support/buy-in
There was a lot of changes before I took over the project. The project was handed over from one project manager to another and the scope and approach changed each time with this. The project was also low priority to the refinery who was one of the main stakeholders. Everything has to be approved by the refinery, from drawings to hazops and process hazardous assessments. We went way over the original time and	Poor change management

budget planning.	
	Stakeholder influence
PE MMT	Contractor performance
This project had so much potential to be one of the great ones. It was ruined because the client bypassed me and interfered with the contractor. The contractor also had many equipment procurement delays.	Stakeholder influence
Question 10	
Which e-colour combination do you think make better project managers and why	
Yellow	
I would say a project manager that has a strong yellow and maybe red and green personality type. Yellow because you sometimes need someone that can connect with someone on a more social manner.	

Transcript:	**PM3**
Question 1	**Open Code**
How have the implementation of E-colours affected you?	
It made me understand all personality types, and how to approach people differently. My e-colours are green-red and I'm a thinker and I look to think before I do, but I want to get things done. I'm a logical person and sometimes I over analyse. The problem is that people hide behind e-colours, because if he does not have a dominant red colours he says that he does things slower or not at all. In the old days the name of the game was performance and using time efficiently with great accuracy. I remember when I was a youngster, one of our managers use to say quite often "I don't care about how you are, how is the project?". Times have changed. I also use e-colours for my family - it helped me to understand my family. What concerns me though is the hiding behind e-colours. If you are maybe blue you cannot say that 1 + 1 does not equal 2 because you're not a logical thinker like a green!	Understanding all personality types Hiding behind e-colours Inappropriate use of e-colours? Understanding others

Question 2	
Describe your relationships with stakeholders before and after the implementation of E-colours?	
It helps that every meeting is started with an e-colours moment which sensitises everybody. The project managers are very performance driven but I'm getting use to using a different approach. My relationships have improved due to this. The organisation is very hierarchal - people get very angry when you bypass someone or jump over their heads to their supervisors. I now sit back and think before sending an email and ask myself how I must approach the receiver to get what I need.	Using different approaches Improved relationships Change in communication style/behaviour
Question 3	
How do you define project success?	
Most importantly is not to have any HES incidents. Have you completed the project	Achieving the project objectives

on time and within budget? Have you satisfied all of the project objectives? Quality is important but we use the same contractors all the time, so the level of quality is more of an expectation.	Level of quality is an expectation
Question 4	
Which factors influence your ability to achieve project success?	
The scoping of the project - has the scoping been done correctly at initiation, because you find that scope can easily be increased during the course of the project. Capital funds also need to be spent within a certain period. The project is requested in August but by December all the money needed to have been spent. This messes things up because there is a natural way in which to run the project. You can't run it because you need to spend it by year end.	Project scoping effectiveness
	Organisation's CAPEX metrics

Question 5	
Which organisational factors influenced the success of your projects and how?	
Lengthy procurement processes can mess things up and there is always a battle between head office and the terminal and the project manager gets caught between the two as both are clients technically. Between these groups there is sometimes different priorities which leads to disputes and conflict. Leadership support is very important otherwise you'll get absolutely nowhere.	Procurement process efficiency
	Stakeholder/Client collaboration
	Leadership support
Question 6	
Between the following project phases which are you most comfortable with and why?	
Project Initiation	
Project Planning	
Project Execution	

Project Closure	
Project execution:	
You get to do what you planned to do. It is very satisfying to see your designs in action when commissioned. I also like project initiation because that is when the scoping happens and tests your understanding of the bigger picture. It's nice to get all the engineering disciplines together and to brainstorm aspects of the project.	Job satisfaction
Question 7	
Between the following project phases which are you least comfortable with and why?	
Project initiation	
Project Planning	Planning effectiveness
Project execution	Contractor's project plan compliance
Project Closure	It's more the contractor and the PM buying into the plan. Buy-in can only be achieved when you participate in the

	planning
Project Planning	
Planning is based on the logic of individuals, it is therefore not an exact science. This uncertainty makes me uncomfortable. But how important is the plan? You expect an activity to happen in 2 days then it actually happens in 5 days. The contractor sometimes misinterprets the plan and sometimes they do it intentionally. How does one deal with contractor inflation, you can plan as much as you want, but there are so many unknowns that can have an effect.	
Question 8	
Name your two most successful projects and why?	
Alrode TTLR Upgrade	
We built a 7 bay mezzanine loading gantry. It was a difficult project, very complex. And it was done within budget against all our expectations. All groups worked very well together.	Stakeholder collaboration

Dumela Upgrade	Contractor performance
It was challenging to manage a project in Botswana from Cape Town - travelling and logistics was a nightmare and there were very few flights between Francistown and Cape Town. There were many times when meetings couldn't be scheduled on a specific date because there were no flights. Even worse, having to travel to Joburg first! We had great contractors, especially contractor supervision and that is what pulled us through.	Effect of logistical challenges
Question 9	
Name your two most unsuccessful projects and why?	
Maputo COC	Stakeholder buy in
It was very difficult to work in Mozambique - the contractors were bad, the country's infrastructure were bad, the language. The Mozambiquen client supported the local contract above me, the project manager. There were times that the client refused to sign payment certificates for contractors, the contractor would then offload on me.	Contractor performance

	Effect of local governance
Milnerton Slops	Stakeholder cooperation
It was just a big balls-up. Refinery didn't want to play ball and sometimes it felt as if they were intentionally trying to block us.	Stakeholder collaboration
Question 10	
Which e-colour combination do you think make better project managers and why	
Blue and yellow	
You need to be reasonable with contractors, everybody doesn't matter who you are wants to be treated reasonably. We use the same contractors most of the time and there is no such thing as a good or bad contractor. Because I know that I would probably work with them again I need to help them improve, the organisation will benefit from this in the long run.	

Transcript:	**PM4**
Question 1	**Open Code**
How have the implementation of E-colours affected you?	
It taught me a lot about myself. I like to get things done, and when I deal with people I first check their level of competence - people always have to prove themselves to me. I'm also very analytical and I tend to assume that people need the detail, whilst they may not need the detail. So I normally give a lot more info that is required to avoid comebacks and queries. I don't like to go back and explain something again - this is my red shining through. In the past I would be very impatient and would only listen to someone if they know more than what I do. So e-colours changed my behaviour. I have identified some of my potential limiters: rushing or bullying people or expecting stakeholders to aspire to my own high standards.	Change in behaviour Awareness of own limiters Understanding oneself?

Question 2	
Describe your relationships with stakeholders before and after the implementation of E-colours?	
e-colours helped me to deal with stakeholders. I think I communicate better now and it helps me to assess how to get more out of resources.	Communication effectiveness
Question 3	
How do you define project success?	
Finishing the project on time, within budget and with no rework. I ask was the	Lack of accountability

scoping good enough, because rework and scope creep is expensive and blows time. Rushing also puts HES at risk. If the budgeting was not done properly you can't measure or track it effectively. HES is most important in terms of how the contractors perform and whether client operations are at risk. What's happening is that the project managers are becoming more administrative and I hate it. The problem with the schedule is that nobody is held accountable when not sticking to the project plan. The client must also be satisfied, but the nature of projects is that the client don't care about the cost, they just want the best and they want it their way.	Scoping effectiveness
	Project budgeting
	Contractor performance
Question 4	
Which factors influence your ability to achieve project success?	

The contractor must be good, they must be analytical and they must communicate effectively. The must have good drawings, they must have competent supervisor, good NDE, etc. External factors such as wind, rain and ship receipts also plays a big role, but the delays caused by it is usually not that long.	Contractor performance
	External factors
Question 5	
Which organisational factors influenced the success of your projects and how?	
The terminal operations must be collaborative, they must communicate effectively and they must buy into the project. I don't think much about management support because it is usually very good.	Management support
	Client collaboration
Question 6	

Between the following project phases which are you most comfortable with and why?	
Project Initiation	
Project Planning	
Project Execution	
Project Closure	
Project Initiation	Project scoping
I enjoy scoping the project and defining what to do. I like designing and looking at designs. I also like researching the latest methods and alternatives. I also like it if I have done a similar project before and can implement the lessons learnt.	Application of lessons learnt
Question 7	
Between the following project phases which are you least comfortable with and why?	
Project initiation	

Project Planning	
Project execution	
Project Closure	
Project Planning	Planning effectiveness
I don't like it because it is very administrative and way too short. The plan should be treated as the most important phase because it lays out completely what you are going to do and when. I also don't like project closure that much because many things can still go wrong during this phase. Contractors also tend to relax when they think that their work is done.	Contractor performance
Question 8	
Name your two most successful projects and why?	
Tank 860 Upgrade	
Managed a difficult project with no assistance from engineering consultants - I decided that the scope was small enough to not warrant these resources.	

Alrode Firefighting Upgrade	
It was state of the art design - we designed and built a completely new type of system. We changed all hydraulic energised equipment to electrical. There was a big chance that something wouldn't work, but it did.	Effect of new technology and methods
Question 9	
Name your two most unsuccessful projects and why?	
Nomix Project	Stakeholder collaboration / buy-in
The job was to install tags on loading trucks and filler points - loading was not allowed unless there was a match between the tags. What happened was that stakeholder buy-in was not obtained and the project was ultimately stopped due to a lack of CAPEX and nobody was convinced to make CAPEX available. In fact the main user of the tags were not interested in them.	
Alrode CCTV	

This project is still not completed and has been going on for years! There was disagreement between us and Engen and the current CCTV network is still insufficient. Engen wanted the project but we did not.	Operating partner conflict / disputes
Question 10	
Which e-colour combination do you think make better project managers and why	
red-green	
Reds can get things done but does not shy away from the detail. As a project manager, although you are effectively managing people and relying and trusting in what they are contributing, you still need to know the detail especially on critical path works.	

Transcript:	**PM5**
Question 1	**Open Code**
How have the implementation of E-colours affected you?	
I'm a green-blue and I cannot make decisions without feeling comfortable with the info - I also don't like confrontation. I'm very pedantic when it comes to things like quality of drawings, designs, specifications, etc. I'm very impatient. E-colours gave me a lot of information about myself, but it didn't have any effect on my behaviour. It also helped me to understand others but there was nothing significant about that - I learnt how to deal with people throughout my career. E-colours did not make much of a difference.	Effect on behaviour Self-awareness Understanding others

Question 2	
Describe your relationships with stakeholders before and after the implementation of E-colours?	
My relationships are the same before and after e-colours. E-colours is just another initiative deployed by the organisation to get people excited and enthusiastic. Every year there is some new thing that the organisation rolls out - it's also used to show top management that we are doing something different in order to improve results. You can't do the same thing year in and year out - some people have to justify their existence.	E-colours generates excitement and enthusiasm
Question 3	
How do you define project success?	

When executing the project within time, budget, attaining the original objective. The client must be happy with the final deliverables. Quality is a factor but this depends on the outcomes of design reviews.	
	Client satisfaction
Question 4	
Which factors influence your ability to achieve project success?	Operational / Client Delays
Delays cause by hot work permits and the terminals not giving permits quick and efficiently. External factors such as wind, rain, tank ships, pipeline receipts. The choice of contractors. We don't have enough good civil contractors. Contractor supervision, construction supervision can mess up big time.	External Factors
	Contractor selection
	Contractor performance

Question 5	
Which organisational factors influenced the success of your projects and how?	
The feelings and wants of clients. Red tape, clients that do not understand because they are not technically competent. All stakeholders must work towards the same goal. I'm not really affected by leadership - I don't want to get involved in the politics related to decisions on whether the project goes ahead or not. I will speak up if I think that there is risks which cannot be mitigated.	Client's understanding of the project
	Effect of Red tape
	Stakeholder teamwork?
Question 6	
Between the following project phases which are you most comfortable with and why?	
Project Initiation	
Project Planning	Effect of organisational factors

Project Execution	
Project Closure	Effect of legislation
Project Execution	Job satisfaction
I like the practical hands on part of the job, and I like seeing the project grow. During execution there is less queries and less admin work to do.	
Question 7	
Between the following project phases which are you least comfortable with and why?	
Project initiation	
Project Planning	
Project execution	
Project Closure	
No choice - all are equally cumbersome	

Question 8	
Name your two most successful projects and why?	
Alrode Upgrade	
The project was very big, it was complex and very expensive - R100 Million! We finished within time and budget. It was also very challenging and stretched wide across the terminal.	level of or effectiveness of trouble shooting
Waltloo Upgrade	
The project was ongoing whilst the depot was operating - they did not shut down for the project. There was very good trouble shooting. The project went well despite contractor construction manager having no technical experience, no engineering experience or qualifications. He couldn't even read a drawing! A construction manager needs to be a more rounded person.	Effect of project resources or Contractor performance

Question 9	
Name your two most unsuccessful projects and why?	
Tanks 893 East London	
The project team resources changed a lot - there was little consistency. There were many unforeseen problems, which meant that the homework was not done properly.	Change Management effectiveness
	Effect of unplanned events
Kroonstad	Contractor Performance
We had a very poor contractor that messed things up for all of us. We kicked the contractor off-site.	
Question 10	
Which e-colour combination do you think make better project managers and why	
Blue	
Blues are relators so they are concerned with people - they also want to understand people. It is people that make a project successful or unsuccessful.	

Transcript:	**PM6**
Question 1	**Open Code**
How have the implementation of E-colours affected you?	
E-colours didn't really affect me that much seeing that I have completed the MBTI before, the DISC and 360 degree feedback. At that point in time I was shocked and it was a defining moment in my career when I learnt all these things about my personality. I think that 360 degree feedback is more valuable than personality typing, because it gives you insight in what people think about you and how people want to be treated. The bad thing is that 360 feedback only has a small group of participants - it would have been wonderful if I could get feedback from all the people which I work with. I tend to work with the same stakeholders each time. I do see the value of e-colours but to many it's just a case of ticking the box to say that you have completed it. In the end you just go with the flow, because everybody expects you to buy into it.	

Question 2	
Describe your relationships with stakeholders before and after the implementation of E-colours?	
Relationships with stakeholders improved when I started reflecting internally and because I made a conscious decision to learn continually. Because I'm green-red I find that I get along with other green-reds and I don't have to change my behaviour much. But when I need to work with blues and yellows I have to consciously make adjustments to suit that type of interaction. You have to be a chameleon to be a successful project manager. I do not like changing my behaviour to suit others because it feels disingenuous. For every project I work a stakeholder strategy and this is not based on e-colours but based on past learnings working with that stakeholder. I like frankness - call a spade a spade - don't beat around the bush.	Effect of internal reflection
	Effect of continual learning
	Adjusting behaviour to suit others
	Ability to change

Question 3	
How do you define project success?	
When the project is within time, budget and if the client is happy. Whether your client is happy depends a lot on your relationship with the client. I've seen many times that the project quality is poor but that the client is still happy purely because there is a good relationship.	
	Client support/buy in
	Client satisfaction
Question 4	
Which factors influence your ability to achieve project success?	Contractor resources
Technical ability and quality of technical resources provided by the contractor. South Africa in general has a skills shortage. The contractor must be fully involved and a lot depends on whether the contractor is good or bad. There must also be a good relationship between the contractor and the client, because I'm not always on site to	Contractor performance

be the conduit. Both the contractor and the client must also provide good quality feedback.	
	Client-contractor relationship
	Effect of good feedback
Question 5	
Which organisational factors influenced the success of your projects and how?	
The organisation has a lot of red tape. Contractors are not held accountable and there is a culture of it being ok to be behind schedule as long as there are no incidents. The organisation's project management is not streamlined - there is a lot of mumbo jumbo in the processes to either satisfy other overarching processes or to give management a sense of comfort. Instead of processes being in place to help you, you are doing things to satisfy the process. Many times you just tick the box to get it over and done with and to move on.	Effect of red tape
	Contractor accountability
	Project Plan compliance
	Organisation's project management process efficiency

Question 6	
Between the following project phases which are you most comfortable with and why?	
Project Initiation	
Project Planning	
Project Execution	Problem solving effectiveness
Project Closure	
Project Initiation	
During initiation you can think freely and about the bigger picture. You need to solve problems. I specifically like it when no money is involved yet. I also like the designing and clarification part of it and when we need to recycle to rework a couple	

of things.	
Question 7	
Between the following project phases which are you least comfortable with and why?	
Project initiation	
Project Planning	
Project execution	procurement process effectiveness
Project Closure	
Project Execution	Contractor selection
This is my least favourite partly because I have to deal with non-technical people - I don't like the tender process. It’s once again one of those processes which could be better. Where it is supposed to facilitate appointing the right contractor, it becomes more about what the organisation is prepared to live with. Procurement has a disconnect with the real world. Project closure I don't really like but I can live with it. Then there is a lot of admin work, QA/QC packs - if something is missing it can lead	

to an audit finding.	
Question 8	
Name your two most successful projects and why?	
Alrode FF Upgrade	Client relationship
I had a great relationship with the client and I think that's why everything went well. I didn't have to structure my conversation with the client - I just said it like it was and I think he appreciated that. We went over schedule but nobody really cared.	
Klerksdorp Tank Project	Contractor Performance
We had a very good contractor and the contractor took the initiative. I hope to work with this contractor again - depending on if they can navigate themselves through the tender process.	Procurement process efficiency

Question 9	
Name your two most unsuccessful projects and why?	
Milnerton TTLR	
There was a lack of support from the refinery and we cut a lot of corners to get things done. Once again refinery won't do anything until one out of 1000 steps have been satisfied.	Lack of stakeholder support
Milnerton Tanks	
It took 3 years for the project to be completed! There was once again very little support from the refinery. The refinery also insisted that we hold processes although everybody knew this was incorrect processes. The new processes were not approved yet, so therefore they couldn't be used. People don't think anymore - they follow the processes blindly.	Organisational red tape
Question 10	

Which e-colour combination do you think make better project managers and why	
I have no idea! I think the perfect project manager will have strengths across all e-colours. Don't forget that all of us has some percentage of all colours - it is possible that a project manager can have a 25% four-way split between the colours.	

Appendix I: Category Formulation

Category	Extracts from transcripts and memo note
Organisational Policies and Procedures	Operational Requirements
	Project Management processes and Procedures Red tape, burocracy TIME CONSUMING
	Refinery . Other priorities which are more important such as running the refinery
	Procurement processes and procedures early payment is needed sometimes to keep the contractor going
	orders needs to be placed and approved is their weaknesses in the ariba or RFP process
	Requirement to spend CAPE secondary to project plan
	Contractor selection
	Leadership support? Internal politics
	Change Management this is not typically done as part of MOC
	Contractor pool size
	don't hold contractors accountability, e.g there are no penalty causes -(next line)
	if you have any major mishaps like IR or HES issues you will get klciked offsite quickly
	Only few contractors are trusted - sometimes PM will use contractor or supplier which is on database whilst this may not be the best or most appropriate contractor
	- difficult and time consuming to get a contractor on dbase
	Implemented e-colours just another thing to create excitement? (next slide)
	whats so bad about this - surely it must be good?
	Conflicting priorities of business units
	Scope creep there must also be addenda to contracts here
	Holding contractors accountable - penalty clauses
	Logistical challenges
	Staelite project managers, smaller group of PM's covering a large and wide area
	- moc requirements that all must be at one place to sign off documentation
	Training and development of PMs

Contractor Performance	Contractor resources skills and expertise
	Contractor processes and procedures
	Contractor supervision
	can a contractor be good if it has poor supervision? Its unlikely but possible, and this has its own systemic factors, such as the contractor company's processes and procedures, quality of resources, etc.
	Hiding behind e-colours — interesting one - shows that e-colours has negative aspect
	Accountability
	Quality is an expectation
	Project plan compliance
	Feedback quality
	Communication effectiveness
	Working circumstances and morale of contractors
	does the PM have an effect on this - the PM don't communicate directly with contractor resources, but the message which he gives to management can have an effect on resources morale.

External factors	Operational Requirements			define clearly in dimensions what is meant by external factors - includes ecological factors and operational requirements
		Plant availability		
		Plant pipeline receipts		
	Wind, rain, extreme temperatures			
	Local governance	Infrastructure	logistics	can all of these be mitigated by effective planning, problem solving and trouble shooting
	Contractor IR issues - the whole MEIBC or Seifsa can strike			

Health of Stakeholder relationships	If stakeholder relationship is good:		e-colours helped some PMs to improve their stakeholder relationships
		No worries about project plan	
		Client will always be satisfied	
		Utilise e-colours and using lessons learnt	
	Stakeholder contribution		
	Stakeholder collaboration	differing priorities	how do you influence or can you influence priority if priority of of your project is justifiably low
	Stakeholder Influence		
	client's understanding of the project - talks to PM, contractors and various other stakeholders, have to issue work permits - work is normally high risk		
	the PM must be able to communicate on appropriate level		

PM's leadership abilities	Yellow/Blue 4 way split using e-colours to your advantage by understanding self does that mean that you will now change or is it business as usual. Understanding self and own behaviours, limiters, etc. Ability i.t.o people uilising e-colours alligning behaviour/approach to suit Lead people Understanding others and self aligning communication style and method Develop people Engage people connect on a personal level Maximise human resources stakeholder strategies based on previous experiences and e-colours Gaining and maintaining support from stakeholders Using lessons learnt projects are of a repetitive nature and very rarely new internal reflection Accountability Build relationships consistently uses the same contractors, a pool of 6 or 7 contractors level of quality is an expectation Abilit to change, or adjust to situation, or adjust to stakeholder ("a more rounded person, yellows and blues tend to be more people focused") be cameleon everybody has all e-colours its just that some are more dominant learning continually and using lessons learnt Scoping effectivenss ability to do admin stuff because the environment that he is in and wont change Ability to trouble shoot problem solving effect of unplanned events this would mean that he experienced in how long activities take, the criticality of certain activities and risk Scope creep is very demotivating is the end goal which is in sight and which drives the teams are moved ffurther away Helping to improve contractors - CHESM, etc. how effective is it being done? Are we maximising the opoortunity to meat with contractor management Stakeholder Collaboration PM must encourage it stakeholder team work Sometimes it feels disingenious - not to be completely yourself, if you handle other they way in which they preferred to be handled Project budgeting effectiveness Client's understanding of the project - clients (Terminal Managers) are not technically savvy - the PM should therefore be able to communicate salient aspects of project in understandable language sounds like we rely entirely on the contractor - if so, what are we doing about it? Instead of seeing the org processes as cumbersome, can PM leverage or use to his benefit - surely the first time these processes were developed the intention was for the safe and efficient project execution The greater the consequences and the unlikelihood of project success the greater the level of job satisfaction Pm performance is sometimes measured against poor plan

Planning effectiveness and compliance	Requirement to spend CAPE secondary to project plan
	ability to prevent scope creep or re-assessment of project objectives, plan, etc.
	effect of unplanned events
	link between planning and problem solving
	PM ability to create faith and confidence in the plan ability to plan Contractor ability to Plan Having faith in the plan - do activities in accordance with plan, not neccesarily what appears to be cost effective or "quicker"
	PM's ability to plan projects are repetitive so plan can be predictable
	through planning you can lesson or even remove the perceived negativite org processes and procedures - it could just be another activity such as all other activities
	Effectiveness of the plan
	Effectiveness of the feedback
	Stakeholder buy-in

Appendix J: Category Dimensions

Category		Attributes	Examples	Influence and Consequences (variable continuum)
1	Effect of Organisational Policies and Procedures	Projects Managers need to be compliant with the organisational policies, procedures, such as Organisational Project Management tools	Procurement Process Burocracy	Good: Early payment assistance for contractor to continue Poor: Poor supplier and or late payment can lead to long delays
2	Project manager's Leadership Abilities	Project managers need to have leadership abilities appropriate to lead the project team and contractor management	Effective Communication abilities Establishing and maintaining focus on project objectives	Effective Leadership Abilities: will more than likely lead to successful projects Ineffective or no Leadership Abilities: will more than likely lead to unsuccessful projects
3	Contractor's performance level	Onsite project execution are conducted by the Contractors	High performance levels would typically include effective	High performance level: will more than likely result in successful projects Low performance level: will more than likely

			communication, high expertise of supervision and other resources	result in an unsuccessful project
4	Health of stakeholder's relationships		The relationship between the project manager and the Terminal Manager The relationship between stakeholders	Good: Stakeholder collaboration and the client relationship can lead directly to project success. Poor: The inability to obtain and maintain support from stakeholders can lead to the projects being delayed or not completed
5	Planning Effectiveness and Compliance	Putting in place an effective plan and obtaining and maintaining project teams' and other stakeholder's compliance to the plan. The plan should allow for organisational policies and processes which may delay the project	Planning for Organisational Policies and Procedures Planning for events or delays caused by external factors such as industrial	Good: In the case where a project delay is caused by a marine pipeline fuel receipt, this will suspend project hot work. If the planning is effective and all stakeholders are supportive, other cold work activities can be scheduled. Poor: Easy

			relations such as protests and/or strikes	
6	Effect of External Factors	External factors are deemed as factors over which the PM believes he has no control over such as: High winds Rain Extreme Temperatures Terminal Pipeline receipts Local governance Protests/Strikes Influence which activities may be conducted in this period with in the interest of the terminal's and the project crew's safety.	During High winds certain activities such as rigging and lifting may not be conducted When the terminal receives a slug of fuel into their bulk storage tank(s) no hot work may be conducted In extreme heat project contractors may be evacuated from the sites to	High: Infrastructure challenges such as poor roads can lead to long delays (>15 days) in the supply and delivery of spares and equipment Low: A pipeline receipt can delay hot work by approximately 1-2 days, but has not impact on cold work.

			safeguard the workers against fatigue and subsequent injury. Where logistics to and from the project site is hampered by poor local infrastructure.	