University of Pretoria

# THE ROAD TO PURPOSE-FIT SELECTION OF THE CONSTRUCTION MANAGER

**A.H.G. (HENNIE) VAN HEERDEN**

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# Declaration

I, A.H.G (Hennie) van Heerden declare that:

The thesis hereby submitted by me for the degree Philosophiae Doctor (PhD) at the University of Pretoria is my own work and has not previously been submitted at another academic institution. I furthermore cede copyright of the thesis in favour of the University of Pretoria.

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A.H.G (Hennie) van Heerden

# Abstract

**THE ROAD TO PURPOSE-FIT SELECTION OF THE CONSTRUCTION MANAGER**

By

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For the degree Philosophiae Doctor (PhD)

A shortage in experienced skilled construction managers is foreseen in the near future. A big contributing factor is the entering of non-purpose-fit candidates into construction management programmes. Valuable time and resources are wasted on students enrolled in construction management programmes, entering construction management positions and ultimately leaving these positions due to a common misconception of the actual work conditions of a construction manager.

The philosophical framework constituted an underlying pragmatic philosophical underpinning. The researcher opted for mixed methods and action research approached within this study. The research study was restricted to cross-sectional time-horizons as the thesis had to be completed within a specific time frame.

The aim of this research study is to suggest a purpose-fit selection of the construction manager in South Africa. This will link with the soft skills in the competency domain that is currently needed in the industry and in the profession itself.

It is suggested that construction management students should do practical work for a year before they start their studies. This will give them a better understanding of the work conditions, pressure and work-life balance associated with the construction industry, as this is not tested in the online SAPI personality test. Tertiary education in construction management and proper practical experience are crucial; but without the necessary soft

skills and purpose-fit personality profile, the construction manager would not be successful on a project.

Keywords: Purpose-fit selection, Soft Skills, SAPI, Construction Manager, South Africa

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- To my late brother, Steve, your wise words – my compass and light

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# List of Abbreviations

| | |
|---|---|
| AIB | Australian Institute of Building |
| BIM | Building Information Modelling |
| BTI | Basic Traits Inventory |
| CIDB | Construction Industry Development Board |
| CIOB | Chartered Institute of Building |
| CPAI | Chinese Personality Assessment Inventory |
| EBIT | Engineering, Built Environment & IT |
| FFM | Five-Factor Model |
| GMA | General Mental Ability |
| IP | Intellectual Property |
| NMU | Nelson Mandela University |
| PWC | PricewaterhouseCoopers |
| SA | South Africa |
| SACPCMP | The South African Council for Project and Construction Management Professions |
| SAPI | South African Personality Inventory |
| Stats SA | Statistics South Africa |
| TTO | Technology Transfer Office |
| UFS | University of the Free State |
| UP | University of Pretoria |

# PART A

## CHAPTER 1

## 1. RESEARCH PROPOSAL, SCOPE AND OVERVIEW OF THE PROBLEM

### 1.1. Title

THE ROAD TO PURPOSE-FIT SELECTION OF THE CONSTRUCTION MANAGER

### 1.2. Background

The construction industry is a very old industry; and it dates back to approximately 12,000 BC, as archaeological excavations in Europe indicate (Swenson, 2015) (Jackson, 2010). Humans needed protection against the elements in each place they rested, as they travelled after their food source. Only once agricultural activities were initiated, were permanent settlements needed. As the materials, tools and skills involved in construction improved over the years, the industry quickly transformed and expanded from small villages to large, complex and impressive mega-cities.

Over thousands of years, construction has transformed vigorously into an approximately $4 trillion robust industry worldwide (Jackson, 2010). It has its own unique characteristics that definitely separate it from other industries in the economy. In South Africa, the construction industry also plays a pivotal role in the economy; and it is an important contributor to South Africa's economic growth (CIDB, 2012; Stats SA, 2010, cited in Windapo and Cattell, 2013); (Enshassi, Mohamed, Abu Mustafa and Mayer, 2007; Jackson, 2010; PWC SA construction, 2014). Even when the automotive and steel industry is combined, the construction industry is still bigger in terms of its gross domestic-product contribution. Its gross domestic product contribution amounts to between 9 % - 10 % of the world's economy (Jackson, 2010; SA Construction Industry Status Report, 2004).

In South Africa, the construction industry provides more than a million jobs, generating annual revenue of approximately R267bn (Construction Sector Fact Sheet, 2015). Without the construction industry, there would be no infrastructural development; thus, there would be no catalyst for economic growth (Ibrahim, Roy, Ahmed and Imtiaz, 2010). It is fragmented, involves different parties with different needs, and is at the mercy of economic cycles, becoming more complex and volatile in terms of growth (Hegazy, Abdel-Monem, Saad and Rashedi, 2013; PWC SA construction, 2014; Construction Sector Fact Sheet, 2015; Jackson, 2010).

At the University of Johannesburg, a feasibility meeting was held by the CIDB on 23 July 2015, to discuss the possibility of exporting South African contracting services into the African continent. The African continent has been through a metamorphosis, changing from a continent of despair to one of growth potential and prosperity. The African market for construction is expected to grow by 5,7 % in 2015. According to the 2014 International Monetary Fund World Economic Outlook, seven of the ten fastest growing economies in the next 5 years will be in Africa (Deloitte on Africa: African Construction Report 2014; Construction Sector Fact Sheet, 2015).

By tapping into the international market and especially crossing borders into Africa, South African construction companies will have to demonstrate their capabilities in competing with the best in the world. To compete internationally with the best, puts pressure on the industry to ensure that the initial investments in human capital resources are based on the correct skills being identified, developed and rolled out. This would ensure a sustainable, continuous flow of purpose-fit candidates throughout the industry. The construction manager is possibly the most important purpose-fit candidate in any team (Watanabe and Sumpuwejakul, 2002).

## 1.3. Problem statement

The construction manager plays a key role in the construction phase; and ultimately, he forms part of a team that will determine the success of the project. Clients are very demanding and projects become more intricate every year. The lack of experienced construction managers in the construction industry is increasing every year; and that impedes the successful delivery of projects. The construction industry faces challenges to attract and retain skilled construction managers. Lucrative international opportunities and other industries successfully lure skilled construction managers away. The older more experienced construction managers are slowly retiring and draining the industry of irreplaceable knowledge. This creates a continuous, expanding gap that will not be able to be filled within a short space of time. This is leaving the young construction managers to respond to the industry's demand and to manage significant projects at an early stage in their career.

The unattractive image of the construction industry only aggravates the situation. With the void of competent construction managers remaining in the industry, it is important to ensure that the selection of soft skills in the competency domain and the personality profile that is required is as efficient and purpose-fit as possible.

### 1.3.1. Main research question

The construction manager requires an educational background, technical skills, practical experience, with specific soft skills in the competency domain and a specific personality

profile – in order to ensure the success of a project. This will not only assist in the successful delivery of a project, but it will also increase the probability that the construction manager be satisfied on a construction site for longer sustainable periods. What personality profile does a construction manager need and which soft skills will contribute to the success of such an individual?

The research questions of this research study are divided into five research questions:

#### 1.3.1.1. Research question 1

What management skills does the industry require from a construction manager?

#### 1.3.1.2. Research question 2

What soft skills in the competency domain does industry require from a construction manager?

#### 1.3.1.3. Research question 3

What are the variables that must be investigated, in order to ensure an interchangeable model to indicate the soft skills in the competency domain of a construction manager?

#### 1.3.1.4. Research question 4

What is a possible profile of a construction manager, according to the South African Personality Inventory (SAPI) personality test?

#### 1.3.1.5. Research question 5

Does the South African Personality Inventory (SAPI) personally test and select a construction manager who meets the profile requirements of industry?

## 1.4. Limitations, Delimitations and Assumptions

### 1.4.1. Limitations

The study predominantly focused on the built environment, specifically the construction manager. It was limited to construction management in the construction industry. The theoretical literature was an overview on construction management, the South African built environment and purpose-fit selection to retain construction management professionals in the industry. The empirical section focused on South Africa. The structured interviews were conducted with individuals working in the built environment within South Africa who completed questionnaires. The SAPI personality testing were performed by respondents working in the built environment within South Africa and 3$^{rd}$ year construction management

students from three different South African universities, namely University of Pretoria, University of the Free State and Nelson Mandela University.

### 1.4.2. Delimitations

The research study consisted of construction managers in the Gauteng region, with 10 or more years of construction industry experience. The industry construction managers held a tertiary education qualification in construction management. Third-year construction management students from three different tertiary institutions (Nelson Mandela University, the University of the Free State, and the University of Pretoria) were requested to participate in the South African Inventory (SAPI) personality test.

**It is noteworthy to mention that throughout the content of this thesis reference is made to both construction manager and construction site manager.** The description of both of these titles in effect refers to same concept; the task of the construction manager is defined according to the CIOB definition and is broadly described under section 2.1. The reason for specifying construction 'site' manager is to specifically make the reader aware of a construction manager operating on a construction site and not a construction manager performing construction project management functions, as is often a common misperception.

### 1.4.3. Assumptions

The selected construction managers were competent professionals and were assumed to be fully capable to carry out their responsibilities in the built environment.

## 1.5. Importance of the study

A shortage in experienced skilled construction managers is foreseen in the near future. A big contributing factor is the entering of non-purpose-fit candidates into construction management programmes. Valuable time and resources are wasted on students enrolled in construction management programmes, entering construction management positions and ultimately leaving these positions due to a common misconception of the actual work conditions of a construction manager.

The aim of this research study is to suggest a purpose-fit profile selection of the construction manager in South Africa. This will link with the soft skills in the competency domain that is currently needed in the industry and in the profession itself. Assistance can be provided to future candidates in selecting the appropriate programme should they be interested in tertiary studies in construction management.

Fewer construction managers leaving the industry (taking their experience and expertise to their new workplaces) should slowly create an elite pool with the appropriate levels of critical

skillsets. This retained expertise would be vital to the survival and even the expansion of the South African construction industry.

## 1.6. Methodology

After identifying the problem, an in-depth literature study was conducted to identify the soft skills in the competency domain needed by a construction manager, as illustrated in the conceptual model of Figure 1 below. Further empirical research was conducted to reinforce any previous research findings.

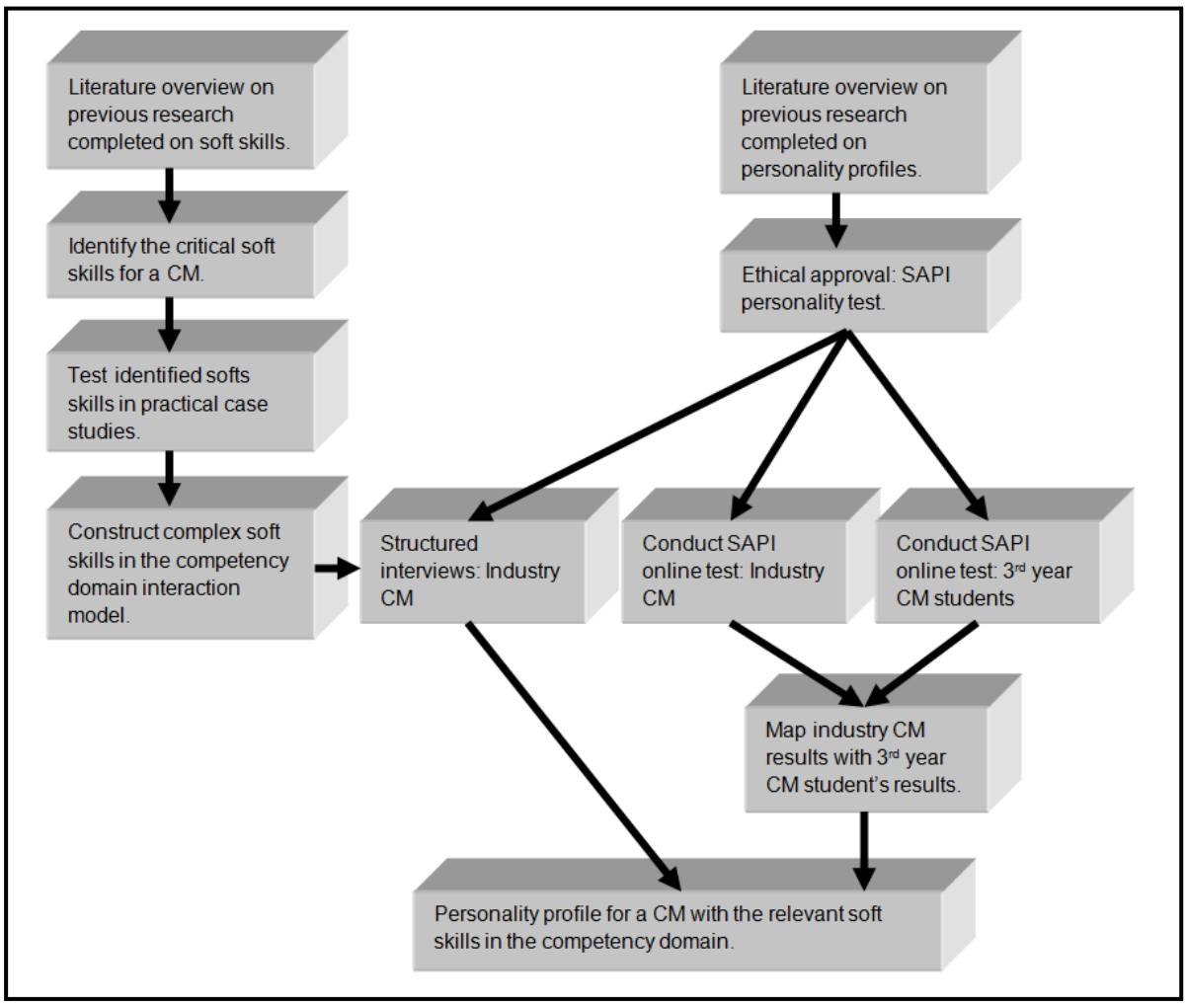


**Figure 1: Conceptual Model**

Structured interviews were conducted with ten construction managers that had 10 years or more industry experience. The results from the structured interviews were then used to assist with underpinning the soft skills in the competency domain that was derived from the literature study. The structured interview results further assisted with the constructability of the soft skills in the competency domain's interchangeable model.

A questionnaire was used to collect all the data from the structured interviews.

The same industry construction managers participated in the online SAPI personality test. Third-year construction management students from three different tertiary institutions (NMU, UFS & UP) also participated in the online SAPI personality test. The results of the SAPI personality tests were received on a database, from where they were distributed to the researcher, in accordance with the rules and regulations of the ethical-clearance process.

These results were then collected, scrutinised, evaluated and discussed, to assist with the proposal of a suggested profile of the construction manager. The third-year construction-management students' results were mapped against those of the industry-construction managers; and further conclusions were made.

## 1.7. Literature overview

The aim with the literature study was to do a theoretical study on the soft skills in the competency domain for a construction manager. The literature study further focused on the tendencies in the personality tests and their validity in the South African multi-cultural context. The following sources were consulted:

- Congress reports
- Dissertations and theses
- Electronic articles
- Journal articles
- Magazine articles
- Text books
- Dissertations and theses

The literature overview forms an integral part of this research study. Adequate previous research was conducted on the soft skills of a construction manager in the competency domain; but very little was done on the personality profile of the construction manager.

## 1.8. Data collection and empirical study

The respondents that formed part of the population of the structured interviews were selected in the built environment. The target population was further restricted by only interviewing construction managers with a B.Sc. degree in construction management, and those with 10 or more years' experience in construction site management. These specific respondents were selected, due to their specific expertise and knowledge that they had gained over the years in the South African building industry. The target population was also selected, on the

basis of each respondent having gained expertise and knowledge in different sectors of the built environment (office/retail, industrial, residential or civil engineering and roadworks).

The researcher also attempted to select individuals with different ages – to specifically investigate whether the responses would vary. The structured interviews used ten construction managers in the Gauteng province. The same participants were used to participate in the online SAPI Inventory personality test.

The same online SAPI Inventory personality test was also used to test the 3rd year construction management students. The total sample size of 15 for the third-year construction management students comprised 11 UP students, 4 UFS students and 1 NMU student. In this research study, the total came to approximately 48 %, which is well above the minimum requirement. For the purpose of this research study, the total number of responses can be regarded as being representative of the population.

By using various research methods, the research did not merely focus on one dataset procurement method. This allowed the researcher to compare the different datasets received during the research study.

## 1.9. Framework and content of the chapters

### 1.9.1. Chapter 2: Background and Literature Study: Soft skills in the competency domain

The aim of this chapter was to give a background overview of the construction industry and the difficulties that are faced on an annual basis. This chapter further investigates the construction manager's role in a construction project; and the focus was on the previous research conducted on the knowledge areas required for the construction manager.

The thirteen key soft skills in the competency domain for a construction manager were identified; and an in-depth literature research was conducted on each. At the end of this chapter, a preliminary complex of the soft skills required in the competency domain of the interaction model was derived. At this stage, the interactive model was discussed and tested in the four practical case-study scenarios in which the researcher was involved. The complex soft skills in the competency domain interaction model proved to be a workable concept that could be developed throughout this research study.

### 1.9.2. Chapter 3: Background and Literature Study: Personality Profiles

The aim of this chapter was to investigate the current personality measurements and their reliability during the recruitment and selection of construction managers. Construction managers have unique characteristics; and therefore, they must be able to ensure that the

correct employee is selected. It is important for the construction manager's personality to be able to embrace the robust construction environment; otherwise, the unhappy individual would be obliged to leave the industry.

This chapter further scrutinises the multi-cultural context of South Africa; and it considers the use of the South African Personality Inventory (SAPI) personality test. The possibility of using the SAPI in predicting job performance; and to incorporate it into the decision-making systems of the selection of a purpose-fit construction manager was also considered.

### 1.9.3. Chapter 4: Research Design and Methodology

The aim of this chapter was to clarify how the research design and the methodology were handled in the study. This chapter further discusses the information on the structured interviews conducted with the ten industry-construction managers. Both online SAPI personality testing for the industry construction managers and the third-year construction management students, from three different tertiary institutions (Nelson Mandela University, University of the Free State and University of Pretoria) are discussed.

The ethical clearance processes, the setting and the participant-selection procedures, informed consent and the permission procedures, the confidentiality of the information, sampling size and the sampling technique, the data collection, the data measurement, the data analysis, the validity and the reliability thereof, are tested.

### 1.9.4. Chapter 5: Structured Interview: Data Collection, Analysis and Findings

This chapter focuses on the empirical research study; and the focus is on the industry-construction managers with a B.Sc degree in construction management, with 10 or more years of construction-industry experience. The chapter further aims to create the opportunity for the researcher to collect new data within the construction environment; and specifically to test the literature findings via the empirical research.

The structure of the interview questions was pre-determined; and it further allowed each interviewee to share his/her experiences, opinions, likes, dislikes and suggestions – without being influenced by other individuals. The data were collected in the Gauteng province; and they were analysed to formulate answers to the research questions. The structured interview questionnaire was divided into three main sections:

- Part A was more on the general statistical information needed to categorise the interviewees into age, project size, project type, project complexity and their sector of involvement;

- Part B was to investigate the importance of soft skills in the competency domain, personality and the work-life balance of a construction manager.
- Part C comprised more personally directed questions to evaluate how the interviewees would describe themselves, the possibilities of improving their lifestyle, their work-life balance – and test whether they are happy in their current profession in the construction industry.

### 1.9.5. Chapter 6: The Online South African Personality Inventory (SAPI) test Results: Industry construction managers and the third-year construction management studies

The aim of this chapter was to suggest a possible personality profile for the industry-construction managers and to map that with the third-year construction management students who participated in this research study. The focus was to see whether there are any deviations in the results between the two groups tested; as this could give the researcher guidance on the type of students in which the tertiary institution invests.

The online SAPI results from the industry-construction managers were further evaluated and discussed to determine the main dimensions that are most important for a construction manager and least important to inherit.

### 1.9.6. Chapter 7: Conclusion and Suggestions

The aim of this chapter is to summarise and conclude the research study. The complex soft skills in the competency-domain interaction model were finalised and presented in this chapter. The SAPI results were concluded; and a possible personality profile for a construction manager was suggested. The most important personality traits for a construction manager, based on the SAPI results, were summarised and tabled. The personality traits least favourable were also summarised and tabled.

Further recommendations were suggested that could assist in closing the middle-management skills gap and to retain the key individuals in the South African construction industry.

# PART B

## CHAPTER 2

## Soft skills in the competency domain

## 2. THE LITERATURE STUDY

### 2.1. Introduction

The construction industry is enormous, diverse and multifaceted; consequently, professional teams are selected to successfully wrestle a specific project from start to finish (Jackson, 2010; Riley, Horman and Messner, 2008; James, 2011; Love, Haynes, Sohal, Chan and Tam, 2002). Those days, in which one specialist had all the necessary skills to successfully complete a project, have become obsolete. Various specialists are needed; one such specialist being the construction manager (McKeon, 2011).

Construction is changing continuously at a fast pace, increasing in difficulty, decreasing construction timeframes and dealing with a multitude of frustrations of one sort or another (Melvin, 1979; Smith, 2003). These aggravations have severe impacts on the construction industry (McKeon, 2011; Walker, 2011).

Notwithstanding these problems, a sustainable construction industry is seen as one of the important drivers of economic growth in every country, including South Africa. The construction industry is employing unskilled labourers, citizens without any formal education. It is obliged to address employment at the lowest level, while reducing poverty, especially in developing countries (Smith, 2003; Ahmed and Saqib, 2010; Ntuli and Allop, 2014; Babalola, Buys and Ncwadi, 2015).

All of the above-mentioned challenges have created a need for highly educated and competent construction-management professionals. As stated by McKeon, so many projects would not have been successful if it were not for the professional-construction manager. Projects like (McKeon, 2011):

- The Township Auditorium in Colombia, South Carolina.
- The new water-distribution system for the Metropolitan Water District of Southern California.
- The ground-breaking ‘visu-centric’ learning facility for deaf students at the University of Washington, DC.

- The San Francisco Public Utilities Commission expansion and seismic upgrade of pipelines, dams, reservoirs and water-treatment plants.
- Ford's Theatre upgrade to comply with the Disability Act.
- The complex and ambitious construction programme of the Woodrow Wilson Bridge near Washington, DC.
- Burj Al Arab, Dubai Tower, Bahrain Twin Tower, Palm Island and World Island projects (Mouchi, Rotimi and Ramachandra, 2011).

By just mentioning a few of these projects, it is clear that the job of a construction manager is regarded as gruelling, intricate and diverse, as well as being profoundly dependent on their managerial skills (Affandi, Hassan, Ismail and Mustafa, 2012). Regardless of the type of contract, to build even the simplest structure requires a number of workers, each with his own specific career skills (Melvin, 1979). A construction manager rarely does the actual construction work; he or she is the overall manager, the cement that holds the job together (McKeon, 2011).

The physiognomy that makes construction management possible is fascinating to people; since it combines a great deal of different skills, rarely found in any other job (McKeon, 2011).

To complete a project successfully, according to the mutually agreed contract, the construction manager needs the ability to manage (Affandi et al. 2012) (Love et al. 2002). The construction industry is contending on the global market; and therefore, the construction manager must be able to think differently (Flagello and Dugas, 2009). The construction manager plays an indispensable role in the construction phase, coping with the difficult dynamics of an ever-changing industry to meet the required project goals (Watanabe and Sumpuwejakal, 2002). There are many other professionals involved in the construction life-cycle; but it is only the construction site management team that creates something that is tangible (Jackson, 2010).

According to Mintzberg (2009), interpreting what successful managers actually do, is the real problem. Managing is neither a science, nor a profession; it is a practice (Mintzberg, 2009). Mintzburg has described managing (as indicated below in Figure 2), as a triangle in which art, craft and the use of science meet. Art includes the ideas and the integration; craft means building on tangible experiences, making the connections; while science enables the systematic analysis of knowledge, thereby providing order (Mintzburg, 2009).

In broad terms, management can be regarded as that field which concerns itself with all the factors, methods, principles and processes involved in the successful functioning of organisations (Cronje, Hugo, Neuland and Van Reenen, 1994). Managers are formally

responsible for supporting the work efforts of other people (Schermerhorn, Hunt and Osborn, 2005). Management is a process of working with and through others, in order to achieve organisational objectives efficiently and ethically (Kreitner and Kinicki, 2001). According to Smit and Du Plessis (1994), management is a process that gives the necessary direction to enterprise resources, so that its objectives can be achieved, as productively as possible in the environment in which it functions.

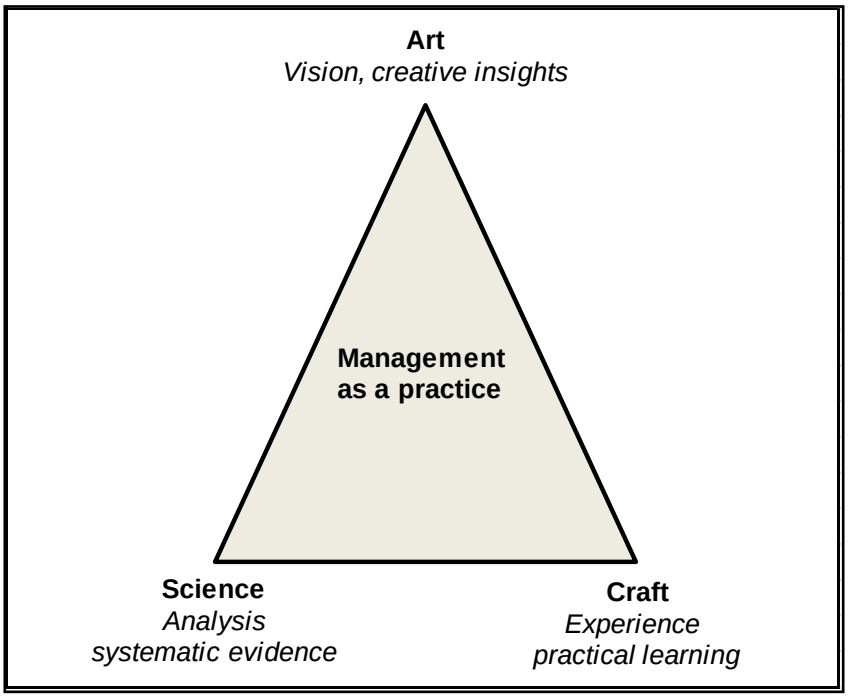


**Figure 2: Managing as Art, Craft, Science (Mintzburg, 2009)**

Construction management is about getting things done properly throughout the whole construction project (Fryer, Ellis, Egbu and Gorse, 2004, cited by Sherratt, 2015). Fryer (2004) further states that a construction manager must be able to forecast, plan and control the work, as well as indicate how these processes should be carried out. While conducting and controlling work, construction managers also need to lead their teams, have sound technical knowledge of construction, be dedicated, experienced, have a strong character and perform well under pressure (Griffith and Watson, 2004, cited by Sherratt, 2015).The Chartered Institute of Building (CIOB, 2010, cited by Sherratt, 2015) defined the construction manager's task as: *"The management of development, conservation and improvement of the built environment; exercised at a variety of levels, from the site and project through the corporate organisations of the industry and its clients to society as a whole; embracing the entire value stream from inception to recycling, and focusing on a commitment to sustainable construction; incorporating a wide range of specialists services; guided by a system of values demonstrating responsibility to humanity and the future of our planet; and informed, supported and challenged by an independent academic discipline".*

*"Construction management addresses the effective planning, organising, application, co-ordination, monitoring, control and reporting of the core business processes of marketing, procurement, production, administration, accounts and finance necessary to achieve economic success and/or profitability for an enterprise or organisation engaged in the provision of construction facilities"* (Harris, McCaffer and Edum-Fotwe, 2013).

The construction manager is responsible for all the functions of management (planning, leading, organising and controlling) of the construction site activities on a daily basis (see Figure 3), coping with continuous resource constraints, to satisfy the needs of the different stakeholders involved; while ensuring that the specified goals of the project are met (Jackson, 2010; Watanabe and Sumpuwejakal. 2002; Love *et al.* 2002).

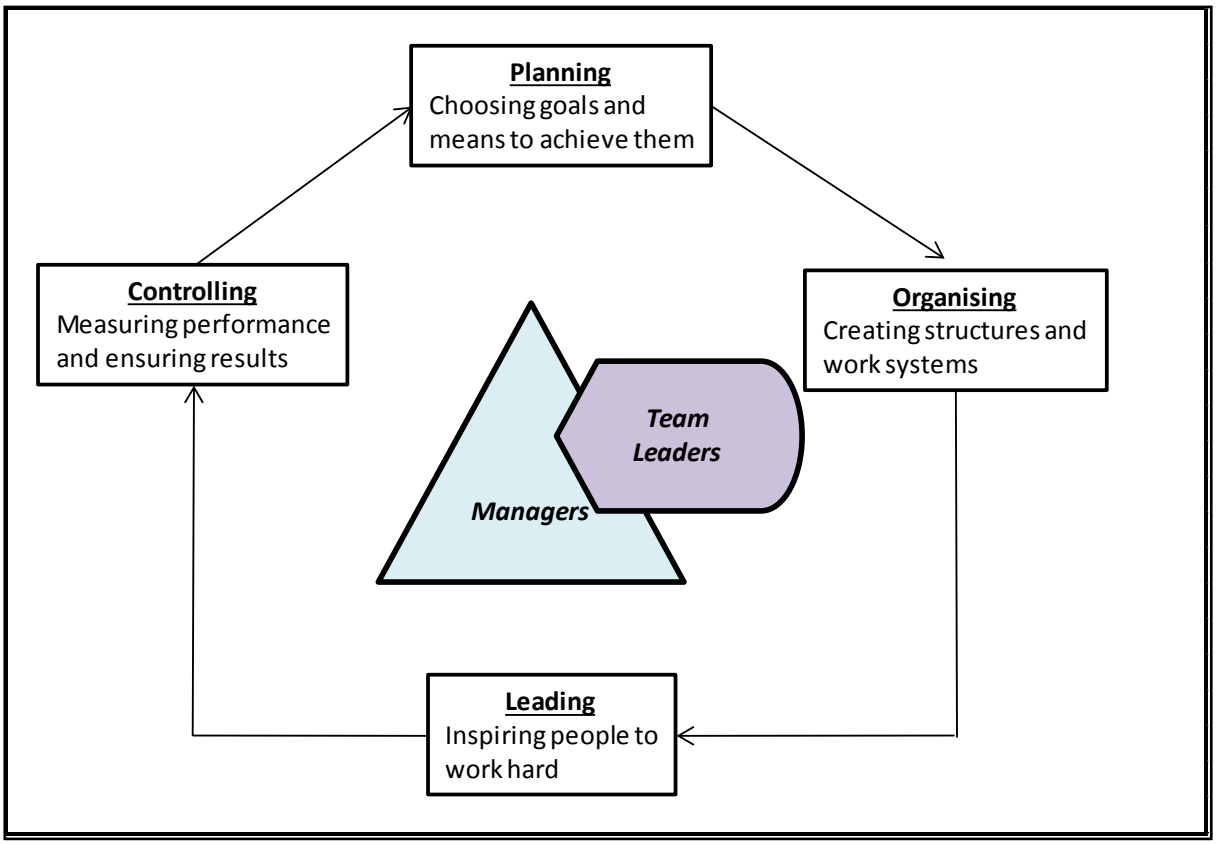


**Figure 3: The management process of planning, organising, leading and controlling (Schermerhorn *et al.* 2005)**

Compared to other industries, the general public in South Africa do not take the construction industry seriously; and they tend to regard it as insignificant. Most citizens see new construction activities as a work-place for people of low intellectual status that generates noise, dust and traffic congestion (De Souza, 2000; Vaid, 1999; Lu and Fox, 2001; cited by International Labour Office, 2001).

This poor image of the construction industry is not restricted to South Africa. In Malaysia, the youth would rather be unemployed than work on a construction site; in Spain it is also difficult to recruit young qualified people.

According to Flagello *et al*. (2009), management is the identification, alignment and integration of available and appropriate resources, in just the right mix, to achieve a desired outcome. It is a discipline steeped in the operation science of precision, processes and execution: input leads to transformation, which leads to output. Systems, quantitative measurements, schedules and processes monitor and control the critical balance between the inputs and outputs, in order to ensure that companies achieve their intended goals. Procedures direct people and processes to perform efficiently and effectively.

According to Mintzberg (2009), interpreting what successful managers actually do, is the real problem. Managing is neither a science nor a profession; it is a practice (Mintzberg, 2009). Mintzburg has described managing as a triangle, in which art, craft and the use of science meet (Figure 2). Art includes the ideas and the integration thereof; while craft means building on tangible experiences, making the connections; and science enables systematic analysis of knowledge, thereby providing order (Mintzburg, 2009).

Drucker contends that management has three primary functions: managing the business; utilising the full complement of the available resources; effectively matching employees with the work required; together with an all-inclusive social-responsibility function (Flagello *et al.* 2009). According to Nicholas (2001), managers should have general business skills:

- Understanding of the organisation and the business;
- Understanding of general management, marketing, purchasing etc;
- Ability to translate business requirements into project and system requirements;
- Strong, active, continuous interest in teaching, training, and developing (Nicholas, 2001).

Construction management is about getting things done effectively throughout the whole construction project (Fryer *et al*. 2004, cited by Sherratt, 2015). Fryer (2004) further states that *"a construction manager must be able to forecast, plan and control the work, as well as indicate how these processes should be carried out".* The Chartered Institute of Building (CIOB, 2010, cited by Sherratt, 2015) defined the construction manager's task as *"the management of development, conservation and [the] improvement of the built environment; exercised at a variety of levels from the site and project through [to] the corporate organisations of the industry and its clients to society, as a whole; embracing the entire value stream from inception to recycling, and focusing on a commitment to sustainable construction; incorporating a wide range of specialist services; guided by a system of values*

*demonstrating responsibility to humanity and the future of our planet; and informed, supported and challenged by an independent academic discipline".* This is the definition that will be used throughout the thesis when referred to the 'Construction Manager' and the 'Construction manager'. The addition of the word 'site' only refers to the fact that the construction manager must physically manage on a construction site. The reader should not confuse this term with a 'Construction Project Manager' as stated by Howes and Cruywagen (2009): *"Within the South African construction industry today, the terms Construction Management and Construction Project Management are used by professionals when in fact they themselves are unsure of the exact definition and description of what each profession entails in adequate detail."*

A certain level of construction know-how, expertise and training are required to manage a project successfully. The construction manager needs to possess the ability to manage a project well and to have the right technical (hard) and people (soft) skills to control the successful outcome of any project (Affandi *et al*. 2012). The CIDB was established in 2000 as a statutory body; and one of their many mandates was the improvement of the construction skills in South Africa (Ntuli *et al*. 2014). The South African Council for the Project and Construction Management Professions (SACPCMP) also refers to these soft skills that must form part of construction management graduate outcomes.

According to Cimatti (2016) there are various definitions of soft skills, but authors use it with little agreement on denotation (Matteson, Anderson and Boyden, 2015). Matteson *et al*. (2015) further explains that a skill must have a component of action, are interpersonal and broadly applicable; thus there is no general set of soft skills that exits (Robles, 2012).

A mismatch with the construction managers hard and soft skills compared to the specific complexity of a project could lead to the ultimate failure of the project (Mouchi *et al*. 2011). Williams (2002), as cited by Mouchi *et al*. (2011) explains that project complexity is pigeon-holed by two measurements: structural complexity and uncertainty, as illustrated in Figure 4 below. Figure 4 further shows that structural complexity hinges on a number of elements and the objectivity of those elements. Another dimension, which makes a project complex, is the uncertainty in goals and methods. Therefore, the construction manager that needs to manage effectively on demanding construction projects would require different approaches, mentalities and skills.

According to Melvin (1979), a construction manager must command a skein of abilities (see Figure 5 below) that thread the range of human occupations. Melvin (1979) further elaborates and explains that the construction manager must have business-management knowledge, understand the different facets of construction, interpret contractual aspects,

possess a sound knowledge of financial management, be able to take risks, mobilise people, equipment, and be an educator. The construction manager needs this wide range of abilities to be able to take the architects' ideas and make them real (Jackson, 2010).

Malvin (1979) stated that the architect is not more talented; but the construction manager just constructs in a different medium.

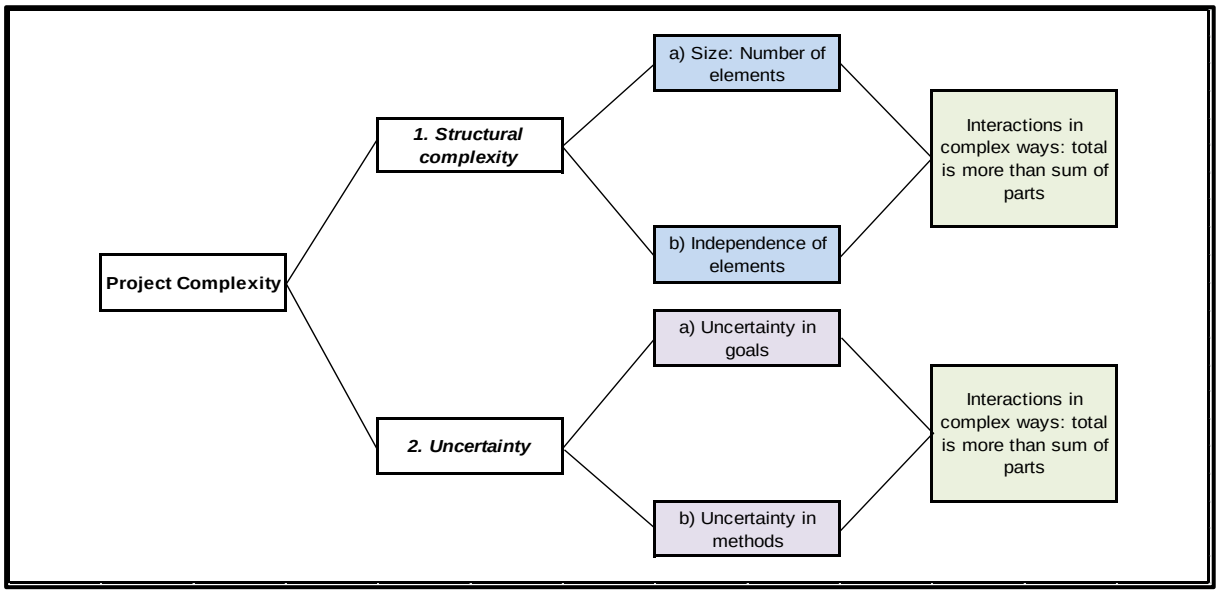


**Figure 4: Dimensions of Project Complexity (Williams, 2002, cited by Mouchi *et al.* 2011)**

The construction manager needs a wide range of skills to manage (by adding value) a project successfully. The demand for dilettante construction managers from industry will only increase. The pressing matter is that the skills gap is continuously increasing for various reasons. This is not only with regard to the South African construction industry; but it is a worldwide phenomenon (Oyegoke, McDermott, Aouad and Cleary, 2009; Citizen, 2015; SA Commercial Prop, 2013; The Guardian, 2015; the Sunday Independent, 2014; CIOB, 2010; CIOB, 2015).

As mentioned earlier, a construction manager requires hard and soft skills (Mouchi *et al*. 2011). These skills include the managerial, technical and legal aspects of work (Styhre, 2008). According to Smallwood, construction managers need to be able to work with people, integrate the efforts of people and have technical expertise (Smallwood, 2006).

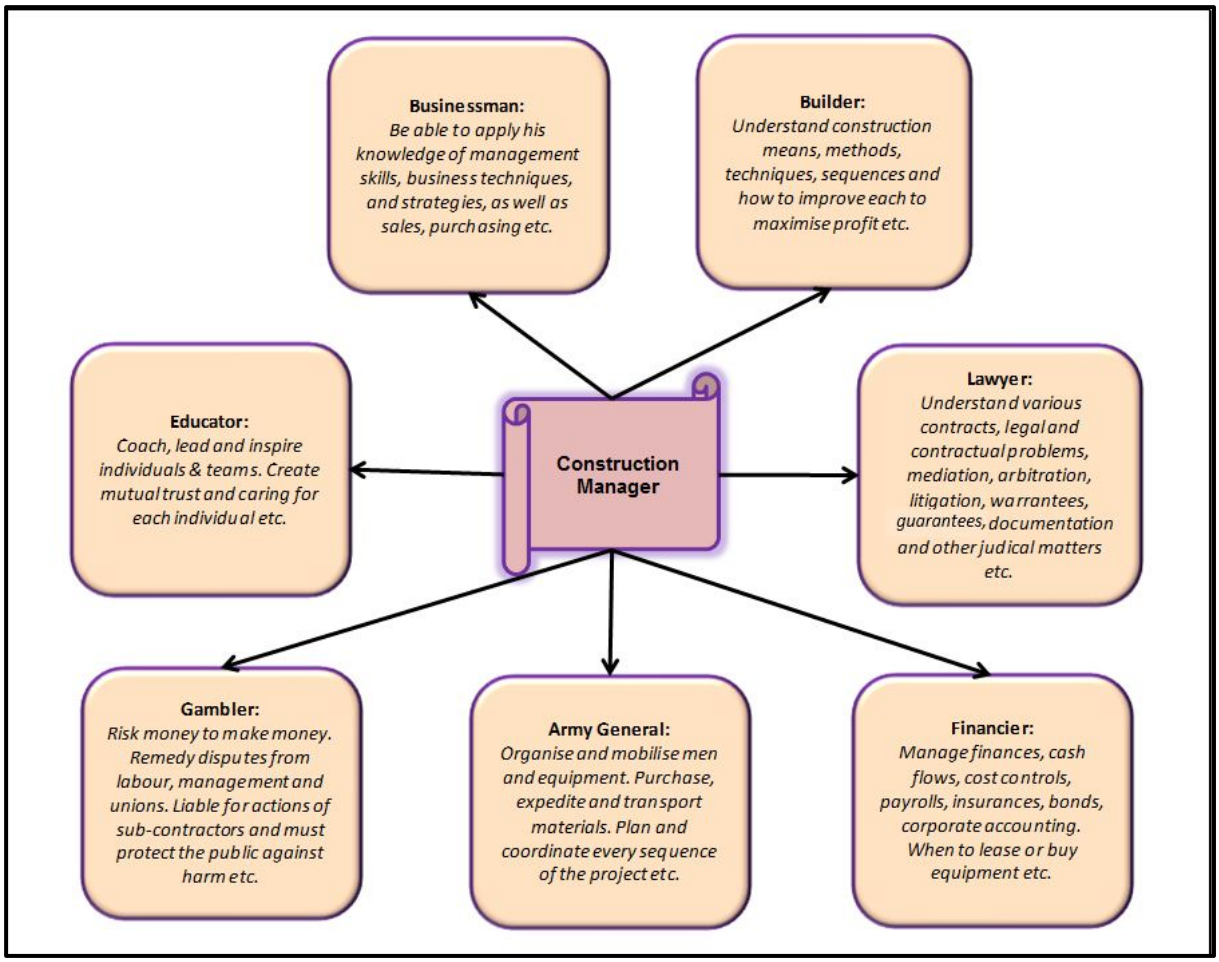


**Figure 5: The construction manager commands a skein of abilities that cover the range of human occupations (Melvin, 1979 and Jarad, 2012)**

Engineering graduates also require personal, business and technical skills (Back and Sanders, 1998, as cited by Love *et al*. 2002). Zulch (2014) divided the skills that a project manager requires into three sets: (1) cognitive skills; (2) technical skills; and (3) communication skills. Sears and Cough (1991, as cited by Love *et al*. (2002), stated that construction management graduates must have three essential attributes:

1. Construction managers are supposed to have practical experience, thus being familiar with the workings and convolutions of the industry.
2. The graduate seems to be accustomed to the various tools and techniques needed for planning, scheduling and controlling construction operations.
3. Construction managers are supposed to have the personality and intuition that would enable them to work in conjunction with other personalities, under stressed and tiresome circumstances.

Employers want construction management graduates, who are team players and leaders, have good personal attributes, information-technology skills, language ability, problem-solving skills and a good awareness of the business environment (Warszawski, 1984; Rigg,

1998), cited by Love *et al.* (2002). Melvin (1979) also focuses specifically on the psychological and inherent issues; but he mentions the fundamental technical and legal problems as well.

The research results of Riley *et al.* (2008) indicated an overemphasis on the development of technical skills and the need for more responsiveness to the development of emotional intelligence (EQ) (Burger and Verster, 2013; CIOB, 2008). The job of a construction manager largely depends on their managerial skills, specifically soft skills (Affandi *et al*. 2012). According to Affandi *et al*. (2012), the soft skills that construction-management graduates possess have been an issue since around the 2000's (Riley *et al.* 2008).

The lack of non-technical soft skills and the over-reliance on the technical skills of graduates in the past have changed; nowadays, the focus is more on the human skills. Human skills include the aptitude to work in teams, problem-solving, adaptability and managerial skills (specifically social skills) (Affandi *et al*. 2012). Riley *et al*. (2008) stated that emotional intelligence and the related management and leadership skills can be learned; and that the science behind leadership is a much more accurate predictor of success than any other form of measure (Ostadalimakhmalbaf and Simmons 2015).

According to Gorman (1998), as cited by Riley *et al.* (2008), although emotional intelligence can be learned, it is not a technical skill that can be trained with a neocortical approach typically taken to develop analytical and technical abilities. As stated by Gorman (1998), his research found that the traits of emotional intelligence are trained in the brain's limbic system. Development of the limbic system is best advanced through motivation, extended practice and feedback.

The tertiary institutions have developed curriculums over years that focus heavily on the technical (hard skills) subjects that form part of the underlying fundamentals of a construction manager. The curriculums also emphasise some managerial and legal aspects with regard to the construction industry. These tertiary institutions in South Africa also differ in the weight of technical, managerial and legal subjects that are taught.

According to the CIOB (2008), managers use more of the hard skills (cognitive and easily measured); while leaders focus more on the soft skills (intangible and difficult to measure; since they involve personal and subjective attributes) (Abduwani, 2012). Hard skills would involve deliverables, such as work-breakdown structures, schedules and critical paths, etc. Usually, there are software tools available that can assist in effectively managing these hard skills. In contrast with the hard skills, soft skills cannot be linked with a deliverable or tangible output. Soft skills generally work without the use of tools or templates (Marando, 2012). Hard

skills may be meaningless if not supported by the manager's ability to combine the necessary soft skills (Robles, 2012).

Businesses rate employees' interpersonal skills as being more important than their analytical abilities (Klaus, 2010; cited by Robles, 2012).

Leadership is also earned; whereas managers are appointed. There is an unyielding need for a new class of construction-industry leaders. Construction managers are managers; but more importantly, they are also leaders (Badger, Sullivan, Wiezel and Bopp, 2009; Ellis and Peterson, 2001; Hyatt and Fakner, 2012; cited by Bradley, Hyatt and Leed, 2013). Badger *et al*. (2009) stated that there will be more construction activities in the next 30 years than those in the last 2000 years, where investment in talent and human resources will be unparalleled. People ensure a construction project's success, and not processes and systems. This reinforces the idea of the importance of the human factor in the construction industry (Mahasneh and Professor, 2015).

There is a broad consensus amongst academia and industry that graduates must be equipped with the necessary technical (hard) skills and non-technical (soft) skills. However, previous reports and research regarding new construction graduates' employability indicates an unsatisfactory low level of soft skills (Ahmed and Omotunde, 2012; Group, 2004; Huitt, 1999; Institute for a Competitive Workforce, 2012; Representatives, 2012; cited by Mahasneh *et al*. 2015; Affandi *et al*. 2012).

In the Global Talent Index Report, (2015), Abduwani (2012) stated that soft skills not only empower the higher education institutions and workforce in advancing career development and personal growth; they also create new opportunities; and they go beyond the motivation for money. The Global Talent Index Report, (2011 – 2015) also mentioned that even in developed countries, there are serious shortages of recruits with the critical soft skills, which companies require most.

In the Engineering News, an article (2013) by Tarita stated that South African companies tend to spend money on the training of soft skills for senior managers; as they do not think it is necessary for everyone in the company to have a firm grasp of soft skills.

It is of the upmost importance for policy-makers and construction-industry business leaders to develop interests and to preserve talented construction managers to ensure long-term sustainable growth and competitiveness for the future of the industry as a whole (McKeon, 2011).

## 2.2. Knowledge areas for the construction manager

Bilbo, Fetters, Burt and Avant (2000) have stated that the construction industry has become more reliant on accredited tertiary programmes to supply individuals adequately equipped to enter into the increasingly complex and demanding work environment.

According to Schroeter (2008) the construction manager must require competence before competency can be achieved. Thus, competency is about the actual performance in a given situation. When the construction manager orally communicate (skill) with an un-skilled sub-contractor, he will be communicating (competency) on a different skills level than to write a professional report (skill) to the client.

A study from Othman, (2014) summarised the skills and competencies (using various sources) that a construction-manager graduate needs to obtain (refer to Table 1).

Jarad, (2012), has also highlighted the specific leadership characteristics and personal factors that would assist the construction manager to effectively manage a successful project. According to Gillard (2012, cited in Jarad, 2012), leadership skills comprise the baseline competencies. This is the ability, through interpersonal skills, to lead the construction site management team (Jarad, 2012).

**Table 1: Skills and competencies needed for a construction manager (Othman, 2014; Jarad, 2012 and Strydom *et al.* 2015)**

| SOURCE | SKILLS AND COMPETENCIES OF CONSTRUCTION MANAGER |
|---|---|
| Katz (1971 cited in Fryer (2004) | Human skills<br>Technical skills<br>Conceptual skills |
| Young and Duff (1990) cited in Smallwood (2000) | Supervision<br>Communication<br>Motivation<br>Leadership |
| Smallwood (2000) | Conflict resolution<br>Leadership<br>Personal management<br>Technical expertise<br>Decision making<br>Oral communication<br>Planning<br>Interpersonal<br>Organising<br>Controlling |
| Love et al. (2001) | Accept responsibility<br>Adaptability |

| SOURCE | SKILLS AND COMPETENCIES OF CONSTRUCTION MANAGER |
|---|---|
| | Time management<br>Work autonomously<br>Interpersonal skills<br>Exercise professional judgement<br>Practical building knowledge<br>Oral communication<br>Trust and honesty<br>Update professional knowledge |
| Gunderson et al. (2000) | Oral and written communication<br>Planning and scheduling<br>Estimating including quantity take-off and bid analysis<br>Project administration<br>Decision making<br>Health and safety<br>Accounting and cost control<br>Construction methods and materials<br>Logistics<br>General education |
| Edum-Fotwe and McCaffer (2000) | Technical skills<br>Managerial skills<br>Financial skills<br>IT skills<br>Legal skills<br>Communication skills<br>General skills |
| Education and Training Authority (2005) cited in Ampofo-Anti (2007) | Basic skills<br>Technical skills<br>Organisational skills<br>Company/industry specific skills |
| Chileshe and Haupt (2007) | Trust and honesty<br>Planning, scheduling, and controlling construction operations and activities<br>Numeracy<br>Time management<br>Measurement, costing and estimating<br>Acceptance of responsibility<br>Practical building knowledge<br>Active listening skills<br>Verbal communication skills<br>Decision making |
| SACPCMP (2006) | ***[Technical competencies]***<br>Knowledge of construction science |

| SOURCE | SKILLS AND COMPETENCIES OF CONSTRUCTION MANAGER |
|---|---|
| | Quality management<br>Health and safety management<br>Environmental management<br>Organisational/management structures<br>Knowledge of building trades<br>Knowledge of the design process<br>Knowledge of financial and cost factors<br>Cost management |
| Verma and Wideman (2002), Benator and Thumann (2003), Hopkins (1996), Wilson et al., (2006), Gosling (2003), Badger et al., (2012), Snee (2005), Hartman (2003), Suresh et al., (2009), Anderson (1991), Farooqui (2008), El-Sabaa (2001), Ogunlana et al., (2002), Edum-Fotwe and McCaffer (2000), Mustafa and Naoum (1997), cited in Jarad (2012) | ***[Leadership characteristics]***<br>Communication<br>Influencing<br>Conflict resolution<br>Empowerment and conscience discipline<br>Problem solving and informed judgement<br>Visioning<br>Team building<br>Planning and goal setting<br>Sense and responsibility<br>Ethic<br>Positive expectations<br>Conceptualization<br>***[Personal factors]***<br>Age<br>Educational qualification<br>Experience<br>Management abilities<br>Leadership capabilities<br>Human relations<br>Administrative experience<br>Technical abilities<br>Personality, traits and abilities of the manager |

The construction manager needs to be intelligent, flexible, adaptive, and competent and have the ability to deal with uncertainty and rapid changes (Love *et al*. 2002). According to Singh (2004), one needs to distinguish between competencies; and divide them into two categories: surface characteristics and core skills. The surface competencies include: knowledge and skills, and core competencies include aspects, such as self-concept, traits and motives. The CIDB distinguishes between the need for scarce skills and critical skills. Scarce skills can be

achieved through training over short time-spans; whereas critical skills are on a deeper level within a specific occupation (CIDB, Skills for infrastructure delivery in South Africa, 2007).

Melvin (1979) has summarised a construction manager as, someone who needs specific skills different from those seen in different professions.

From the above, it can be seen that there is little consensus on the skills and competencies required of a successful construction manager. Lack of success can, however, have devastating consequences, as shown by the high failure rate in the construction industry, both globally and in South Africa.

According to McIntyre (2002), starting a construction business has a higher risk involvement than any other business. Looking at the U.S. Census data from 1989 – 2002, the average rate of failure in the U.S. construction industry is almost 14 %; while the average rate of failure for all industries is less than 12 % (Construction Business Owner, 2007).

Van Vuuren (2013), stated that the lack of skills is the reason why many small, medium and micro-enterprises (SMMEs) failed (Engineering News, 2013). The desperate need to improve construction skills can be seen in the CIDB's Contractor Skills Survey (Report of 2011). The CIDB's statistical information also showed that from 1995 – 2005, around 5900 construction companies were liquidated within the first 5 years; and 80 % of these were in the first year of operation (CIDB, 2004; Stats SA, 2007).

From the above review of the literature, it can be seen that currently four major challenges make it crucial to select and retain successful construction managers:

- Expanding opportunities in Africa
- The key role of the construction manager in successful projects
- The declining numbers of experienced construction managers
- The severe economic impacts of unsuccessful projects.

However, the literature review has also revealed many opinions about skills, competencies and the profile required of a successful construction manager.

## 2.3. The Effective Manager Leadership

Construction companies need effective manager-leaders on their projects; as this would increase productivity and performance (Coetsee, 2002). Compared to manufacturing industries, the productivity performance of construction projects is poor (CIDA, 1993, as cited by Love *et al*. 2002). The scarcity of leadership skills in the construction industry would have a deep impact on the potential sustainable growth of the industry (CIOB, 2007). For management to be effective, good leadership is needed: construction managers are leaders (Walker, 2011; Marando, 2012) (Badger *et al*. 2009; Ellis and Petersen, 2011; Hyatt and

Fakner, 2012; cited by Bradley *et al*. 2013). The previous research of Kreitner and Kinicki (2001) indicated the 11 skills exhibited by an effective manager: (1) He clarifies goals and objectives; (2) he encourages participation; (3) he plans and organises; (4) he has technical and administrative expertise; (5) he facilitates work; (6) he provides feedback; (7) he keeps things moving; (8) he controls the details; (9) he pressurises for goal accomplishments; (10) he empowers and delegates; and (11) he recognises good performance.

According to Ahmed and Saqib (2012), a manager should have 16 skills to be able to manage effectively: (1) health and safety management; (2) quality assurance/total quality management; (3) inspection/quality control; (4) organisational; (5) documentary control; (6) project management/administration; (7) cost control; (8) leadership ability; (9) team building; (10) site planning and management; (11) personnel/resource management; (12) risk-planning, assessment and control, (13) productivity management; (14) managing labour issues; (15) knowledge and information management; (16) and financial management.

Fisher (2010), cited by Mouchi *et al.* (2013) stipulated that effective leaders require specific people skills: (1) The ability to be transparent in his relationships with others; (2) to be able to use good leadership styles to lead people; (3) be able to influence and impress people to support an agenda; (4) not forcing people to change who they are; but accepting them and manage accordingly, (5) be able to deal with conflict decisively; and (6) to be aware of the cultural dynamics of a team.

Coetsee (2002) emphasised five characteristics (see Figure 6 below) that a manager-leader needs in order to be successful.

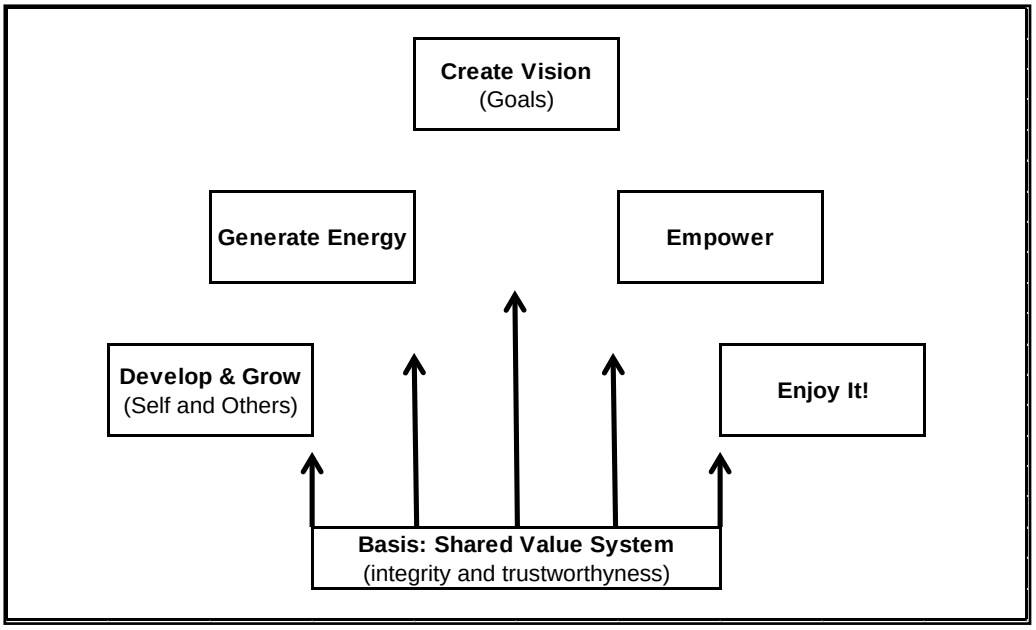


**Figure 6: The elements of successful management leadership (Coetsee, 2002)**

(1) Manager-leaders must be able to create motivation and inspire those ideals, which they desire to achieve. It is thus very important for a manager-leader to give people gist and importance in their different work roles and responsibilities. If the values are not properly aligned, the visions would lose its motivating punch. (2) Fruitful manager-leaders can generate liveliness in other people. Manager-leaders must be role models and be transparent in their passionate commitment towards these goals and values. It is thus important for the manager-leader to assist each subordinate to visualise the realisation of his or her own contribution towards the vision. (3) The ability to empower the people in their team is also very important. According to Coetsee (2002), some elements are needed for the empowerment process to be successful. The manager-leader must provide the necessary resources, training, information and trust. The team member must be competent, have integrity and be trustworthy.

The manager-leader must establish a continuous communication platform and ensure that the team members grasp the whole idea. It is also important for the team members to understand how to use the information that they have received. (4) The growth and development of team members must be stimulated on a regular basis. Manager-leaders must on a continuous basis expand their own knowledge and experience. Except for the fact that he/she must improve themselves with regard to management and leadership through further continuous studies or courses, he or she must also learn from their previous mistakes.

Manager-leaders can learn from their mistakes through receiving feedback from their team members. (5) Manager-leaders relish their work and create an atmosphere in which their team members are also able to experience job gratification. If manager-leaders do not create an environment where their team members can have both fun and be productive, labour turnover and absenteeism will inevitably increase (Coetsee, 2002).

The construction manager must be a ‘savvy’ manager. Savvy is not only to follow a set of structured behaviour or instructions, but a way of being. A savvy manager finds it naturally easy to ethically inspire, lead and motivate people to reach exceptional performances (Flagello *et al*. 2009). According to Flagello *et al.* (2009), to become a savvy manager graduates need the rudimentary management skills taught at tertiary institutions; and they also need to mature in these basic skills. These five savvy managerial skills mentioned by Flagello *et al.* (2009) are self-managing, reflecting, acting consciously, collaborating and evolving.

### 2.3.1. Self-managing

A savvy manager must be able to understand himself, before he can understand and manage his own subordinates. If a manager is self-aware it becomes entwined with the self-management abilities of the people that work with him in a team. Such a manager will be able to uplift team members' abilities, enable them to solve basic issues at work, and in their personal lives (Flagello *et al*. 2009).

### 2.3.2. Reflecting

To take a few minutes every week and quietly embrace all the things that went wrong and the things that were a huge achievement. Things that do go wrong and the reasons why it derailed from the actual base plan will become clearer. The manager must be able to visualise these procedures, actions, emotions and thoughts on a profound level, in order to be able to comprehend the bigger picture (Flagello *et al*. 2009).

### 2.3.3. Acting consciously

Managers sometimes find it demanding to act on the decisions they have made. To intensely manage the anticipated outcomes of their actions and to own the responsibility of their decisions are critical issues (Flagello *et al*. 2009). Savvy managers make calculated decisions after evaluating the possible outcome of each.

### 2.3.4. Collaborating

The savvy manager must be able to hand-pick key individuals, each known for their specific skills, which complement and add value to the team and project as a whole. Through purpose-fit selection, each employee would be able to grasp the concept of the bigger picture (Flagello *et al*. 2009).

### 2.3.5. Evolving

Complacency is a warning signal for every manager. Savvy managers constantly seek opportunities to improve and develop themselves. Even managers that have reached the top of their industry must know their own shortfalls, to take a calculated risk, and to improve their current competency and skillsets (Flagello *et al*. 2009).

Managers can use the interplay of the three learning domains: learning, emotions and body (L-E-B Model) to process and internalise information. The manager can use the L-E-B Model (see Figure 7 below) to realise the five savvy managerial skills to manage his team and himself (Flagello *et al*. 2009).

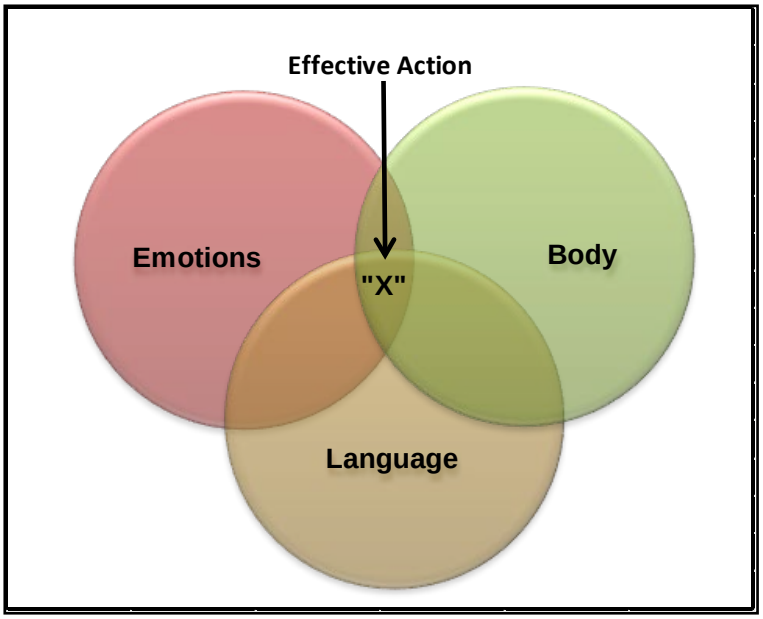


**Figure 7: The L-E-B Model (Newfield Network, Inc; cited by Flagello *et al.*, 2009)**

Flagello *et al.* (2009) stated 'X' at the centre of all three L-E-B circles marks that highest point of your emerging capability to act cohesively, with savvy. Effective action always results from the alignment of what you think, what you say, how you feel, and what you do.

Your ability to pull the circles closer together, thereby making the centre 'X' space larger, is the objective. It is directly connected to your ability to more efficiently reflect upon and integrate your interpretation of events.

# 3. CONSTRUCTION MANAGERS' SOFT SKILLS IN THE COMPETENCY DOMAIN

## 3.1. Introduction

The idea of soft skills originated in 1936 from a book that was published by Dale Carnegie with the title 'How to win friends and influence people'. A shortage of skills from a manager would usually indicate a lack of soft skills. Soft skills are essential to empower hard skills, to advance personal development and professional ethics (Abduwani, 2012). Previous research from Stasz *et al.* (1996), Fleischer and Dressner (2002), cited by Abduwani, (2012) indicated that new employees need to cultivate their soft skills after their initial appointment. Snell *et al.,* (2002), as cited by Mahasneh and Thabet (2015), defined soft skills as *"the ability and traits that pertain to personality, attitude and behaviour, rather than formal or technical knowledge".*

Abduwani, (2012) divided soft skills into three main categories: (1) personal; (2) interpersonal; and (3) situational skills. Abduwani, (2012) further stated that the personal skills include abilities that would improve personal growth, as well as competence in the organisation. The interpersonal skills would assist in developing the individual's ability to think under diverse capacities, aid in team excellence, as well as in organisational competencies. If both personal and interpersonal skills become critical, situational skills can be developed (Abduwani, (2012).

Employers believe that a shortage of soft skills competencies inhibits employees' performance, outputs and efficiencies; since new recruits must have a resilient sense of balance between both hard and soft skills (Mahasneh and Thabet, 2015). According to Playfoot and Hall (2009), as cited by Mahasneh and Thabet (2015), the construction industry is fast changing into a service-oriented industry that competes in a robust global market. In parallel with that, South African construction managers' will have to work with four generations (traditionalists, baby-boomers, generation X and generation Y) in the workplace. Adding to the complexity, each generation differs in values, the level of experiences, managing styles and cultural diversity (Mahasneh and Thabet, 2015).

It is crucial for tertiary institutions and construction companies to cultivate the necessary soft skills. The inability to learn or grow these soft skills would stagnate: (1) the personal growth of construction managers; (2) the ability to manage projects successfully; (3) hinder the construction companies' survival through growth and profitability and (4) decrease the industry's ability to meet the necessary demand.

Previous research completed by various authors has supplied many different soft skills required by construction managers (Table 1). Only thirteen of these skills cross-surfaced in most of the research mentioned above; and they are: (1) leadership skills, (2) communication skills, (3) negotiating skills, (4) conflict-resolution skills, (5) problem-solving/critical thinking skills, (6) decision-making skills, (7) motivation, (8) teamwork, (9) stress, (10) work ethics, (11) flexibility, (12) attitude and (13) integrity.

For the purpose of this study, the emphasis will only be on these thirteen above-mentioned soft skills.

## 3.2. Leadership skills

For years philosophers were baffled with regard to the questions of what exactly constitutes leadership (Melvin, 1979). Thousands of studies have been researched on leadership skills and the various approaches it entails (Selvarajah and Meyer, 2008). The research only delivered a few theories concerning behaviours that differentiate between effective and

ineffective leaders. There is empirical support for each theory; but none of these theories is conclusive (Swanepoel, Erasmus, Van Wyk and Schenk.2000).

There are still disagreements on what the definition of leadership should be (Selvarajah and Meyer, 2008). Some researchers define leadership in terms of personality and physical traits. Others have indicated that leadership is represented by a set of prescribed behaviours; or that this temporary role can be filled by anyone (Kreitner and Kinicki, 2001). The Institute of Civil Engineers defines leadership as: *"The ability to set the direction of a project and guide people through that direction"* (Ostadalimakhmalbaf and Simmons, 2015). Swanepoel *et al.* (2000) defined leadership *as "an influence relationship among leaders and followers who intend real changes that reflect the purposes [that are] mutually held by both leaders and followers".*

Melvin (1979) mentioned that the function of a leader is to modify, direct and control the action of a particular group. Melvin (1979) further stated that psychologists transcend this more-traditional definition; and they study leadership from several points of view: (1) the nature of leadership; (2) the functions of a leader; (3) the traits of a leader; and (4) the types of leadership. According to Melvin (1979), some studies have indicated that leadership:

- Implies a social differentiation: if there is a leader, there must be people that look up to him;
- Also entails screenplay, whether by chance or by recognised authority;
- Certain types of behaviour are expected from leaders. Give direction, wield influence in actions of the juniors, communicate effectively, be trusty to the group, etc.
- Calls for specific drives within individuals.

Schermerhorn *et al.* (2005) define leadership *"as a special case of interpersonal influence that gets an individual or group to do what the leader wants done"*. How people view leadership also depends on their culture. According to Swanepoel et al. (2000), the Arabs idolise their leaders, Iranians seek supremacy and strength and Orientals must be humble.

According to Coetsee (2002), the difference between leadership and management has almost become vague. Leaders cannot be effective without their management abilities; and managers cannot be fruitful without being a good leader. Coetsee (2002) further mentioned that manager-leaders' characteristics should include:

- Self-knowledge, insight and understanding of the world, in which this role must be performed;
- To serve, or unlock, the potential of people and make team members successful;

- To create a motivating environment, which stimulates ownership behaviour and commitment, leading to greater effort, increased performance and satisfaction (Coetsee, 2002).

From the above, it is clear that the manager-leader needs to concentrate on comprehending the prospective of his team members; because he believes that he can only be fruitful if they are prosperous (Coetsee, 2002).

In the South African context, it is important to define leadership with a cross-cultural mind-set; as various cultures view leadership differently (Swanepoel *et al*. 2000). Numerous diverse issues, such as cultural diversity, diverse languages and religion, race and gender pose challenges for South African leaders.

Booysen and Van Wyk (1994), as cited by Swanepoel *et al.* (2000), came up with a specific definition for leadership in the South African context:

- *"A leader is an accepted person, who displays a natural ability in a given situation to inspire others to willingly follow an idea or vision".*
- *"A leader is a person who leads followers to believe in themselves, their own strengths, abilities and worth, who inspires followers to commitment, motivation and self-confidence".*
- *"A leader is a person who is capable of paradigm shifts, who takes risks, is a facilitator of people and empowers people, and who is perceived to be a trustworthy person with high moral values".*

Preliminary research from Booysen and Van Wyk (1994), as cited by Swanepoel *et al.* (2000) indicated that the preferred style of effective leaders in South Africa is to be strong and directive, but also democratic and participative. South African leaders prefer the transformational leadership style; and they are also perceived as catalysts of change, visionaries, individualists, charismatic, responsible and sensitive to followers (Avolio, 1995; cited by Swanepoel *et al*. 2000). Khoza (1994, cited by Swanepoel *et al.* (2000)) disputes the idea that a business culture can be enforced on people and work seamlessly, without taking into account the cultural archetypes of the people in question. Kurke and Aldrich (1983), as cited by Kreitner and Kinicki (2001), stated that culture can influence organisational behaviour in two ways (see Figure 8 below). Employees bring their own customs and values (societal culture) to work; and societal culture is a by-product of organisational behaviour. This again affects the individuals' values/ethics, attitudes, assumptions and expectations.

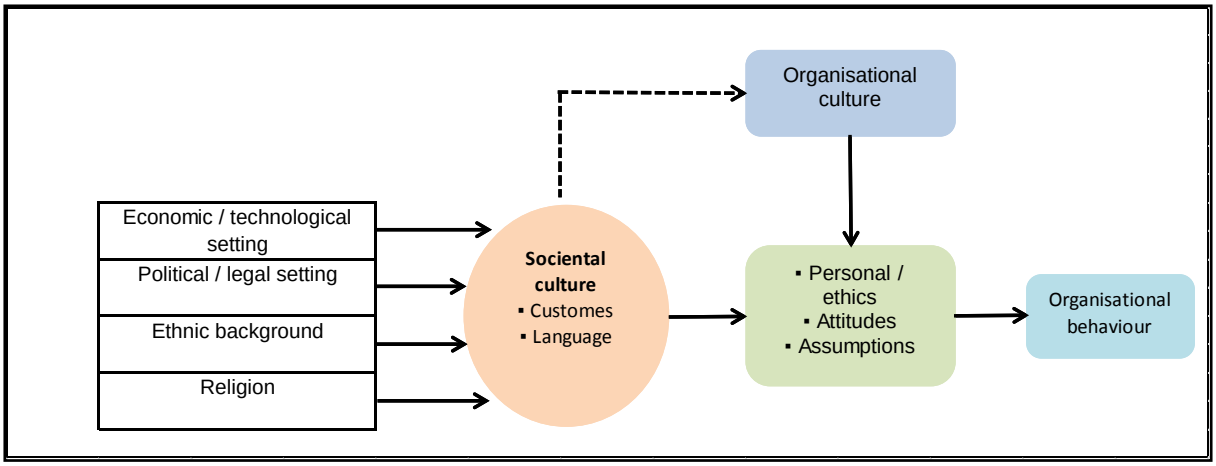


**Figure 8: Cultural influences on organisational behaviour (Punnett and Withane, 1990; cited by Kreitner and Kinicki, 2001)**

Selvarajah *et al*. (1995), cited by Selvarajah and Meyer (2008) constructed 94 'excellence in leadership' value statements and surveyed 671 managers in China. The research emphasised the importance of excellent leadership abilities, especially with regard to personal qualities. The results also showed that young (less experienced) and old (more experienced) managers viewed the importance of excellent leadership differently. The more senior managers ranked excellent leadership much higher in importance than the junior managers. In their research, they divided these 94 'excellence in leadership' value statements into four main categories:

1. Personal qualities:

The most trustworthy indicators of excellence in personal qualities that scored the highest were found to be practical, dependable and reliable, to be willing to work after hours at home, to be empathetic to matters entailing the heart and to be unswerving in dealing with people.

2. Managerial behaviour:

The most trustworthy indicators were found to be able to make timeous and independent decisions, to take risks and the initiative.

3. Organisational demands:

The results showed that participation as a member of the team and playing a supportive role during joint decisions made by others, to score the highest.

4. Environmental influences:

They identified that leaders must constantly be searching for problems and opportunities, to use economic indicators for planning purposes, on a regular basis to evaluate novel technology, to embrace an international perspective in the organisation, to be able to apply

multicultural approaches and to follow those social trends that might influence work (Selvarajah and Meyer, 2008).

Previous research also indicated that great leaders use most of their time to focus on their personal strengths, contrary to the traditional idea of working on all skills and abilities (Buckingham, 2012, cited by Bradley *et al*. 2013). Some research supports the idea of mentorship, concentrating on repetition through real experiences (Kenner and Isaak, 2004, Riley *et al*. 2008; Nadim and Singh, 2008, as cited by Bradley *et al*. 2013).

Other findings from Badger *et al.* (2006) showed thirty 'pearls of leadership wisdom'. The top ten are shown in Table 2 below. The results reinforce the idea that a leader needs to be a mentor, to be able to share information through good communication, and to support sub-ordinates. Leaders have the charisma to push employees to exceed their perceived abilities and still keep a transparent ethical balance. They understand team dynamics; but they still keep employees accountable to achieve expectations.

According to Coetsee (2002), it is one of the biggest challenges for a manager in South Africa to be able to unlock and utilise the potential of their subordinates.

**Table 2: Pearls of leadership wisdom (Badger *et al.*, 2006)**

| | | |
|---|---|---|
| 1 | Leaders educate, give respect and support their people. | 72 % |
| 2 | Communication is the key to all success. | 59 % |
| 3 | Seven magic words: 'please', "thank you", "you're welcome", "yes sir", "no sir", "yes ma'am", "no ma'am". | 57 % |
| 4 | Leaders delegate and trust their employees and bring out the best in everyone. | 48 % |
| 5 | Never ask more out of your people than you are willing to give yourself. | 47 % |
| 6 | Always be open and honest; since openness promotes ethical behaviour. | 45 % |
| 7 | There is no "I" in team. | 45 % |
| 8 | Great leaders are quick to accept blame and quick to give credit. | 45 % |
| 9 | Leaders share information with others; and consequently, they receive additional knowledge. | 43 % |
| 10 | Leaders set expectations and hold people accountable. | 42 % |

The equilibrium between management and leadership skills constantly changes, according to Badger *et al*. (2006). Therefore, the construction manager would require excellent leadership

skills to spearhead behaviour and the actions of all role players involved in a construction site.

## 3.3. Communication skills

It is important for any manager to be able to convey a message to others in an effective way. For the construction manager, it is even more important to be effective in his communication skills. The construction industry is currently fragmented with so many role players involved in a project, each using their own communication mediums. Construction managers in South Africa must be able to communicate with professionals, clients and sub-contractors. The same message from a professional must effectively be conveyed through to an unskilled person on site. Increasing the difficulties, there are communication barriers, like gender, age, different cultures, different languages, personalities, perceptions, environmental situation and the time of the day. From the above-mentioned barriers, it is easy to understand why messages get lost in translation (Melvin, 1979).

Flagello and Dugas (2009) define communication *"as a process of transforming thoughts and ideas into messages transferred between senders and receivers".* Bowditch and Buono (1997), as cited by Kreitner and Kinicki (2001), stated that communication *"is the exchange of information between a sender and a receiver, as well as the inference of meaning between the individuals involved"*. According to Schermerhorn *et al.* (2005), communication *"is the process of sending and receiving symbols with attached meanings".*

Other research completed by the American Management Association also indicated below-average communication skills from managers. The results showed that managers had a 63 % success with communicating information and direction. The findings with regard to listening and asking questions were found to be a little higher at 67 % (Schermerhorn *et al.* 2005). According to Flagello (2009), previous research also indicated that during communication, the actual words that one speaks, account for only between 7 % – 10 % of the message that needs to be conveyed. Body language accounted for 55 % – 58 %; and the vocal tone for 38 % – 40 %. It is important to understand that in the communicating process, there could be more than one barrier disturbing the effectiveness of the message.

The communication process consists of several parts and phases. The key elements in the communication process are illustrated in Figure 9 below.

In terms of face-to-face conversations, the source instigates the message and encodes it (ideas or thoughts). In this case, the transmitter (the human voice) transforms the information into spoken words. The communication channel with a face-to-face conversation would be the air that carries the sound. There are many communication pathways (face-to-face meetings, e-mails, written letters, faxes, and telephonic or video communications) that can

be used during communications. The key is to decide which one would best suit the information that needs to be conveyed. The receiver would then interpret the information conveyed by the sender. The receiver's level of knowledge and experience would influence the way he or she interprets the message received. The receiver must be able to decide whether he or she wants to understand and respond to the message. This can be a daunting exercise during communications for the construction manager. He or she must be able to effectively convey this message from the qualified engineers' specifications and drawings to the unskilled labourer on the construction site, to decrease the probability that the receiver would misinterpret the message. Consequently, it is important for the sender to use more than one channel to communicate the idea.

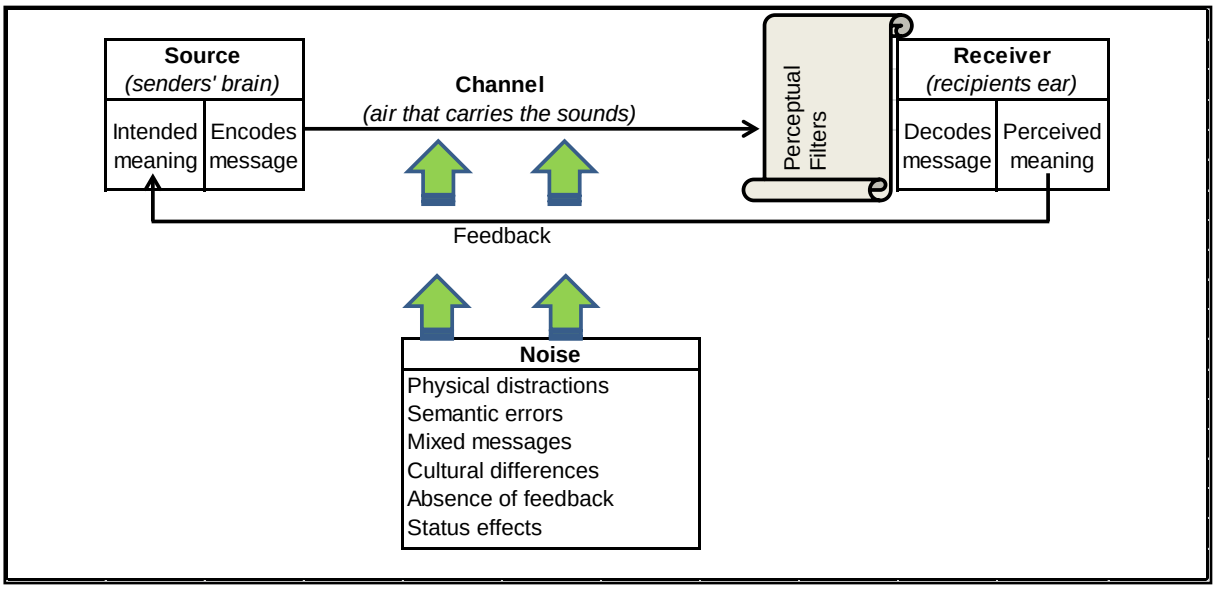


**Figure 9: The communication process and possible sources of noise (Schermerhorn *et al.*, 2005; Melvin, 1979)**

The engineer could email new technical plans to the construction manager, where the manager phones the engineer to clarify any uncertainties. The construction manager then replies on email what he understands with regard to the new technical plans, as telephonically discussed with the engineer (Melvin, 1979; Walker, 2011; Schermerhorn *et al.* 2005; Kreitner and Kinicki, 2001).

The construction manager (receiver) gives feedback on what exactly he understood from the new technical plans emailed from the engineer. The roles change at this point, where the construction manager becomes the sender and the engineer the receiver. The whole idea of feedback is very important, because this is the only way for the initial sender (engineer) to see whether his message has been correctly understood (Walker, 2011; Schermerhorn *et al.* 2005; Kreitner and Kinicki, 2001).

Noise is part and parcel of a construction site. In this case, noise does not only refer to the loud working machinery and equipment, but also to the softer noises, such as the constant dripping of water from the air-conditioning unit in the site office. It is even more difficult to manage emotions that can influence the message conveyed. Huczynski and Buchanan (2007), as cited by Walker (2011), focused on this aspect and identified perceptual filters which can interfere with the accuracy of the decoding. This is a function of people's perceptions that is derived from their values, traits, biases and prejudices (Walker, 2011).

To be an effective communicator, meaningful conversations need to take place. For a conversation to be meaningful, everybody involved in the conversation needs to listen openly and empathically (Flagello and Dugas, 2009). During meaningful conversations, good relationships can be built between the parties involved; and the solutions are better than that which one party can apprehend. Senge (1990) presented the work of Bohm and the concept of dialogue in his published book: 'The Fifth Discipline' (Flagello and Dugas, 2009). According to Flagello and Dugas (2009), dialogue is the flow or meaningful exchange of a conversation; thus it is the essence of conversation. Dialogue is a process of receiving a message, reflecting on all the possible outcomes, and taking the most suitable avenue.

Without the ability to exchange ideas and increase the levels of understanding during the communication process, the communicators would only speak at someone (Flagello and Dugas, 2009).

Flagello and Dugas (2009) further explain that there are three different types of conversations. Speculative conversations are all about being creative (brainstorming), and thinking outside the box. These types of conversations must generate alternative ideas; and the key is to keep in touch with team members imaginative ideas after the meeting has been adjourned. The action conversation is more focused; and decisions are made here. During this type of conversation, action is taken. Resources are allocated, tasks assigned to team members, quality standards are determined; and completion dates are set.

Communication breakdowns are also a type of action conversation. It is very important for any manager, to give his full attention to breakdowns as soon as possible. One way of minimising the impact of communication breakdowns is to ensure that the manager is always approachable. It is important for the manager to use more than one communication channel and to ensure that he has constant contact with his team members (Flagello and Dugas, 2009).

Community-building conversations are the last type of conversation. This type of conversation can be divided into two subsections. It is important for new employees to have (1) orientation conversations on a regular basis. During these conversations, successful

stories are being told to reinforce the framework within which each new employee will operate with regard to the organisation. During communication breakdowns, (2) trust conversations will glue team members together. It is important for the manager to address these issues, whether they are significant or not. The trust conversation must be transparent; and each member of the team must be involved. Some trust conversations are more on a personal note. Obviously, these personal trust conversations must be conducted in a discreet manner. The latter conversation is a very sensitive issue for team members and overstepping the confidentiality boundary could result in irreparable damage (Flagello and Dugas, 2009).

Melvin (1979), Mersino (2005), Burton and Dalley (2010) and Caruso and Salovey (2004) also emphasised the importance of the ability to be able to read non-verbal communication signals. As body-movement signals are transmitted visually; and therefore with greater speed than spoken words. Body movement signals are also not affected by noise barriers, as in the case with spoken words. Melvin (1979) specifically identified four main signals that were relevant to construction: (1) facial expressions, (2) eyes, hands, arms and fingers, (3) voice and (4) space.

Melvin (1979) explained that facial expressions were the more dominant signal and that people change their expressions while they speak. He also explained that this type of expression should always be read in conjunction with the situation. If a person smiles, it could be because the person is happy or under stress, or even embarrassed. Therefore, the receiver should be able to read the context of the situation and the spoken words.

The second most expressive part is the eyes. Depending on the situation, wandering eyes can indicate no interest, disrespect, unfriendliness, even low self-esteem or intimidation (Melvin, 1979).

Hand, arms and fingers are just as strong non-verbal communicators; and we use them on a daily basis. When we watch sports and your team has just scored, you would throw your arms in the air with your fists clenched, suggesting happiness and excitement. If the taxi driver swerves in front of your car, the extended middle finger would also speak a thousand words. The traffic law enforcement officer that regulates a four-way crossing just uses hand signals to communicate with the road users (Melvin, 1979).

How fast or how slowly we speak, the change in pitch and tone of our voice and whether we speak loudly or whisper would have a profound influence on the meaning of what was said. Whispering can indicate deceit; speaking slowly can give the impression of a well-thought through idea. If the construction manager receives a variation order on a Friday afternoon, he

can respond with: *"That is just beautiful!"* Through the tone and pitch of his voice, that sentence is possibly full of sarcasm (Melvin, 1979).

Communication of space is one of the most ignored, noteworthy signals. Each person has a preferred distance between him and another person during a conversation. This comfort zone or private space differ in distance and will depend on how intimate the relationship is. Aspects like different cultures and emotions can also impact on the distance of the space between two people having a conversation. Previous research from Edward Hall, cited by Melvin (1979) indicated that white Americans become ill at ease when a person moves closer than two feet and may back off (Melvin, 1979).

Bennett and Wood (1989), cited by Kreitner and Kinicki (2001) indicated that previous research also indicated the importance of a manager to be able to identify the three different listening styles. As each person prefers to hear information in a fashion that is similar to their own listening style. The inconsistency of different listening styles can also be seen as a barrier to effective listening. The three different listening styles that the research indicated were: (1) results style, (2) reason style and (3) process style. With results style the listener wants to hear the bottom line, action orientated. Reason style type of listener must be convinced whether the solution is realistic and practical. Constantly ask 'why' questions and want to receive information in an orderly manner. The process styled listener is more people oriented and wants in detail to be informed of the whole background situation. They are future orientated with a primary focus on the 'how' and 'benefits'. Processed styled listeners also prefer to develop continuous conversations where they rather would imply something than to state the bottom line (Kreitner and Kinicki, 2001).

Some communication experts contend that listening is the cornerstone communication skill for managers (Kreitner and Kinicki, 2001). They indicated that previous research showed that managers typically spend 9 % of their working day reading. Writing (16 %) and talking (30 %) that leaves listening with 45 %. Further research by Hendriks and Ulijn (1992) indicated that the average American manager spends 30 % of his time speaking, 45 % listening and that top managers may even spend 70 % of their time listening. What was shocking is that people in general only comprehend about 25 % of a verbal message.

Kreitner and Kinicki (2001), defines listening as the process of actively decoding and interpreting verbal messages. Active listening encourages team members to say what they really mean (Schermerhorn *et al.* 2005). It is very important for the manager to keep a continuous flow during the listening process. The listener must not interrupt or respond to the speaker, before he or she is finished delivering the full message (Walker, 2011). Through visual and aurally concentrating on the speaker the listener can show interest in the

conversation (Walker, 2011). It is also very important for the listener to organise all the information during the listening process. If the speaker is finished conveying his/her message the listeners can immediately respond with questions around the clarification of his understanding. Through this back and forth conversations both parties involved can find an understanding and the correct solution to the problem is achieved (Walker, 2009).

The construction is still mainly dominated by males, but in the last few years females started to enter the industry. Tallying to the countless communication barriers already existing on a construction project, gender communication differences add to the list. According to Kreitner and Kinicki (2001) it is important to remember that males and females say the same thing in a different way.

Table 3 illustrates seven different communication patterns between women and men. As stated by Kreitner and Kinicki (2001) the table is generalising men and women and that your perception with regards to your confidence, competence and authority is influenced by your linguistic style. In short, Kreitner and Kinicki (2001) defined linguistic style as the typical speaking pattern of a person.

**Table 3: Communication differences between women and men (Kreitner and Kinicki, 2001)**

| Linguistic Characteristics | MEN | WOMAN |
|---|---|---|
| Taking credit | Greater use if "I" statements; more likely to boast about their achievements; (e.g. "I thought of this" and "I improved that") | Greater use of "we" statements; less likely to boast about their achievements; (e.g. "We thought of this" and "We improved that") |
| Displaying confidence | Less likely to indicate that they are uncertain about an issue | More likely to indicate a lack of certainty about an issue |
| Asking questions | Less likely to ask questions (e.g. asking for directions) | More likely to ask questions |
| Conversation rituals | Avoid making apologies because it puts them in a one-down position | More frequently say " I'm sorry" |
| Giving feedback | More direct and blunt | More tactful; tend to temper criticism with praise |
| Giving compliments<br>Indirectness | Stingy with praise<br><br>Indirect when it comes to admitting fault or when they don't know something | Pay more compliments than men<br><br>Indirect when telling others what to do |

## 3.4. Negotiating skills

Managers negotiate on a daily basis and a construction manager even more so. Construction managers need to negotiate with heads of suppliers, sub-contractors, members of the

professional team, team members, bank managers and organisational departments, for resources within the organisation (Cheung, Yiu Yiu and Yeung, 2006).

Although in construction there are restrictions enforced by the contract and during all construction projects issues do arise on a daily basis, it is not practically possible to resolve all these disputes in court and it should then be settled through a negotiation process during an arranged meeting (Melvin, 1979; Cheung *et al*. 2006).

According to Hendriks and Ulijn (1992), negotiation *"is a process in which two or more entities discuss common and different interests and objectives in order to reach an agreement or a compromise in mutual dependence, because they see benefits in doing so".* Kreitner and Kinicki (2001) defined negotiations *"as a give-and-take process between conflicting parties". "Negotiation is the process of making joint decisions when the parties involved have different preferences"* (Schermerhorn *et al*. 2005). Smit and Cronje (2001) defined negotiation *"as a process of interaction between two parties, directed at reaching some form of agreement that will hold and that is based upon common interests, with the purpose of resolving conflict, despite widely dividing differences".*

Ideally negotiations should not be competitive, but rather be cooperative (not a game, neither a war). The negotiator must be tough about his business, soft for people and must be flexible in attaining his initial determined objectives. Both parties should also trust each other to a certain extent. Safety clauses in construction contracts could damage the negotiation process and the mutual compromise that should flow from a long-term relationship (Hendriks and Ulijn, 1992; Melvin, 1979).

The construction manager in South Africa must have good negotiating qualities. He needs to be able to negotiate with people with no or low educational backgrounds to professional registered people. During these different levels of negotiations the construction manager must be able to be sensitive to the needs of his own team, but also towards the members of the opposing team. The construction manager must use his vast technical knowledge, combined with his communication and listening ability to access the root cause of the dispute. The construction manager needs to be a diplomat, but still need to know when to be rigid or to let go with regards to a specific argument. He must be able to be persuasive and have the logic to know the critically right time to use the information needed to tilt the balance. The construction manager needs to absorb high levels of stress on a daily basis and negotiation is just adding to an already full bucket. To stay patient, calm and within a certain degree to not become emotionally involved will add to his negotiation integrity (Bendix, 2003).

Schermerhorn *et al.* (2005) mentioned three sets of criteria for a negotiation to be effective:

1. Quality: the agreement that is reached between the parties must be sensible and leave both parties fulfilled
2. Harmony: the negotiation needs to embrace good interpersonal relations and be conducted in a harmonious manner
3. Efficiency: only consume time that was really necessary to conduct the negotiation in a harmonious manner.

Bendix (2003) also stated that previous studies from the Huthwaite Research Group tried to identify the attributes of successful negotiators. These studies indicated that the skilled negotiators had broader assortment of alternatives and outcomes than the less skilled negotiators. Skilled negotiators also focus much more on areas of cooperation and twice as much time was spent on long-term objectives. They determined more flexible sequences beforehand and established upper and lower limits during their planning sessions. The skilled negotiators also tend to reserve themselves and do not make immediate counter claims. They think before they speak, focus on avoiding the use of annoying vocabularies and on a regular basis summarises his and the other parties' arguments. They first focus on the problems and then shift their focus on the possible solutions, so both parties can enjoy profits. This is to ensure that the negotiator understands his own reasoning and explanations, and also that of the opposition party involved. The research also showed that approximately 66,67 % of the skilled negotiators would reflect back after the negotiations to review on what happened during the negotiation process, thus learning from past experiences (Bendix, 2003; Fisher and Ury, 1983).

The South African construction manager has an added national challenge on top of the general negotiation skills already mentioned. South Africa is a multicultural country and previous research from Hofstede (1991) indicated that culture (language) affects the competitiveness of an organisation. Hofstede (1991) (as indicated in table 4 below) used cluster analysis and regrouped European countries into eleven cultural areas.

Hofstede (1991) realised after his initial research results that he needed to add a fifth dimension (Confucian dynamism) for Far East countries. The fifth factor included aspects such as respect for ages, tradition, persistence, parsimony, fear of loss of face and sense of shame.

The results for instance showed that cross-cultural negotiations can easily create miscommunications. One of his examples explained that Orientals will say 'yes' even if they mean 'no', as no in their culture means a total rejection of the other party.

South Africa have 11 official languages, although two (Afrikaans and English) are of Western decent and the balance (Ndebele, Northern Sotho, Sotho, (Si)Swati, Tsonga, Tswana, Venda, Xhosa and Zulu) of Bantu origin.

The linguistic classification of Afrikaans and English are West Germanic and the Bantu languages are divided into three main groups: (1) Nguni languages (Zulu, Xhosa, Swati and Ndebele), (2) Sotho-Tswana languages (Northern Sotho, Southern Sotho and Tswana) and (3) Tswa-Ronga language (Tsonga).

**Table 4: Cultural and Linguistic Typologies within Europe (Hofstede, 1991)**

| REGION | CLUSTER | COUNTRY | LANGUAGE | FAMILY |
|---|---|---|---|---|
| Southwest | 3,4,6 | Belgium<br>France<br>Italy<br>Portugal<br>Spain | French<br>French<br>Italian<br>Portuguese<br>Spanish | Romance |
| Central | 8,10<br><br><br>9<br><br>11 | Austria<br>Germany<br>Switzerland<br>Ireland<br>United Kingdom<br>Belgium<br>Demark<br>The Netherlands<br>Norway<br>Sweden | <br>German<br><br><br>Anglo: English<br>Dutch<br>Danish<br>Nordic: Dutch<br>Norwegian<br>Swedish | Germanic |
| Northwest | ? | Hungary | Hungarian * | |
| East | | Bulgaria<br>Poland<br>Serbia and Croatia<br>Russia | Bulgarian<br>Polish<br>Serbo-Croatian<br>Russian | Slavic |

In Afrikaans and English cultures being late for an appointment is considered to be impolite, whereas with the Bantu cultures it is not the case. Afrikaans and Bantu cultures tend to address the elderly in a more respectful manner (Afrikaans: ‘Oom’; Sotho-Tswana: ‘Ntate’), versus their English counterparts (calling a friend’s mom Linda instead of aunt(y) Linda). However this characteristic of the Afrikaans and Bantu cultures is to their own disadvantage in the business world, where it is more acceptable to address colleagues by their first name.

Hofstede (1991) stated that the best approach during negotiation showed to be a listener-orientated communication. The more the negotiator knows of the other parties’ cultural background, the easier it will be to avoid miscommunication during multicultural negotiations.

It is important for a construction manager to have strong negotiations skills in order to successfully handle such situations. Without it, conflict may arise.

## 3.5. Conflict resolution skills

Ideally, negotiations must end up in an agreement. If an agreement is not reached, disputes will arise. The conflicting constraints of time, cost and quality are part and parcel of any construction project (Mersino, 2005). Parties tend to use disputes to pressure opposite parties to yield during the negotiation process (Bendix, 2003). Conflict during these disputes is unavoidable and a construction manager must have the ability to deal with them effectively (Kreitner and Kinicki, 2001).

Projects and especially construction projects are festering grounds for conflict. During construction, there is constantly conflict with regard to resources, rewards and recognition, roles and responsibilities, diversity of team members, cross-cultural dealings, reporting structures, technical decisions, individual personalities, constant change and a lack of emotional intelligence between team members (Mersino, 2005; Kreitner and Kinicki, 2001).

Putnam and Poole (1987), cited by Smit and Cronje (2001) defined *conflict "as the interaction of interdependent people who perceive opposition of goals, aims, values and who see the other party as potentially interfering with the realisation of these goals".* According to Wall and Callister (1995), cited by Kreitner and Kinicki (2001), conflict *"is a process in which one party perceives that its interests are being opposed or negatively affected by another party".* Schermerhorn *et al.* (2005) stated that *"conflict occurs whenever disagreements exist in a social situation over issues of substance; or whenever emotional antagonisms create friction between individuals or groups"*. Kreitner and Kinicki (2001) and Smit and Cronje (2001) also highlight the word 'perceived'; as this indicate that conflicts can be real or imagined; and they can be managed over time.

Construction managers spend a substantial portion of their time on conflict resolution. In some instances, the construction manager is directly involved, or as a mediator between two parties. Good managers must have the ability to early identify possible conflict situations and deal with them before they arise and/or escalate (Walton, 1987, cited by Schermerhorn *et al.* 2005).

Melvin (1979) explained four factors (see Table 5) that could cause intergroup conflict and the escalation thereof.

**Table 5: How intergroup conflicts develop and escalate (Melvin, 1979)**

| ELEMENTS OF INTERGROUP CONFLICT | DESCRIPTION AND EXPLANATION |
|---|---|
| The nature of the conflict | Because of a competitive goal and/or the means to obtain that goal. Two contractors tender for work, only one can win. The contractor wants to maximise his profit, while the client wants the most for the least cost. |
| The past and present relationship between parties | Past history positive or negative can cause lasting effects that will influence a person's present and future behaviour. If the inspector on site dislikes a subcontractor he can become unfairly harsh in inspecting the subcontractors' quality of work. If the subcontractors feels that he was unfairly paid he may retaliate or find ways to take short cuts that will escalate the current hostility. |
| Defining the problem | Distinguishing between frictions because of technical difficulty or personality clashes. Technical problems must be defined, but personalities can distort and aggravate the initial cause of conflict. Misinterpretations of building plans by construction manager or architect did not draw detail on building plans. |
| Strategies, employment and contingent results | If two parties are involved in a clash, the conflict strategy they use will provoke different consequences. If the contractor failed to complete an item and heated arguments arise, the owner then writes a letter smearing the contractor's name. The contractor most probably will then reply in the same manner. |

Dysfunctional conflict (destructive) must be dealt with quickly by the manager to prevent or minimise all the disadvantages with regard to it; as it is just the opposite of constructive conflict. Most of the time, dysfunctional conflict deals with personalities and not necessarily with issues (Kreitner and Kiniski, 2001; Schermerhorn *et al.* 2005). Previous conflict that was resolved on a temporary resolution would only set the stage for the same or similar conflicts in the future (Schermerhorn *et al.* 2005).

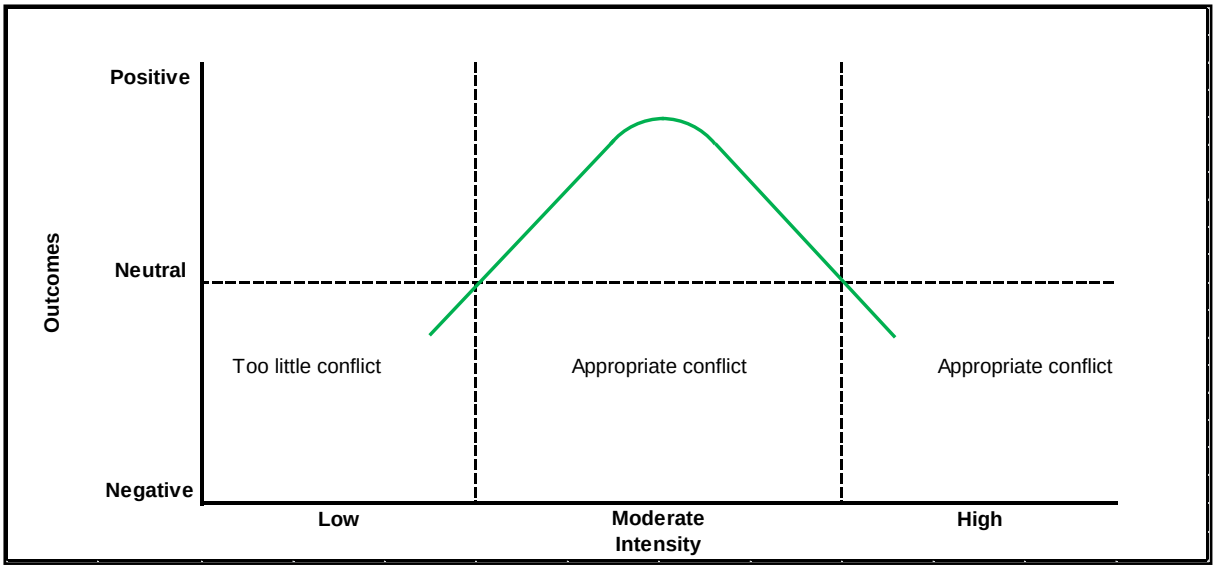


**Figure 10: The relationship between conflict intensity and outcomes (Kreitner and Kinicki, 2001; Schermerhorn *et al.*, 2005)**

## 3.6. Problem-solving/critical thinking skills

Construction managers are daily faced with problems that they have to overcome. Goldenson (1970), cited by Melvin (1979) stated that the problems increased rapidly with regard to the stagnated solving methods. Constantly seeking for new problem-solving methods in an-ever increasing complex construction environment is pivotal for survival (Melvin, 1979). In construction, you can plan as much as you like; but obstacles will regularly surface (Schultz, 2012). The key for the construction manager is to use his problem-solving skills to reach effective solutions. Most problems on construction sites have more than one solution (see Figure 11 below); but the consequences might not be the same (Whelton and Ballard, 2002). Figure 11 illustrates this concept of problem-solving on a daily basis in a case study; and it offers three different possible solutions.

Sternberg (1995) defined critical thinking, in which we consciously direct our mental processes to find a thoughtful solution to a problem. According to Sternberg (1995) critical thinking can be viewed both in terms of analysis (chipping out individual bricks in a brick wall) and synthesis (use the individual bricks to construct a wall). Comparing divergent thinking (creating various ideas) and convergent thinking (concentrating on one idea), convergent thinking focuses on problems that have only one outcome (i.e. 5 + 5 = 10).

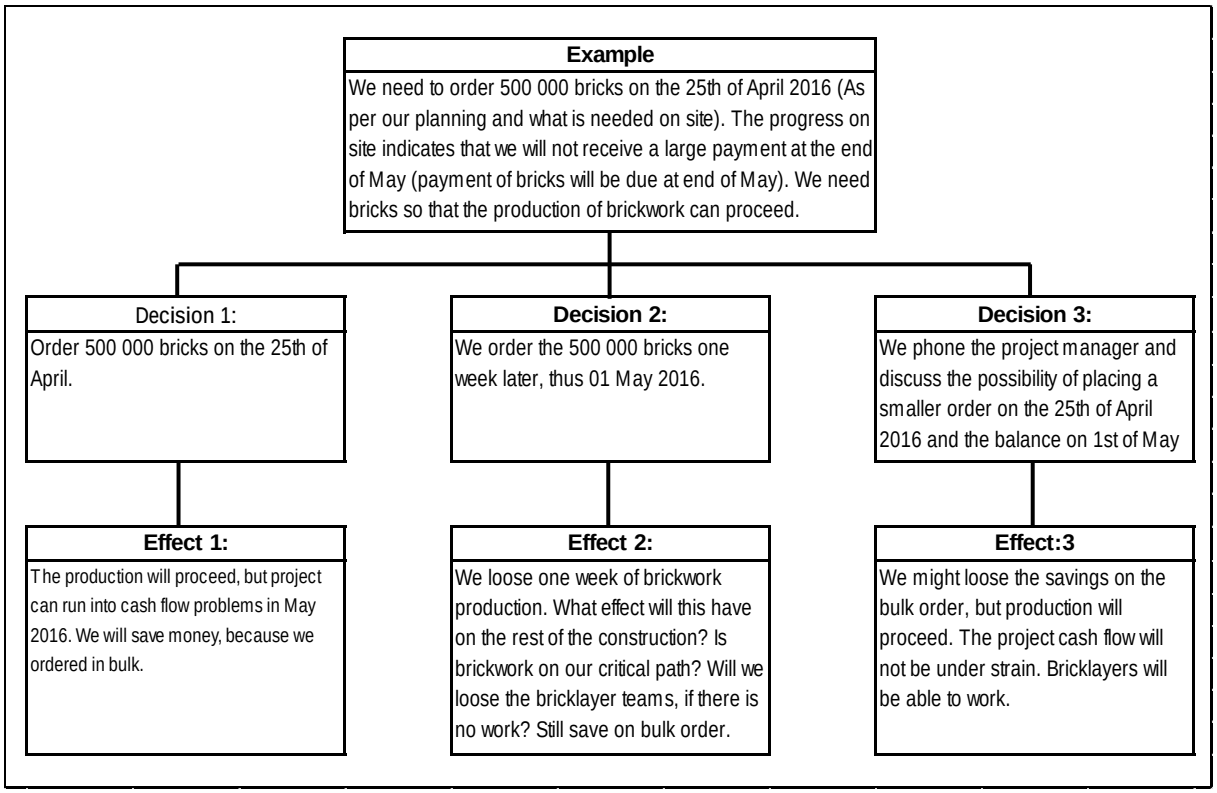


**Figure 11: Typical construction-manager solving problems on a daily basis (Author case study, 2016)**

Were creativity is needed and more ideas needs to be scrutinised, divergent thinking is best (Melvin, 1979., Sternberg, 1995).

According to Sternberg (1995) cognitive psychologists divide problems into two main categories: well-structured and ill-structured problems. Well-structured problems are typically problems with clear paths and ill-structured problems with unclear paths (Simon, 1984., cited by Whelton and Ballard, 2002). During setting out of a building the responsible person must make sure that the corners are square, through using the 3-4-5 rule (well-structured). Will the first year student enrolled for construction management enjoy and succeed working on construction site (ill-structured)?

Melvin (1979) also discusses five factors that can hinder the problem-solving process. The first factor is the inability for the construction manager to acknowledge that a problem indeed exists (lack of recognition). Secondly, the inability of the construction manager to grasp the difficulty surrounding the real scope of the problem (erroneous definition). The third factor is the ability of the construction manager to be motivated in trying to solve the problem (lack of motivation). A lack of motivation will lead to an inability to overcome the problem. Too much zest may blind the construction manager, hastening into choosing a solution, leading to an undesirable outcome. Construction managers use their common sense, past experiences and their practical abilities to tackle new projects. Many older construction managers are

more prone to fall into the trap of not using new construction methods; where they are needed (prejudice and preferences). This could happen in a situation where more creativity is needed to solve a specific problem. Fifthly, if team members' ideas constantly get shot down with scornful remarks low self-esteem will surface in the group (poor attitudes and atmosphere). For team members with poor attitudes and who work in a tense atmosphere the problems on the project will seem impossible to solve.

Melvin (1979) further discusses some problem-solving techniques to overcome the above-mentioned pitfalls (see Table 6 below). The table illustrates the various techniques available and the steps of each technique to be used.

Without giving too much thought about the processes involved, the Dewey system is used to solve all sorts of common problems. If creativity is needed, the Osborn (applied imagination) or Synectics (brainstorming) techniques would be best suited; as both systems increase the quantity of possible alternatives (Melvin, 1979).

**Table 6: Steps in problem-solving (Melvin, 1979)**

| SYSTEM | DEWEY | OSBORN | SYNECTICS | WORK SIMPLIFICATION | MILITARY METHOD |
|---|---|---|---|---|---|
| Steps to follow: | | | | | |
| 1 | Motivation to recognise and solve difficulty | Orientation: identifying the problem | State the actual problem in concrete terms | Select an area or job that needs improvement | Identify the problem |
| 2 | Delimitation - define and restrict the problem | Preparation: collecting relevant material | Analyse and discuss to render the strange familiar (and vice versa) | Collect the facts | Research; assemble and analyse facts and data |
| 3 | Hypothesis - develop tentative solutions | Analysis: breaking down the material into cause / effect relationships | Purge the immediate solution | Challenge the details and implications | Define the actual problem |
| 4 | Test the hypothesis | Hypothesis: developing a wide range of alternatives | Restate the problem | Improve old methods | Brainstorming for innovations and new ideas |
| 5 | | Incubation: letting ideas simmer in order to invite illumination | Use analogies, evocative questions, reversals, improbabilities and other methods to compile many ideas | Implement the improvements | Screen and clarify ideas. Judge the applicability and consequences |
| 6 | | Synthesis: assembling and digesting all information | Follow ideas to conclusions and implications | | Test against external criteria |
| 7 | | Verification: critical judgement of ideas | Apply original and new problem statements to force new perspectives | | Execute |
| 8 | | | Explore new perspectives; repeat steps if necessary | | |

Previous research indicated that more experienced construction managers will have better problem-solving abilities than their less-experienced counterparts, because of their knowledge base. Their existing knowledge base was larger; and the experienced individuals'

information were better organised. This means that the experienced construction managers did not use any extraordinary mental processes. If experienced construction managers are faced with new challenges; they can selectively combine the new information in more ways than their less-experienced counterparts.

With a larger pool of existing information, the ability to generate more problem-solving combinations increases. This gives the experienced individual a much larger catalogue of possibilities for selective-comparison insights into problem solving (Sternberg, 1995).

The construction manager does not have to know all the answers immediately, but must have the ability to reach an effective solution within an acceptable timeframe. It is evident that for the construction manager to be a good problem solver, he needs to have knowledge. This knowledge is not only from tertiary institutions, but also from practical experience on-site. Through constantly motivating himself, he must be able to learn and gain new knowledge on every project in which he is involved in. As with every new project, whether different or similar in scope, there will be other constraints involved.

Through this constantly evolving process, the construction manager can utilise his leadership skill and through effective team communication pave ways for better ways of solving problems (Whelton and Ballard, 2002).

Managers are confronted on a daily basis with decisions that they have to make; and construction managers even more so. These decisions could vary from being relatively trivial to difficult (Smit and Cronje, 2001; Walker, 2011). As decision forms part of a manager's planning activities; it is fundamental to management and found in all levels (individual, group and organisational) of the organisation (Smit and Cronje, 2001; Walker, 2011; Kreitner and Kinicki, 2001; Swanepoel *et al*, 2000; Omar, 2016; Ahmed and Omotunde, 2012). According to Schermerhorn *et al.* (2005), *"decision-making is the process of choosing a course of action for dealing with a problem or opportunity".* Swanepoel *et al.* (2000) referred to decision-making as *"the identification and choice of alternatives, in order to solve problems and to achieve [the] organisational objectives".* Kreitner and Kinicki (2001) defined decision-making as *"identifying and choosing solutions that lead to a desired end result".* Fincham and Rhodes (2005), cited by Walker (2011) defined decision-making *"as a human process constrained by the limits of ability and by the conflicts of social and economic life".*

According to Omar (2016), managerial decision-making is *"the process of making a conscious choice between two or more rational alternatives, in order to select the one that will produce the most desirable consequences (benefits) relative to the unwanted consequences (costs)".* Ahmed and Omotunde (2012) defined decision-making *as "the study*

*of identifying and choosing from alternatives, the best option that suits a purpose. It is regarded as a cognitive study; since it involves mental and logical reasoning".*

## 3.7. Decision-making skills

The improvement of performance and the long-term survival of the organisation is dependent on the manager's ability to make sound decisions (Smit and Cronje, 2001; Walker, 2011; Ahmed and Omotunde, 2012). A wrong decision could have huge repercussions on all three of the levels, mentioned above. According to Jackson (2010), construction managers' decisions influence the six dials they have to manage closely, namely: cost, time, quality, safety, scope and function.

If, for example, the construction manager makes a wrong decision that would delay the time, the ripple effect could mean that his people would have to work overtime to redirect the project back on schedule. If they cannot manage to force the project back on track, there would be a cost effect, such as penalties. Not even to mention the effect that his decision would have on the morale of the team; as they might have to work over weekends, in order to rectify the construction manager's mistake.

There are many quantitative tools that can assist a construction manager in making sound decisions. Such tools might include: decision-trees, break-even analysis, critical-path method (CPM), programme evaluation review technique (PERT). Even with all these tools available to the construction manager, he/she must be able to identify the decision and the conditions, which will be made. His/her knowledge and previous experience would significantly influence the decisions he/she makes. (Walker, 2011; Haidar, 2016; Goff, 2012).

At a very rudimentary level, decisions can be divided into programmed and unprogrammed (non-programmed) types (Walker, 2011; Smit and Cronje, 2001; Schermerhorn *et al.* 2005; Omar, 2016). Programmed decisions are more routine; repetitive; and managers should not spend a lot of time on them. Decision rules can be created for these types of decisions, so that managers can easily decide on which alternative to choose. Unprogrammed decisions are when a manager needs to make a decision on a problem that had not previously occurred. These types of decisions are intricate, vague and ill-structured; consequently, there is no established method for dealing with them.

Although construction projects are unique, previous completed projects might bear some similarity. In most of these projects, the construction manager would have to make decisions on a level between the programmed and the unprogrammed types. If the specific project is unique (first time that the company is doing a project of that type), then the construction

manager would have to rely heavily on his knowledge and previous experience to make sound decisions (Walker, 2011; Smit and Cronje, 2001; Schermerhorn *et al.* 2005,).

As most of the construction managers' decisions are made under some sort of uncertainty; and that involves a degree of risk (Walker, 2011; Smit and Cronje, 2001; Omar, 2016). The manager would have various options available; although their outcomes are uncertain. When the manager needs to make decisions in conditions of uncertainty, both the available options and the outcomes are uncertain. This ability for construction managers to deal with uncertainties is very rare (Smit and Cronje, 2001; Omar, 2016).

According to Walker (2011), the decision-making incorporates both the classical and the behavioural approach (see Figure 12 below). Classical decision theory views decision-makers as *"acting in a world of complete certainty"* and the behavioural decision theory as *"acting only in terms of what they perceive about a given situation"* (Schermerhorn *et al*. 2005). Schermerhorn *et al*. (2005) further explain that both of these theories have their limitations; however, they cannot be completely ignored.

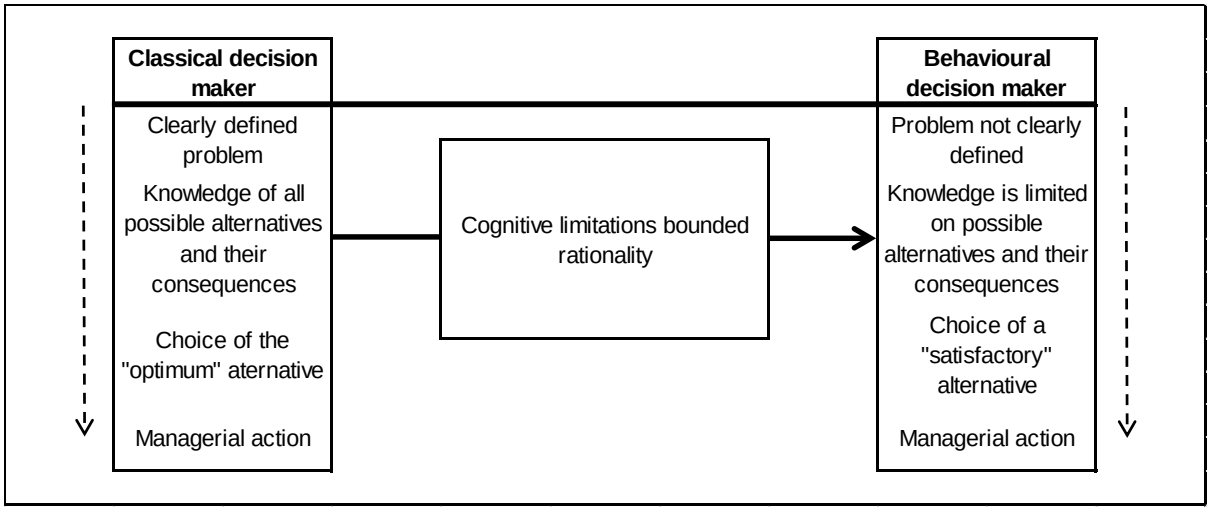


**Figure 12: Decision-making viewed from the classical and behavioural perspectives (Schermerhorn *et al*. 2005)**

Robbins and Judge (2008), as cited by Walker (2011), stated that the personality of the manager would influence the decision he/she makes. Some managers will be more risk adverse; and others might be risk-takers. Gender also influences the manager's decisions; since women would most likely over-analyse a problem. This means that men are less likely to engage in cogitation than women, probably, these differences in gender with regard to decision-making decrease with age (Walker, 2011). A creative manager would also have the ability to generate more new alternatives than their conventional counterparts. According to McShane and Von Glinow (2003), as cited by Walker (2011), creative thinkers have the intellectual ability to scrutinise data, to synthesise information by connecting facts in ways

that have not occurred to others; and they would be able to apply these ideas in the actual world. Their inventive thinking style, sound knowledge and historical experience provide a foundation from which creativity can sprout. They must be able to motivate themselves through perseverance and ensure that their creative ideas are realised (Walker, 2011).

Robbins and Judge (2008), as cited by Walker (2011), also realised that there are also organisational constraints that would influence the decisions that managers make. Some people would base their decisions on what would increase their performance evaluation rating; and not necessarily on what is a good sound decision for the project (Walker, 2011). Ethics and culture can even further distort the decisions made. McShane and Von Glinow (2003), as cited by Walker (2011), determined that moral principles will guide the decision maker to do the right thing.

They further stated that ethical issues should be tested against the three ethical perspectives: (1) Utilitarianism will look at what will be best suited for most of the people; (2) individual rights where everybody has the freedom to act within certain parameters; and (3) distributive justice must favour those worst off in society; and then inequality is acceptable, if it has resulted from equal access to all positions in society.

Culture in construction organisations is a potent force; and it is complex on projects, as a result of subcultures (Walker, 2011). In construction, there are many interacting subcultures involved on a project. Through scrutinising construction professionals, it is clear that organisational subcultures have a different set of values. According to Gouldner (1957), as cited by Walker (2011), construction professionals are less dedicated to their companies (Cosmopolitans); rather, they are extremely dedicated to their specific skill roles.

Construction projects are so complex that specialised skills are needed from different fields to be able make a sound decision. Group decision-making is also another route that the construction manager can utilise, especially when these unprogrammed decisions surface. In stages 2 and 3 in the group decision-making process (illustrated in Figure 13 below), that relies heavily on creativity and innovation, objectives and alternative actions should be generated. Group decision-making can enrich this process, specifically in the case of non-programmed decisions; where there is generally a significant amount of uncertainty about the result (Smit and Cronjé, 2001).

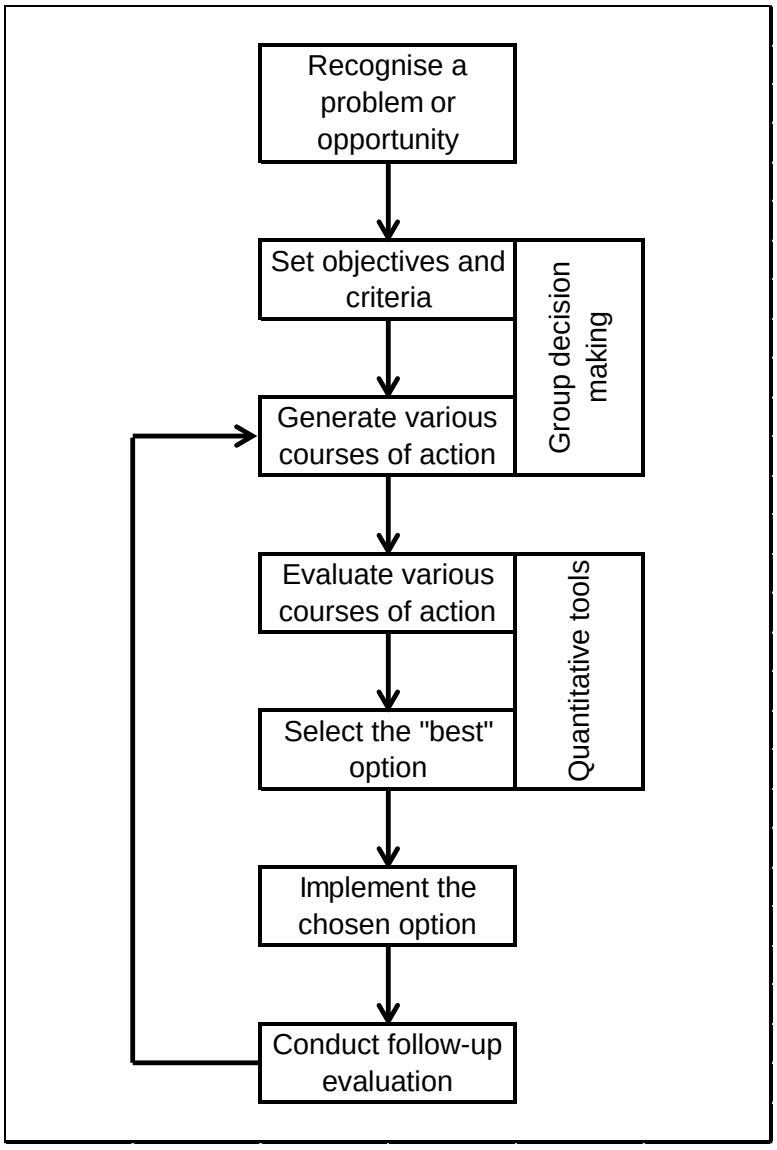


**Figure 13: The decision-making process/model (Smit and Cronjé, 2001)**

It is of the utmost importance for the construction manager to be able to make individual decisions; but also to know when to rather consider group decisions. According to Brown (1998), as cited by Smit and Cronjé (2001) "*groups make better decisions than the average group member; since their decisions consistently fall short of the quality of decisions made by the best individual member*" (Kreitner and Kinicki, 2001:355). The construction manager can use a combination of the two (consultative decision), by making an individual decision, but also by reinforcing his/her decision with the other parties involved (Schermerhorn *et al*. 2005).

In South Africa, the group decision-making tools for construction managers would typically be the ones that lower and middle management use. As can be seen from Figure 14 below, these tools are typical of brainstorming (lower management), nominal and group techniques (middle management). It should be noted that any type of technique can be used at any

management level. This is just an indication of where the different techniques are mainly used (Smit and Cronjé, 2001).

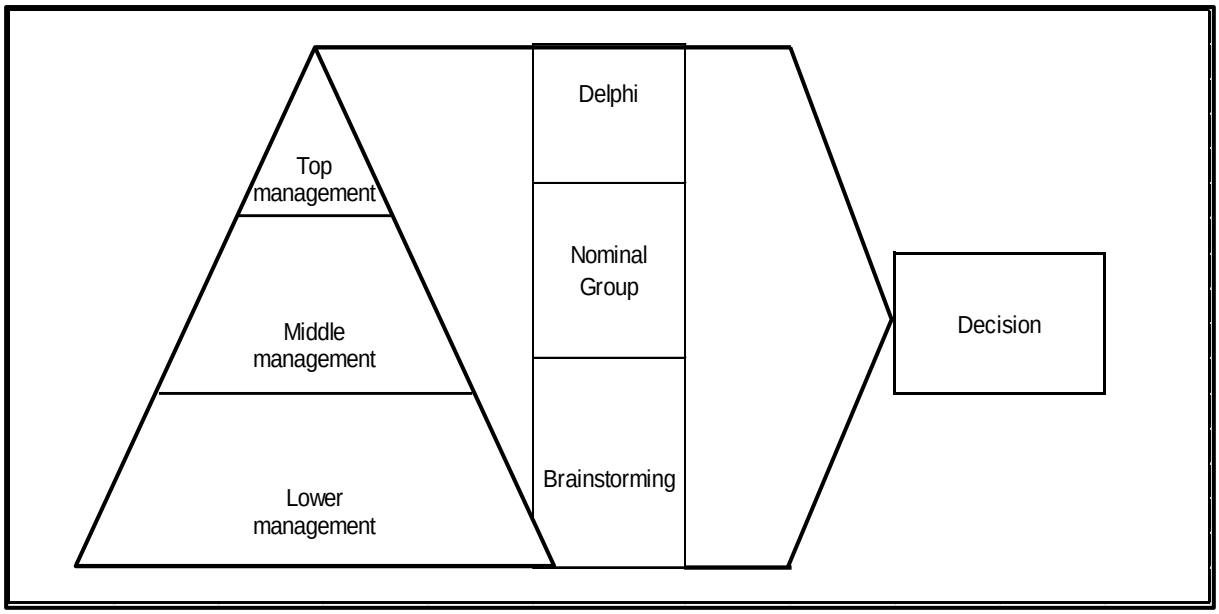


**Figure 14: Group decision-making techniques (Smit and Cronjé, 2001)**

The Delphi technique can be used where face-to-face discussions are not practically possible. The manager might find himself in a position where he/she must decide something; but he/she needs experts' opinions that are in different geographical areas (Kreitner and Kinicki, 2001, Smit and Cronjé, 2001).

It could also be used where conflict could blight the communications, or where a certain individual might dominate the group discussions (Kreitner and Kinicki, 2001). After the problem is clearly identified, experts are asked to think of possible solutions through the use of questionnaires. The information is then compiled at a central location, recorded and reproduced. The results of the questionnaires are then supplied back to the experts. They are then asked to look for more solutions after reading through the previous results. This might cause changes in a position, or create new solutions. This process is then repeated until consensus is reached.

The nominal-group technique is typically a structured group meeting, where all the members are present. To minimise the dominance of one member in the group, each member operates independently. The problem is then discussed, explained; and then each member writes his/her ideas on a piece of paper. In random order, the members then give their possible solutions. All the solutions of the members are then written down on a blackboard; and at the end, members are given 30 seconds to defend or support any of the possible solutions. The group members then anonymously vote for their best choices through a weighted-voting procedure. The group leaders then add up the votes; and they determine the

group's choice. The group can now discuss the top-ranked solutions and vote again – before the final decision is made (Kreitner and Kinicki, 2001; Smit and Cronjé, 2001).

Brainstorming is a good idea; if a variety of ideas need to be generated in a relatively short timeframe. In 30 – 60 minutes, one can easily generate between 50 – 150 ideas. The biggest problem with brainstorming is that the members in the group tend to obey the dominant group's opinions. This could lead to the decline of creativity; but can be minimised if the team leader adheres to the following 5 rules: (1) the idea of creativity and imaginative solutions must be created and judgement must be blocked; (2) outrageous solutions must be welcomed and encouraged; (3) there must be a vast range of solutions; so quantity and not quality is very important; (4) members must be encouraged to combine or to improve the solutions mentioned and; (5) ranks should be nullified; so that everybody has the same seniority in brainstorming sessions. It is important to understand that brainstorming only generates ideas. The Delphi and Nominal group technique actually arrives at a preferred solution (Kreitner and Kinicki, 2001; Smit and Cronjé, 2001).

Construction managers can also use quantitative tools to assist them to increase their decision-making skills. Tools, like decision-tree analysis; Pay-off matrix (middle management) and Queuing theory, Linear programming (lower management) can be used to improve their decision-making skills (see Figure 15 below).

Simulation can be used to imitate a set of real conditions; so that the probable outcomes of various actions can be compared (Smit and Cronjé, 2001). It can also be used for performance optimisation, safety engineering, testing and education (Ahmed and Omotunde, 2012). Mining engineering at the University of Pretoria is already using virtual reality to prepare students for health and safety scenarios underground in mines. Construction managers can do similar virtual simulations, in order to predict certain outcomes. Information-based Modelling (BIM) can also play a pivotal part in enhancing simulations for construction managers, and also for students enrolled as future construction managers. The only drawback with simulation is that experts are needed to do the evaluations (Ahmed and Omotunde, 2012).

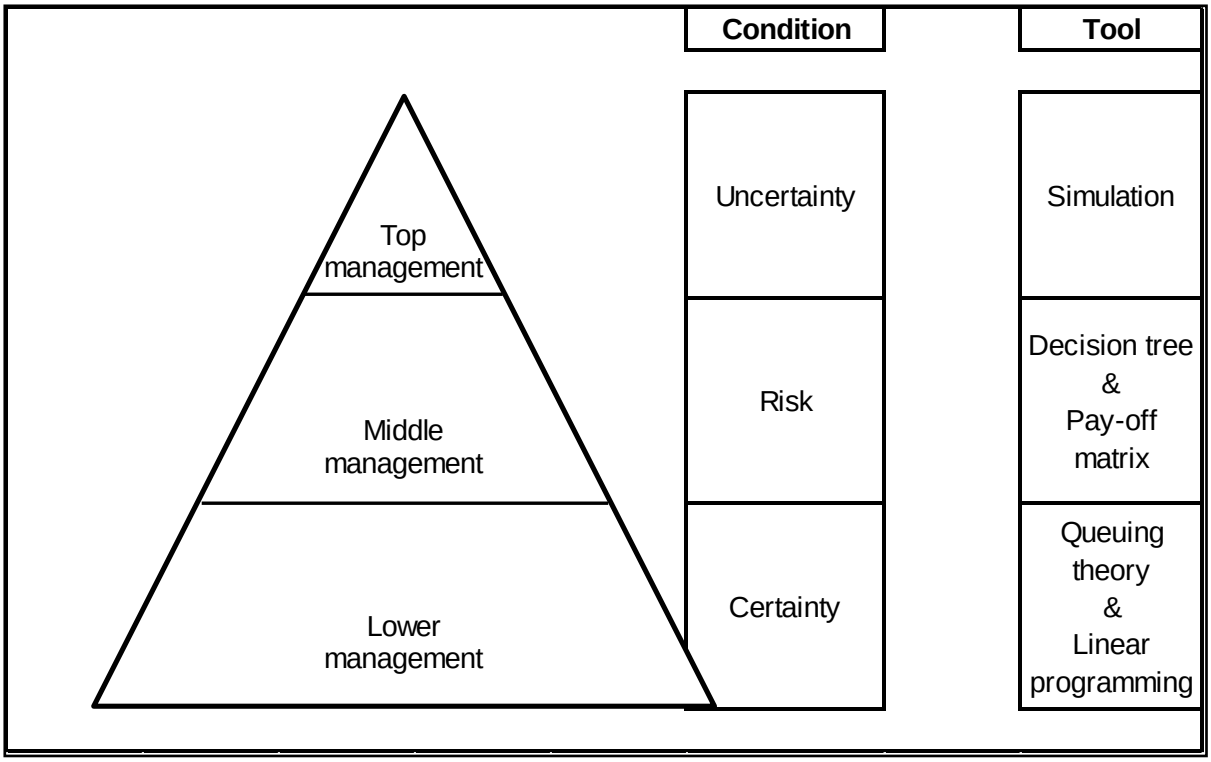


**Figure 15: Conditions of decision-making and decision-making tools (Smit and Cronjé, 2001)**

Pay-off matrices and decision-trees are both complementary approaches to using probability analysis. The pay-off matrix is used to determine the possible returns from pursuing different courses of action. These anticipated revenues can now be used in a decision-tree. The resulting diagram is a graphic-tree illustration; and this can be used to estimate the outcome of a series of decisions (Smit and Cronjé, 2001; Kreitner and Kinicki, 2001). Because the decision-tree is visual, it is an excellent tool to use; as it makes it easier for the manager to read and understand (Ahmed and Omotunde, 2012).

Linear programming is a mathematical method that can be used in different fields of study. It is typically used to determine the shortest route, or the least-costly one to follow (Smit and Cronjé, 2001; Ahmed and Omotunde, 2012). The Queuing theory is typically used to identify an optimal solution for maximising service, while minimising the costs. The latter of the two quantitative tools is most commonly and widely used (Smit and Cronjé, 2001).

Sound decision-making is the foundation of effective management (Walker, 2011); and it is a skill that can be improved (Ahmed and Omotunde, 2012). This gives construction managers the ability to identify a type of problem, decide under certain conditions on various alternatives, and then choosing the best possible option. Managers can either see decisions as hitches or opportunities (Smit and Cronjé, 2001). It is also important for construction managers to understand the different tools and techniques available to assist them to

enhance their decision-making capabilities (Walker, 2011; Smit and Cronjé, 2001; Ahmed and Omotunde, 2012).

## 3.8. Motivation

Managers have to work with people, one of the most difficult input resources, on a daily basis. To understand what makes people act in a specific way in their organisations is one of the main functions of a manager (Kreitner and Kinicki, 2001; Smit and Cronjé, 2001; van Niekerk, 1988; Strydom, Bruwer, De Beer, Holtzhausen, Kiley, Maritz, Nieuwenhuizen, Oosthuizen, Rudansky-Klopper and Steenkamp, 2015).

According to Strydom *et al.* (2015), motivation is derived from the Latin word *motivus*. Motivation (a moving cause) can then refer to people's actions, or to the events that ensure people behave in a specific way (van Niekerk, 1988).

According to Coetsee (2002), motivation can be defined as "*the willingness of individuals and teams to exert high levels of effort to attain organisational goals, conditioned by the efforts capability to satisfy individual and team needs*". Robbins (1994) cited by Swanepoel *et al,* (2000) said that *"motivation is the willingness to do something; and it is conditioned by this action's ability to satisfy some need of the individual."* Kreitner and Kinicki (2001) stated that *"motivation is a psychological process that arouses and directs goal-directed behaviour."*

According to Moorhead and Griffin (2001) and McShane and Von Glinow (2003), as cited by Walker (2011), *"motivation is the set of forces that cause people to engage in one behaviour, rather than some alternative behaviour; and it refers to the forces within a person that affect his or her direction, intensity and persistence of voluntary behaviour. The latter further states that even when people have clear work objectives, the right skills and a supportive work environment, they must have sufficient motivation to achieve their work objectives."*

There are currently several theories with regard to motivation; and there are various overlays between them, but still no communal ground between them all (Walker, 2011). We can divide all the different theories into two main categories: (1) content theories (older) concentrate more on the factors, which cause motivation; and (2) process theories (more modern), attempt to explain how motivation and behaviour narrate to each other. The needs and causes are the main focus in the older content theories; whereas the modern process theories concentrate more on the association between elements that yield, or prevent motivation (Coetsee, 2002).

It is clear from the above, that motivation is still a very complex topic; and that – even with all the experts providing their different explanations for and approaches to motivation – not one can be applied to all the situations. The expectancy, equity, goal-setting theories (three

process theories) combined with the job-characteristic theories and some elements of the older content theories are important ingredients for an integrated model for creating a motivating climate, as is illustrated in Figure 16 below (Coetsee, 2002).

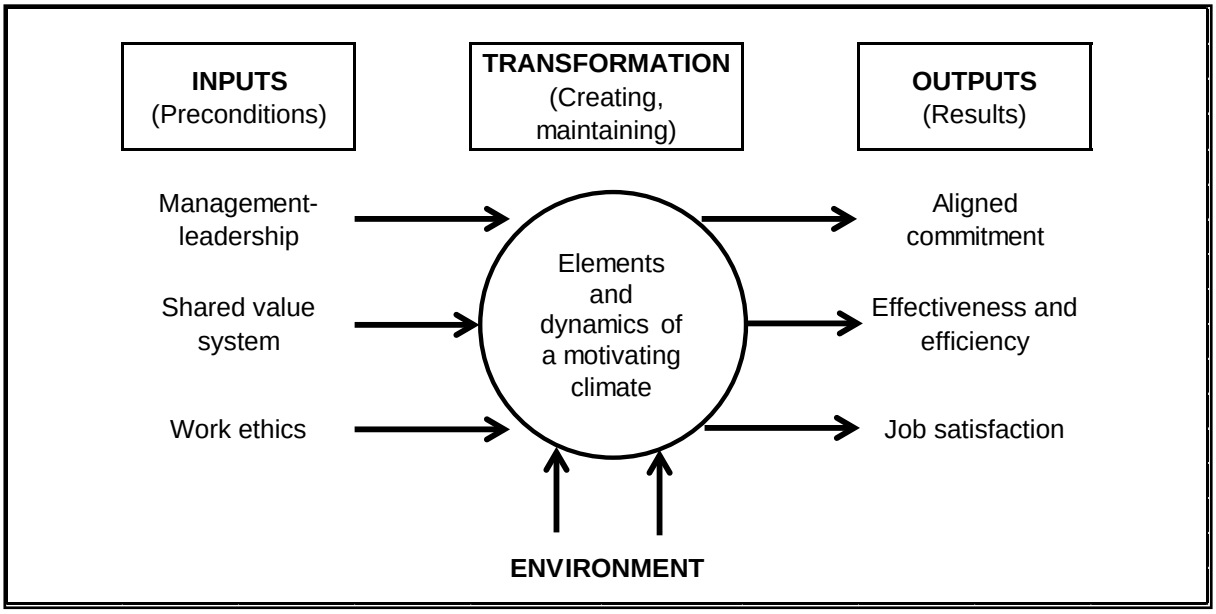


**Figure 16: Open system model of a motivating climate (Coetsee, 2002)**

Coetsee (2002) further states that one can understand motivation more clearly if one considers the following three aspects:

- A manager can only create a motivating climate for people to work in; thus, it is not possible for him/her to motivate people directly. To be able to create a motivating climate, the manager needs to know what is needed. The manager must be able to measure the outputs against the necessary prerequisites. Effective management-leadership, shared value system and sound work ethics form a part of these inputs needed, in order to create a motivating climate. Managers need to be able to lead, while concentrating on the shared goals and values. They must also be able to demonstrate their own aligned commitment to these goals and values, as well as to their set of principles in guiding and directing work behaviour. Managers must work with honesty and integrity, and be enthusiastically committed to effective work. Managers must also remember that the environment in which the organisation operates has a direct influence with regard to the inputs. These environmental factors are also inputs; but they are not preconditions, as are the other factors (Coetsee, 2002).
- The interaction between a combination of forces within a person's work environment and within the individual determines his/her level of motivation.

- People are different; and managers need to realise that the 'average person' does not exist.

It is important for a manager to understand that if one of the elements of aligning-commitment is absent, they would be unsuccessful. Coetsee (2002) stated that aligning-commitment can be explained in an equation, i.e. Aligned-commitment = Knowledge x Information x Empowerment x Rewards & Recognition x Shared vision.

The construction manager can, for example, get all the team members to tackle the new project with enthusiasm and purpose. Ensure that specific goals are explained and agreed upon (shared goals and values). Give the relevant members all the plans, specifications and conditions of the contract (information). Ensure that all the members involved have the necessary skills to add value to the project (knowledge). The construction manager must make sure that everybody has a Responsibility-Assigned Matrix (RAM); so that there is no confusion with regard to the responsibilities on the project (empowerment). If the construction manager then neglects the necessary performance acknowledgement, interest and encouragement, this would result in zero commitment, according to the aligned-commitment formula (Coetsee, 2002).

## 3.9. Teamwork

In the construction industry, a large part of people's activities occur in groups (Smit and Cronje, 2001; Kreitner and Kinicki, 2001; Walker, 2011). Glassop (2002), as cited by Walker (2011) further states that because the scale and complexity of projects only increases, groups and teams are more productive (Jackson, 2010). Pieter Drucker (1988), cited by Kreitner and Kinicki (2001), emphasised the fact the future organisation's structures will be hierarchical and flatter, with the information based and organised around teams. On construction projects, multiple skills, judgement and experience are required between team members, in order for them to be successful (Glassop, 2002, as cited by Walker, 2011; Jackson, 2010).

According to Kolb (1995), as cited by Walker (2011), managers spend much of their time (50 % – 90 %) in some sort of group activity. It is only natural then for a manager to grasp the intricacies of groups and their performance, which in turn will enable them to be more effective, as group members and leaders.

Literature makes an unblemished distinction between the term groups and teams; although some still use these concepts interchangeably. As illustrated in Figure 17 below, groups and teams are on a continuum (Smit and Cronje, 2001, Walker, 2011).

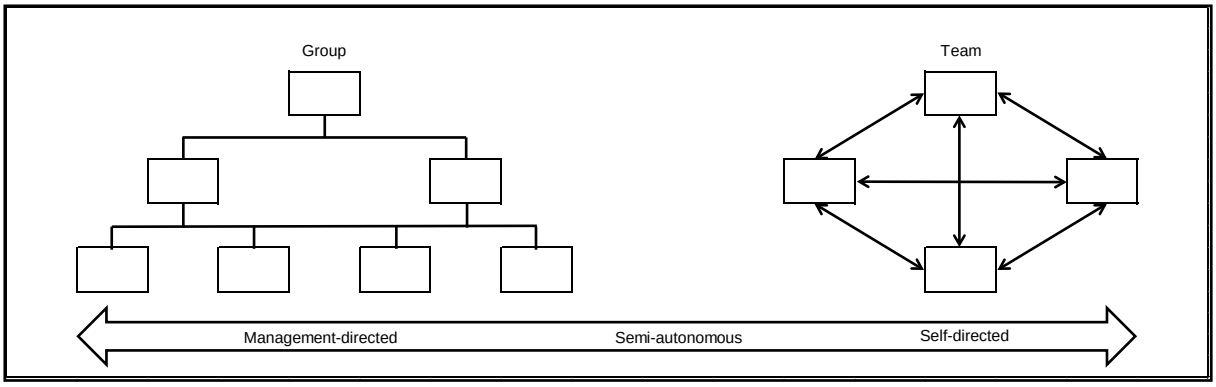


**Figure 17: Differences between groups and teams (Smit and Cronjé, 2001)**

If an organisation is structured along rigid lines of authority, where a definite hierarchy exists, it can mainly be referred to as a group. Teams are usually small, they share leadership, job responsibilities and are typically rewarded for individual and group performance. As a result, teams will deliver the whole product (complete building) and not only a part (concrete) (Smit and Cronje, 2001). Lussier (1997) cited by Smit and Cronje (2001) defined that *"a group has a clear leader and [it] consists of two or more members, who perform independent jobs with individual accountability, evaluation and rewards."*

A team has a small number of members with shared leadership; and its members perform interdependent jobs with individual and group accountability, evaluation and rewards. Robbins and Judge (2008), cited by Walker, (2011) defined groups *"as information-sharing groups that do not need to engage in joint effort; and they work in teams, hence generating synergy through co-ordinated effort".* McShane and Von Glinow (2003) state that *"all teams are groups; because they consist of people in a unifying relationship".*

They further stated that *"not all groups are teams; [while] some groups are just people assembled together".* Kreitner and Kinicki (2001) divided groups into formal (formed by the organisation for a specific purpose) and informal groups (emerge to serve special interests, formed by friends) (Schermerhorn *et al.* 2005). The problem is to define and distinguish groups and teams in the construction environment. The size and complexity of the construction project and the wide variety of skills needed, will determine the size of the team (not necessarily a small number).

Disterer (2002) and Walker (2011) stated that groups and teams are defined and described by their composition, purpose and focus. They can range from an informal unstructured group to highly structured and focused-project teams (Walker, 2011). As stated by Fincham and Rhodes (2005), as cited by Walker (2011), these two terms will be used interchangeably in this thesis, as there seems to be no real difference between the two.

Schermerhorn *et al.* (2005) also distinguish between groups and effective groups. It is important in construction to ensure that the group/team is effective; otherwise the project can result in total failure. Schermerhorn *et al.* (2005) defined an effective group *"as one that achieves high levels of task performance (goals), member satisfaction and team viability".* Schermerhorn *et al.* (2005) further mention virtual groups *as "a group whose members convene and work together electronically via computers".* These types of groups are also on the increase on construction projects. International competiveness, project complexity and the necessary skills are needed to compel large construction companies to make use of virtual groups (i.e. Kusile, Medupi and Gautrain). These virtual groups are driven by information and skills and not by time and location. Some of the negative downfalls of these types of teams are the lack of physical interaction. This could prevent reciprocal trust to blossom between members and decrease accountability in each individual as well as the group as a whole. If there is no trust and accountability within the group, communication would also deteriorate (Kreitner and Kinicki, 2001).

Building Information Modeling (BIM) is also another good example that construction is moving more towards virtual groups. Construction organisations can use BIM to assist them in delivering these large, multi-disciplinary capital projects. According to the Australian Institute of Building (AIB), one of the many benefits of using BIM is better outcomes through collaboration. All project partners use a single shared 3D model, thereby cultivating collaborative working relationships.

It is necessary for the construction manager to understand the stages of group development in the quest to reach their full potential as a high-performance system. According to Schermerhorn *et al.* (2005), it is very important that each group member is able to reach his/her performance maximum, in order to complete the given task in the standard sense of quantity, quality, and the timelines of the work results. It is also pivotal that the group performs as a team, working as a unit to achieve the goals of the organisation.

All team members should be trained to be instrumental to the success of the team, as a whole. Each member of the group has special abilities that can be used to solve the problem. Therefore, effective groups help organisations accomplish tasks that would not easily be accomplished individually. Group synergy is necessary for organisations to be competitive and achieve long-term high performance in today's business environment. However, organisations need to realise that group performance can only be improved by understanding and recognising the development stages in the life-cycle of the group. Knowing a group's location in the life-cycle helps management to understand group performance and to avoid setting unrealistic objectives that limit a group's success.

There are five stages of group development in the life-cycle of groups. These stages are forming, storming, norming, performing and adjourning; they are shown in Figure 18 below Kreitner and Kinicki, 2001; Schermerhorn *et al.* 2005; Smit and Cronje, 2001).

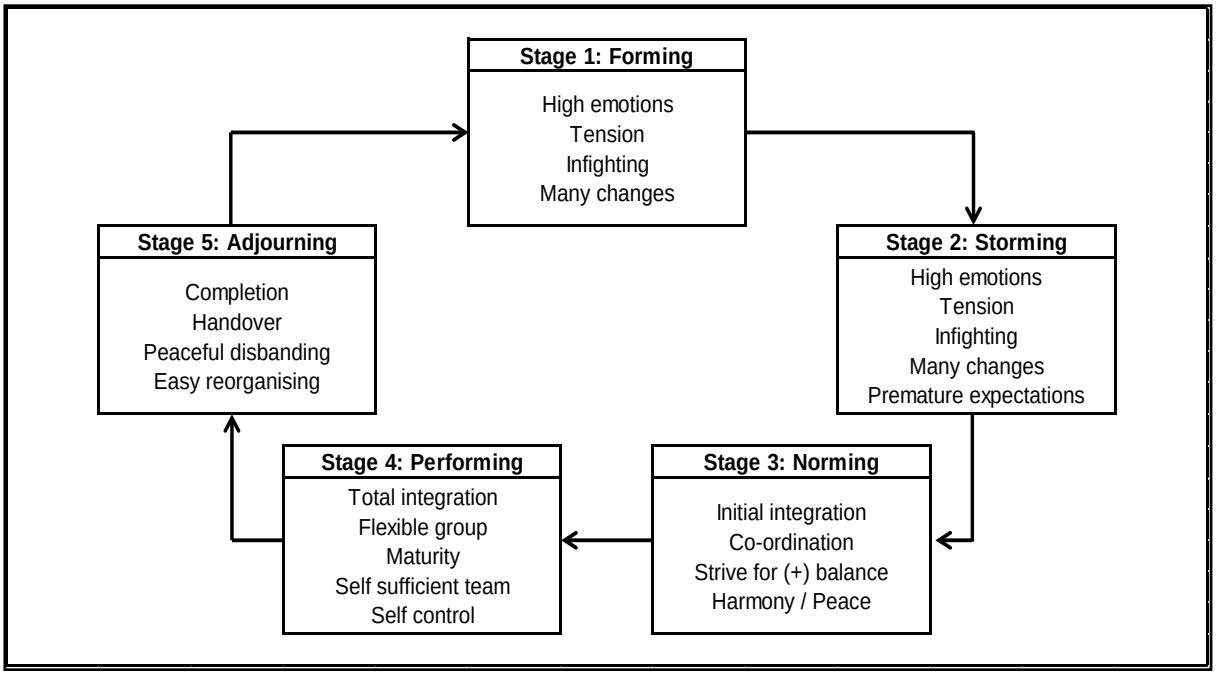


**Figure 18: The five stages of group development (Schermerhorn *et al.* 2005)**

As shown in Figure 18, the forming stage is the beginning stage, in which the members are getting to know each other and becoming aware of the boundaries of acceptable behaviour in the group. This is followed by storming stage. This is the stage that is most difficult; as the members start to realise the amount of work that lies ahead. There is a great deal of conflict; and the leader needs to be tolerant and malleable in working with the group to overcome the growing pains. Then the norming stage follows. This is the stage at which the members begin to work together. There is more time and energy to focus on the objectives; and significant advancement is achieved. Next, there is the performing stage, in which the group members have settled their relationships and expectations. They understand their roles; and they work in concert to achieve their objectives effectively and efficiently.

It is only when this specific stage is reached that true group maturity is emerging. Many group leaders make the mistake when they feel a sense of accomplishment in the latter stage (norming) and think that this is the ultimate maturity (see Figure 18 above and Figure 19 below). Group leaders must be able to embrace this phase, as just a stepping stone to the next level (performing); and they should be able to manage it very closely. The last stage is adjourning; this is a stage where a group needs to evaluate its performance and determine the lessons learned. It is crucial that these feedback sessions should always be credible, constructive, timeous and future-directed (Coetsee, 2002).

This information can be used by group members when they participate in future groups. There also needs to be a celebration to recognise the group's contribution to the organisation. Ultimately, it is the objective of each group to reach a performing stage (Kreitner and Kinicki, 2001; Smit and Cronje, 2001; Schermerhorn *et al*. 2005).

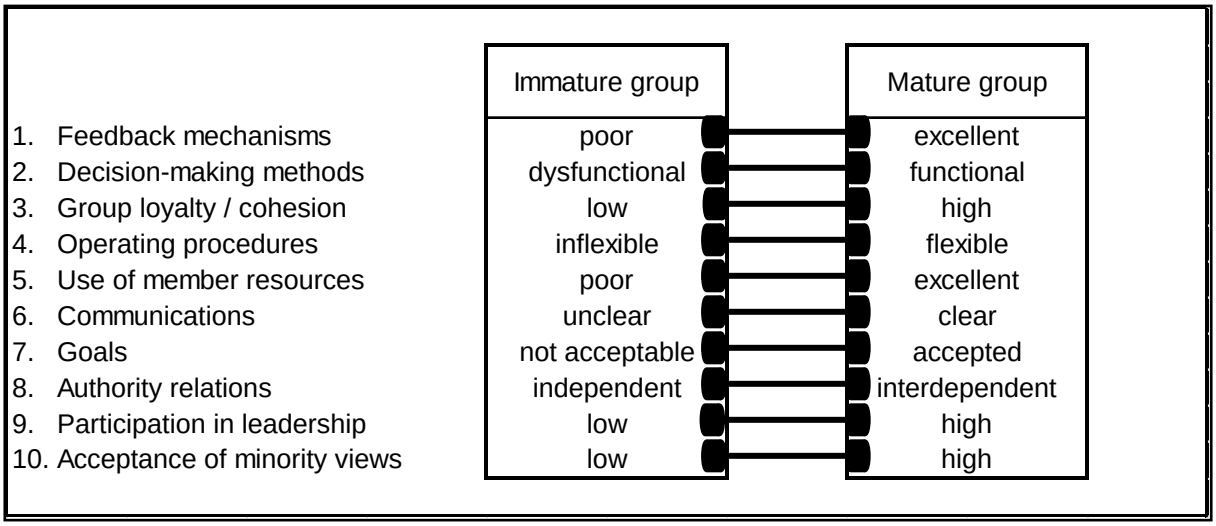


**Figure 19: Ten criteria for measuring the maturity of a group (Schermerhorn *et al.* 2005)**

The construction industry needs high-performance teams to cope with the industry's demands. According to King (1989), as cited by Kreitner and Kinicki (2001), it takes a long time to build high-performance teams: between 3 to 5 years. Coetzee (2002) made use of a calculation (peak performance = potential x commitment x motivating climate) to explain what is needed for peak performance, as indicated by Figure 20 below. It is important again to note that it is a multiple equation; thus, if one element is missing the effect would be zero.

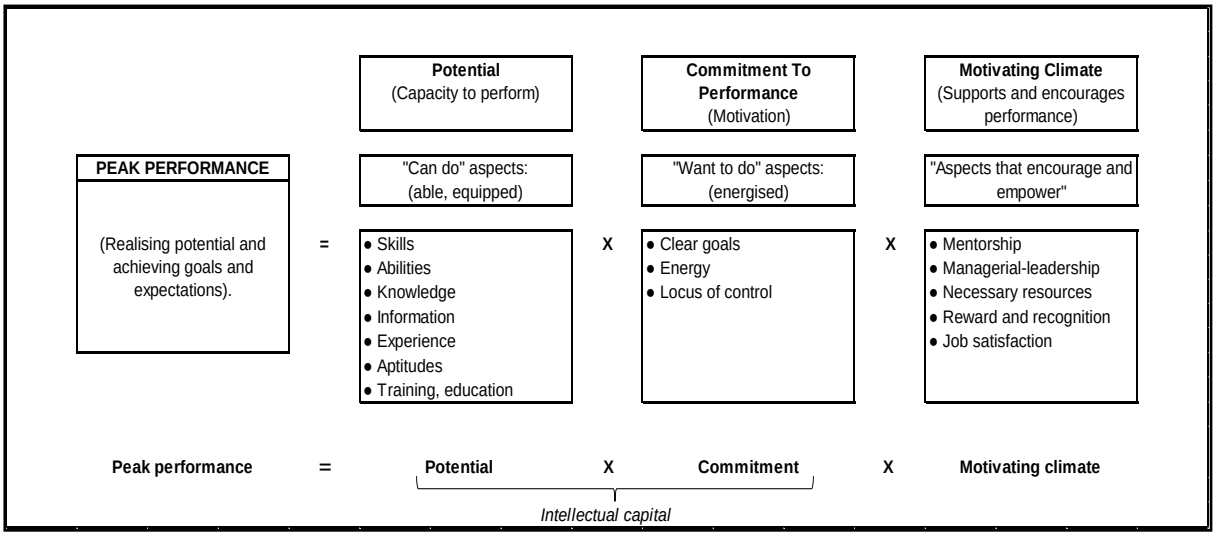


**Figure 20: Peak performance model (Coetsee, 2002)**

Coetsee (2002) further explains that because performing well does not have a long-term motivating effect, performance should be linked to specific outcomes. There should also be some aspect of positive reinforcement for the behaviour (effort) of each individual and for the group as a whole. It is very important for the construction manager to link the team's performance with their specific outcomes. As Coetsee (2002) stated, *"Good performance, followed by giving rewards and recognition, reinforces the effort, as well as the performance behaviour".*

Managers in general need to grasp the concept, that an annual increase in salary is welcomed by individuals; but very few link these increases directly to the effort they have made (Coetsee, 2002).

Construction managers need to further understand that teams will only perform if the reward and recognition schemes are fair and meaningful. Individuals will compare their rewards with another individual in the group, and whether the individual perceives it as being negative (whether it is the truth or not). Construction managers must be able to create and maintain a motivating climate by implementing a type of behaviour, specific techniques and mechanisms (Coetsee, 2002).

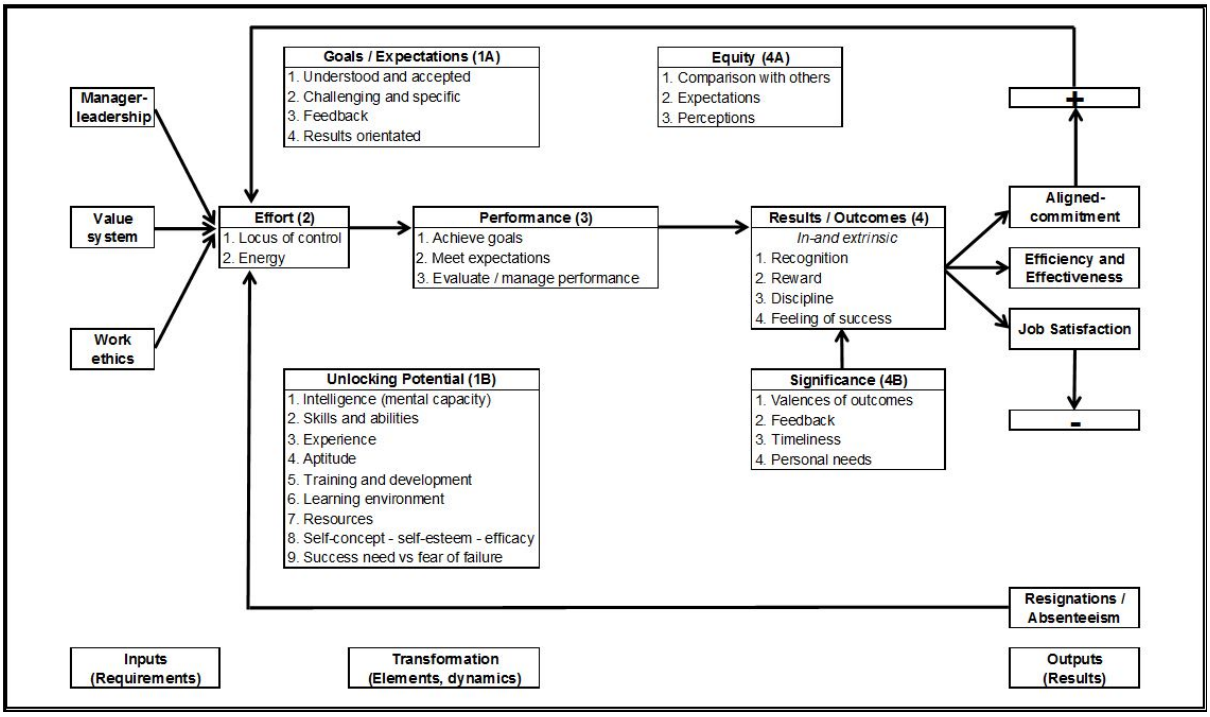


**Figure 21: Elements and dynamics of a motivating climate (Coetsee, 2002)**

As indicated in Figure 21, if any of the elements are missing in the chain, it would lead to dissatisfaction. Coetsee (2002) mentioned that *"both satisfaction and dissatisfaction are thus the result of a series of events; and [they] are not [the] direct causes of performance. They*

*could, however, be indirect causes of performance; because satisfaction or dissatisfaction caused in the ways describe above, may have an influence on effort".*

The general opinion of the value of groups and teams in organisations seems to be ambivalent at best, when compared to construction in which they are essential. Fincham and Rhodes (2005), as cited by Walker (2011), summarised the conflicting views, observing that *"teams and team working are still seen by management consultancies as the best way of marrying the fulfilment of fundamental individual psychological needs with senior management demands for more flexibility, less 'down time'" since the members cover for each other's absences or variable work rates and more self-regulation by team members, thereby reducing the cost of supervision".*

Under very difficult construction site conditions and project constraints, it is very important for the construction manager to have the ability to create a motivating climate. By successfully creating a motivating climate for individuals and teams on construction sites, their full potential would be unlocked. All the construction workers are divided into teams by using different coloured hard hats. The steel fixers are all wearing a red hard hat; and they are called 'The Scorpions'. For a general labour worker to become part of that team he/she needs to improve in various ways, in order to become part of that team.

## 3.10. Stress management

Construction management is a demanding profession; because of the increase in project complexity and more vigorous international competition. Clients demand better quality with less project duration and budget, demanding more than the standard 40 working hours per week (McKeon, 2011; Walker, 2011). Technology, such as cellular phones also makes it harder for construction managers to escape work situations during vacations or long weekends. Workers that need assistance would constantly disrupt the construction manager's free time, making it almost impossible to completely switch off from work. This leaves the construction manager with a conundrum. If the construction manager switches off his cellular phone; and a critical situation arises on site, it could be disastrous for the project.

The construction manager is also bound to the geographical aspects of the construction site. This creates tension in his personal life, as he is only every second weekend at home, depending on the conditions of the project (Kreitner and Kinicki, 2001; Schermerhorn *et al.* 2005; Walker, 2011). Numerous researchers have also indicated that construction yields some of the most stressful jobs (Walker, 2011). According to Sung-Hoon, Zhen and Ung-Kyun, (2013), construction managers are usually under a heavy workload; and they need to deal with a high level of mental and physical stress.

As stated by Jordaan and Jordaan (1994), stress, strain and tension are physical concepts that can be applied analogously to the human workings. They explained this relationship with an illustration where a string was extended when force (stress) was applied to it. The stress applied puts a strain on the spring, which again produces a specific tension. Every stress-wielding factor (stressor) places a strain on the person; and these results in tension. As long as a person's elastic limit (amount of tension he or she can tolerate) is not exceeded, he/she would still be able to deal with the tension (Jordaan and Jordaan, 1994).

According to Schermerhorn *et al.* (2005), stress is defined as a *"state of tension experienced by individuals facing extraordinary demands, constraints or opportunities".* Kreitner and Kinicki (2001) defined stress as *"an adaptive response, mediated by individual characteristics and/or psychological processes, which are a consequence of any external action, situation, or event that places special physical and/or psychological demands upon a person".* According to Moorhead and Griffin (2001), as cited by Walker (2011), stress is defined *"as a person's adaptive response to a stimulus that places excessive psychological or physical demands on him or her".*

In general, stress is regarded as a negative; but previous research has showed that both positive and negative experiences can trigger an identical stress response that can be constructive (eustress) or destructive (Walker, 2011; Marilyn, Davidson and Sutherland, 1992). Eustress, according to Walker (2011), is defined as *"stress in moderation, sufficient to activate and motivate people to achieve things and successfully meet challenges".* Kreitner and Kinicki (2001) defined eustress as *"the stress that is good or produces a positive outcome".*

According to Selye (1936), cited by Walker (2011), the general adaptation syndrome indicates that everyone has a normal level of resistance to stressful events. Some people can tolerate stress on a very high level before it affects them. Other people might feel the effects on a much lower level; thus every individual would have a different threshold (Walker, 2011).

Stressors are those variety of things causing individuals to stress, thus there is a prerequisite to experience the stress response (Kreitner and Kinicki, 2011; Schermerhorn *et al.* 2005; Walker, 2011). Both Schermerhorn *et al.* (2005) and Walker (2011) divided stressors into two main categories, work and life stressors (Potgieter and Barnard, 2010). Work stressors are typically those things that influence an individual because of the current task demands, role conflicts. Life stressors, for example, a death in the family and divorce can cause spill-over to the individual's work environment (Marilyn *et al.* 1992). Other personal factors, such as the

individual's needs, capabilities and his/her personality create another set of stressors (Schermerhorn *et al.* 2005 and Walker, 2011).

Kreitner and Kinicki (2001) divided stressors into four major types: individual, group, organisational and extra-organisational, as illustrated in Figure 22 below.

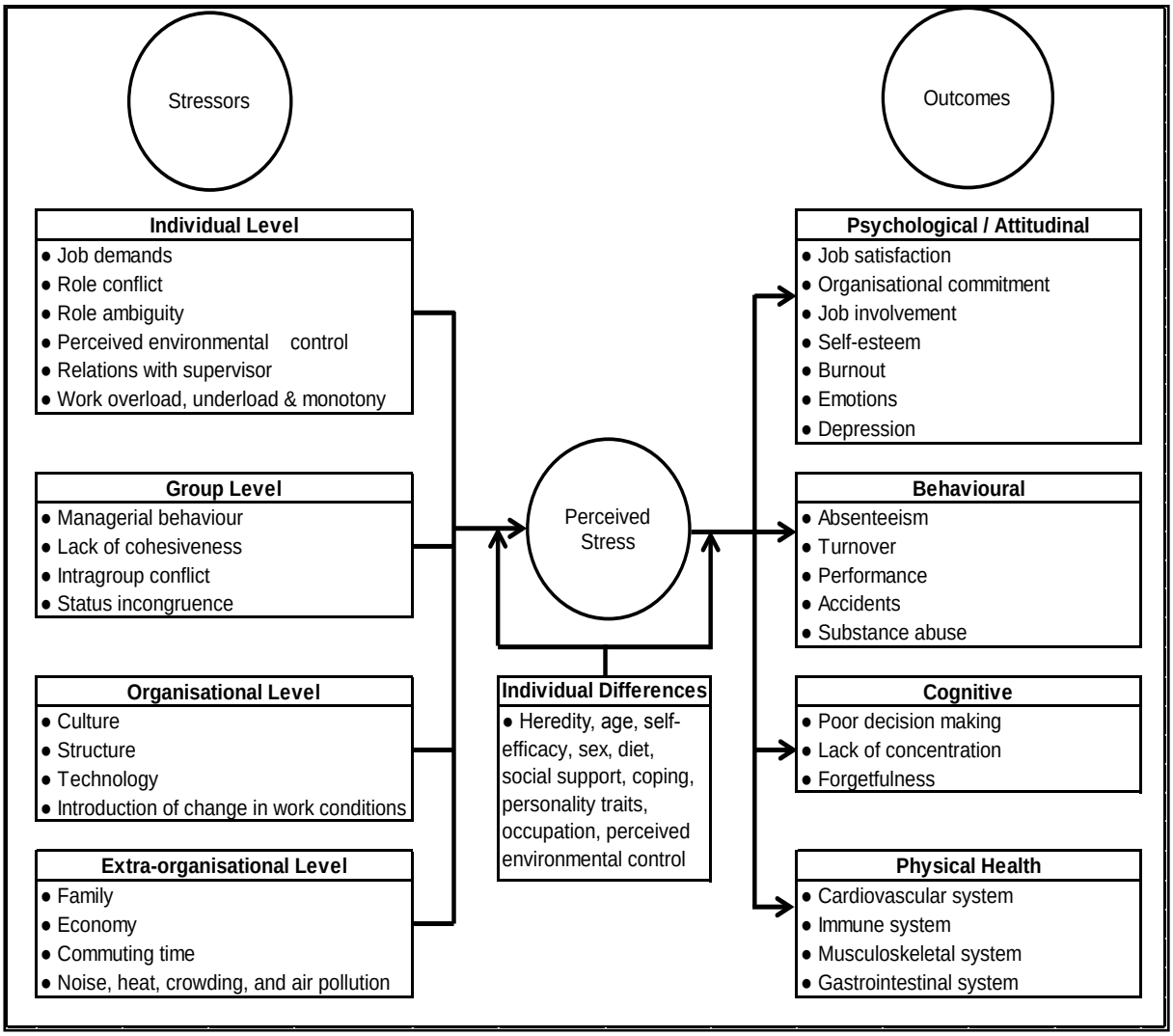


**Figure 22: A model of occupational stress (Koslowsky, 1998., Matteson and Ivancevich, 1979, cited by Kreitner and Kinicki, 2001)**

On an individual level, task demands are stressors created by the specific type of job. Some jobs have high levels of stress involved, i.e. the air-traffic controller and the police officer. The individual can also experience high levels of stress in a job, because of his/her incompetence to do the job. The individual might just not have the ability or belief that he/she can successfully complete the project (Walker, 2011).

Task demands have a huge impact in a construction manager's daily life, because of his/her heavy workloads on projects. This situation is aggravated by the fact that the construction manager's tasks are interdependent. In most cases, he/she needs information from

individuals from the different professional teams involved on the project. If this information is received late, it can create a spoke in the critical aspects that would increase the workload for the construction manager. This can again create situations, where he/she can overrun deadlines or put themselves under unnecessary pressure, i.e. working over weekends, or longer hours (Walker, 2011).

Role ambiguity is also a stressor that is created; because the construction manager is uncertain about what is expected from him/her in terms of the duties, performance and level of authority. This role stressor typically arises because of a lack of information received by the construction manager, as well as the organisational structure that is used.

The construction manager has to report to 2 or 3 (sometimes even more) different authorities; this is highly stressful – especially when urgent decisions have to be made.

Walker (2011) divided role conflict into inter-role and intra-role conflicts. Inter-role conflict is i.e. where the construction manager is instructed by his/her project manager that a specific job needs to be executed; but there is only an x-amount (insufficient) of money available. The construction manager needs to use the small budget allocated to him/her to ensure a specific outcome. This also opens up the possibility that the construction manager is unethically forced into taking short-cut situations that were not because of his/her own mistakes. Intra-role conflict would then be, if the project manager gives a specific instruction to the construction manager; but the architect gives conflicting instructions i.e. the project manager gives an instruction that the construction manager must complete section 1 of the building, as it could save time on the schedule and increase the claim for the month. The architect wants the construction manager to focus on section 2 of the building, because the client wants to decide on possible finishing options (Walker, 2011).

Organisational stressors are non-task-related events within the enterprise; and they can even begin when a new employee joins a company. From the induction of a new employee to joint ventures, restructuring and uncertainty of what happens to the individuals after the contract ended. Team leaders with different leadership styles can create conflict within individual members. The fact that construction managers have to work with different team members on different projects, the dynamics of group stages, as mentioned before in Figure 18 (forming and norming), starts to add stress to the current situation. Office, project politics, and power structures can pressure relationships and generate stress as individuals are pressured to declare for one faction or another, which could be detrimental to their future with the enterprise.

There is also an increase in the number of women entering the construction industry; and that creates stressors like sexual harassment, bullying and violence. Loosemore and Waters

(2004), as cited by Walker (2011), stated that upon their investigation *"the under-representation of woman in the construction industry may produce higher levels of stress in women. Although there are common sources of stress for both men and women, there are also some differences. Men appear to suffer from more stress in relation to risk-taking, disciplinary matters, and the implications of mistakes, redundancy and career progression.*

*In contrast, women stress more because of factors, such as opportunities for personal development, rates of pay, keeping up with new ideas, business travel and the cumulative effect of minor tasks".* Sang *et al.* (2007), as cited by Walker (2011), also concluded that women in the construction industry have poorer health and wellbeing than their male counterparts; and this is probably due to their subordinate position within the construction industry.

Extra-organisational stressors are factors outside the enterprise that cause stress. Work-life balancing can create stress that would affect an individual's attitude and performance at work. Individuals with a lower socio-economic status (income, education level and occupational status) indicated higher stress levels than their colleagues with a high socio-economic status (Kreitner and Kinicki, 2001; Walker, 2011). Holmes and Rahe (1967), as cited by Walker (2011), identified 43 life-changing non-work stressors that create stress in an individual. Death was rated as the highest, with a score of 100; retirement was number 45 and the beginning of school scored 26. Employees that have resilient family values might also feel guilty because they work long hours or travel comprehensively for business purposes. McShane and Glinow (2003), as cited by Walker (2011), also found higher levels of stress in employees that find it difficult to separate their home and their work life, i.e. the construction manager must be unsympathetic on the construction site, in order to achieve the completion goals of the project, but at home he/she must be empathetic with regards to family problems. According to Roberts (2007), cited by Potgieter and Barnard (2010), overload was initially identified as the main reason for work-life balance problems; but other research by Kinnunen and Mauno (1998), as cited by Potgieter and Barnard (2010), indicated a more bi-directional nature of work and family demands.

What makes work-life balance even more difficult to gauge is the fact that each individual is affected differently by stressful events. One construction manager might feel the tension to finish off a snag list before the given deadline. He/she can work themselves up with excitement; and be positive to overcome their challenges. Another construction manager might also feel the same tension; but would be unable to respond to the tension, thus he/she reached their elastic limit (Jordaan and Jordaan, 1994; Walker, 2011).

According to Walker (2011), the main difference between these two construction managers is that personality traits, self-esteem; and individuals with a high self-esteem are more self-assured; and they can cope more efficiently with stress than their counterparts that inherently have a lower level of self-esteem (Fincham and Rhodes, 2005, cited by Walker 2011). McShane and Von Glinow (2003), as cited by Walker (2011), also indicated that older employees have more severe stress symptoms because of a lack of energy to cope with these stressors, than their younger counterparts.

Fincham and Rhodes (2005), cited by Walker (2011) further stated that Type A personalities are more susceptible to stress than Type B; and evidence has shown the latter type personalities to be more prone to heart decease. The type A behavioural pattern was characterised by Friedman and Rosenman (1974), as cited by Marilyn *et al*. (1992) by *"competitiveness, time urgency, aggressiveness, hostility, a need to control the environment, striving for achievement and explosiveness in speech".* Type B was just the opposite of the Type A characteristics (Chesney *et al.* 1980; Howard *et al.* 1976; Howard *et al.* 1986 cited by Marilyn *et al.* 1992; Kreitner and Kinicki, 2001).

Research from House (1981), cited by Marilyn *et al.* (1992) did not support the above-mentioned findings. House (1981), cited by Marilyn *et al.* (1992) supported the idea that job stress affects the health of employees; but stated that social support (illustrated by Figure 23 below) can assist in an increase of wellbeing in individuals. He further divided social support into emotional support (empathy, listening, caring and social approval) and instrumental support (group cohesion, interpersonal trust and liking one's supervisor).

Stress can impact directly on the individual that can influence his/her work-life balance and create potential problems in both domains (Walker, 2011). Figure 24 below illustrates the flow of early symptoms that are typically behavioural to more serious illnesses.

The effects of any of these symptoms are detrimental to the organisation and to the team that the individual is involved with (Figure 24). Absenteeism and sick leave might increase, lead to dissatisfaction and end up with a demoralised burned out employee (Kreitner and Kinicki, 2001;Schermerhorn *et al.* 2005; Walker, 2011).

Too much stress can overload and break down a person's physical and mental systems.

The individual will feel exhausted and unable to deal with his/her responsibilities, or in more extreme cases, attack and assault colleagues (Kreitner and Kinicki, 2001; Schermerhorn *et al.* 2005; Walker, 2011).

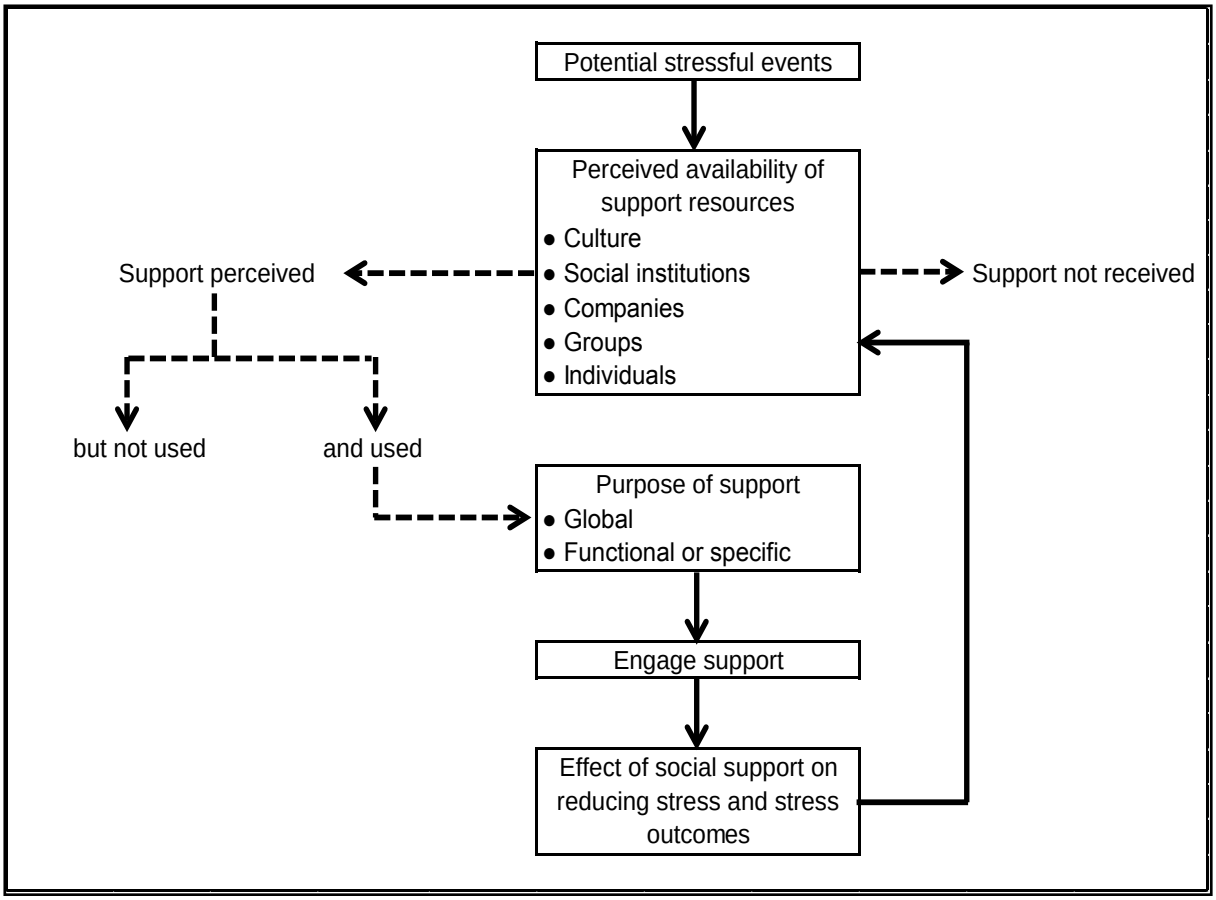


**Figure 23: A flow model of the mechanism of social support (Cohen and Wills, 1985; Bruhn and Philips, 1984; cited by Kreitner and Kinicki, 2001)**

One of the outcomes of too much stress is burn-out. It is important to understand that burn-out is not something that happens suddenly; but it realises over time (Kreitner and Kinicki, 2001). Lingard (2003) cited by Walker (2011) maintains that research results also indicated that burn-out in the construction industry was an important issue. Job-related stressors, such as intricate technology, constrained schedules, budgets and low profit margins culminating in high risks (Walker, 2011) are also important. The research results of Lingard (2003) cited by Walker (2011) showed that there are no overnight solutions with regard to burn-out, as a result of the multi-faceted interaction of individual characteristics and issues in the work environment. Job characteristics contribute heavily as a culprit that creates burn-out. Lingard and Francis (2006) cited by Walker (2011) also suggested that there must be a supportive work environment, giving support to Coetsee (2002) with his idea of the manager that must have the abilities to create a motivating climate for employees to unlock their potential.

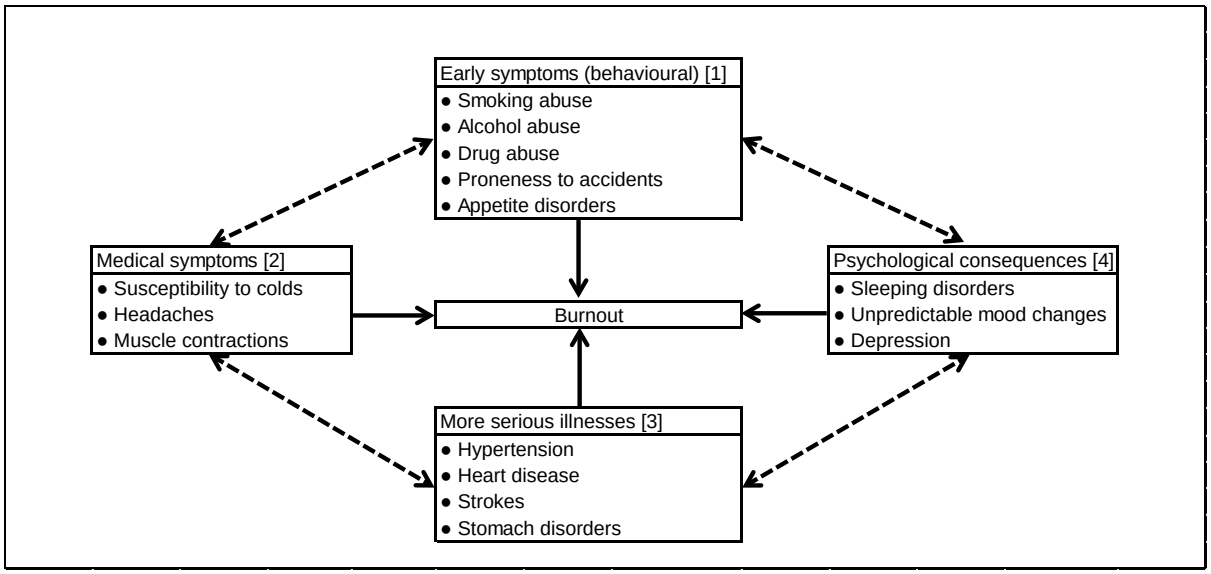


**Figure 24: Flow of the consequences of stress and the symptoms thereof (Walker, 2011 cited by Author, 2016)**

Cordes and Dougherty (1993) cited by Kreitner and Kinicki (2001) used a model to illustrate the burn-out process (see Figure 25 below).

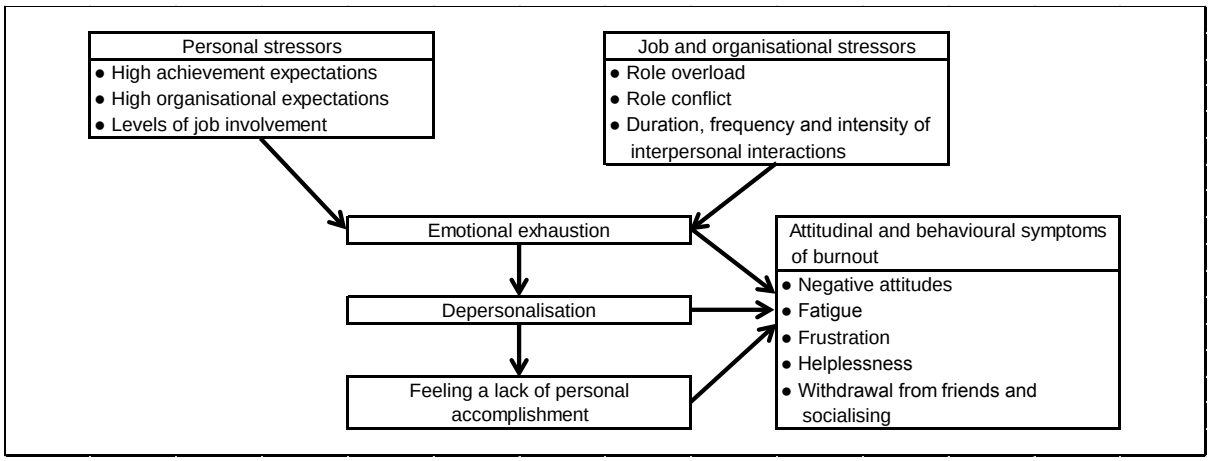


**Figure 25: A model of burn-put (Cordes and Dougherty, 1993 cited by Kreitner and Kinicki, 2001)**

Finchham and Rhodes (2005) cited by Walker (2011) mentioned three factors that define burn-out. Emotional exhaustion was previously seen as the pinnacle reason for burn-out; but it was later shown to be generic. This type of exhaustion arises from an individual's feelings that there are not enough emotional resources to deal with the emotional demands of the problems.

Cynicism is a burn-out idea that refers to work more generally. People are objects, or just a number for the enterprise. Lastly, people being ineffective at work and not achieving their expectations are referred to as being professionally ineffectual.

Marilyn *et al*. (1992) presented the top ten stressors for construction-industry managers. Time pressure (51,8 %) and working long hours (46,4 %) were found to be high up on the list, both leading to adverse effects of the cardiovascular system and coronary heart disease (Friedman and Rosenman, 1974; Breslow and Buell, 1960, cited by Marilyn *et al.* 1992). Breslow and Buell (1960) cited by Marilyn *et al.* (1992) showed that people under the age of 45 working longer than the 48 hours a week, have twice the risk of death from coronary heart disease (CHD). The insufficient time to pursue leisure interests (44,1 %), volume of paperwork (47,2 %) and insufficient family-work (43,3 %); balance also surfaced among the higher rankings. What was interesting was the fact that most of the construction managers spent plenty of their time in travelling (40,2 %) to and from the construction site. Of the construction managers that participated in the survey, forty per cent suggested that they spend in excess of three hours daily in travelling time. The other stressors on the lower end of the scale were: lack of support from architects (33,8 %), inadequate communication flows (28,8 %), staff shortages (31 %) situations related to responsibility issues that were not within the construction manager's control (29,5 %).

Because of the many stressors that affects construction managers on a daily basis; it is understandable that construction managers leave the industry to work in a better work environment (Sung-Hoon *et al.* 2013).

It is a known fact that the construction industry is not a glamorous industry to work in; and it is very difficult to source excellent graduates and to retain them to become skilled managers. It is very important for the industry not to lose these pivotal construction managers, because of stress- related issues (Marilyn *et al*. 1992). The construction industry needs managers with a high level of self-esteem, self-concept, self-efficacy, self-monitoring and preferably a Type B personality that are less prone to stress. These personality traits can increase the construction manager's attitude towards a specific problem, the abilities to find different solutions and control his/her emotions under pressurised situations (Kreitner and Kinicki, 2001).

Walker (2011) suggested that of all the research conducted, exercise was shown to be the most effective stress reliever. Stress management programmes proved to be ineffective and not necessarily productive (Finchham and Rhodes, 2005; Wilson, 1999, cited by Walker 2011). According to Marilyn *et al.* (1992) stress-management interventions at the level of the individual to specific groups of people could show a reduction in stress.

## 3.11. Work ethics/integrity

Ethics and especially professional ethics are important for any construction enterprise (Mason, 2009 cited by Enshassi and Al-Sweity, 2013). Construction managers have the daily

responsibility of adjudicating fairness and the significance of every demand made on the project; and ethics is the foundation on which such decisions are based (Strydom *et al*. 2015). Miller (2011) stated that *"ethical behaviour in the construction industry is a subject rarely discussed openly, probably because for most people in the construction industry, it's the epitome of throwing stones in a glass house".*

There are increasing concerns within and outside the construction industry that corruption and other unethical behaviours are endemic in the construction industry (Enshassi and Al-Sweity, 2013). Construction professionals sometimes are involved in unethical practices for various reasons. According to Hamimah *et al*. (2012) cited by Enshassi and Al-Sweity (2013), this could be because of factors, such as, inadequate legislative enforcement, ferocious competition, economic recessions, not enough ethical education from tertiary institutions, cultural changes and the increasing complexity of construction work.

Ethical behaviour will influence whether the enterprise has a good public image; and this affects the ability to attract excellent employees (Scalza, 2008). Poon (2004) stated that sound ethical behaviour can increase both the level of client's trust and the financial returns for an enterprise. Ameh and Odusami (2010) cited by Enshassi and Al-Sweity (2013) further stated that ethical behaviour increases personal security. According to Albratt *et al.* (1992), cited by Poon (2004), ethical behaviour enriches success in the long term for an enterprise.

Ethics can be defined as the *"code of moral principles and values that direct the behaviour of an individual or a group in terms of what is right or wrong"* (Smit and Cronje, 2001). Coetsee (2002) defined sound work ethics as *the "commitment to professional guidelines, or the professional conduct of personnel".* According to Strydom *et al*. (2015) ethics can be defined as *the "principles governing an individual or a group's behaviour or conduct".* Schermerhorn *et al.* (2005) defined ethical behaviour as *"morally accepted as [that which is] good and right".*

Coetsee (2002) stated that previous studies showed that values and work ethics are influenced as early as one's childhood experiences. In homes where the parents expected their children to do chores in and around the house, the child expressed a higher level of work ethics. Coetsee (2002) further states that individuals are influenced by the values of the enterprise.

Ethical and unethical conduct is an intricate combination of influences, as illustrated in Figure 26 below. The individual decision-maker at the centre of the model has an inimitable combination of personality characteristics, values and moral principles. The combination of these factors can impact the individual to either lean towards ethical or towards unethical behaviour. Personal experience with rewards and other incentive mechanisms can also contour the individual's predisposition to act ethically or unethically.

Men and woman also differ with regard to ethical organisational behaviour. Moral situations and problems are viewed in a different manner between males and females. Moral problems are perceived by males from a justice perspective; while females depend more on a care perspective. (Kreitner and Kinicki, 2001; Coetsee, 2002). According to Kreitner and Kinicki (2001) "*men tend to view moral problems in terms of rights; whereas women conceptualise moral problems as an issue of care, involving empathy and compassion. The justice perspective leads males to focus on the 'rules of the game'; whereas females are more situational and contextual. Women focus more on the dynamics and the expectations associated with the people involved in the specific situation at hand*". Kreitner and Kinicki (2001) further state that both these valid approaches are equally applicable in ethical behaviour.

Figure 26 below illustrates the three major sources of influence on one's role expectations (Kreitner and Kinicki, 2001). Most of these principles form a part of the elements and dynamics of a motivating climate (Figure 21). The locus of control has to do *with "the degree to which you believe that you yourself largely determine what happens to you".*

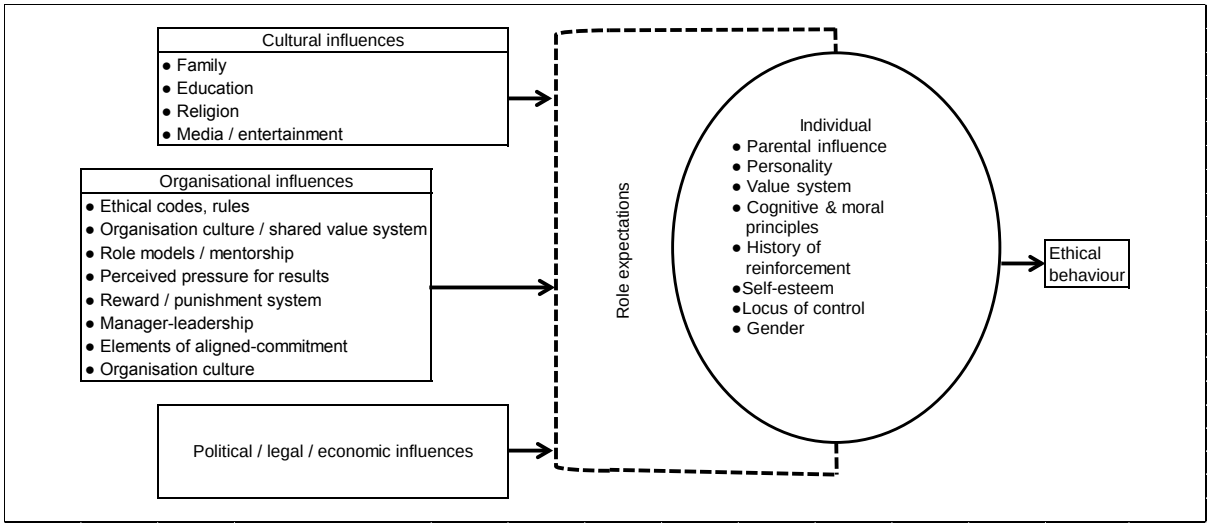


**Figure 26: A model of ethical behaviour in the workplace (Kreitner and Kinicki, 2001; Coetsee, 2002)**

These are factors within a person's control; and it includes things, such as, abilities, skills and efforts. The construction manager's dedication to the project, how hard he/she tries to ensure the success of the project, as well as the decisions he or she made during the execution phase of the project (Coetsee, 2002).

In some cultural societies, it is acceptable (ethical) to hire family to execute a project; whereas in other cultures, this is regarded as unethical behaviour (Kreitner and Kinicki, 2001). In South Africa, unethical behaviour is a reality in the construction industry. From a small contractor that quotes rates for a specific scope of work and then constructs something

cheaper to large construction enterprises that are involved in collusive tender practices, such as in the case of the 2010 soccer stadiums.

Vee and Skitmore (2003) established different types of ethical improprieties surveyed in the modern construction industry: collusive tendering, bribery, fraud, negligence, dishonesty and unfairness. In South Africa, the 2010 World Cup stadiums collusive tendering between the 'Big Five' construction enterprises shocked the building industry. Typically, the construction enterprises predetermine which of them would win a particular tender. The successful tenderer would then include additional fees in the tender bid, in excess of the initial value of the project cost, which may already have been inflated. The winner would then pay a portion of that extra fee to each of the losing cartel members, as a reward. These losers' fees can range between R50,000.00 per company to R1,000,000.00 on larger projects.

With regard to the 2010 World Cup stadiums, the cartel members agreed to a 17,5 % profit margin (Steyn, 2015; SA Commercial Prop News, 2013; Vee and Skitmore, 2003).

Bribery is also a serious concern in the South African construction industry. Construction enterprises bribe government officials to receive tenders; and they agree on 'kick-back' payment terms. In other instances, municipal officials generate extra income or receive some sort of a 'gift' to supply contractors with occupational certificates (Vee and Skitmore, 2003).

Most of the lower end or entry level construction enterprises do not have sufficient health and safety standards on their construction sites. These lower-end construction enterprises just do not have the financial capacity to supply the necessary health and safety equipment. If the tender was received through bribery; it is even worse. In some cases, they also make use of poor quality materials and workmanship. Using a family member or close friend to execute the specific work, or be the material supplier for the contractor on the project, for example, installing a skew ceiling using 6,4 mm thick gypsum board instead of a 9 mm and then plastering and skimming the ceiling. By the time that the client pays the final amount of the contract, the ceiling begins to sag because of the weight of the plaster on the ceiling. Typically, these entry-level contractors are very hard to find after they have left the construction site; and it would be problematic for the client to rectify the problem (Vee and Skitmore, 2003).

Some contractors will sometimes not even know that fraud could happen on their construction sites. Use the making of concrete test cubes for an example. The contractor can instruct his/her supervisor to make concrete test cubes, according to the specified rules. If the concrete mixing truck arrives on the construction site, the supervisor observes the concrete slump at the back of the chute. He/she sees that the slump is low (stiff) and will be difficult to cast and place the concrete (workability) in its final position. The concrete test

cubes are then taken from the truck and then he/she pours water to adjust the slump. Although, a good truck driver will report this on the delivery slip as 'added water', the test results that the engineers will receive is skewed to what actually was poured on site.

In other situations, contractors could also be involved with people on the laboratory side and ask them to alter some of the results; although this is more difficult to orchestrate (altering of construction documents) (Vee and Skitmore, 2003; Van Heerden and Booyens, 2015).

In some cases, the client and the government receive tenders for a project; and after the closing of the tender process, they look for better prices. They then select the successful tenderer, but subject to their better prices; and this comes across as unfair conduct (Vee and Skitmore, 2003).

The modern construction manager must understand that ethical consideration starts with understanding the individual. Individuals are both physiological organs and spiritual being; and the fact that people have inherent within themselves a notion of what the difference is between good and evil. Construction managers must realise that every action or decision they make will lead to an outcome. How moral the base of the decision, the virtues of the construction manager will lead him/her to good. The construction manager will also find that to reach the project objectives or goals he/she will find themselves in a situation, where a decision must be made between common good and personal gain.

The construction manager must have the ability to balance both – even if it requires effort from his/her side. The Personality-Morality-Good Model illustrates these three in separate stages, as indicated in Figure 27 below (Mondejar, Cheung and Suen, 2007)

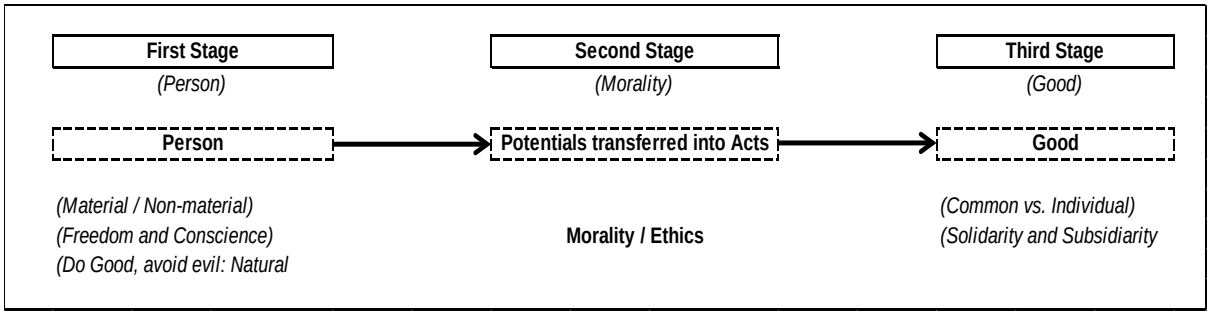


**Figure 27: Person-Model-Good Model (Mondejar *et al.* 2007)**

*"Every succeeding stage builds upon the previous one. As one moves to the next stage, the comprehension of the inevitability of ethical behaviour becomes more apparent"* (Mondejar *et al*. 2007).

Unethical conduct and corruption have damaged the construction industry greatly (Oyewobi *et al*. 2011, cited by Enhassi and Al-Sweity, 2013). What makes corruption even more difficult to control or eradicate, is that it can be found in numerous forms, different ways, and

at any stage during the life-cycle of the construction process (Patrick, 2006 cited by Enhassi and Al-Sweity, 2013). According to Ameh and Odusami (2010) cited by Enhassi and Al-Sweity (2013), there is enormous pressure on construction managers to be involved in unethical, professional misconduct and negligence. According to Mason (2009), cited by Enhassi and Al-Sweity (2013), it is necessary to establish a universal industry-wide code to improve the ethical standards of conduct within the construction industry.

Hamzah (2010) cited by Enhassi and Al-Sweity (2013) concluded that if the construction industry wants to sustain acceptable quality, professional ethics as a pre-requisite, there is a growing demand for sound ethical practices and professional behaviour in the construction industry. This is important to business, personal careers and the image of the construction industry (Poon, 2004; Scalza, 2008).

## 3.12. Flexibility and attitude

Construction managers must be flexible as leaders; and they should inherit a specific attitude towards the project, and the people they work with, etc. flexibility is required; as the circumstances of a project changes, as well as the type of role the construction manager has to fulfil on a daily basis.

Construction managers have vastly diverse task responsibilities during the different phases of a project; and they must be able to jump from one activity to another. The level of required flexibility will be determined by the skills that are needed to successfully complete the project i.e. when working on a governmental project, the construction manager must use a workforce consisting of a significant percentage of community-based labour. The construction manager can be much more flexible with regard to his/her own subcontractors that he/she knows and trust; and just the opposite prevails with regard to the community-based labour. Unusual events occur on a regular basis during construction projects and the construction manager must be flexible in the manner which he/she manage the crisis; i.e. during the pouring of a large section of a concrete slab, the temperature suddenly drops below 5 degrees. The construction manager must then be flexible in the disruption of the pouring; phones the engineer with regard to the protection against frost of the poured concrete; determine where it is safe to stop the pouring; how the engineer prefers the concrete to be finished off, etc.

The external environment can over long periods of time also cause opportunities or threats i.e. the construction enterprise is only involved in residential construction, and during a recession they have to source work in commercial construction. If they are successful in a tender, the construction manager must be flexible enough to adjust between building houses and the construction of 3-storey office block.

There are always trade-offs in construction projects; and the construction manager must try to find the balance on every project. According to Jackson (2010), there are six dials of project value, but only four that the construction manager has any control over: (1) cost, (2) time, (3) quality, and (4) safety. These dials are interconnected; and altering one would almost always cause a change in the others. For example, if the project time needs to be compressed (time dial decrease), more people and machinery would have to enter the construction site (cost and safety dials increase); working hours would have to increase (cost and safety dials increase); and quality would have to be monitored more intensely (cost and quality increase).

The key for the construction manager is to find the optimal level for each dial; and that setting will be different for every construction site. It sometimes happens that a junior construction manager that performs well is moved from his/her current construction site to start a new construction site as the senior construction manager. This much-needed flexibility with regard to changing from a construction manager supervising a section of the construction work under the supervision of a senior construction manager, to being the senior construction manager, are very valuable to construction enterprises (Yukl and Mahsud, 2010; Walker, 2011).

To be an innovative construction manager; he/she must be flexible enough to apply new methods, systems, technology, etc. (Melvin, 1979). It is also important to emphasise the fact that flexibility on a construction site would have to be based on a psychological contract; thus based on trust. Types of change that increase the need for flexibility and attitude are: (1) globalisation, (2) swift technology changes, (3) changes in culture values, (4) increase in the diverse workforce, (5) more forms of social networking and virtual interaction; and (6) concerns for outcomes besides profits (Yukl and Mahsud, 2010).

Construction managers must comprehend the different circumstances; and that requires flexible behaviour. They must be able to make a diagnosis with regard to the situation and identify the type of behaviour that is suitable for specific circumstances. It is then also important for the construction manager to expertly know how to use different behaviours. Construction managers must use their skills to indicate a high level of commitment to what is necessary and ethical. They should be more flexible in assisting their subordinates during development, under changing, uncertain and stressful conditions (Yukl and Mahsud, 2010).

A construction manager's attitude and flexibility are also interchangeable; and good construction managers will confirm the fact that the attitude of team members is everything (Jackson, 2010). A simple example could be the construction manager's attitude to being flexible towards the assistance of a subcontractor on the site. If the subcontractor (sb1) and

the construction manager work well together, the construction manager's attitude and flexibility towards assisting with regard to a problem that occurred would be different than towards a subcontractor (sb2) if the opposite were true. The same would be true from the subcontractor's point of view.

According to Walker (2011), attitudes are *"evaluative statements or opinions, which people have about events, people and objects"*. Attitudes represent *the "cluster of beliefs, assessed feelings and behavioural intentions towards a person, object or event"* (McShane and Von Glinow, 2008). Attitudes involve conscious logical reasoning; and thus, they are judgements that are relevant over longer periods of time (McShane and Von Glinow, 2008).

Previous research focused on the three components of attitude: (1) beliefs, (2) feelings and, (3) behavioural intentions, as illustrated in Figure 28 below. The above model can be divided between a left- and a right-hand side. The left-hand side depicts the logical reasoning process. The beliefs are about previous experiences that shape our feelings towards something. If these feelings are positive, they would influence our behavioural intentions positively and vice versa.

Two construction managers might have different feelings towards working with a specific subcontractor, based on past experience and personality. Construction managers will typically choose the behavioural intentions that he/she think will work best, or make them feel more comfortable (McShane and Glinow, 2008).

The right-hand side of the model depicts how emotions influence our attitudes and behaviour. When the construction manager receives sensory information, he/she automatically forms emotions regarding that information – before consciously thinking about it; thus, speedily and sketchily, he/she calculates whether the incoming sensory information supports or threatens any inborn ambitions. Then he/she attaches emotional signs to the information (McShane and Glinow, 2008).

The dots on the right hand side indicate multiple emotions triggered by the sensory information received. Thinking about what was received, discussing it with fellow construction managers, etc. These emotions are then transferred to the cognitive process side, where they whirl around; and in the end, they shape our conscious feelings towards the attitude or object (McShane and Von Glinow, 2008).

It is also possible that the logical reasoning and the emotional side disagree with each other. This indicates the construction manager's logical analysis of the situation, but cannot identify reasons to support the automatic emotional reaction (McShane and Glinow, 2008). It is also important to note that attitudes can change from $A_1$ to $A_2$. Some theories make the assumption that the new attitude replaces the old one. Other authors suggest that $A_1$ can

override, but not replace the former one, resulting in dual attitudes. "*The attitude that people endorse depends on whether they have the cognitive capacity to retrieve the explicit attitude, and whether this overrides their implicit attitude*" (Wilson, Lindsey and Schooler, 2000).

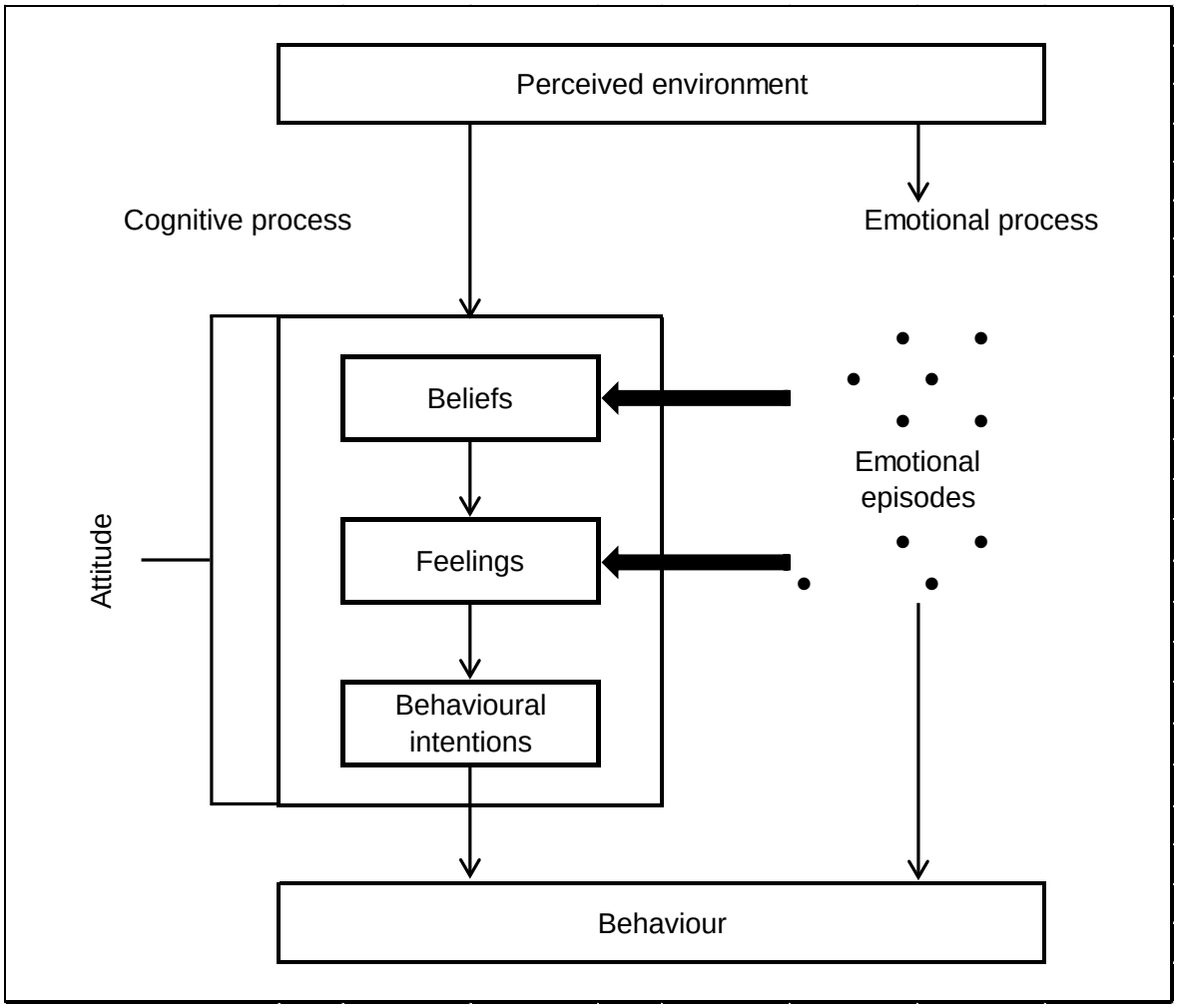


**Figure 28: Model of emotions, attitude and behaviour (McShane and Gilnow, 2008)**

Even when the construction manager is flexible with regard to the different written policies, procedures, rules and regulations and there is no foundational attitude of superior workmanship and safety, it would be all in vain. This attitude must come from the highest levels of leadership and management down to every single worker and subcontractor on the construction site (Jackson, 2010).

## 3.13. Conclusion

The aim of this research literature chapter is to establish the core-essential soft skills in the competency domain, which a construction manager would need to cultivate, in order to be able to manage future construction projects. According to Bilbo et al. (2000), the construction industry has become more dependent on accredited tertiary institutions to equip construction management students with the relevant critical skills, so that they can enter into the multi-

faceted and arduous work environment and add value to a construction enterprise. In previous studies, researchers supplied summaries of various lists that indicated the specific soft skills and competencies (using various sources) that a construction manager graduate needs to obtain (Othman et al. 2014; Jarad, 2012 and Strydom et al. 2015). Melvin (1979) has summarised a construction manager, as someone who needs specific skills different from those seen in other professions. Melvin (1979) further indicated that for a construction manager to be successful he/she must be a chameleon. The construction manager must be a businessman, builder, lawyer, financier, army general, gambler and also an educator (Melvin, 1979).

This research area has received little previous attention, as the construction industry is dominated by males and soft skills were seen as an indication of weakness. The majority of academic work focused on the control of a program, lean construction, procurement, cost, quality and budgets.

Within this context, this chapter has focused on which of these soft skills in the competency domain overlap between the various different researches already completed. An in-depth literature research project was then conducted on each one of these identified soft skills that continuously overlap. Theoretically, it is acknowledged that significant improvements can be gained from improving the robustness of the quality of the soft skills in the competency domain, inherited by students studying construction management. Through laying the foundation at these early stages, the young construction manager can accelerate more quickly in becoming an effective leader in the construction industry (illustrated in Figure 29 below).

Since a construction project involves many incongruent views, it was realised that Bono's 'six thinking hats' can also be used at this stage to support these soft skills in the competency domain; and see whether they can fortify the idea of an increase in productivity, thus linking these soft skills with an increase in productivity (Sheth, 2012). The construction manager must have the ability to apply these soft skills in the competency domain and within, using these softs skills to manoeuvre between the six thinking hats. The construction manager's ability to use these interchangeable soft skills are important – in combination or separately – and to be able to float between the six thinking hats to make sound decisions. This would increase his/her effectiveness on the construction site. As illustrated in Figure 29, these interchangeable soft skills and the six thinking hats can be used by the construction manager to transform into any single one, or a combination, of Melvin's professions.

The construction manager's previous experience would also influence the level on which he/she can use Melvin's different professions effectively. The practical case studies indicated

the possibility of adding another profession to Melvin's already long list of professions. It is becoming very important for construction enterprises to understand the impact of the construction processes on the environment. Whether the construction enterprise can outsource this function for complex projects, or absorb it in-house for less complex projects; the construction manager must ultimately execute and manage all the environmental issues specific to his/her site. This follows on the costing perspective, managing the Environmental Management Plan during construction, to carrying the risk of possible penalties that could be incurred.

Four practical case studies were used (discussed in Tables 7 and 8 below) to test and see where these interchangeable soft skills can be applied by the construction manager. This can further reinforce the idea – or provide more substantial evidence that each of these soft skills is crucial for the construction manager, in order to be able to be effective and successful in a project. As these case studies are practical examples, only some of the possibilities were indicated in Table 8; since not all these aspects were needed to complete the projects. The aim of the case studies was to practically show that Melvin's professions were the result of the eleven typical soft skills. These were interpreted by means of Bono's six thinking hats; and they are, therefore, relevant.

This literature section sought to provide important and useful recommendations. Firstly, it indicated the importance of cultivating soft skills in a construction manager. Secondly, it emphasised the importance of the ability of the construction manager to apply these soft skills interchangeably, in combination with the six thinking hats. Thirdly, the level of ease with which the construction manager can balance everything will depend on how effective he/she will be on the project. Fourthly, the margin of increase of production will be partially dependent on the construction manager's level of effectiveness. Fifthly, it is important to realise the importance of a proper tertiary education in construction management, as well as practical experience. This is clearly illustrated in Figure 29; and this working model will evolve, as the research study progresses.

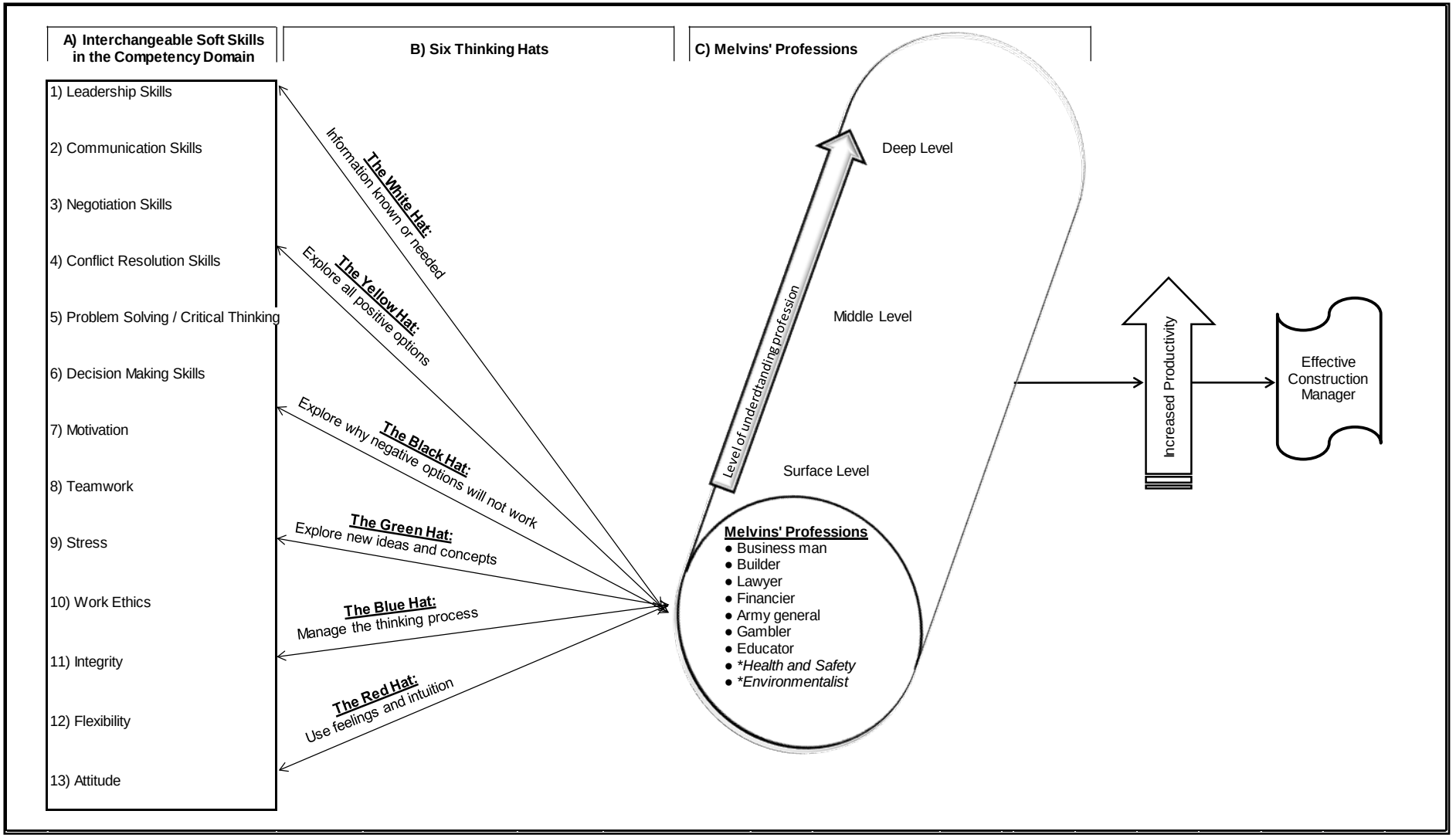


**Figure 29: Working complex soft skills in the competency domain interaction model (1) (Othman *et al.* 2014; Jarad, 2012; Strydom *et al.* 2015; Sheth, 2012; Melvin, 1979)**

**Table 7: Linking Melvin's Professions with practical case studies 1 & 2**

| MELVIN'S PROFESSIONS | CASE STUDY 1: 3-STOREY RESIDENTIAL UNIT | CASE STUDY 2: 5-STAR LODGE |
|---|---|---|
| Business man | Unlock the potential of the workers on site. Give the necessary assistance and support for setting out 176 uneven concrete columns, thus growing much needed skills in the company for future projects. Ensure safe working conditions. | Create a motivating climate for employees and subcontractors to work in .i.e. hot water showers, temporary water closets and closed off sleeping quarters, as site is far away from personal residences. Ensure safe working conditions. |
| Builder | Technical skills involved in setting out 176 uneven concrete columns on a sloping construction site. Understand the Health and Safety requirements for the specific site. | Technical skills involved in pouring a 250 $m^3$ concrete 1$^{st}$ floor slab under difficult environment conditions. Understand the administrative and technical procedure to follow if the concrete pour has to be discontinuous. Understand the Health and Safety requirements for the specific site. |
| Lawyer | Joint Building Contracts Committee (JBCC) Principal Building Agreement. Understand the structure, risks and options of specific contract. Understand procedures for time and change management, variations, claims, suspension, termination and dispute resolution. | Joint Building Contracts Committee (JBCC) Principal Building Agreement. Understand the structure, risks and options of specific contract. Understand procedures for time and change management, variations, claims, suspension, termination and dispute resolution. |
| Financier | Must be able to interpreted cash flows over December and January to determine the impact that the concrete pour of the 1st floor will have if the hired formwork, large section of concrete poured and labour will only be paid by the end of January 2017. | Understand the financial impact to execute an expensive construction project away from the main office facilities and primary area of operations. Control and manage the negative cash flow effect of large, high volume material deliveries to the secluded construction site. |
| Army General | Mobilise the correct in-house people to assist with setting out the 176 columns. Ensure that the different subcontractors are informed and instructed at the | Give the necessary instructions to team leaders during crucial concrete pour. Plan, organise, lead and control the whole process and activities involved. |

| MELVIN'S PROFESSIONS | CASE STUDY 1: 3-STOREY RESIDENTIAL UNIT | CASE STUDY 2: 5-STAR LODGE |
|---|---|---|
| | correct time. | |
| Gambler | Decide to work out of schedule sequence to try and gain time .i.e. construct the 2nd floor ceilings while completing the 3rd floor tiling. The risk involved with breaking floor tiles on the 3rd floor when installing the ceiling. | To pour the 250 $m^3$ in one day. If the engineer was consulted he/she could have indicated were the 1st floor slab could be divided into two pours (over two days). Could have reduced the risk of running into cold weather trouble. |
| Educator | Train the junior site agent with regards to the procedures of how the engineer does the base footing inspections; ensure that the correct procedures are followed to submit rain claims. General weekly toolbox talks. | Give the junior site agent the opportunity to set out the 20 superior rooms/chalets. Explain the process of soilcrete to team leaders, practically show the first chalet's foundations, and let them further proceed with the other 19 chalets. General weekly toolbox talks. |
| *Environmentalist | The river next to the construction site must be protected against contamination from building activities. Necessary to submit an Environmental Management Pan. | 3 trout dams and rivers connecting them must be protected against building contamination. Duck nesting place must be protected and other animals within the lodge area. Specified trees to be protected from damage and cement dust were needed. Necessary to submit an Environmental Management Plan. |

**Table 8: Linking Melvin's Professions with practical case studies 3 & 4**

| MELVIN'S PROFESSIONS | CASE STUDY 3: ALTERATIONS AT A HOSPITAL | CASE STUDY 4: COMMUNITY AFFORDABLE HOUSING |
|---|---|---|
| Business man | Concentrate on good communication between hospital manager and staff. Build and keep good relationship. Ensure safe working conditions. | Build a good relationship with community members and ensure safety for all workers on the construction site. Ensure safe working conditions. |
| Builder | Technical skills needed to understand the correct building procedures to do connections between old and new .i.e. sewer | Low technical skills required. Raft foundations were constructed, but the rest of the construction process was low in complexity. Understand |

| MELVIN'S PROFESSIONS | CASE STUDY 3: ALTERATIONS AT A HOSPITAL | CASE STUDY 4: COMMUNITY AFFORDABLE HOUSING |
|---|---|---|
| | pipes, plaster patches, paint patches, dust and noise controls, etc. Understand the Health and Safety requirements for the specific site. | the Health and Safety requirements for the specific site. |
| Lawyer | Federation Internationale des Ingénieurs-Conseils (FIDIC). Understand the structure, risks and options of specific contracts. Understand procedures for time and change management, variations, claims, suspension, termination and dispute resolution. | Joint Building Contracts Committee (JBCC) Principal Building Agreement. Understand the structure, risks and options of specific contract. Understand procedures for time and change management, variations, claims, suspension, termination and dispute resolution. |
| Financier | Manage and negotiate prices as materials are not purchased in bulk. Monitor cash flows and keep a close tab on profit margins vs progress of work. | Understand the impact on the cash flow of a high volume, low profit margin construction projects. Show understanding into the difference between high turnover vs profit margins. Impact of labour strikes on the project cash flows. |
| Army General | Ensure continuous flow of small quantities of material, because of material storage problems. Keep worker motivated while working under strained, disrupted time schedules. Establish allies from hospital side and built good relationships. | Must be able to mobilise subcontractors and labourers from the community and try to integrate them with his/her own and still be productive on the construction site. |
| Gambler | Shutting down the water and electricity supply to the hospital wing, without possibly knowing what will happen during the connections between the old and new. Try to indicate to subcontractors when they will be able to execute their work, because of noise and dust restrictions. | High volume, low profit margin projects have high risk involved as the operation and structures involved must be tailored according to the conditions. Construction mistakes, control of quality, an increase of material theft and a possibility of community labour strikes during the project could drastically reduce profits. |

| MELVIN'S PROFESSIONS | CASE STUDY 3: ALTERATIONS AT A HOSPITAL | CASE STUDY 4: COMMUNITY AFFORDABLE HOUSING |
|---|---|---|
| Educator | Explain the construction activities on a daily basis to hospital staff and why the activity needs to be executed in a specific way. Guide the subcontractors and workers to understand the delegate relationships and the sensitivity of the environment they work in. General weekly toolbox talks. | Ensure that the 70 % community members involved in the project, are trained within the different trades and uplifted during the project. Some of the community members that supply material must be educated with regards to procuring the right quality and quantity of materials, storage cost, cash flows, etc. General weekly toolbox talks. |
| *Environmentalist | Identify a dumping site for all the construction material. Environmental Management Plan N/A. | Identify a dumping site for all the construction material. Protection of agricultural land adjacent to affordable construction site. Ensure all wet works mixes are not in contact with soil. Environmental Management Plan N/A. |

The above is critical; and these soft skills are crucial in a supportive context to the latter. Lastly, it is necessary to try and find personal traits in those individuals who typically inherit these soft skills.

From the above review of the literature, it can be seen that currently there are challenges that make it even more crucial to select and retain these successful construction managers with the requisite purpose-fit skills, abilities and personal profiles:

- Expanding opportunities in Africa;
- The pivotal role that the construction manager occupies in successfully delivered projects;
- Declining numbers of experienced construction managers to other Industries;
- A large percentage of experienced construction managers that are close to retirement age;
- The decrease in enrolments of new entrants into construction-management tertiary Institutions;
- The major economic impact of projects that have failed;

- The increase in the complexity of projects.

Chapter Three will investigate personality-measurement instruments and how effective these instruments are for prediction success in the work environment. This chapter will further investigate the South African Personality Inventory (SAPI) instruments that are available, and are suitable for the multi-cultural context of South Africa.

# CHAPTER 3

# Personality Profiles

## 3.1. Introduction

In a perfect world, one would like to use an instrument that could test an individual's personality profile – in order to try and forecast the probability of that person being a purpose-fit candidate for the position. The real added value would then depend on the quality of the fit that is formed between the employee, their work, the organisation and the environment (Swanepoel *et al*. 2000; Mouton, 2017).

It is pivotal for the construction industry, and even more so for individual construction companies, to retain critical skills. To enrol the correct profile student for construction management can reduce the probability of skills being lost over time; provided that student enters the industry. Companies can improve their systems and processes and apply new technology; but this would all be fruitless if they do not invest their efforts in their intellectual capital. It would be even worse if a construction company invests resources in the development of an individual, only for that individual to leave the industry, and apply their skills and knowledge somewhere else (Denisi and Griffin, 2005; Walker, 2011; Jantan, Hamdan and Othman, 2010).

Every individual who has worked on a construction project knows the impact that a key person has on the success of such a project; and also the opposite reaction if that key person decides to resign (Burma, 2014). The expensive replacement cost, disruption of the project and involved team members, typically create frustration within the organisation (Sanders, 2007). Some sources indicate that to replace a professional individual can cost as much as 1,5 times their annual salaries (O'Connell and Mei-Chuan, 2007; Suleman and Nelson, 2011). The bulk of the cost of recruiting or replacing management is in the cost of training the new employee; secondly, there is the cost involved with the loss of work by the outgoing employee (Swanepoel *et al*. 2000).

The research of Guion and Gottier (1965) concluded that personality measurements should not be used when selecting personnel. This view was only contested a few years later by Barrick and Mount (1991) and Tett, Jackson and Rothstein (cited in Morgeson, Campion, Dipoye, Hollenbeck, Murphy and Schimitt, 2007). Previous research studies indicated that if a test is intended to specifically measure personality within a work context, the criterion-related validity escalates; and this also increases the value of personality constructs from an

industrial and organisational perspective (Sanz, Gil, Barras, and Garcia-Vera, 2006., cited by Mouton, 2017).

Schmidt and Hunter, (2016) were involved in a meta-study that stretched over 100 years to scrutinise the predictive validity of various instruments. The research findings concluded that different methods and combinations of methods have very different validities for predicting future job performance i.e. General Mental Ability (GMA) combined with a structured interview increased in terms of their prediction. Their research also concluded that methods, such as personal-job fit, personal-organisational fit and the amount of education have little validity; and graphology has in essence no validity. During their research, they realised that the combination of two predictors is practical for use in recruiting; and it has a high composite validity. GMA and above, an integrity test and GMA and above a structured interview both proved to be good predictors of performance in job-training programmes.

These two combinations can also be used for recruiting both entry-level and expert-job applicants.

Thus, when the HR manager recruits by using the GMA, the probability is good that they will select an employee who has a high level of performance on the job. This recruited individual will learn mostly from job-training programmes on the job, as well as acquiring job knowledge more quickly from experience on the job (Schmidt and Hunter, 2016). The research also indicated that even personality has a certain predictive validity. In a local meta-study conducted in South Africa by van Aarde, Meiring and Wiernik, (2016) on personality, the results indicated that students with an education lower than grade 12, on the Big Five were found to be low in conscientiousness. However, extraversion is a good predictor for overall job performance. Conscientiousness proved to be the best predictor for task performance in the South African context.

In an academic environment, conscientiousness also proved to be an important predictor; but combined with an introverted personality. As such, an individual is more focused – and not easily distracted from the task at hand. To predict overall performance, extraversion, emotional stability and openness proved to be the best predictors.

According to Holland's theory, "*personality is an important determinant of career choice; and that career choice is an expression of personality*" (Holland, 1985, cited by Swanepoel *et al*. 2000). Holland (1985) further explained the interaction that individuals experience when they embrace their environments, which correlates with their personal orientation, as illustrated in Table 9 below.

Table 9 also shows that construction managers must be able to move between their environments, personality types and the different professions i.e. the construction manager

must be realistic about money, budgets, investigative with regard to the new technology that is available, as well as the latest trends to be applied, etc., social to educate and assist co-workers, etc., conventional to ensure proper book-keeping and record-keeping. As a leader and a good communicator, he/she must be enterprising. He/she must be able to read, visualise, interpret the building plans and sometimes be creative during the construction thereof.

**Table 9: The correlation between Holland's six personality types and environmental types (Swanepoel *et al.* 2000)**

| PERSONALITY AND ENVIRONMENTAL TYPES | PREFERENCES | JOB DESCRIPTION |
|---|---|---|
| Realistic | Values concrete things such as money, status and power. | Craftsman, Farmer, etc. |
| Investigative | High regard for scientific knowledge. | Economics, Engineering, Psychology, Veterinary Science, Computer Programming, Toolmaking, etc. |
| Social | Well equipped to help other people, understand and educate them, places high priority on social and ethical matter. | Social Worker, Teacher, etc. |
| Conventional | Conforming and orderly, clerical and numerical skills, high regard for business and economic achievements. | Record Keeper, Typist, etc. |
| Enterprising | Aggressive, popular, full of self-confidence and blessed with leadership, communication skills, high regard for economic achievements. | Banker, Estate Agent, etc. |
| Artistic | Creative, non-conformist, independent, organised, artistic and verbal skills, high regard for the aesthetic. | Language Teacher, Dramatist, etc. |

The extent to which the construction manager is involved in each environment could differ between the positional levels, the type of construction. Swanepoel *et al*. (2000) further explains that there are other non-psychological factors, such as family and schools that exert significant influences on career choices (Crites, 1969; Van Rooyen, 1969; Hall, 1976; cited by Swanepoel *et al*. 2000). Construction companies can use new technology, effective systems and more efficient construction methods to increase their competitiveness in the market.

Although all these positives contribute to the level of competitiveness of the company, it is the employee that eventually gives the company the ultimate edge. The type of employees a company employs is the only major competitive advantage for future construction companies (Walker, 2011).

## 3.2. Personality tests

To select employees with superior organisational performance in the construction industry is one of the most important decisions that construction companies need to perfect. Psychometric tests can be used for effectively selecting new employees and applying it internally to promote current employees (Van Der Merwe, 2002; Gregory, 2011; Huysamen, 2002; Ones and Anderson, 2002; Van der Merwe, 2002, cited by Cilliers and Meiring, 2014; Mouton, 2017; van Aarde *et al*. 2017). The use of psychological tests is well-known in different facets of life; and the development of personality psychology has improved over the last twenty years.

In South Africa, personality investigation and assessment have expanded in the last thirteen years (Meiring *et al*. 2005; Taylor, 2000; Visser and Viviers, 2010, cited by Hill, Nel, van der Vijver, Meiring, Valchev, Adams and de Bruin, 2013; Mouton, 2017). Previous research indicated that there is a positive link between personality and performance outcomes; although some suggested a very low validity (Kinder and Robertson, 1994; Swanepoel *et al*. 2000; Roberts, Kuncel, Caspi and Goldberg, 2007; Williamson, Pemberton and Lounsbury, 2007; Tyagi, 2008; Reddock, Biderman and Nguyen, 2011; Mouton, 2017).

Van der Walt (1998) cited by Van der Merwe (2002), stated previous research indicated that psychometric tests are as much as four times more effective than screening interviews.

According to Kerlinger and Lee (2001), cited by Mouton (2017), personality is a *"psychological construct; and thus, it is an abstract idea created by the abstract thinking ability of man that allows him to achieve intellectual control over that which he experiences around and within himself, and [also] to communicate these experiences."* Schermerhorn *et al*. (2005) stated that personality can be defined as the *"overall profile, or combination of*

*characteristics that capture the unique nature of a person; as that person reacts and interacts with others".* They further state that heredity and the environment both influence an individual's personality with an approximately 50:50 split. Swanepoel *et al*. (2000) stated that personality is a concept that is difficult to define. *"In a broad sense, personality can be taken to refer to the way in which the biological, physical, social, psychological and moral traits of an individual are organised into a whole; and also to the relatively stable set of behavioural patterns, which flow from the dynamic interaction between the individual and his/her environment in a particular situation".*

According to Cilliers and Meiring (2014*), "personality can be defined as: (a) the sum total of all the physical, mental, emotional and social characteristics of an individual; and (b) the organised pattern of behavioural characteristics of the individual".*

In South Africa, companies may use psychological testing as part of the selection process (Swanepoel *et al*. 2000). During the selection process; tests can be used to assist in identifying students who have the behavioural and cognitive traits that are required for the field of construction management. Some companies also use these psychology pre-employment tests to increase the probability of hiring the right candidate, thereby decreasing high staff-turnover rates. Companies that can incorporate these tests will effectively increase the individual's production, as well as the total value that the individual will contribute to the company (Carr, 2000; Gatewood and Field, 2001; Roberts *et al*. 2007; Atalah, 2014).

According to Atalah (2014), construction managers not only require knowledge, a variety of skills and experience, but they should also possess certain personality traits (Melvin, 1979, Atalah, 2014).

South Africa forms part of the Sub-Saharan Africa GLOBE cultural cluster, thereby indicating a more collectivistic culture. According to Hofstede (2001) and House *et al.* (2004), cited by van Aarde *et al*. (2017), the culture in South Africa leans strongly towards social cohesion, group pride, loyalty, collective action and collective distribution of resources. This does not only include the South African society in general, but also families and organisations. Psychometric testing in South Africa has received some criticism; because the tests were not culturally biased. Apart from the cultural factors, van Aarde *et al.* (2017) also mentioned two practical factors that can have an impact on the predictive validity of personality measurements in South Africa. The first factor was the limitation to the extent to which organisations can be selective while procuring or terminating poor performers, resulting in the possibility of a lower range of restrictions of personality traits in South Africa, when compared to other countries.

Secondly, there is the very wide variance in performance criteria for South African organisations. This suggests that absenteeism, corruption, theft and other counterproductive work behaviours occur at much higher rates than found in other contexts. South Africa and China both experienced similar validity and reliability issues, with most of the imported tests (Cilliers and Meiring, 2014). This created a much-needed push towards a more standardised psychometric test that would include the whole South African population (Nel *et al*. 2012; Valchev *et al*. 2011, cited by Hill *et al*. 2013; Donald, Thatcher and Milner 2014; Cilliers and Meiring, 2014).

This selection instrument must adhere to the Employment Equity Act (Act No. 47 of 2013), which states that it needs to be scientifically proven to be accepted as valid and reliable. This Act was recently amended from the previously known Employment Equity Act (Act No. 55 of 1998). [Cilliers and Meiring, 2014; Swanepoel *et al*. 2000; Van Der Merwe, 2002; Hill *et al*. 2013; Donald *et al*. 2014]. It must be applied fairly to all employees, and not biased against any employee or group (Van der Merwe, 2002; Donald *et al*. 2014).

The psychometric test must be "*certified by the Health Professional Council of South Africa established by section 2 of the Health Professions Act (Act No. 56 of 1974), or any other body, which may be authorised by law to certify the tests or assessment*" (SIOPSA, 2005, cited by Cilliers and Meiring, 2014; Donald *et al*. 2014). The Employee Equity Act (No.47 of 2013) specifically states the following:

*"Psychological testing and other similar assessments of an employee are prohibited unless the test or assessment is going to be used (Cilliers and Meiring, 2014):*

*a) It has been scientifically shown to be valid and reliable;*

*b) It can be applied fairly to all employees; and*

*c) It is not biased against any employee or group; and*

*d) It has been certified by the Health Professional Council of South Africa (Act No. 56 of 1974)."*

Psychometric testing can be defined as a *"sample of behaviour gathered under standardised conditions, with clearly defined rules for scoring the sample, with a view to describing current behaviour or predicting future behaviour"* (Moerdyk, 2009, cited by Donald *et al*. 2014).

Validity is defined as the *"agreement between a test score or measure; and the quality it is believed to measure"* (Kaplan and Saccuzzo, 1993, cited by Swanepoel *et al*. 2000). According to Muchinsky, Kriek and Schreuder, (1998), validity refers to *"accuracy and precision".* Reliability can then be defined *as "the consistency or stability of a measure"* (Muchinsky *et al*. 1998; Swanepoel *et al*. 2000). Swanepoel *et al*. (2000) further mention that

there are several methods that can be used to determine the validity and reliability of such a psychological instrument.

A shortage of proof has been found to meet these requirements for psychological assessment tests that are currently in use (Fetvadjiev, Meiring, Nel, van der Vijver and Hill, 2015). Psychological tests are tools that can be used to assist with better decision-making. Usually, psychological tests outperform all other types of predictors; and while test-validity coefficients are not always impressively high, it would be unreasonable to totally reject them (Muchinsky *et al*. 1998).

## 3.3. Personality test overview

There are many personality test instruments available; but as previously mentioned; the instrument to be used must be valid and reliable. In most cases, companies use the Myers-Briggs Type Indicator (MBTI); or they rely on the Big Five personality questionnaire. Both of these instruments are widely used by companies or recruiters to assist individuals with better career choices, or more purpose-fit career choices (Schermerhorn *et al*. 2005; Tyagi, 2008; Reddock *et al*. 2011).

According to van Aarde *et al.* (2017), personality research and assessment in South Africa mostly use imported or adapted instruments from the United States or the United Kingdom. Van Aarde *et al.* (2017) further state that previous studies indicated the equivalent functioning of imported instruments in South Africa; but they experienced problematic issues with translation and the measurement of non-variance across language and radical groups. Many South African individuals do not have English as their first language; and that can contribute to the list of factors that lead to a lower level of reliability and weaker criterion relations for imported personality scales in South Africa, when compared to other countries (van Aarde *et al*. 2017).

The MBTI are typically problem-solving styles, which ask individuals how they would typically act or feel in a specific situation. The Big Five personality dimensions indicate how confidently or disagreeably an individual totals on each of these dimensions (Schermerhorn *et al*. 2005; Tyagi, 2008; Reddock *et al*. 2011).

In the context of the above, there are also researchers that indicate that these two instruments used are not sufficient for cross-cultural applications (von Rueden *et al*. 2012; Laher, 2011; Markus and Kitayama, 1998; McAdams, 1997; McCrae and Costa, 2008; Meiring, 2007; Murphy and Davidshofer, 2005; Salgado *et al*. 2003; Swanson, 2007; Yang and Bond, 1990; cited by Cilliers and Meiring, 2014; Pittenger, 1993; Fetvadjiev *et al*. 2015).

It is also important to understand that both of these instruments were designed with a Western origin in mind (Fetvadjiev *et al*. 2015). It may, therefore be concluded that these Western models and instruments mainly focus on personality across cultures; and they often neglect ethnic inequalities.

In the South African context (multi-cultural), this will not be sufficient; because the instrument to be utilised should be using an emic-etic approach that could accommodate this rich South African diversity. Church (2017) gives a very strong argument for the relevance of the conceptualisation and assessment of culture and personality. *"Etic or cross-cultural focus on the transferability of models and tools across cultures. Thus, the 'ethnic' approach refers to the alternative of importing Western personality instruments to construct new measures locally. The emic or indigenous focuses on assessing psychological constructs that are particularly salient in a specific, usually non-Western, cultural context"* (Fetvadjiev *et al*. 2015; Mouton, 2017; van Aarde *et al*. 2017).

Taylor and De Bruin (2005) did devise an instrument in South Africa, based on the Five-Factor Model (FFM) that considered the importance of local context. Strong psychometric properties across the ethnic groups were found through using their Basic Traits Inventory (BTI). Although the BTI instrument was not designed to assess indigenous personality concepts, it was commonly used in South Africa as an FFM instrument (Meiring *et al*. 2006, cited by Fetvadjiev *et al*. 2015).

The South African Personality Inventory Instrument (SAPI) was constructed around the main ethno cultural groups of South Africa. Embracing a combined emic-etic approach includes measures of the Big Five traits and social-relational traits that are particularly striking in South Africa's Bantu ethnic groups. Parallel scales were concurrently developed in the eleven official South African languages (Hill *et al*. 2013; Nel *et al*. 2012, cited by Fetvadjiev *et al*. 2015; Mouton, 2017; van Aarde *et al*. 2017).

The SAPI was based on the same principle as the Chinese Personality Assessment Inventory (CPAI) that was designed with the whole concept of the indigenous perspective (Cilliers and Meiring, 2014).

With the development of this instrument, more focus was given to cultural specific indices and ideas more specific in certain cultures; since previous instruments neglected this area (Cheung, Cheung, Wanda and Zhang, 2003; Cheung, van de Vijver and Leong, 2011; van der Vijver, 2013; as cited by Fetvadjiev *et al*. 2015).

SAPI's blueprint did not start from a predefined model, such as the FFM; but it opted for a more all-inclusive reportage of the personality ideas relevant across the different groups. The SAPI instrument was developed in two stages: (1) *"the qualitative stage of a conceptual*

*model development; and (2) the quantitative stage of instrument development".* The latter stage was broadly conceptual; and it tried to disentangle the implied personality structure dimensions reflected in natural language by speakers of all eleven official languages in South Africa. The second part ultimately concentrated on the empirical validation of the preliminary personality inventory (Cilliers and Meiring, 2014).

During the instrumental development stage, ethnographic data were collected from all 11 languages (Nel *et al*. 2012, cited by Fetvadjiev *et al*. 2015). Characteristics of translated items and factor replicability across groups were used as the main criteria of selection. Fetvadjiev *et al*. (2015) stated that replicability across ethnic groups can increase the probability of succeeding factor duplication, and lessen the existence of distinctive elements. It was also suggested that structure replicability must be increased if cross-cultural comparisons are visualised.

Fetvadjiev *et al*. (2015) further suggested that during social desirability, a distinction must be retained between impression-management-focused aspects (associated with personality in different cultural groups) and lying aspects (more circumscribed effects).

Although there are noticeably different ethno-cultural groups within the South African context, the model development was allowing for transcendence from narrow emic constructs. Cross-cultural personalities, where the emic-etic was combined in a balanced manner where represented in the instrument. From a local perspective, this gave rise to an analogous structure to the Big Five form; although not all of these factors looked as if they were equally replicable (Fetvadjiev *et al*. 2015).

## 3.4. Conclusion

The aim is to apply the SAPI instrument within the cross-cultural South African context; and to test 3rd year students enrolled for construction management; thereafter to use the same instrument and test construction managers in practice with a tertiary degree, and 10 years or more site experience. The results can then be mapped against the students tested to see whether their personality profiles correlate with each other. From the data already available from previous industry tests, the SAPI instrument can then be used to indicate whether the construction manager's profile is different from that of the general population (Giritli and Civan, 2008; Atalah, 2014; Fetvadjiev *et al*. 2015).

It is important to use the correct personality test instrument when selecting an individual to enrol for construction management (Gregory, 2011; Huysamen, 2002; Ones and Anderson, 2002; Van der Merwe, 2002; cited by Cilliers and Meiring, 2014). For the purpose of this

study, it was decided that SAPI was a valid and reliable instrument to use. According to Cilliers and Meiring (2014) and Mouton (2017) SAPI's validity was proven to be sound.

It is pivotal for the tertiary institution and industry to ensure a purpose-fit entry; since scarce resources are invested in these individuals. Thwala and Monese (2012) concluded that it is a very important contributor for the success of a business to attract, retain and develop talented employees. They further stated that the construction industry has unique characteristics; and the employee must be satisfied on a daily basis with the work being done over the duration of the project. Ballantyne (2009) stated that construction companies must not focus on replacing employees that leave their company, or increase the employee numbers because of expansion; but they should rather ensure that the correct employee is selected. These employees must typically operate on a great performance level and exhibit sound commitment.

This waste of resources on individuals who leave the construction industry for various reasons can be minimised if proper time were utilised during the selection process. MacManus and Kelly (1999); cited by De Beer, Visser and Nzama, (2008) stated that both ability and personality factors are needed for an individual to perform well in a job. According to McManus and Kelly (1999) cited by De Beer *et.al*. (2008), "*personality tests are more predictive of contextual performance than task performance; whereas ability reflects the multi-dimensional nature of work performance*" (Langdon, 2000; Mink, Owen and Mink, 1993; cited by De Beer *et al*. 2008; Sackett *et al*. (1998) cited by De Beer *et al*. (2008).

Organisations would be in a better position to predict job performance if they included both ability and personality assessments in their selection processes. La Grange and Roodt, 2001), cited by De Beer *et al*. (2008) further supported this notion in the light of previous studies that had been conducted. After 1990, these studies largely indicated a stronger relationship between work performance and personality, than did studies conducted prior to 1990 (La Grange and Roodt, 2001; cited by De Beer *et al*. 2008).

The individual's personality needs to fit the construction industry. If this is not the case, it is plausible to accept the strong possibility that such individuals will always be non-productive, unhappy and scouting for new opportunities outside the construction industry.

The previous research completed and discussed above provides evidence that personality does play an influential role in the nomological network of latent variables that determine the level of job (and learning) performance that employees (and learners) achieve (Mouton, 2017). Mouton (2017) further stated that the SAPI project aimed to develop an "*indigenous model and an instrument for its measurement, covering the implicit personality concepts deemed relevant across the ethnic groups and languages*" (Meiring, Van der Vijver and

Rothmann, 2006; Nel *et al*. 2012; Valchev *et al*. 2011; Valchev *et al*. 2013., cited by Mouton, 2017).

The research study conducted by van Aarde *et al.* (2017) indicated that the Big Five personality traits play an essential role for predicting job performance in South Africa. The results of the meta-analytical evidence indicated that human-resource managers, industrial psychologists, as well as managers should adopt personality assessments. They need to incorporate them into their decision-making systems for personnel selection, as well as for other applications, such as career-guidance, coaching, succession planning and developmental interventions.

According to research completed by Mouton (2017), the evidence was not sufficient to indisputably conclude that SAPI provides reliable and construct-valid measure of personality within the multi-cultural South African context; although the evidence revealed that the instrument is compatible. Kuncel, Klieger, Connelly and Ones (2013), cited by van Aarde *et al.* (2017) suggested that to maximise validity, test scores should be interpreted with respect to the South African norms for professions under consideration, by using mechanical decision rules. According to Fetvadjiev *et al.* (2015) cited by van Aarde *et al.* (2017) *"the SAPI project provides an excellent example of the kind of culturally and contextually aware research that has the potential to greatly enhance the science and practice of personality assessment in South Africa."*

Chapter Four contains information about both the structured interview and the SAPI instrument testing, on ethical clearance processes, settings and participant selection procedures, informed consent and permission procedures, confidentiality of information, sampling size and sampling technique, data collection, data measurement, data analysis and validity and reliability.

# CHAPTER 4

# Research Design and Methodology

## 4.1. Introduction

This chapter clarifies how the research design and the methodology were steered in the study.

According to Fellows and Liu (2008); cited by Jarad (2012*), "research methodology indicates the principles and procedures of logical thought processes, which are implemented in a scientific investigation. This lies at the heart of all research. Techniques which are available, as well as those that are actually employed in a research project are conducted by methods".*

The research design is the *"map, framework, or blueprint of how the research study will be conducted and the questions that were involved; where the research will take place; in what environment; what the time dimensions of the research will be; and does it provide an analysis of the data"* (Burger and Verster, 2013).

It is important to ensure that the research objectives are achieved through the use of an appropriate research strategy (qualitative or quantitative), research design (blueprint for conducting the research) and research method (data-collection method for the structured interview and SAPI instrument).

This chapter also contains information about the case studies: both the structured interview and the SAPI instrument testing, on ethical clearance processes, setting and participant-selection procedures, informed consent and permission procedures, confidentiality of information, sampling size and sampling technique, data collection, data measurement, data analysis and validity, in addition to the reliability of the data.

## 4.2. Research

According to Saunders, Lewis and Thornhill (2009:5), research is defined *as "something people undertake, in order to find out things in a systematic way, thereby increasing their knowledge".* Through this definition, one can reason that research is based on coherent connections that will lead to increased knowledge on a specific topic, and that there are several possibilities or determinations for the research. The philosophical framework constituted an underlying pragmatic philosophical underpinning.

Construction managers absolutely need technical (hard skills), but which softs skills and personality type/s will be needed for such an individual to be truly "happy" on a construction

site? If a construction manager has obtained the necessary hard skills, soft skills and inherit the correct personality type, why would these individuals then still leave a construction site? Can this research further support and emphasise the work environment and the reality of construction site conditions?

The researcher opted for a mixed methods and action research approached within this study. The research study was restricted to cross-sectional time-horizons as the thesis had to be completed within a specific time frame.

The main research objective was to propose the profile of the ideal construction manager and to use this information to reinforce the selection of such an individual. The core objectives of this study can be divided as follows:

- Do an expert opinion literature study on the profile of the construction manager's soft skills.
- Perform a structured interview with 10 or more expert construction managers to rank and score the attributes of the construction manager in terms of management, technical, soft skills and psychometric profile.
- Test 3rd year tertiary level construction-management students, according to the South African Personality Inventory (SAPI).
- Test construction managers with 10+ years' experience in the construction industry, according to the South African Personality Inventory (SAPI); and map the results with students previously tested.

By identifying the problem, the formulation of the research questions, collecting the research data, and analysing and interpreting of the data, these study objectives will be achieved with the aid of a scientific method. The application of this method will allow the researcher to acquire the necessary data to answer the research questions.

## 4.3. Research strategy: Interacting soft skills in the competency domain model

The aim of the research literature review is to establish the core essential soft skills that a construction manager would need to cultivate, in order to be able to manage future construction projects. In previous studies, the researchers supplied summaries of various lists that indicated the specific soft skills and the competencies (using various sources) that a construction manager graduate needs to obtain. Melvin (1979) has summarised a construction manager as someone who needs specific skills different from those seen in other professions.

The construction manager must be a businessman, builder, lawyer, financier, army general, gambler, as well as an educator (Melvin, 1979). Within this context, the literature review focused on which of these soft skills overlap between the various different researches already completed. An in-depth literature research study was then conducted on each one of these identified soft skills that continuously overlap. As a construction project involves many incongruent views; it was realised that Bono's 'six thinking hats' can also be used at this stage to support these soft skills and see whether they can support the idea of an increase in productivity, thereby linking these soft skills with an increase in productivity (Sheth, 2012).

The construction manager must have the ability to apply these soft skills and using these softs skills to manoeuvre between the six thinking hats. The construction manager's ability to use these interchangeable soft skills in combination or separately, and to float between the six thinking hats to make sound decisions, would further increase his/her effectiveness on a construction site. These interchangeable soft skills and six thinking hats can be used by the construction manager to transform into any single one, or a combination of Melvin's professions. The construction manager's previous experience would also influence the level on which he/she can use Melvin's different professions effectively. Practical case studies will be used to indicate the possibility to add another profession to Melvin's already long list of professions.

Four practical case studies will be used to test and see where these interchangeable soft skills can be applied by the construction manager. As these case studies are practical examples, only some of the difficult issues were used to illustrate the possible workings of the model; and not all the aspects were needed to complete these projects. The complex soft skills interaction model was derived from the literature review and tested against the case study examples to ascertain whether it was a suitable model. The aim of the case studies was to practically illustrate that Melvin's professions were the results of the thirteen typical soft skills interpreted by means of Bono's six thinking hats; and to determine whether they are therefore relevant.

## 4.4. Research strategy: Structured interview

Research can be conducted by using a combination of both qualitative and quantitative research methods (Emuze, 2013). According to Vann (2012), qualitative research appeals to social constructivism, which is a widely held viewpoint encountered in people. The logic, reason and a verifiable method of assessment and replication are based on scientific realism; hence, the quantitative method will be used.

As indicated by Table 10 below, the qualitative methods rely on the inductive approach; whereas the quantitative method relies more on the deductive approach.

**Table 10: Difference between deductive and inductive approaches (Emuze, 2013)**

| Deduction | Induction |
|---|---|
| More scientific principles | Gives an understanding of the meanings people attach to various contexts |
| Move from theory to data | Gives an understanding of the research context |
| Emphasis on quantitative data | Emphasis on qualitative data |
| A structured approach | A flexible approach which allows a change of emphasis as the project continues |
| The researcher is separate from the process | The researcher is part of rather than separate from the research process |
| Need to generalise results by selecting sample of sufficient size | Less need to generalise results |
| Need to explain causal relationships between variables | |

The research used both qualitative and quantitative methods (mixed method, as described in 4.2 above) in the structured interview to determine whether construction managers need a specific personality profile with certain soft skills, in order to be successful in the management of projects. The structured interview questions were distributed to a pilot group that consisted of 10 academics, as listed in Table 11 below.

**Table 11: Different Professions of the Academic Pilot Group**

| No | Academic Institution | *Civil Engineer* | *Construction Manager* | *Professional Accountant* | *Property Management* | *Project Manager* | *Quantity Surveyor* |
|---|---|---|---|---|---|---|---|
| 1 | University of Pretoria | X | | | | | |
| 2 | University of Pretoria | | X | | | | |
| 3 | University of Pretoria | | | X | | | |
| 4 | University of Pretoria | | | | X | | |
| 5 | University of Pretoria | | | | | X | |
| 6 | University of Pretoria | | | | | X | |
| 7 | University of Pretoria | | | | | | X |
| 8 | University of Pretoria | | | | | | X |
| 9 | University of the Free State | | | | | | X |
| 10 | Nelson Mandela Metropolitan | | | | | | X |
| *Different Professions: Pilot Group* | | *1* | *1* | *1* | *1* | *2* | *4* |

Feedback from the pilot group was received and the necessary changes were adjusted and/or improved accordingly i.e. *"use CIDB categories when dividing contract Rand values as it is easier to comment when analysing"* and *"differentiate between being involved or responsible in a project"* Only after the much-needed improvements were completed, were the questions used in the pre-arranged structured interview with the pre-selected respondents.

The predetermined structured interview questions are flexible in the answering of the respondents. The respondents used the predetermined questions as guidelines, but also elaborated and contributed information, based on their knowledge and skill, as they deemed suitable.

A significant section of the questions in the structured interview used a Likert scale, giving the respondents five options from which to choose. These options ranged from 1 = not important at all to 5 = very important, and also 1 = strongly disagree to 5 = strongly agree, with overall rankings. According to Burger and Verster (2013), the Likert scale can be used to change a qualitative attitude to a quantitative one.

Qualitative research data are usually textual and image-based; the sample is small; and it usually involves non-standardised observations and interviews (Leedy and Ormrod, 2002). According to Sim, 1998; Freeman, 2006; Goldman, 2005; Gill, Stewart, Treasure and Chadwick, 2008; Marelli, 2008 (cited by van Eck, 2016), qualitative research methods collect the research data by gaining rich insight and understanding of people's personal experiences, perceptions, beliefs, feelings, attitudes and meanings – within the context of their circumstances.

The structured interview also requires research methods that can assist with one-on-one real-time discussions. The research participants had the opportunity during some of the questions to give relevant responses on their own experiences, insights, opinions, perspectives and attitudes towards the research topic.

## 4.5. Structured Interview – Defined

Interviewing is a way to collect data, as well as to gain knowledge from individuals (Kvale, 1996). According to Cohen *et al.* (2000), an "*interview in not simply concerned with collecting data about life: it is part of life itself; [and] its human embeddedness is inescapable."*

There are many different types of interviews available for the researcher's disposal, which include:

4.5.1 Structured interviews;
4.5.2 Semi-structured interviews;
4.5.3 Unstructured interviews;
4.5.4 Non-directive interviews.

Structured interviews are interviews "*in which all [the] respondents are asked the same questions, with the same wording and in the same sequence*" (Corbetta, 2003).

## 4.6. Structured Interview – Purpose

According to Gill, Stewart, Treasure and Chadwick, (2008), interviews, are usually used to collect the data in qualitative healthcare research. Individual respondents' opinions, know-hows, dogmas and inspirations can be reconnoitred through the use of interviews (Gill *et al*. 2008).

Using structured or standardised interviews, each respondent received the same questions. Unfortunately, the tone of voice would deviate from each structured interview; and that could influence the different respondents (Grey, 2004).

With structured interviews, the predetermined questions are verbally overseen. These predetermined questions are typically easy and quick to administer. The respondents might need to be prompted on some of the predetermined questions, to assist in the clarification thereof. The predetermined questions in the structured interview allow for a limited number of participants; because little 'depth' is required (Gill *et al*. 2008). Some of the questions were quantitative in nature, where more 'depth' is needed. In this research, both quantitative and qualitative information were obtained by the questions asked.

## 4.7. Structured Interview – Environment

The interviews will be conducted on a one-on-one basis; and it was decided that it would be less intrusive if each respondent decided where to hold his/her interview. When the respondent was phoned a suitable venue for the respondent was arranged. The same researcher conducted all the interviews. It was also difficult to interview some of the respondents in a corporate office; as these individuals were typically busy on construction sites, thus utilising construction site offices. One of the respondents was re-allocated from his current construction site; and therefore, the researcher arranged for a telephonic interview.

Audio recordings were made of each individual respondent's interview; so that it could be utilised for later data analysis.

## 4.8. Structured Interview – Size/Participants/Group Composition

The researcher used purposive and convenience sampling methods. The latter method was used to obtain information from construction managers in Gauteng; as this made travelling for the interviews much easier. The researcher further used his experience to select people who had previously worked with him in a company, on a project; and he also used referrals from these individuals. The respondents that formed part of the population of the structured interviews were selected in the built environment. The target population was further restricted by only interviewing construction managers with a B.Sc. degree in construction management,

with 10 or more years' experience in construction site management. It might be that some of the respondents are currently in a more influential position, but must still be involved in a construction company. These specific respondents were selected due to their specific expertise and knowledge that they had gained over the years in the South African building industry. The target population was also selected; due to the fact that each respondent gained expertise and knowledge in different sectors of the built environment (office/retail, industrial, residential or civil engineering and roadworks). The researcher also tried to select individuals with different ages to specifically investigate whether the responses vary.

Since some of the predetermined questions were quantitative in nature, the researcher decided to use Cronbach's Alpha to statistically calculate the answers. When using Cronbach's Alpha to evaluate the questions by factor analysis, the sample size needs to be large enough to produce a reliable factor. To use Cronbach's Alpha, there needs to be a minimum of between 10 – 15 respondents per question (Costello and Osborne, 2005; Field, 2009; Tabachnik and Fidell, 2001, cited by Hof). The target population size was selected to be between 10 respondents.

## 4.9. Structured Interview – Facilitation

It is important for the researcher to do the required planning before the actual interviews start. According to Cruywagen (2015) and Alshenqeeti (2014) the researcher needs to address the following aspects to ensure a productive interview:

- **Identify some questions in advance:**
  Prepare a few questions in advance to keep the interviews on track; questions should relate to the topic (avoid leading questions).
  The researcher did prepare all the questions in advance; and he understood why each question was asked.
- **Consider how participants' cultural background might influence their responses:**
  Language might be a basic barrier (the participants might not be native English speakers).
  Some of the respondents that were selected communicated in English; as this was their first language. The other respondents used English, as their second language; and they had the ability to effectively communicate and write in English.
- **Make sure your interviewees are representative of the group:**
  Choose people whom you would expect to give you typical perceptions and perspectives.

The respondents were targeted because of their specific knowledge and expertise in various sectors of the built environment.

- **Find a suitable location:**

  Use a quiet place, where there are no distractions.

  Because the study focuses on construction managers, it was not always possible to interview the respondents in an office environment. Some of the construction managers were still actively involved in managing a construction project. Therefore, it was not practical for those respondents to meet in an office, because of their site responsibilities and obligations. One of the respondents was also relocated from a construction site in Pretoria to one in Cape Town. This specific interview was conducted over the telephone.

- **Get written permission:**

  Explain the nature of the study and plans for the results. Ask the participants to sign forms of consent.

  Before the interview was conducted, each respondent was informed of the nature of the study and how the information would be used. All the participants had to sign a consent form for ethical approval.

- **Establish and maintain support:**

  Break the ice. Show an interest in what people have to say; qualitative interviews are informal – gain trust from interviewees.

  A few minutes before the researcher started with the interview, a short discussion was held with each respondent. Asking typical questions with regard to their current projects; and how they view the future of the South African construction industry.

- **Focus on the actual rather than the abstract:**

  One is more likely to get revealing information if you ask persons what they would do in a specific situation (e.g. Ask a teacher about teaching strategies, rather than educational philosophy).

  The interview questions were structured is such a way as to accumulate both qualitative and quantitative data.

- **Don't put words in people's mouths:**

  Let people express their own thoughts – a good interviewer must be a good listener.

  The researcher only focused on the questions and did not guide the respondents in any specific way. Where the respondents did not clearly understand a question, the researcher prompted to assist. Those questions were marked so that they could be identified during the data-analysis stage.

- **Record the responses verbatim:**

Whether you use notes, a tape recorder, or a laptop, capture exactly what people say (if not sure, read or play back to make sure it reflects the person's thoughts).

All interviews with respondents were recorded on a voice recorder, as previously stated. The respondents were informed of these actions; and it was explained that the recordings would only be used to verify that all the information was correctly written down. This would all be utilised during the data-analysis stage.

- **Don't show any reactions:**

  One is more likely to get information if you do not show shock, surprise, or disapproval of what someone is telling you.

  The researcher did not use any facial expressions during the receiving of answers from the respondents. The researcher focused on listening to ensure that the correct wording was captured.

- **Remember that you are not necessarily getting the facts:**

  Always treat the responses as perceptions, rather than as facts.

  In some cases, the researcher had to motivate the respondents and reassure them that there are no right or wrong answers. These actions were specifically aimed at the qualitative questions, in which the respondents had to give their opinions.

- **When conducting a structured interview, group dynamics are not taken into account:**

  To make use of a one-on-one interview, the researcher must be able to collect useful data.

  There was no domination of one member that could happen in focus groups. With the structured interview, each respondent received a fair opportunity to respond effectively in their own time. The benefit of using focus groups to gather information on the interaction between members of the group was lost – something that cannot be collected easily by means of individual interviews.

According to http://cerg.csse.monash.edu.au (accessed 05 July 2017), the researcher also needs to have developed the following skills and abilities:

- The ability to listen;
- The ability not to judge;
- A sound memory; and
- The ability to think quickly.

## 4.10. Structured Interview – Guide/Content

It is important for the researcher to have an interview guide available. This list consists of questions, topics and issues that the researcher wants to address during the interview. This interview guide or list should be unblemished; and it should avoid vagueness. According to WHO http://www.who.int (accessed 05 July 2017), six steps can be utilised to ensure a sound interview guide; and these steps were used by the researcher. They include:

- Identify appropriate topics and questions;
- Decide on the level of detail;
- Draft the questions;
- Order the questions;
- List any probes or prompts, and
- Pilot questions to be able to identify possible problems.

## 4.11. Structured Interview – Duration

The researcher timed some of the structured interviews during the pilot study. Most of the pilot participants were able to finish the questions in less than one hour, with an average of approximately 45 minutes. It is important to keep the time less than an hour, in order not to strain the intellectual capacity of the research participants. However, sufficient time should be allocated to obtain meaningful information.

## 4.12. Research Design: Structured Interview

The research design investigates how the data will be collected and analysed (Buckingham *et al*. 2007, cited by Burger and Verster, 2013). The research design contains the how's, when's, where's and what's of the research aspects. The research design refers to how the research was conducted. When and where the research would take place; and how the data collection process worked (Van Eck and Burger, 2016).

## 4.13. Structured Interview – Time (when)

The timeframe in which the research was conducted spanned a relatively long period. The gathering of the relevant sources had started already in June 2015; thereafter, the research proposal was presented and accepted by the departmental research committee in November 2015. The literature section was completed in approximately 9 months, around September 2016. During September 2016, all the relevant documents were submitted for ethical clearance at all three tertiary institutions that comprised the study. Ethical clearance from the University of the Free State was received early in December 2016; and in January 2017,

from Nelson Mandela University. The only delay was with the ethical clearance from the University of Pretoria. This delay was not related to the general aspects of ethical clearance, such as structured interview question and consent forms. It was more related to the SAPI instrument to be used to test the personality of the 3rd year construction-management students, as well as the construction managers with 10 or more years of site experience.

The detail on the ethical clearance for the SAPI instrument will be discussed under the ethical clearance of the SAPI Inventory instrument.

Final ethical clearance from the University of Pretoria was received from the faculty's ethical committee during June 2017. The researcher could only start to use the questions for the structured interview after ethical clearance had been received. The researcher then proceeded with the pilot study, in order to ensure that all the unnecessary problems were corrected, before the structured interviews with the construction-management respondents could be arranged. The pilot study process consumed approximately 2 – 3 weeks, as this was during a recess and not all the participants were always available in their offices. The structured interview was arranged during the month of August 2017. The researcher allocated 4 weeks for the structured interviews to take place, as this was subjected to the availability of the construction managers. Upon the completion of these structured interviews, the required data were collected; and they were readily available for data-analytical purposes.

## 4.14. Structured Interview – Environment (where)

Research can be conducted in various settings, such as a laboratory, simulated conditions, or in the actual environment (Cooper *et al.* as cited in Schoenrade, 2003, cited by Burger and Verster, 2013). The ideal venue selected should be quiet, free from distractions, private and comfortable for all the participants. Unfortunately, due to the daily work environment restrictions for a construction manager, some interviews took place in the construction site office, where disturbances were not always avoidable.

## 4.15. Structured interview – Sampling (who)

The researcher used purposive and convenience sampling methods. The latter method was used to obtain the information from the construction managers in Gauteng; as this made travelling for the interviews easier. The topic of this research study specifically refers to construction managers with 10 or more years of site experience. These construction managers were further limited by the fact that they had to have a B.Sc. degree in construction management, received from a tertiary institution. The candidates were selected, according to age, work experience and possible involvement in different sectors of the built

environment. The purpose of this was to try and ensure that a more diverse set of participants would participate in the structured interview.

## 4.16. Structured Interview – Data Collection (what)

The objective was to conduct a structured interview in a professional manner; so that the participants could appreciate the importance of the research. It was important for the researcher that the participants should choose the venue, to ensure that they were at ease. The questions in the structured interview were both qualitative and quantitative in nature; and therefore, both styles of reasoning could be used.

The researcher separated all the qualitative questions from the quantitative ones. The qualitative data were analysed by using numbers (Leedy, 2010). Numerical data were produced through the Likert scales, which forms part of the quantitative-interview questions. The numerical data in this research were interpreted by using descriptive statistics.

The inductive method was used to analyse the qualitative data received from the interview questions. All the data received from the qualitative questions were organised into more manageable units. After inspecting the data a few times, a clear logic of the complete and broad categories and themes was identified. The data were then integrated and summarised (Leedy, 2010).

## 4.17. Research Methodology: Structured Interview and South African Personality Inventory (SAPI)

Methodology refers to the philosophy or logic that underlines a specific method (Buckingham and Saunders, 2007, cited by Burger and Verster, 2013); it can then be described as the approach that was followed in conducting this research. It describes a gradual approach of the lucidity underlying the structured interviews and the SAPI testing.

## 4.18. Ethics Approval

All research studies conducted at the University of Pretoria have to go through an ethical clearance process, before the researcher or research team may proceed with the study. To manage the ethical clearance process more effectively, each faculty at the University of Pretoria has an Ethical Clearance Committee that needs to oversee the research activities. This is an initiative from the University of Pretoria – to strive to be pro-active, in order to minimise risk and exposure for breaching the ethics policy. Through the ethical clearance process, the University of Pretoria can reduce the possibility of potential legal action that may arise from any research conducted at the tertiary institution.

This research study (including the structured interviews) was overseen by the Ethical Research Committee of the Engineering, Built Environment and Information Technology Faculty (EBIT Faculty) and the SAPI instrument for ethical clearance was supplied by the Faculty of Humanities.

### 4.18.1. Structured Interviews

The ethical clearance at the EBIT Faculty was an online process. A standard form with questions is electronically completed and submitted to the EBIT Faculty Ethical Research Committee. The application addressed aspects, such as whether or not you are questioning human subjects as part of the research, whether the prior company's permission was obtained, in order to engage with potential participants, the health and safety risks to research subjects, the duration of participation on subjects; how confidentiality will be dealt with; how the data will be stored; and how consent from the participants would be obtained. The research ethical clearance application was submitted in October 2016; and after certain issues had been addressed, the EBIT Ethical Research Committee was in essence satisfied with the application. The EBIT Ethical Research Committee did give the researcher approval to continue with the research, subjected to the approval of the SAPI instrument; as there were still outstanding issues with regard to the SAPI instrument that needed to be resolved.

### 4.18.2. South African Personality Inventory (SAPI)

The researcher introduced himself to one of the authors of the SAPI instrument in February 2016. A meeting between the researcher, the supervisor of this research and one of the authors of the SAPI instrument was scheduled, in order to discuss the possibility of utilising the instrument for this study. A request for the use of the South African Personality Inventory (SAPI) was submitted to the authors (Prof. Deon Meiring, Prof. Frans van de Vijver, Dr Velichko Fetvadijiev, Prof. Alewyn Nel and Prof. Carin Hill).

The application form requested the researcher to indicate the research objectives, methods, target sample and target sample size; in order to explain how the SAPI scales would be used; and how the copyright of the SAPI and its items would be protected; additional measures to be taken and how the personal data would be protected.

The authors granted permission to the researcher to use items of the SAPI for the study on the conditions listed provided that:

- at least one of the members of the research team has basic training in psychological testing; and if the investigators were students, the authors expect the supervisor to be a psychologist, or a person with basic training in psychological testing;

- the SAPI will be used only for the purposes specified in the research proposal;
- the findings of the study and the dataset of the SAPI will be provided to the SAPI project;
- the authors will be acknowledged in all publications involving the SAPI;
- a copy of all the publications will be sent to the SAPI project-team archives;
- the SAPI items will not be given to other persons without the prior permission of the authors; and
- surplus copies of the SAPI not used in the specified study would be destroyed or returned to the authors.

After the authors had given the researcher permission to use the SAPI for research purposes, the EBIT Faculty ethical clearance process was finalised.

After numerous emails and communication, the EBIT Faculty Ethical Research Committee still refused to give the researcher ethical clearance to proceed with the study. The reasons given by the committee were based on the following outstanding issues regarding the SAPI instrument:

- Who will administer the data received on the SAPI instrument?
- The data will be fed into the SAPI instrument. The data gathered at UP or by UP students or personnel belong to UP; and necessary agreements need to be in place to provide these data to a person or entity outside UP. The UP Technology Transfer Office (TTO) is responsible for managing the UP Intellectual Property Policy (RT181/09); and it must give a ruling in writing to resolve this particular issue.
- The SAPI project needs ethical clearance from the University of Pretoria; it needs to be clear which ethical committee will oversee the SAPI project.

The supervisor for the research is a person with basic training in psychological testing; and Prof. Meiring confirmed that he would assist the researcher with the administration process. A meeting was scheduled with the TTO office; and it was concluded that the SAPI project was not an entity, but a group of researchers from various organisations. Hence, the TTO office advised that the researcher could go ahead with the research; as there would be no Intellectual Property [IP] flight. This was also on condition that the authors would remove the dataset collected during this research from the SAPI data base.

The researcher received a letter from the SAPI project team stating the following: *"Mr van Heerden can utilise the SAPI online platform to collect data with the SAPI inventory for his PhD thesis. That the SAPI will be administered and interpreted under the supervision of Prof. Meiring for the purposes of the study. That the data collected for the study would be*

*transferred to the University of Pretoria; and removed from the SAPI data base"*. This resolved the 1st two issues that were still outstanding.

After another meeting, it was concluded that the EBIT Faculty Ethical Committee does not have the necessary capacity to oversee the SAPI inventory instrument. In the meeting, all parties agreed that the Humanities Faculty would be the most suitable to oversee the SAPI inventory for the University of Pretoria. The application to use the SAPI inventory was submitted to an *ad hoc* committee at the Faculty of Humanities scheduled for the 5th June 2017. The application was approved; and it is valid for a period of five years, until June 2022.

The *ad hoc* committee requested that the individual research project involving the use of SAPI must undergo separate ethical clearance from the EBIT Faculty. After all the letters were submitted to the EBIT Ethical Research Committee, the conditional approval was granted on 13 June 2017 to the researcher to proceed with the study.

The SAPI Inventory also involved the testing of 3rd year construction-management students enrolled at the University of the Free State (UFS) and the Nelson Mandela University (NMU). Each of these tertiary institutions had a similar ethical clearance process as that of the University of Pretoria, as previously mentioned in 4.18. The ethical clearance application for UFS was submitted in September 2016; and for NMU in October 2016. Both of these institutions responded with some questions that were not clear to them in the original application. After the researcher had clarified the various issues for each of the separate ethical committees, both ethical clearances were conditionally granted.

The approval letter from UFS was received by the researcher on 05 December 2016 and the approval letter from NMU was received on 27 January 2017.

## 4.19. Funding

The research study costs can be seen as twofold. The researcher first required funding for the structured interviews, and secondly for the use of the SAPI Inventory. The aim was to try and save money as far as reasonably possible; but still conduct everything in a professional manner. In order to do this, the researcher decided to look for suitable construction managers that are currently implementing projects in the Gauteng Region of South Africa. The researcher then scheduled an hour-long meeting with each individual, at a time and place that was suitable for the respondents. The researcher would then drive with his private vehicle to the pre-arranged structured interview location. After all 10 respondents had participated in the structured interview; the total distance was claimed back by the researcher and deducted from his research fund.

The authors of the SAPI Inventory were prepared to let the researcher use the instrument for free; and they offered to assist with the administrative aspects thereof. The researcher was also able to use key contact persons at UFS and NMU, to assist with some of the administrative duties. Duties included such as explaining to the 3rd year construction-management students what the research study is about, whether they wanted to participate, the signing of consent forms and supplying their email addresses. The researcher did exactly the same at UP; and by collecting the necessary student information in this way; it reduced the travelling cost significantly. The researcher did supply all the necessary documents to all the relevant parties to ensure that identical information reached everybody involved. There were no tokens of appreciation given to any participant in the structured interview, or for the online SAPI Inventory test. This was one of the pre-conditions from all the different ethical committees; as this could influence the participants or the respondents.

Because of everybody's involvement and generous assistance; it was possible to complete this research study without the need to source and allocate large amounts of research funds. As mentioned previously, it was only the travelling cost to the structured interview locations and back, as well as some phone calls that contributed to the research study's expenditure.

## 4.20. Consent

### 4.20.1. Industry Construction managers

It is important to obtain the necessary consent from the employers of each individual, as well as the individuals themselves. The signed consent form is needed to indicate that employers and individuals are aware of the study; and that they both are willing to participate in the research study. The researcher contacted all the identified companies and ensured that the information regarding the research study reached the correct individual in the company. The responsible person to sign on behalf of the company had to acknowledge on a company letter head that the researcher can proceed to engage with interviewing the relevant individuals.

The employees of each company were then approached via email or telephonic conversation. After the researcher had made contact with each individual, a consent form was emailed to each willing participant. After the researcher had received the signed consent letter of approval from each individual, the necessary arrangements were made for the structured interview. This consent letter requested permission to involve the individual in the specific company; and it addressed the following matters:

- The aim and objective of the study;

- That the participants voluntarily grant permission to participate in the structured interview and the SAPI Inventory online test;
- The participants acknowledge that the structured interview discussion and the results of the SAPI Inventory test would be recorded for record purposes and publications;
- The nature, objectives, possible safety and health implications had been explained to the participants; and it was ensured that they understood them;
- The participant's right to choose whether to participate in the structured interview and SAPI Inventory test; and that the information furnished would be handled confidentially.

### 4.20.2. The 3rd Year Construction Management Students

After all three tertiary institutions had given ethical clearance, the researcher approached the key individuals from each institution to supply the necessary signed consent forms from each willing student. After the consent forms had been received, the email address of each student was supplied. The email addresses were used to email the link of the online SAPI Inventory test.

The target population size is 111 third-year construction-management students. This population can be divided into 34 UP students, 47 UFS students and 30 NMU students. After the students were briefed on the study, they were asked if they would be willing to participate in the research study. From the target population of 111 students only 31 students were initially interested in participating therefore making up the total sample size (UP, 15 students, UFS, 4 students and NMU, 12 students). After the online link was mailed, only 16 students actually completed the test.

The total sample size of 16 for the 3rd year construction-management students consisted of 11 UP students, 4 UFS students and 1 NMU student. The sample size is determined, according to the formula of Stroker. According to Stroker (1981), this percentage of the participants compared to the total sample size must be above 30 %. In this research study, it amounted to approximately 52 %; and that is well above the minimum requirement. For the purpose of this research study, the total number of the responses can be regarded as being representative of the population.

All the signed consent forms are currently in the researcher's possession; and they are filed electronically for record purposes. This includes the signed documents from the private companies that gave the authorisation to interview their construction managers employed by them, the individual consent forms from each construction manager, as well as all the relevant 3rd year construction-management students enrolled at UP, UFS and NMU.

## 4.21. Confidentiality of Information

It was important for the researcher to ensure that each participant knew that the collected information would be handled confidentially. It was also necessary to ensure that each participant should know that there were no right or wrong answers in the structured interview, as well as the SAPI Inventory test. The personal information of each participant, as well as the organisations they represent, would always remain confidential; and they would never be published. The information provided by the participants would only be accessible to the prime researcher, the supervisor and the SAPI authors. The data collected would only be for the use of this study and for any publications that might emanate from the research. If any confidential information might be requested in future for any reason whatsoever, prior permission would have to be obtained from the research informants, as well as their respective companies.

The dataset collected by the SAPI Inventory was removed from the database and is in possession of the author.

## 4.22. Structured Interview

Some of the strengths of conducting a structured interview, as a research method, are that the researcher has control over the topics and the format of the interview. This also makes it easier for the researcher to analyse, code and compare the collected data. Prompting is also possible on data; and the reasons for no responses made can be recorded (Corbetta, 2003). After the structured interviews were completed; the researcher gained more insight in conducting a structured interview; but he also learned valuable lessons that are shared below.

### 4.22.1. Recruiting the research participants

Without willing participants, who are prepared to participate in the research, there would be no structured interview. It was thus pivotal to be able to identify willing construction managers that fall within the limitations of this research study. All the participants were interested in the research study from the start; and they asked more questions to try and obtain more information. This was mostly a surprise to the researcher; as the perception that soft skills in the construction industry are deemed as unimportant, or not needed in this male domain, proved to be the opposite with the individuals that participated in the structured interview.

The one huge advantage of a structured interview over a focus group was that it was not necessary to try and allocate a time and venue that would suit all the parties simultaneously. A focus group would have caused a possible problem; as most of the construction managers

would have found it difficult to abandon their construction sites for at least half a day. To synchronise all the participants under these specific restricted circumstances could have caused difficulties for the researcher.

The researcher allocated the month of August 2017 to schedule all the structured interviews with the identified construction managers. The arrangements were simple, as the researcher phoned each individual and scheduled the appointment, according to the participants' availability. Over-recruiting was not necessary; as the identified participants were available during the month of August. There was always the risk that an individual might be allocated to another construction site outside the Gauteng Region. This was, however, not a concern for the researcher; as it was still possible to reach these individuals over Skype or via the telephone.

### 4.22.2. Obtaining a suitable venue

It was difficult to arrange a suitable venue for each structured interview; since some of the interviews took place in a corporate office that had the ideal environment setting; and others were conducted in a site office on the construction site, which was less ideal. Even after closing the doors of the site office, the construction noise was still evident during the structured interview. One concern for the researcher was the possible interruptions that might occur during the interviews in the site office venues, as people on the construction site have the tendency and need for questions and information to be answered and received on a regular basis. This could obstruct or impede the concentration of the construction manager, increasing the time needed to complete the interview. The time of the structured interview was also a matter of concern; as most of the construction managers preferred to schedule the interview for after 12h00. This means that during their lunch time, or after most of the problematic situations that occurred in the morning on the site had been addressed or resolved. This could imply that the construction manager's mind is not as fresh and clear, as if it would have been during the mornings. There was always the risk that an individual could have experienced high levels of stress during the allocated structured interview time. Something might have happened the previous evening, or the morning before the interview took place, which might divide his/her attention; and they might try to rush through the interview.

The researcher tried to minimise the impact of these effects above, by showing an interest in the specific construction project, and trying to gain insight on the current progress situation of the project itself. This would enable the researcher to try and gauge the complexity of the construction project, as well as the stress levels that are involved. The researcher used this observation information to try and put the participants at ease and focus them on the

questions at hand. The researcher was a construction manager himself; and he was able to assist with the method used.

### 4.22.3. Facilitating structured interviews

It is important for the researcher to first prepare for the structured interview. If the researcher is well prepared with sound relevant constructed questions, a good structured interview can be conducted, as previously mentioned under 4.9.

## 4.23. Validity and reliability

According to Pilot and Hungler (1985), as cited by Jarad (2012), validity indicates the "*degree to which an instrument measures what it is supposed to measure*". Thus, it is important to select the most effective research tool to measure the current research subject matter under scrutiny. In turn, Pilot and Hungler (1985), cited by Jarad (2012) state that reliability is "*the degree of consistency, which measures the attribute; it is assumed to be measuring*". Thus, the reliability will be higher if there is less dissimilarity an instrument creates in recurring measurements of a trait. It can then be concluded that an instrument cannot be valid unless it is reliable.

### 4.23.1. Structured Interview

It was important to the researcher to ensure a high level of validity and reliability from the research data collected in the structured interviews. Cronbach Alpha was used by the researcher to determine the internal consistency of the structured interview questions, expressed as a number between 0 and 1. "*Internal consistency describes the extent to which all the items in a test measure the same concept or construct; and hence, it is connected to the inter-relatedness of the items within the test´* (Tavakol and Dennick, 2011). Because of the use of a mixed method design it was needed to calculate the internal reliability of the quantitative questions that formed part the structured interviews.

The number of participants for the structured interview had to be in the range of 10 – 15, as this number also falls within the parameters for using Cronbach Alpha's formula. The participants were all males, except for one female participant. All the participants had different construction project involvement and their level of work experience varied. The researcher tried, as far as possible, to facilitate each structured interview in the same fashion. Each participant had to answer the same questions; and none had the opportunity to scrutinise the questions before the actual interview. All the structured interviews were recorded for quality purposes.

The audio recordings also assisted the researcher to be able to listen to the different interviews several times, to ensure that no errors had been made in correctly capturing the responses. The trustworthiness of the qualitative data was insured through triangulation were the participants were selected from a few organisations to reduce the effect of receiving data from one particular organisation. This created a variety of ideas that generated a more steady actuality from different observations.

All of the above-mentioned measures were used by the researcher to increase the validity and reliability of the data collected through the structured-interview questions.

### 4.23.2. SAPI Inventory Test

Psychometric testing in South Africa has received some criticism; because the tests were not culturally biased. South Africa and China both experienced similar validity and reliability issues with most of the imported tests (Cilliers and Meiring, 2014). This has created a much-needed push towards more standardised psychometric tests that would include the whole South African population (Nel *et al*. 2012; Valchev *et al*. 2011, cited by Hill *et al*. 2013; Donald *et al*. 2014; Cilliers and Meiring, 2014). This selection of instruments must adhere to the Employment Equity Act (Act No. 47 of 2013), which states that it needs to be scientifically proven to be valid and reliable. This Act was recently amended from the previously known Employment Equity Act (Act No. 55 of 1998). [Cilliers and Meiring, 2014; Swanepoel *et al*. 2000; Van Der Merwe, 2002; Hill *et al*. 2013; Donald *et al*. 2014]. It is applied fairly to all employees and not biased against any employee or group (Van Der Merwe, 2002; Donald *et al*. 2014).

The psychometric test must be *"certified by the Health Professional Council of South Africa established by section 2 of the Health Professions Act (Act No. 56 of 1974), or any other body, which may be authorised by law to certify the tests or assessment"* (SIOPSA, 2005; cited by Cilliers and Meiring, 2014; Donald *et al*. 2014). The Employee Equity Act (No.47 of 2013) specifically states the following:

*"Psychological testing and other similar assessments of an employee are prohibited unless the test or assessment being used (Cilliers and Meiring, 2014):*

*a) has been scientifically shown to be valid and reliable;*
*b) can be applied fairly to all employees; and*
*c) is not biased against any employee or group; and*
*d) has been certified by the Health Professions Council of South Africa (Act No. 56 of 1974)."*

Psychometric tests can be defined as a *"sample of behaviour gathered under standardised conditions with clearly defined rules for scoring the sample, with a view to describing the*

*current behaviour or predicting future behaviour"* (Moerdyk, 2009, cited by Donald *et al*. 2014).

Validity is defined as the *"agreement between a test score or measure and the quality it is believed to measure"* (Kaplan and Saccuzzo, 1993, cited by Swanepoel *et al*. 2000). According to Muchinsky *et al*. (1998), validity refers to *"accuracy and precision"*. Reliability can then be defined as *"the consistency or stability of a measure"* (Muchinsky *et al*. 1998; Swanepoel *et al*. 2000). Swanepoel *et al*. (2000) further mention that there are several methods that can be used to determine the validity and reliability of such a psychological instrument. Proof has been collected to meet these requirements for psychological assessment tests that are currently in use (Fetvadjiev *et al*. 2015). Psychological tests are tools that can be used to assist with better decision-making. Most of the time, psychology tests outperform all other types of predictors; and while test validity coefficients are not always impressively high, it would be unreasonable to totally reject this method (Muchinsky *et al*. 1998).

The researcher used the SAPI Inventory Test to obtain personality data from the construction managers that participated in the structured interview. The same personality test was used to test the 3rd year construction-management students. The data were then collected, scrutinised, interpreted and mapped against the two groups, with the assistance of one of the SAPI Inventory authors.

## 4.24. Conclusion

This chapter has outlined the research methodology, as well as the strategies and design used in this research study. This chapter also included the data-collection tools and the data-collection methods utilised during the study. Throughout this chapter, the researcher emphasised and explained how the reliability and validity of the research process was maintained. Both qualitative and quantitative methods were used in this research strategy. The structured interviews used ten construction managers. The same participants were used to participate in the online SAPI Inventory personality test. The same SAPI Inventory personality test was also used to test the 3rd year construction-management students. By using various research methods, the research did not focus on one dataset procurement method. This allowed the researcher to compare different datasets received during the research study. The research findings from the structured interview are presented in Chapter Five and the results of the SAPI Inventory are shown in Chapter Six.

# CHAPTER 5

# Data Collection, Analysis and Findings

## 5.1. Introduction

In this chapter, the results of the structured interviews are analysed and discussed. This empirical section of the research study focused on construction managers with a B.Sc. degree in construction management, with 10+ years of construction-management industry experience. The one-on-one interviews created the opportunity for the researcher to collect new data within the construction environment, but also to test the literature findings through the empirical research.

## 5.2. The Data Collection

The structured interview questions were pre-determined, as discussed in the previous chapter. The aim of the questionnaire was to answer the research questions, as well as to meet the research objectives. The structured interview questionnaire further prompted each individual to share his/her experiences, opinions, likes, dislikes and suggestions – without being influenced by another individual or group. The data were collected in the Gauteng province; one of the interviewees moved to a project in Cape Town, thus a telephonic interview was conducted.

## 5.3. The Data Analysis

The data collected from the structured interviews in Gauteng were analysed to formulate answers to the research questions under scrutiny. The structured interview questionnaire was divided into three main sections:

- Part A consisted of more general statistical information of each interviewee to categorise into age, project size, project type, project complexity and sector of involvement.
- Part B comprised more research-specific questions to investigate the importance of soft skills, personality and work-life balance of a construction manager. In this section, the SAPI inventory's 7 sectors were also used in question 30, to see which of the 7 sections should weigh more in the personality test.
- Part C contained person-directed questions to the interviewee, to give each individual an opportunity to express his/her personal opinion. These opinions related more to how the interviewee would describe himself/herself, improvement of lifestyle, work-life

balance and whether he/she is happy or unhappy with their current profession in the construction industry.

There were a total of 34 questions; and most of the interviewees could interpret and respond to these questions without any assistance, except for 4 of these questions. The interviewer needed to assist with the clarification of questions 6, 13, 21 and 30. The data analysis pertaining to each research question is discussed below.

## 5.4. Part A: General statistical questions

### 5.4.1 (Q1) What is your current age?

It was important for the researcher to attempt to find construction-management interviewees not only within the research limitations, but also to cover a whole spectrum of different age groups. This was necessary, in order to determine whether the younger, middle and older age groups agreed or disagreed on certain questions, viewpoints or opinions and why. The age-group brackets were determined from 32 years in increments of 15 years, as illustrated in Table 12. Table 12 was divided into 4 columns. The first column, from the left, listed the ten interviewees. The last three columns were divided into the three different age brackets. The reasoning behind this was that if the interviewee finished both his/her 3-year degree and Honours degree at age 22, after 10 years he / she would be 32 years. The ages tabulated in Table 12 below presents the age that the interviewee was on the day of the one-on-one interview during August 2017; and it did not take into account whether the individual still had a birthday coming up later during 2017.

**Table 12: The different age groups of the expert interviewees**

| Description | Different age group brackets | | |
|---|---|---|---|
| | **32 – 47** | **48 - 63** | **64+** |
| Interviewee 1 | | 53 | |
| Interviewee 2 | 42 | | |
| Interviewee 3 | | | 65 |
| Interviewee 4 | 33 | | |
| Interviewee 5 | 32 | | |
| Interviewee 6 | 32 | | |
| Interviewee 7 | | | 71 |
| Interviewee 8 | 47 | | |
| Interviewee 9 | 36 | | |
| Interviewee 10 | 38 | | |
| **Total** | **7** | **1** | **2** |

From Table 12 above, one can conclude that 70 % of the interviewees were in the first age bracket [32 – 47]; while 10 % were in the second age bracket [48 – 63]; and 20 % were in the last age bracket [64+].

### 5.4.2 (Q2) Indicates the highest contract executed in Rand value (as per CIDB contractor grading) where you were the *responsible* construction manager on the project.

This question was important; since the researcher had to have an indication of the Rand value of the different projects involved in the research. This should assist the researcher to link all the data received to the scope of the construction projects involved. These different values can give the reader a glimpse into the complexities of the construction projects involved, as well as the level of skills needed on these construction projects.

The Rand values were also divided into brackets, according to the CIDB grading. By using these brackets, the researcher can better understand the scope of the different projects for which each interviewee was responsible.

The CIDB uses this grading method as a macro-risk management tool. This method only applies to contractors who wish to do work in the public sector. The CIDB uses it to categorise the contractor's annual turnover (financial), the number of the contracts successfully completed (work capabilities) and the company's track record. Typically, a contractor with a CIDB grading of 4 or higher may tender for the construction of a building with an estimated value of R4 million; while a Grade 8 contractor may tender for contracts with a maximum value of R130 million. There is no maximum tender value for Grade 9 contractors. According to the CIDB, all of the interviewees are employed in construction companies graded 8 and 9.

This also relates to question 5.4.6, where a link may be made between the complexities of each project. Furthermore, this question also differs from question 5.4.3 below, as it is related to involvement, where the latter is the responsible construction manager. There is an enormous difference between being merely involved, or being responsible for a construction project. Being involved suggests that you are only responsible for a section or part of the construction. If you are a responsible construction manager, you would need to oversee all the different sections on the construction project.

Table 13 illustrates the different Rand values of projects where the interviewees were with the responsible construction manager. The table was divided into 5 columns, with the 10 interviewees on the left. The other 4 columns were divided into the different CIDB Rand value ratings.

The results in Table 13 below indicate that 40 % of all the interviewees were the responsible construction managers for a project between > R40 – R130 million and 60 % for projects above R130 million.

**Table 13: Rand value as per CIDB grading for being a responsible construction manager on a construction project**

| Description [Responsible] | Different CIDB grading | | | |
|---|---|---|---|---|
| | R6,5 - R13 million | > R13 - R40 million | > R40 - R130 million | > R130 million |
| Interviewee 1 | | | | X |
| Interviewee 2 | | | | X |
| Interviewee 3 | | | X | |
| Interviewee 4 | | | X | |
| Interviewee 5 | | | | X |
| Interviewee 6 | | | | X |
| Interviewee 7 | | | | X |
| Interviewee 8 | | | X | |
| Interviewee 9 | | X | | |
| Interviewee 10 | | | X | |
| **Total** | **0** | **1** | **4** | **5** |

What is also highlighted in this question is the fact that interviewees 4, 5, 6, and 10 were all under the age of 40, representing 40 % of the interviewees; and they were held as being responsible for the projects greater than R40 million (as illustrated in Figure 30 below and Table 12 above).

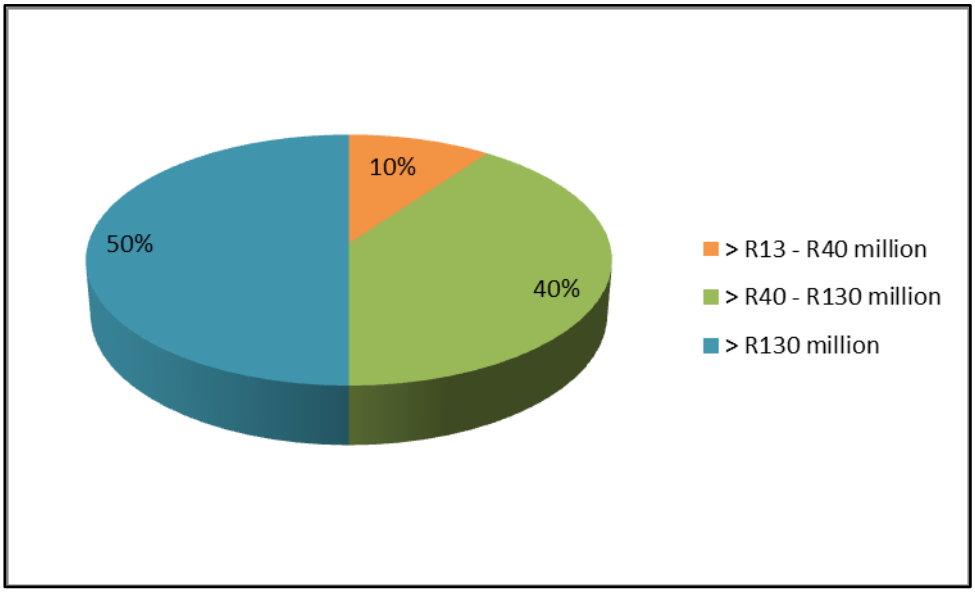


**Figure 30: The interviewees responsible for a Rand value of a construction project under the age of 40**

This might indicate that construction managers must have the ability to manage large construction projects at an early age in their careers. It can also conclude that there are not enough middle-management construction managers; and thus the younger employees' available need to prematurely accept this responsibility.

### 5.4.3 (Q3) Indicate the highest contract executed in Rand value (as per CIDB contractor grading) in which you were involved as a construction manager on the project

The difference between questions 5.4.2 and 5.4.3 is that a construction manager that was responsible for a project indicates that he/she had to oversee the whole project and take full responsibility for everything that happens on the project. The latter indicates that he/she was only involved in such a project. This involvement means that the interviewee only took responsibility for a part or section of the project; and thereafter needed to report to the responsible construction manager on the project.

The interviewee's involvement changes somewhat from the scenario in which he/she was the responsible construction manager, as illustrated in Table 14 below. Only one interviewee [10 %] was involved in projects between > R13 – R40 million, four [40 %] between > R40 – R130 million and five interviewees [50 %] above R130 million. From this, the researcher can propose that some of the interviewees were involved in a project; and because he/she showed potential a larger project was imposed on him/her to be the responsible construction manager. The other interviewees were involved in > R130 million projects; and after the company deemed these individuals to have successfully obtained the necessary skills, they were awarded a similar project, in which they were the responsible construction manager. This can also indicate that the construction companies understand that practical experience is very important; and it is difficult to find young construction managers within a short time-frame. Thus, most construction companies use a type of coaching method, in which a young inexperienced construction manager joins an experienced construction manager.

After completing different projects with the guidance of the experienced construction manager, the inexperienced construction manager has the opportunity to learn and excel at a faster rate, adding value speedily to the company. There are, however, limitations in using this coaching method. The effectiveness of the learning will depend on the attitude and ability of the inexperienced construction manager to learn through first and second instruction responsibilities. The correct previous experience gained from the more experienced construction manager and his/her ability to convey the information would also influence the final outcome of this coaching method.

Virtual reality might also contribute to the improved training of construction managers. By utilising virtual simulations of the construction project, the construction manager can familiarise himself/herself before the actual construction-project commences. This can assist the construction manager to simulate different scenarios of the same construction project and to establish all possible outcomes. During such simulations, the construction manager

can get a feeling of what could be major risks; determine then the possible barriers on the project; and simulate the different outcomes of each decision.

Health and Safety on the project can be evaluated, as well as the responses from different contractual situations, through different simulations using the same project. The virtual reality simulations can also assist with training aspects, such as learning to read, understand and interpret bending schedules. As mentioned above, the researcher believes that virtual reality has the ability to assist with a similar type of coaching method. These simulations can especially improve, inexperienced construction managers, assisting them in shortening their practical learning curve.

The researcher also believes that 3D printing capabilities should be further investigated. This new technology might also assist in reducing practical training and improve academic education. 3D printing technology might have the ability to reduce the learning curve of graduates, as well as inexperienced construction managers. Experienced construction- site managers might be able to utilise 3D printing to assist them when facing changing novel construction projects.

**Table 14: Rand value as per CIDB grading for being involved as a construction manager on a construction project**

| Description [Involved] | Different CIDB grading | | | |
|---|---|---|---|---|
| | R6,5 - R13 million | > R13 - R40 million | > R40 - R130 million | > R130 million |
| Interviewee 1 | | | | X |
| Interviewee 2 | | | | X |
| Interviewee 3 | | | X | |
| Interviewee 4 | | | X | |
| Interviewee 5 | | | | X |
| Interviewee 6 | | | | X |
| Interviewee 7 | | | | X |
| Interviewee 8 | | | X | |
| Interviewee 9 | | X | | |
| Interviewee 10 | | | X | |
| **Total** | **0** | **1** | **4** | **5** |

### 5.4.4 (Q4) What was the position (title) assigned to you during this project involvement mentioned in Question 3?

Table 15 consists of 5 columns with the 1st indicating the different interviewees, and the 2nd their respective positions (titles) during their project involvement. The remaining three columns were again divided into the different CIDB Rand value-grading brackets.

Table 15 reinforces the idea that construction managers must have the ability to manage large projects at a relatively young age. Through all the interviews, the researcher also realised that each construction company uses positions (titles) differently.

**Table 15: Position (title) assigned during project involvement for each interviewee**

| Description | Position (Title) | > R13 - R40 million | > R40 - R130 million | > R130 million |
|---|---|---|---|---|
| Interviewee 1 | Construction Director | | | X |
| Interviewee 2 | Project Manager | | | X |
| Interviewee 3 | Company MD | | X | |
| Interviewee 4 | Contracts Manager | | X | |
| Interviewee 5 | Senior Site Agent | | | X |
| Interviewee 6 | Site Agent | | | X |
| Interviewee 7 | Contracts Director | | | X |
| Interviewee 8 | Contracts Manager | | X | |
| Interviewee 9 | Project Manager | X | | |
| Interviewee 10 | Site Agent | | X | |

A site agent's responsibility in a company, with a horizontal organisational structure, might differ from the responsibility from a site agent employed in a company with a more traditional vertical organisational structure. The construction companies also use these different titles, as one of the many different ways to offer extrinsic rewards, thus motivating their employee with an important job title.

### 5.4.5 (Q5) The above mentioned project/s were construction specific, or more managing specialist sub-contractor intensive

This question was specifically asked to see whether the interviewees' projects were more technical (construction-specific) or more managerial through facilitating the sub-contractors. The previous questions related more to the Rand values of the construction projects. The aim of this question was to establish whether these construction projects were more technical, managerial, or both.

Table 16 below was again divided into four columns, with the different interviewees starting at the left. The remaining three columns were then divided into construction-specific, specialist sub-contractor and both (construction specific and specialist sub-contractor).

60 % of the interviewees indicated that they were involved with projects where both construction (technical) ability and managing specialist sub-contractors were needed. The interviewees indicated that on most of the construction projects, technical skills and managing abilities are needed. Emphasising the fact that it is important for a construction manager to have the technical (hard skills), but also to have sound managerial skills.

A total of 30 % of the interviewees mentioned that their projects were more construction-oriented; and only 10 % referred to their projects as more managing-specialist sub-contractors. The latter suggests a construction project where the actual construction activities were very few; but the bulk of the project activities consisted of specialist sub-contractors, such as the installation of large air-con systems, boilers or medical equipment.

**Table 16: Being involved in construction -specific or managing specialist sub-contractor intensive projects or both**

| Description | Construction specific | Specialist sub-contractor | Both |
|---|---|---|---|
| Interviewee 1 | | | X |
| Interviewee 2 | | | X |
| Interviewee 3 | | | X |
| Interviewee 4 | | | X |
| Interviewee 5 | | X | |
| Interviewee 6 | X | | |
| Interviewee 7 | X | | |
| Interviewee 8 | | | X |
| Interviewee 9 | X | | |
| Interviewee 10 | | | X |
| **Total** | **3** | **1** | **6** |

### 5.4.6 (Q6) The complexity of projects can be divided into two main categories. Each measurement can be further divided into two dimensions, as illustrated below:

| Project complexity | |
|---|---|
| **A) Structural** | **B) Uncertainty** |
| *1. Size: Number of elements* | *1. Uncertain in goals* |
| *2. Independence of elements* | *2. Uncertain in methods* |

**Which of the above dimensions do you consider to be relevant, where you were the responsible construction manager, as mentioned in Question 2?**

All the interviewees needed some further clarification on this question. Project complexity can be divided into two main measurements: structural or uncertainty. Each measurement

can be further divided into two dimensions. If the project is structurally complex, it can either be complex because of the size, the independence of elements, or both.

**Table 17: Responsible construction manager: Complexity of project**

| Description | Project complexity | | | |
|---|---|---|---|---|
| | A) Structural | | B) Uncertainty | |
| | Size: Number of elements | Independence of elements | Uncertainty in goals | Uncertainty in methods |
| Interviewee 1 | X | X | X | X |
| Interviewee 2 | X | X | X | X |
| Interviewee 3 | X | | | |
| Interviewee 4 | X | X | | |
| Interviewee 5 | X | | | |
| Interviewee 6 | X | X | | |
| Interviewee 7 | X | | X | |
| Interviewee 8 | X | X | | |
| Interviewee 9 | X | X | | |
| Interviewee 10 | X | X | | |
| **Total** | 10 | 7 | 3 | 2 |
| Probability to deal with a dimension under A or B on a project | 100 % | 70 % | 30 % | 20 % |
| Probability to deal with A or B on a project | 85 % | | 25 % | |

Table 17 illustrates the different types of construction-project complexities for which the interviewees were responsible. At the bottom of the table, the probability of executing a project, under the different dimensions, is indicated in 4 columns. Just below that are 2 columns that indicate the possibility of executing a construction project under the two main measurements.

If it is the first time ever to execute a specific kind of project, it could be uncertain in terms of goals, methods or both. The interviewees also interpret uncertainty, as construction projects that were never before executed by the company i.e. if the company operates in the residential sector, constructing townhouse complexes and now move to their first multi-storey office blocks. According to some of the interviewees, this also creates, to an extent, uncertainty.

One of the interviewees also referred to doing construction projects in other provinces. Provinces, like the Western Cape, which, for instance, have very strong winds during certain months that can influence the use of high cranes. Most of the labour rates are also higher than in Gauteng; and the type of clients also differ within these two provinces. All the interviewees indicated that structural complexity on their projects out-weighed the complexity of uncertainty. The interviewees were involved with projects, where structural size played a significant role (100 %); and 70 % of the interviewees agreed that structural independence added to their project complexity (as illustrated by Table 17 above).

The independence of elements was mainly due to the fragmentation of the construction industry. The need during the construction phase was to facilitate the different stakeholders, engineers, National Home Builders Registration Council (NHBRC) inspectors and specialist sub-contractors contributions to the structural complexity of the different elements. Within the portfolio of these 5 construction companies, there is an 85 % probability that the construction manager would have to deal with structural complexity on his/her project.

The uncertainty in methods from interviewees 1 and 2 stems from the fact that their company portfolio also contains large affordable housing projects. These affordable projects are not structurally complex, as are their other projects, but rather complex in uncertainty. Some of these affordable housing projects involve community participation. Typically, this consists of a 70:30 ratio, where the company needs to utilise 70 % of community members and 30 % of their own teams. The 70 % can form part of suppliers, sub-contractors and general labourers. The community supplier's amount of stock, reliability in terms of on-time deliveries and quality of material can add to the project uncertainty.

With community sub-contractors and labourers, there is an uncertainty in the ability to complete work within the allocated timeframe and of the specified quality. Furthermore, training and upliftment time are needed to ensure that the specified quality and production levels are achieved. This is very difficult to calculate, as each construction site would be in a different rural area, which means that the skill levels in the different trades would vary. Then there is the uncertainty with regard to labour rates, as agreed and signed by the community leaders. This could change any time during the project. If the community members become unhappy with the agreed labour rates, they will suddenly stop the production on the construction site and negotiate for higher rates.

Each affordable house should, in essence, be viewed as a project on its own, but still managed as a mass project. According to interviewee 2, it is very difficult to manage these projects. This uncertainty involves going through the different status phases of red tape from banks. Clients make use of different banks; and each bank gives approval on different times.

The building plan approvals and the approvals from the NHBRC, to proceed with the raft platforms, are received in different batches, after the work package was calculated for *x* number of houses. This implies that the construction manager needs to plan on a regular basis; as plan A can easily change to plan B, C or D. Sales were completed in a specific section of a phase (grouped together); and because the approval from banks is received in different weeks, it is difficult to manage effectively. In terms of Preliminary and General (PGs), it is difficult to plan plant hauling and walking distance between the houses. The closer the houses are grouped together, the cheaper it is to construct them. If the house is registered, the client expects the completed house within 2 months of signature. The profit margin per house is less than R5 000; and the after-registration interest rates start to consume the profits.

If the house is completed too early, the contractor runs the risk of thieves damaging and stealing things from the house.

Interviewee 7 was previously involved in a project, where they were sure in what direction they needed to take the project; but not sure about the specific goals of how to research the final product.

Only 30 % of the interviewees were involved with projects, where uncertainty in terms of goals contributed to the complexity of their projects, and 20 % in terms of methods. Within all five companies, there was the likelihood of 20 % to be involved in a project, where uncertainty contributed to the complexity of the project.

Consequently, the researcher can assume that within these five companies, it is more important for a construction manager to have the ability to manage structural complexity than uncertain complexity.

### 5.4.7 (Q7) Indicate your sector of involvement as a construction manager

The four different sectors comprised the office/retail sector, the industrial sector, the civil engineering and roadworks, and the residential sector, as illustrated in Table 18 below. The bottom of the table also gives the total percentage of sector involvement of each interviewee. The aim of this question was to further assist in narrowing down the scope of construction projects under discussion in this research study. The previous questions addressed the Rand values, the complexity, and finally, the sector of involvement.

Interviewee 2 elaborated on the different sectors and mentioned that from his experience, the industrial sector is most probably the easiest in which to work. As storage facilities and warehouses do not have many finishes, it is also easy to do the scheduling for the construction program. He further elaborated that the only problem he has experienced on

previous projects like this consisted of material issues, such as a shortage of sheeting. According to interviewee 2, it is of more importance in the office and retail sector to pursue the deadlines; as the penalties involved are typically very costly. In this sector, 24-hour working schedules are not uncommon. In their company, they will even increase their PGs on the project to try and finish the retail project ahead of schedule. This type of client always wants to change things during the construction period; and it is important to keep these clients happy.

Customer satisfaction is of the utmost importance, since this type of client is limited in numbers. He further stated that the residential sector is probably the most difficult sector to operate in. There is a lot of competition from the smaller construction companies that typically start in this sector. The clients are emotional; as they use all their money to construct their dream house.

The clients want to save money; and they do not want to use a professional team that designs proper buildings and structural plans at a cost. The large specialist sub-contractors do not want to execute such small jobs; so they would price the work high. The sub-contractors that are prepared to do the work are not necessarily the best in the industry, resulting in possibly more trivial defects and mistakes.

**Table 18: Interviewees' involvement in the different construction sectors**

| **Description** | **Type of sector involvement** | | | |
|---|---|---|---|---|
| | **Office/ Retail Sector** | **Industrial Sector** | **Civil Engineering & Roadworks** | **Residential** |
| Interviewee 1 | | | | X |
| Interviewee 2 | X | X | X | |
| Interviewee 3 | X | X | | X |
| Interviewee 4 | X | | | |
| Interviewee 5 | | X | | |
| Interviewee 6 | X | X | X | |
| Interviewee 7 | X | X | | X |
| Interviewee 8 | X | X | | X |
| Interviewee 9 | X | X | | |
| Interviewee 10 | X | X | X | X |
| Total | 8 | 8 | 3 | 5 |
| Percentage per sector of involvement | 80 % | 80 % | 30 % | 50 % |

A total of 80 % of the interviewees were involved in both the office/retail sector and the industrial sector. Only 50 % were involved in the residential sector; and a small percentage of 30 % in the civil engineering and roadworks sector, as illustrated by Table 18 above. Interviewees 2, 6 and 10 mentioned that they were involved in a civil engineering and roadworks project. The interviewees did indicate that they had to work with the latter on some projects, or assist with the facilitating and co-ordination between the civil works and the general construction works.

None of the interviewees that mentioned involvement in civil engineering and roadworks projects were participating in infrastructural construction projects, such as dams, bridges, public roads, electrification and public sewer lines.

## 5.5. Part B: Specific Research Questions

### 5.5.1 (Q 8) In your opinion, is there a shortage within the South African construction industry of efficient, skilled construction managers with more than 10 years of site experience?

The purpose of this question was to determine whether there are shortages of skilled construction managers in the industry that was recognised by the researcher during this research study.

All of the interviewees agreed that there was a definite shortage of skilled construction managers in South Africa. Interviewee 2 said that they had experienced a major brain drain in the industry, in which many of the experienced construction managers leave South African shores, to embark on construction activities in other countries, such as Australia and New Zealand. He further stated that in his current company, a few years ago, junior construction site mangers moved through the ranks over the years; as they gained the necessary practical experience. This process meant that the individual had to finish his/her studies, and then become a junior site foreman, then a foreman, and thereafter a senior site foreman.

Depending on the construction project, the individual can then become a senior finishing foreman or a senior wet trade foreman. After this he/she becomes a junior-site agent, a senior-site agent and a contract manager who then oversees his/her own construction project. By this time, the individual could have been involved for more than 20 years in the construction industry. Currently, these young inexperienced individuals find themselves within 4 – 5 years in a senior-site managerial position. In their company, they push these young individuals through the ranks as the available senior site managers in industry earn too much money; and the company cannot afford them. If the individual earns between R880k to R1 million Rands per annum and you look at a construction project of

approximately 50 million; that would push up the PGs for the project too high; as this must typically be between 10 % - 13 % of the project value.

They push these younger individuals with lower salaries quickly through the ranks, as they have the responsibility, but not necessarily the experience. Currently, this is the model that works well in their company, although these individuals did not grow through the ranks.

Interviewee 3 specifically agreed and mentioned that skilled middle managers are the biggest shortage; and thus the most difficult to source. Interviewee 3 further stated that construction companies are not always as stable when going through difficult financial cycles; and they sometimes resort to retrenchments. These retrenched middle-construction managers then start their own construction companies; and they typically fail, because of a lack of business administrative skills. After the failure; they return to a construction company; or they leave the industry prematurely.

Interviewee 8 stated that in his opinion there are enough construction managers with 10 years of site experience. He believes that there is a shortage with 10 years and more site experience. He also mentioned that in his company, it is mostly a problem; because the construction managers with that number of years of experience receive salaries greater than his company is currently prepared to offer them.

Interviewee 10 said that he thinks there are enough construction managers in the market. The problem is the current economic climate that makes it difficult for construction companies to recruit employees; as the projects are mostly shelved. He did mention that although there are enough construction managers available, the problem is that there are not enough skilled ones.

### 5.5.2 (Q9) If your company recruits new construction managers, what are the 5 most important characteristics required in such an individual?

Table 19 below, illustrates a list of all the important characteristics, deemed by the ten interviewees that are required during the recruitment process of construction managers. The interviewees had to give any 5 characteristics which they feel are important; and these were listed from 1 to 15 on the left-hand side of the column. The ten interviewees were further divided into 10 columns, to show the number of overlaps of the same characteristic. The column on the right was used to prioritise each characteristic in terms of the number of repetitions between the different interviewees.

The prioritised column emphasised the importance of each characteristic by ranking them, according to the number of repetitions via each interviewee. This suggests that a scale value

of 1 indicates a characteristic that is of less importance than a scale value of 7. This does not mean, however, that a characteristic with a scale value of one should be ignored.

Interviewee 2 stated that although it is a construction manager, the type of employee to recruit would depend on the sector with which he/she would be involved. The construction manager would be recruited, according to the requirements of the company for that specific market. Interviewee 10 agreed with interviewee 2's statement and added that track records of successful previous projects should be checked. It is important to try and employ a construction manager who has successfully completed similar projects; as this can reduce his/her learning curve during the actual project. Interviewee 9 said that it is very difficult to recruit good employees in their company. They focus especially on the individuals' willingness to work. In Table 19 below, it was clear that practical experience and technical know-how were the two most important characteristics (7).

**Table 19: The list of all the interviewees' five most important characteristics of a construction manager**

| No | Required characteristics | Interviewees | | | | | | | | | | Total # |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | |
| **1** | Practical/ technical know-how & experience | | X | X | X | | | X | X | X | X | 7 |
| **2** | Personal maturity | | X | | | X | X | X | X | | | 5 |
| **3** | Management skills | X | | X | X | | | | X | | | 4 |
| **4** | Problem solving ability | | X | | | | X | | X | X | | 4 |
| **5** | People- management skills | | X | X | X | | | | | X | | 4 |
| **6** | Attitude | X | | | | | X | | | X | | 3 |
| **7** | Leadership skills | X | | | | | X | | | X | | 3 |
| **8** | Decision-making skills | | X | | | X | | | X | | | 3 |
| **9** | Financial-management skills | | X | X | | | | X | | | | 3 |
| **10** | Teams | | X | | | X | | | | | | 2 |
| **11** | Work ethics | | | | | X | X | | | | | 2 |
| **12** | Communication skills | X | | | | X | | | | | | 2 |
| **13** | Conflict management | | X | | | | | | | | | 1 |
| **14** | Assertiveness | X | | | | | | | | | | 1 |
| **15** | Flexibility | | | | | | | | | X | | 1 |

The two oldest interviewees (3 and 7) both emphasised that a sound financial management background is a very important skill for such an individual; although it did not rate highly with the other interviewees. This could indicate that both of these interviewees are owners of businesses and understand the value of financial management when operating a company. The other interviewees are only employees in their respective companies.

Personal maturity appeared to be the second-most important characteristic and the interviewees referred to aspects, such as, responsibility, trustworthiness, independence, professionalism, patience, taking the initiative, disciplined and having personal future goals. The third most-valued characteristics, in no specific order, were management skills, problem-solving skills and people-management skills. The employee's attitude, leadership skills, decision-making skills and financial-management skills followed in fourth place.

Teams, work ethics and communication skills were in fifth place; and lastly, there were assertiveness, conflict management and flexibility.

**Table 20: Required characteristics under four main headings**

| | **Interviewees** | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Q9.1 | 1 | 1 | 1 | 1 | 3 | 2 | 1 | 1 | 1 | 1 |
| Q9.2 | 2 | 2 | 2 | 1 | 3 | 3 | 1 | 2 | 3 | 3 |
| Q9.3 | 3 | 2 | 2 | 3 | 3 | 3 | 2 | 3 | 3 | 4 |
| Q9.4 | 3 | 3 | 3 | 3 | 3 | 3 | 2 | 3 | 3 | |
| Q9.5 | 3 | 3 | | 3 | 3 | 3 | | 3 | 3 | |
| Q9.6 | | | | | 3 | | | 4 | 3 | |
| **Technical Skills [10]** | **1** | | | | | | | | | |
| **Management Skills [9]** | **2** | | | | | | | | | |
| **Leadership Skills [28]** | **3** | | | | | | | | | |
| **Tertiary Education [2]** | **4** | | | | | | | | | |

In Table 20 above, the required characteristics could all be divided under four main headings. Technical skills represent number 1; management skills number 2; leadership skills number 3; and tertiary education number 4. Leadership skills were indicated, as the most important, followed by technical skills, management skills; and lastly, a tertiary education. Interviewee 3 highlighted the importance of business skills; and interviewee 7 emphasised how important financial skills are. Both of these interviewees represent the oldest participants and their results also indicated the importance of management skills. Interviewee 5 only mentioned leadership skills as being important. This supports his/her answer in Question 5, in which he/she stated involvement in managing specialist sub-contractors only, suggesting less importance in the need for technical skills. Interviewee 6 indicated in Question 5 that he/she was only involved in construction activities; although he/she suggested that strong leadership skills and management skills are needed, with no mention of technical skills. All of the other 8 interviewees did suggest that technical skills are important.

Table 20 further suggests that strong leadership skills, supported by sound technical and management skills are weighted much more heavily during recruitment, than a tertiary education.

### 5.5.3 (Q10) In your company, how do you retain your current key construction managers?

Interviewee 6 said that it is very difficult to retain construction managers and that companies should manage this very pivotal aspect. All the interviewees agreed that a decent salary is very important; but a decent salary alone would not guarantee that you retain these key construction managers. In some instances, construction managers left the company to work for a smaller salary; but one in which a more comfortable work environment was offered. Interviewees 3, 4 and 7 also referred to extrinsic performance remuneration, such as bonuses, project incentives and company shares.

Interviewees 1, 2, 8, 9 and 10 mentioned the importance of a good work environment for these individuals. The construction site environment mostly involved being outdoors in the dust, moving around from project to project, working long hours under constant stress, separation from family and friends. They further explained that it can be just to listen to the problems of these individuals, acting on them, and thus supporting them. They need to have the freedom to speak their mind. Many of the decisions are left to the construction manager; and the company must ensure that he/she is accountable for the outcome of such a decision. It is also important to support the construction manager and give him/her, the necessary back-up support.

The opportunity to try a new method, or to implement a different system must be given; and if it is successful, to use the blueprint on other similar projects. Interviewee 8 further stated that the site facilities must be of such a nature that the individual can with confidence arrange site meetings with clients and other corporate project-team members. Interviewees 9 and 10 also elaborated on the importance of rotating individuals to work over the weekends, so that everybody can have an opportunity to go home to spend time with family and friends. The company must also ensure that there are regular social events, so that these individuals can also relax within the company environment.

Interviewees 3, 4, 5, 8 and 9 mentioned the importance of motivation and acknowledgement. Interviewee 8 also suggested that job descriptions are becoming more important. A construction foreman, site agent or site engineer can have the same job description; but companies use different titles. The society status with family and friends of the individual improves through his/her title; and a site foreman is of a lower status than a site engineer. Interviewees 4 and 9 also stated that constructive criticism is necessary where needed. The construction manager must know that if he/she made a decision and it turned out to be a

mistake, costing the company money, he/she would not be punished for it. This gives the individual confidence to make the correct decisions, but also to accept the responsibility for a mistake, and to be accountable for it.

Interviewees 2 and 5 elaborated that it is necessary for a construction manager to be challenged on a weekly basis. Every week, the construction manager will receive a list with new challenges for the week. This can include aspects, such as challenges regarding plant, budget, personnel, security, production, quality and even the protection of services. If the construction manager achieves his/her mini goals, they would receive intrinsic rewards that create a feeling of enjoyment.

Interviewees 2, 7 and 8 stated that job security is another important aspect; as these construction managers want to know what the company's goals and objectives are over the next 5, 10 and 20 years. Interviewee 8 specifically mentioned the importance of the company to show to the employee what the opportunities are for him/her in the near future. Interviewee 6 related more to the importance of good, honest and open communication between the company and the employee. Construction managers want to know that there is a future to grow in the company and that the company can ensure job security.

Interviewees 3, 4 and 5 further explained that it is very important to give the employees a sense of belonging in the company. The employee must not feel like just another number in the company, but rather as part of a family.

Table 21 below illustrates the results that can be divided into three main headings. The extrinsic rewards [salaries and incentives] proved to be a little more important than the intrinsic rewards. Although some of the interviewees mentioned that a good salary alone is not sufficient to retain individuals. The results further indicated that it is pivotal to create a positive work environment. Some of the interviewees reinforced this idea by stating that they would rather work for less money, in a positive work environment.

**Table 21: The three main headings in retaining construction managers**

| | | Extrinsic Rewards | Intrinsic Rewards | Work Environment |
|---|---|---|---|---|
| Interviewees | 1 | 2 | 0 | 3 |
| | 2 | 0 | 0 | 5 |
| | 3 | 1 | 2 | 1 |
| | 4 | 2 | 1 | 1 |
| | 5 | 1 | 1 | 3 |
| | 6 | 0 | 0 | 1 |
| | 7 | 2 | 0 | 1 |
| | 8 | 1 | 1 | 3 |
| | 9 | 0 | 2 | 2 |

| | | | | | |
|---|---|---|---|---|---|
| | 10 | 1 | 0 | 1 | |
| | | 10 | 7 | 21 | |

The results also support the fact that all three items are needed to retain construction managers in a company. This concept further reinforced Figure 37 in Chapter 7, that the company must create this positive motivating environment to unlock the necessary potential and increase the possibility to retain human skills within the company.

### 5.5.4 (Q11) Are soft skills needed for a construction manager to be successful on a project?

The aim of this question was twofold. Firstly, the researcher wanted to see if there would be a variation in the answers given by the younger and older interviewees, respectively. Secondly, it was to determine whether the interviewees rate soft skills important enough that they could determine the success of a project.

To the surprise of the researcher, all 10 of the interviewees most definitely agreed that soft skills are needed for a construction manager to be successful on a project. As many as 40 % of the interviewees first wanted more clarification on what the researcher meant by soft skills. After the researcher referred to the footnote indicated as '1' in the question, the interviewees were able to read the definition and agreed that soft skills are vital for a construction manager.

### 5.5.5 (Q12) In your opinion, is it important to cultivate such soft skills in a construction manager?

The purpose of this question was to support the previous question; and to determine the importance of soft skills through the utilisation of a Likert Scale. The Likert Scale was divided into 5 columns, where each column represented a scale value. Not important at all = 1, slightly important = 2, average = 3, slightly important = 4 and very important = 5. The last column, on the right, represented the average rating out of 5.

All 10 of the interviewees confirmed that it is important to cultivate soft skills in a construction manager, as illustrated in Table 22 below. Interviewee 2 stated that the importance of technical skills become less, as the construction manager is promoted to higher positions on the site. As the construction manager becomes more senior in terms of position level in the company, it becomes more crucial for him/her to have these soft skills.

The average rating of the interviewees for the importance of cultivating these soft skills was 4,8/5 = 96 %.

**Table 22: The importance of cultivating soft skills in a construction manager**

| **Description** | **Likert Scale [1- 5]** | | | | | **Ave Rating** |
|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | |
| | Not important at all | Slightly unimportant | Average | Slightly important | Very important | |
| | **O** | **O** | **O** | **O** | **O** | |
| Interviewee 1 | | | | | X | **4,8** |

| Description | Likert Scale [1- 5] | | | | | Ave Rating |
|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | |
| | Not important at all | Slightly unimportant | Average | Slightly important | Very important | |
| | **O** | **O** | **O** | **O** | **O** | |
| Interviewee 2 | | | | | X | |
| Interviewee 3 | | | | | X | |
| Interviewee 4 | | | | | X | |
| Interviewee 5 | | | | | X | |
| Interviewee 6 | | | | | X | |
| Interviewee 7 | | | | | X | |
| Interviewee 8 | | | | | X | |
| Interviewee 9 | | | | X | | |
| Interviewee 10 | | | | X | | |

### 5.5.6 (Q13) Rate the importance for a construction manager to have the ability to apply such soft skills interchangeably in combination with Bono's six thinking hats.

The previous two questions confirm whether soft skills and the cultivation thereof are important for a construction manager to be successful on a project. This question was aimed at determining whether the construction manager must have the ability to apply these soft skills interchangeably in combination with Bono's six thinking hats, as illustrated in Figure 37 in the literature review section.

All the interviewees asked for more clarification on Bono's six thinking hats. Some of the interviewees were satisfied with the researcher's elaboration of the footnote; but others still needed further explanation of this concept. After the interviewees had grasped the concept of Bono's six thinking hats, they all agreed on the importance of this ability, illustrated in Table 23 below.

Table 23 was divided into columns based on a Likert Scale, with ranges between 1 and 5. Not important at all = 1, slightly unimportant = 2, average = 3, slightly important = 4; and very important = 5. The last column indicates the average rating from all 10 interviewees as a value out of 5. These interviewees suggest with 92 % [4,6/5] that a construction manager must have the ability to utilise these soft skills interchangeably in combination with Bono's six thinking hats.

**Table 23: The construction managers' ability to interchangeably apply soft skills with Bono's six thinking hats**

| Description | Likert Scale [1- 5] | | | | | Ave Rating |
|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | |
| | Not important at all | Slightly unimportant | Average | Slightly important | Very important | |
| | **O** | **O** | **O** | **O** | **O** | |
| Interviewee 1 | | | | | X | **4,6** |
| Interviewee 2 | | | | | X | |
| Interviewee 3 | | | | | X | |
| Interviewee 4 | | | | X | | |
| Interviewee 5 | | | | | X | |
| Interviewee 6 | | | | | X | |
| Interviewee 7 | | | | | X | |
| Interviewee 8 | | | | | X | |
| Interviewee 9 | | | | X | | |
| Interviewee 10 | | | X | | | |

### 5.5.7 (Q14) The level of ease with which the construction manager can balance soft skills would depend on how effective he/she would be on the project.

The previous three questions suggested that soft skills, the cultivation thereof, and the ability to interchangeably apply them with Bono's six thinking hats are important for a successful construction manager on a project. The researcher aimed in this question to underpin the concept of the construction manager's level of effectiveness on the project that will be determined by the ability to balance these soft skills. The question focuses on the principle that a construction manager with an advanced soft skill level would be more effective than one with a lower soft-skill level.

Table 24 below was divided into columns, based on the Likert Scale, with values from between 1 to 5. Strongly disagree = 1, disagree = 2, neither agree nor disagree = 3, agree = 4; and strongly agree = 5. The last column indicates the average rating from all 10 interviewees has a value out of 5. This interviewee suggests that with a 90 % [4,5/5] that a construction manager with an advanced soft skill level would be more effective than one with a lower soft-skill level.

All 10 interviewees agreed with the above statement. As illustrated by Table 24 below, the ability of the construction manager to balance soft skills will depend on how effective he/she is on a project. The researcher can then suggest that without the necessary soft skills, the construction manager will struggle to effectively manage a project successfully. If the construction manager starts to doubt his/her own ability, this could lead to confidence issues and unnecessary negativity. This, in essence, might lead to more poorly managed projects; and this would eventually lead to the individual's resignation.

**Table 24: The construction manager's ability to balance soft skills would depend on how effective he/she is on a project**

| **Description** | **Likert Scale [1- 5]** | | | | | **Ave Rating** |
|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | |
| | Strongly Disagree | Disagree | Neither Agree nor Disagree | Agree | Strongly Agree | |
| | **O** | **O** | **O** | **O** | **O** | |
| Interviewee 1 | | | | | X | **4,5** |
| Interviewee 2 | | | | | X | |
| Interviewee 3 | | | | X | | |
| Interviewee 4 | | | | | X | |
| Interviewee 5 | | | | X | | |
| Interviewee 6 | | | | X | | |
| Interviewee 7 | | | | | X | |
| Interviewee 8 | | | | | X | |
| Interviewee 9 | | | | X | | |
| Interviewee 10 | | | | X | | |

### 5.5.8 (Q15) In your opinion, to what extent will the increase of project productivity be dependent on the construction manager's level of effectiveness?

It is crucial for a construction company to continuously improve their production. The South African construction industry is mostly labour-intensive. The researcher can then argue that labour productivity will have a significant effect on the overall productivity of the project.

Table 25 below was divided into columns. Based on a Likert Scale, which values from between 1 to 5. Not important at all = 1, slightly unimportant = 2, average = 3, slightly important = 4 and very important = 5. The last column indicates the average rating from all 10 interviewees as a value out of 5. These interviewees suggest with a 100 % confidence

[5/5] that the increase of project productivity would depend on the construction manager's level of effectiveness.

**Table 25: The increase of productivity will be dependent on the construction manager's level of effectiveness**

| Description | Likert Scale [1- 5] | | | | | Ave Rating |
|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | |
| | Not important at all | Slightly unimportant | Average | Slightly important | Very important | |
| | **O** | **O** | **O** | **O** | **O** | |
| Interviewee 1 | | | | | X | |
| Interviewee 2 | | | | | X | |
| Interviewee 3 | | | | | X | |
| Interviewee 4 | | | | | X | |
| Interviewee 5 | | | | | X | |
| Interviewee 6 | | | | | X | **5** |
| Interviewee 7 | | | | | X | |
| Interviewee 8 | | | | | X | |
| Interviewee 9 | | | | | X | |
| Interviewee 10 | | | | | X | |

All the interviewees agreed, as illustrated in Table 25, that this statement is absolutely true. The construction manager works with all the people involved on the construction site. If the construction manager manages these human capital factors poorly, their performance would also be below-par, thus decreasing project productivity. An ineffective construction manager will increase the frustration that people experience on site; and this would eventually lead to a decrease in personnel morale.

### 5.5.9 (Q16) Both tertiary education (in construction management) and practical experience are needed for successful construction site management.

This question was asked to determine whether it is necessary for a construction manager to complete a degree in construction management; or can practical experience alone be sufficient.

Table 26 below was divided into columns based on a Likert Scale, with values from 1 to 5. Strongly disagree = 1, disagree = 2, neither agree nor disagree = 3, agree = 4 strongly agree

= 5. The last column indicates the average rating from all 10 interviewees as a value out of 5. These interviewees proposed, with a 90 % confidence [4,5/5] that a construction manager with an advanced soft-skill level will be more effective than one with a less-advanced soft-skill level.

What was interesting with the different results in this question was that mostly the younger interviewees only agreed; were as the older interviewees strongly agreed, as illustrated in Table 26. Interviewee 2 mentioned that a tertiary education and practical experience go hand-in-hand with each other. If the new graduate recruit arrives on site, his/her quality of practical experience will largely depend on what he or she views from the senior construction manager. If the senior construction manager has bad habits, the young recruit will have his/her previous education to measure this against. Interviewee 2 further mentioned that the construction-management profession should be managed more strictly. In the South African construction industry a construction manager can enter the industry without any previous tertiary education. This person gains practical experience over the years; and then ends up with 20 years of practical experience in the industry. The problem is that the quality of such individuals can differ vastly; depending on from whom he/she gained the practical knowledge.

Interviewee 3 stated that practical experience is a huge problem with graduates. He further explained that even if they employ a person from a large construction company into their fold he/she would lack the necessary practical experience.

Interviewees 4 and 5 mentioned the fact that they had previously worked with a construction manager who has no tertiary education, but learned and gained the correct practical experience over the years. Although these individuals are few and far between; it is possible to be a successful construction manager without a formal tertiary education. It will depend on the quality of the practical education that such an individual receives over the years. This is an area where sound mentorship can play an important role.

**Table 26: Both tertiary education and practical experience are needed for successful construction site management**

| **Description** | **Likert Scale [1- 5]** | | | | | **Ave Rating** |
|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | |
| | Strongly Disagree | Disagree | Neither Agree nor Disagree | Agree | Strongly Agree | |
| | **O** | **O** | **O** | **O** | **O** | |
| Interviewee 1 | | | | | X | **4,5** |

| Description | Likert Scale [1- 5] | | | | | Ave Rating |
|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | |
| | Strongly Disagree | Disagree | Neither Agree nor Disagree | Agree | Strongly Agree | |
| | **O** | **O** | **O** | **O** | **O** | |
| Interviewee 2 | | | | X | | |
| Interviewee 3 | | | | | X | |
| Interviewee 4 | | | | X | | |
| Interviewee 5 | | | | X | | |
| Interviewee 6 | | | | X | | |
| Interviewee 7 | | | | | X | |
| Interviewee 8 | | | | X | | |
| Interviewee 9 | | | | | X | |
| Interviewee 10 | | | | | X | |

### 5.5.10 (Q17) In your opinion, are soft skills important in supporting both tertiary education and practical experience?

This question was asked to reinforce the previous questions asked, but also to indicate if both tertiary education and practical experience, without soft skills, are adequate for a successful construction manager.

Table 27 below was divided into columns, based on a Likert Scale, with values from 1 to 5. Not important at all = 1, slightly unimportant = 2, average = 3, slightly important = 4 and very important = 5. The last column indicates the average rating from all 10 interviewees, as a value out of 5. These interviewees suggested with a 96 % confidence [4,8/5] that soft skills are important in supporting both tertiary education and practical experience.

According to the opinions of the interviewees, these softs skills are important in supporting both tertiary education and practical experience, as illustrated by Table 27. The soft skills become more important, as the construction manager's seniority increases.

Interviewee 1 mentioned that the soft skills make the difference; and this is where he sees results in individuals. Interviewee 2 stated that the soft skills are so crucial that the construction manager most probably would not be successful without them.

**Table 27: The importance of soft skills supporting both tertiary education and practical experience**

| Description | Likert Scale [1- 5] | | | | | Ave Rating |
|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | |
| | Not important at all | Slightly unimportant | Average | Slightly important | Very important | |
| | O | O | O | O | O | |
| Interviewee 1 | | | | | X | 4,8 |
| Interviewee 2 | | | | X | | |
| Interviewee 3 | | | | | X | |
| Interviewee 4 | | | | | X | |
| Interviewee 5 | | | | | X | |
| Interviewee 6 | | | | X | | |
| Interviewee 7 | | | | | X | |
| Interviewee 8 | | | | | X | |
| Interviewee 9 | | | | | X | |
| Interviewee 10 | | | | | X | |

### 5.5.11 (Q18) In your opinion, to what extent should a junior construction manager's [0 – 5 yrs] soft skills support his/her technical skills?

This question was asked to see how important it is for a graduate to have these soft skills, when entering the construction industry.

Table 28 below was divided into columns, based on a Likert Scale, with values from 1 to 5. Not important at all = 1, slightly unimportant = 2, average = 3, slightly important = 4; and very important = 5. The last column indicates the average rating from all 10 interviewees, as a value out of 5. These interviewees suggested with a 76 % confidence [3,8/5] that soft skills are needed in supporting the technical skills of a junior construction manager.

The researcher indicated to all the interviewees that Questions 18, 19 and 20 are the same, accept for the different age brackets involved. The results from Table 28 suggest that a junior construction manager's soft skills are of less importance than his or her technical skills.

**Table 28: The extent to which a junior construction manager's [0 - 5 yrs] soft skills should support his/her technical skills**

| Description | Likert Scale [1- 5] Junior construction manager [0 – 5 yrs.] | | | | | Ave Rating |
|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | |
| | Not important at all | Slightly unimportant | Average | Slightly important | Very important | |
| | **O** | **O** | **O** | **O** | **O** | |
| Interviewee 1 | | | | X | | **3,8** |
| Interviewee 2 | | | X | | | |
| Interviewee 3 | | | | X | | |
| Interviewee 4 | | | X | | | |
| Interviewee 5 | | | | X | | |
| Interviewee 6 | | | | X | | |
| Interviewee 7 | | | | | X | |
| Interviewee 8 | | | | | X | |
| Interviewee 9 | | | X | | | |
| Interviewee 10 | | | X | | | |

Interviewees 1 and 3 stated that even though it is a junior construction manager, he/she must have soft skills. The necessity and ability to utilise these soft skills effectively will increase as the individual develops and become more senior. According to interviewees 2 and 4, the junior construction manager still receives support from the senior construction manager; and at this stage, he/she would need to focus more on the technical skills. Although the focus is more on the technical skills for this individual, the soft skills are still needed on this level. Interviewee 8 suggested that even for a junior construction manager, soft skills are very important. Without these soft skills he/she would not be able to survive the first 5 years in the construction industry.

He added that the level of soft skills involvement might be lower from a senior construction manager. Interviewee 10 agreed with the other interviewees above, but further elaborated that the junior construction manager would be more task-specific at this stage. As the individual accepts more responsibility on the construction site, he/she would have to deal more with people issues in his or her area of involvement.

### 5.5.12 (Q19) In your opinion, to what extent should a middle-career construction manager's soft skills support his/her technical skills?

The same question was presented to the interviewees, except that the construction manager was now changed from a junior [0 – 5yrs] to a middle career [5 – 10yrs] level.

Table 29 below was divided into columns based on a Likert Scale, with values from 1 to 5. Not important at all = 1, slightly unimportant = 2, average = 3, slightly important = 4 and very important = 5. The last column indicates the average rating from all 10 interviewees, as a value out of 5. These interviewees suggested with an 80 % confidence [4/5] that soft skills are needed in supporting the technical skills of a middle-career construction manager.

**Table 29: The extent to which a middle career construction manager [5 - 10 yrs] soft skills should support his/her technical skills**

| **Description** | **Likert Scale [1- 5] Middle career construction managers [5 – 10yrs]** | | | | | **Ave Rating** |
|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | |
| | Not important at all | Slightly unimportant | Average | Slightly important | Very important | |
| | **O** | **O** | **O** | **O** | **O** | |
| Interviewee 1 | | | | X | | **4,0** |
| Interviewee 2 | | | X | | | |
| Interviewee 3 | | | | | X | |
| Interviewee 4 | | | | X | | |
| Interviewee 5 | | | | X | | |
| Interviewee 6 | | | | X | | |
| Interviewee 7 | | | | X | | |
| Interviewee 8 | | | | X | | |
| Interviewee 9 | | | | X | | |
| Interviewee 10 | | | | X | | |

All the interviewees agreed that the middle-career construction manager would still need some support and should seek advice from a more senior construction manager. This can be noted by the slight increase in the percentages from a junior [76 %] to a middle-career [80 %] construction manager.

### 5.5.13 (Q20) In your opinion, to what extent should a senior construction manager's soft skills support his/her technical skills?

Again, the same question was presented to the interviewees; except that the construction manager was now changed from a middle-career level [5 – 10yrs] to a senior [10+ yrs.] level.

Table 30 below was divided into columns, based on a Likert Scale, with values from 1 to 5. Not important at all = 1, slightly unimportant = 2, average = 3, slightly important = 4 and very important = 5. The last column indicates the average rating from all 10 interviewees, as a value out of 5. These interviewees recommended with a 94 % confidence level [4,7/5] that soft skills are needed in supporting the technical skills of a middle career construction manager.

All 10 of the interviewees suggested that the senior construction manager would still need soft skills to support his/her technical skills.

**Table 30: The extent to which a senior construction manager's [10+ yrs] soft skills should support his/her technical skills**

| **Description** | **Likert Scale [1- 5] Senior construction manager [10+ yrs]** | | | | | **Ave Rating** |
|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | |
| | Not important at all | Slightly unimportant | Average | Slightly important | Very important | |
| | **O** | **O** | **O** | **O** | **O** | |
| Interviewee 1 | | | | | X | **4,7** |
| Interviewee 2 | | | | X | | |
| Interviewee 3 | | | | | X | |
| Interviewee 4 | | | | | X | |
| Interviewee 5 | | | X | | | |
| Interviewee 6 | | | | | X | |
| Interviewee 7 | | | | | X | |
| Interviewee 8 | | | | | X | |
| Interviewee 9 | | | | | X | |
| Interviewee 10 | | | | | X | |

The interviewees further elaborated on the idea that a junior construction manager would mostly be task-specific and thus need soft skills on a lower level. The senior construction manager would be much more involved with human interaction on various levels of the

construction project; and he would be less task-specific. The senior construction manager has authority on the construction site; but his/her power to influence people becomes more important. Therefore, the senior construction manager must have sound soft skill abilities to support his/her technical skills. This can be noted by the slight increase between the percentages from a junior [76 %] to a middle-career [80 %] construction manager; and the considerable jump to a senior [94 %] construction manager.

**5.5.14 (Q21) Rank the importance of the following identified soft skills for construction managers with 0 - 5 years' experience (where 1 = not important at all, 2 = slightly unimportant, 3 = average, 4 = slightly important and 5 = very important). Also include the overall ranking from 1 – 13 for each skill, as you deem them to be important (where 1 = highest ranking/heaviest weight and 13 = lowest ranking/lightest weight).**

These soft skills in the competency domain were identified in the literature review chapter, as illustrated in Table 1. The results from previous research were obtained through mapping all the soft skills in the different research studies. Only the soft skills that overlapped in the different research projects were listed, as illustrated in Table 31 below.

All three questions (21, 22 and 23) are significant to indicate whether the identified soft skills in the competency domain are relevant and important for a construction manager. Again, the same question was repeated for all three experience levels involved in this research study. This provided the researcher with the opportunity to determine which soft skills are rated as the most important, whether the importance might deviate between the experience levels and whether the older interviewees might disagree with the younger individuals on some of the identified soft skills.

**Table 31: The importance and overall ranking of the identified soft skills in the competency domain for construction managers with 0 - 5 years' experience**

| Construction Site Manager Experience [0 - 5 years] | | | | | | | |
|---|---|---|---|---|---|---|---|
| No | Soft Skills in the Competency Domain | Not important at all.....Very important | | | | | Overall Rank |
| | | 1 | 2 | 3 | 4 | 5 | |
| 1 | Integrity [1] | | | | | | **4.4** |
| 2 | Teamwork [2] | | | | | | **4.3** |
| 3 | Attitude [2] | | | | | | **4.3** |
| 4 | Work ethics [3] | | | | | | **4.2** |
| 5 | Problem solving / critical thinking skills [4] | | | | | | **3.9** |
| 6 | Motivation [4] | | | | | | **3.9** |
| 7 | Communication skills [5] | | | | | | **3.8** |
| 8 | Conflict resolution skills [5] | | | | | | **3.8** |
| 9 | Flexibility [5] | | | | | | **3.8** |
| 10 | Leadership skills [6] | | | | | | **3.4** |
| 11 | Negotiation skills [7] | | | | | | **3.2** |
| 12 | Decision making skills [7] | | | | | | **3.2** |
| 13 | Stress management [7] | | | | | | **3.2** |

Table 31 included the list, consisting of 13 soft skills in the competency domain. Each of the softs skills listed was then rated on a Likert Scale valued from 1 to 5. Not important at all = 1, slightly unimportant = 2, average = 3, slightly important = 4 and very important = 5. The last column indicates the average rating from all 10 interviewees as a value out of 5. These average rating values were used to determine the overall rankings, as indicated in brackets, on the right side of each soft skill listed in Table 31.

The interviewees agreed that all 13 of the soft skills in the competency domain were important; and that it was difficult to decide on their specific ranking. It was surprising to see that integrity was ranked the highest [88 %]. Attitude and teamwork followed in second place with 86 % and work ethics [84 %] obtained a respective third place. Problem solving/critical thinking and motivation were jointly in the fourth place, with a percentage of 78 %. Fifthly, were communication skills, conflict-resolution skills and flexibility [76 %]. Leadership skills were ranked sixth [68 %], followed in seventh position by negotiating skills, decision-making skills and stress-management ability [64 %].

The interviewees reasoning on these results were that a junior construction manager would need certain softs skills more during the first 5 years on a construction site. The soft skills that did not rank very highly, and were still regarded as important, but not as important for his/her task-specific activities.

To be able to see whether the older interviewees deviated from the younger individuals, the data were presented in a radar figure, as illustrated in Figure 31 below. The 10 interviewees were divided into 5 age brackets [32 – 39 yrs], [40 – 49 yrs], [50 – 59 yrs], [60 – 69 yrs] and [70 – 79 yrs].

The younger interviewees [32 – 39 yrs] felt that communication is more important than did the rest of the interviewees [40 – 79 yrs]. The older interviewees [60 – 79 yrs] showed more importance towards motivation, teamwork and work ethics than the younger interviewees [32 – 39 yrs]. There was a strong correlation between all the age groups, when refering to leadership skills.

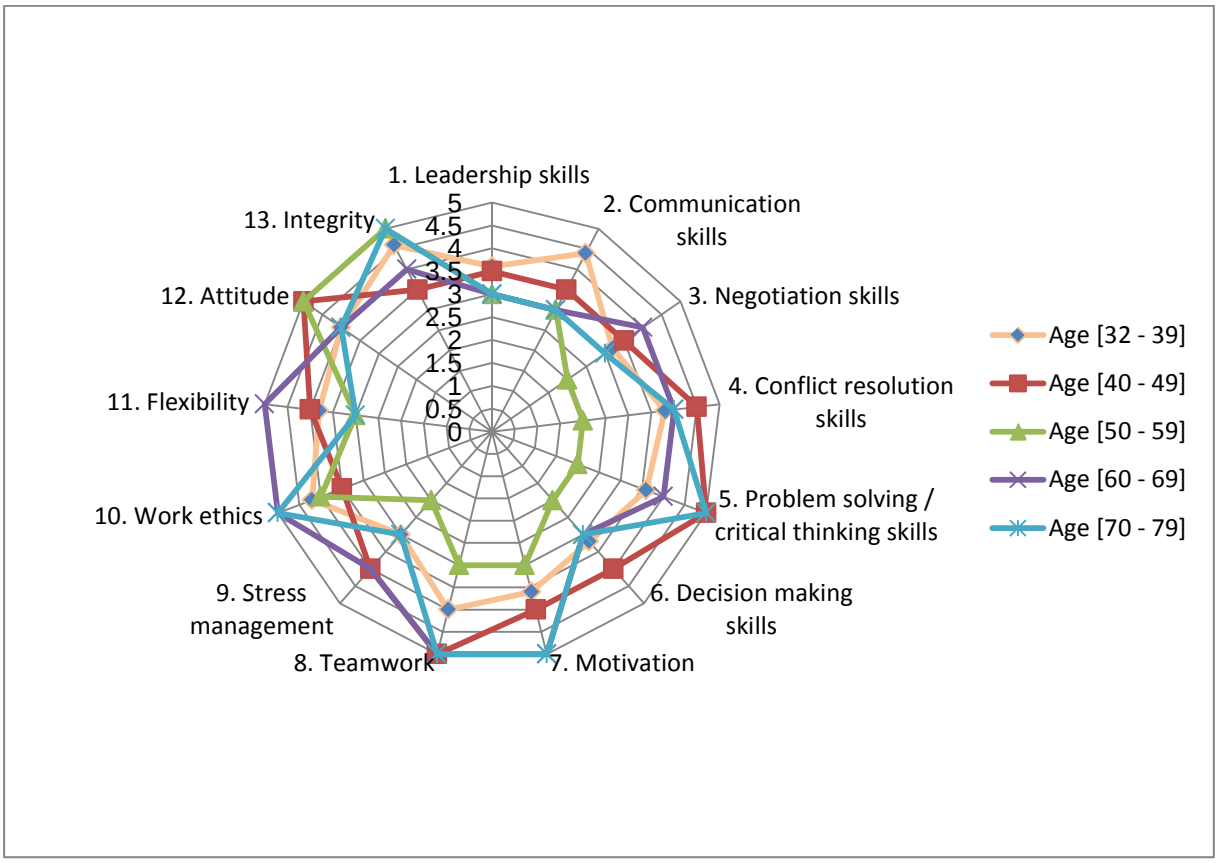


**Figure 31: The comparison of different age group opinions of the soft skills in the competency domain [CM; 0 - 5 yrs]**

The alpha coefficient for the thirteen items [soft skills in the competency domain; CM 0 – 5 yrs. experience] is 0.865, as illustrated in Table 32 below, suggests that the items have a relatively high internal consistency. (Note that a reliability coefficient of 0.70 or higher is considered 'acceptable' in most social-science research situations.)

**Table 32: Reliability statistics for soft skills in the competency domain [CM 0 - 5 yrs' experience]**

| **Scale: ALL VARIABLES** | | |
|---|---|---|
| Scale: ALL VARIABLES - Reliability Statistics - December 13, 2017 | | |
| Cronbach's Alpha | Cronbach's Alpha Based on Standardized Items | N of Items |

| | | |
|---|---|---|
| 0.865 | 0.856 | 13 |

**5.5.15 (Q22) Rank the importance of the following identified soft skills for construction managers with 5 - 10 years' experience (where 1 = not important at all, 2 = slightly unimportant, 3 = average, 4 = slightly important and 5 = very important). Also include the overall ranking from 1 – 13 for each skill, as you deem them to be important (where 1 = highest ranking/heaviest weight and 13 = lowest ranking/lightest weight).**

These soft skills in the competency domain were identified in the literature review chapter, as illustrated in Table 1. The results from previous research were obtained through mapping of all the soft skills in the different research studies. Only the soft skills that overlapped in the different research projects were listed, as illustrated in Table 33 below.

**Table 33: The importance and overall ranking of the identified soft skills in the competency domain for construction managers with 5 - 10 years' experience**

| Construction Site Manager Experience [5 - 10 years] | | | | | | | |
|---|---|---|---|---|---|---|---|
| No | Soft Skills in the Competency Domain | Not important at all.....Very important | | | | | Overall Rank |
| | | 1 | 2 | 3 | 4 | 5 | |
| 1 | Integrity [1] | | | | | | 4.7 |
| 2 | Problem solving / critical thinking skills [2] | | | | | | 4.6 |
| 3 | Leadership skills [3] | | | | | | 4.5 |
| 4 | Communication skills [4] | | | | | | 4.4 |
| 5 | Work ethics [4] | | | | | | 4.4 |
| 6 | Decision making skills [5] | | | | | | 4.3 |
| 7 | Attitude [5] | | | | | | 4.3 |
| 8 | Negotiation skills [6] | | | | | | 4.2 |
| 9 | Conflict resolution skills [6] | | | | | | 4.2 |
| 10 | Motivation [6] | | | | | | 4.2 |
| 11 | Teamwork [6] | | | | | | 4.2 |
| 12 | Flexibility [7] | | | | | | 3.7 |
| 13 | Stress management [8] | | | | | | 3.5 |

As previously mentioned in Question 21, Question 22 is the same as Question 21; the difference is in the level of experience of the construction manager. This provided the researcher with the opportunity to determine, which soft skill is rated most important, whether the importance might deviate between the experience levels, and whether the older interviewees might disagree with the younger ones on some of the identified soft skills. At this stage, the researcher scrutinised them, to see whether there was a difference between the rankings of the softs skills between a junior and middle career construction manager.

Table 33 above includes the list consisting of 13 soft skills in the competency domain. Each of the softs skills listed was then rated on a Likert Scale valued from 1 to 5. Not important at all = 1, slightly unimportant = 2, average = 3, slightly important = 4 and very important = 5. The last column points to the average rating from all 10 interviewees, as a value out of 5.

These average rating values were used to determine the overall rankings, as indicated in brackets, on the right side of each soft skill listed in Table 33.

The interviewees approved that all 13 of the soft skills in the competency domain were still essential; and that it was challenging to decide on their specific ranking. It was unexpected to see that integrity was again ranked the highest [94 %]. Problem-solving/critical-thinking skills followed in second place with 92 %; and leadership skills leapt into third place [90 %]. The fourth position was shared by communication skills and work ethics [88 %]. Decision-making skills and attitude shared the fifth position [86 %]; and negotiation, conflict resolution, motivation and teamwork in sixth with 84 %. Lastly, there was flexibility in the seventh position [74 %] and stress management was eighth with a percentage of 70 %.

The interviewees reasoning around these results were that a middle-career construction manager would need certain softs skills more, as his/her job description changes from the first 5 years on a construction site. The middle-career construction manager will now start to deal more with human problems, even take the responsibility for a section of a large construction project; and he/she might have the opportunity to be responsible for a smaller, less complex construction project. This then correlates with the reason why his /her problem-solving/critical thinking and leadership skill needs to improve and carry more weight. The decision-making skills are still not as critical, because they can still report major issues to the senior construction manager.

The communication skills and work ethics slightly changed between the junior and middle career-construction manager. Work ethics moved down from a third position with the junior [84 %] to a fourth position [88 %] in the middle career. Communication moved up on the ranking list, its importance in terms of percentage increased. Communication skills were in fifth place with 76 % and moved up in the rankings to the fourth position [88 %]. Again, it is important to notice that although it moved down in terms of rankings, its importance in terms of percentage actually increased.

To be able to see if the older interviewees deviated from the younger ones, the data were presented in a radar figure, as illustrated in Figure 32 below. The 10 interviewees were divided into 5 age brackets [32 – 39 yrs], [40 – 49 yrs], [50 – 59 yrs], [60 – 69 yrs] and [70 – 79 yrs]. The averages of the Likert Scale results in Table 33, within each age bracket, were calculated and placed next to that specific soft skill.

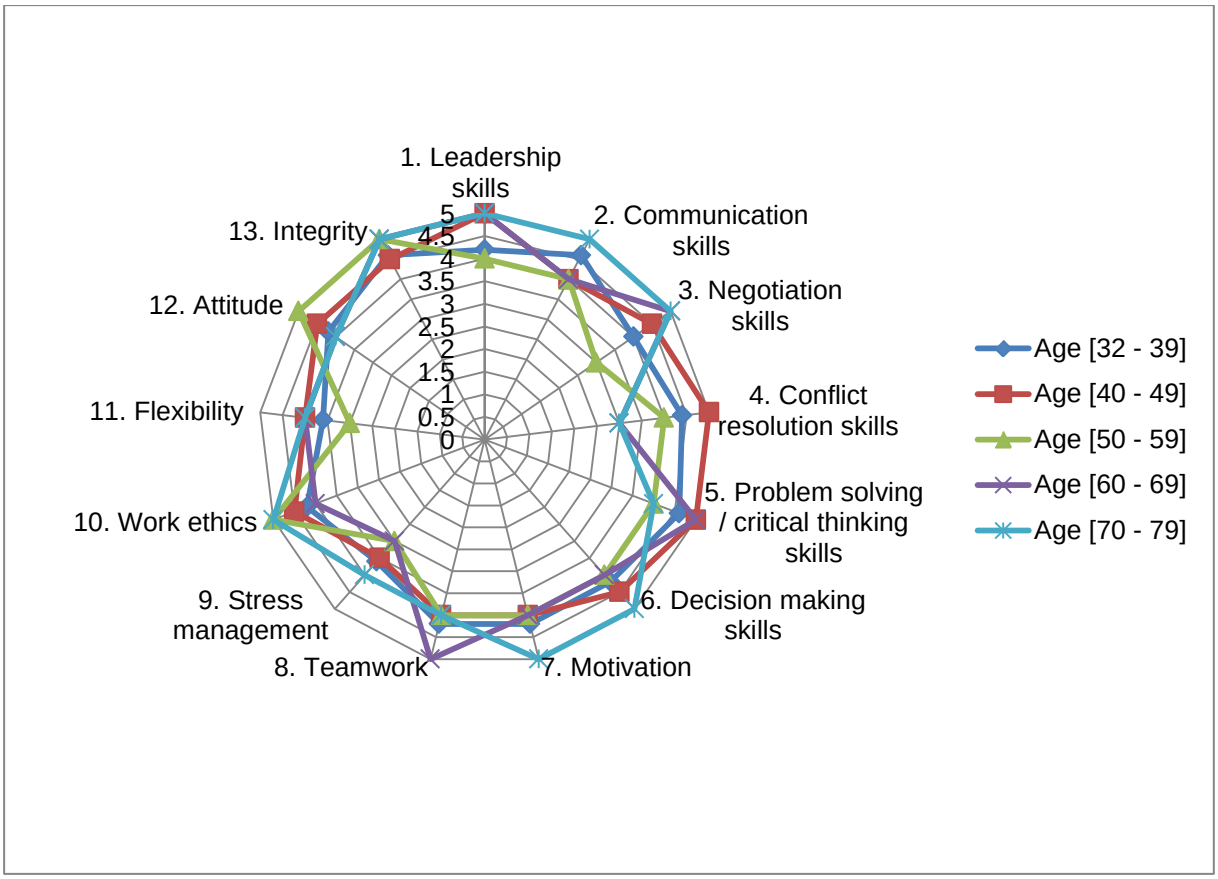


**Figure 32: The comparison of different age-group opinions of the soft skills in the competency domain [CM; 5 - 10 yrs]**

The interviewees [40 – 49yrs] felt that conflict-resolution skills are more important than did the rest of the interviewees. The older interviewees [60 – 69 yrs] displayed more importance towards teamwork and the oldest interviewee mostly stressed motivation, decision-making skills and communication. The older interviewees [60 – 79yrs] emphasised that conflict-resolution skills are still not that essential at this stage of a construction manager's career. Flexibility and negotiation skills were highlighted, as being less important, by the interviewee in age bracket [50 – 59 yrs].

**Table 34: Reliability statistics for soft skills in the competency domain [CM 5 - 10 yrs' experience]**

| **Scale: ALL VARIABLES** | | |
|---|---|---|
| Scale: ALL VARIABLES - Reliability Statistics - December 13, 2017 | | |
| Cronbach's Alpha | Cronbach's Alpha Based on Standardized Items | N of Items |
| 0.771 | 0.76 | 13 |

The alpha coefficient for the thirteen items [soft skills in the competency domain; CM 5 – 10 yrs. experience] is 0.771, as illustrated in Table 34 above, suggesting that the items have a

relatively high internal consistency. (Note that a reliability coefficient of 0.70 or higher is considered 'acceptable' in most social-science research situations.)

**5.5.16 (Q23) Rank the importance of the following identified soft skills for construction managers with 10+ years' experience (where 1 = not important at all, 2 = slightly unimportant, 3 = average, 4 = slightly important and 5 = very important). Also include the overall ranking from 1 – 13, for each skill as you deem it to be important (where 1 = highest ranking/heaviest weight and 13 = lowest ranking/lightest weight).**

These soft skills in the competency domain were identified in the literature-review chapter, as illustrated in Table 1. The results from the previous research were obtained through mapping all the soft skills in the different research studies. Only the soft skills that overlapped in the different research projects were listed, as illustrated in Table 35 below.

**Table 35: The importance and overall ranking of the identified soft skills in the competency domain for construction managers with 10+ years' experience**

| Construction Site Manager Experience [10 + years] | | | | | | | |
|---|---|---|---|---|---|---|---|
| No | Soft Skills in the Competency Domain | Not important at all.....Very important | | | | | Overall Rank |
| | | 1 | 2 | 3 | 4 | 5 | |
| 1 | Leadership skills [1] | | | | | | **5** |
| 2 | Decision making skills [2] | | | | | | **4.9** |
| 3 | Integrity [2] | | | | | | **4.9** |
| 4 | Negotiation skills [3] | | | | | | **4.8** |
| 5 | Problem solving / critical thinking skills [3] | | | | | | **4.8** |
| 6 | Conflict resolution skills [4] | | | | | | **4.7** |
| 7 | Motivation [4] | | | | | | **4.7** |
| 8 | Communication skills [5] | | | | | | **4.6** |
| 9 | Work ethics [5] | | | | | | **4.6** |
| 10 | Attitude [5] | | | | | | **4.6** |
| 11 | Teamwork [6] | | | | | | **4.5** |
| 12 | Stress management [7] | | | | | | **4.3** |
| 13 | Flexibility [8] | | | | | | **4.2** |

Question 23 differs from the previous 2 questions only in the level of experience of the construction manager. This provided the researcher with the opportunity to determine, which soft skill is rated most important, whether the importance might deviate between the experience levels; and whether the older interviewees might disagree with the younger ones on some of the identified soft skills. At this stage, the researcher scrutinised whether there is a difference between the rankings of the softs skills between a middle career and a senior construction manager.

Table 35 above compiled the list consisting of 13 soft skills in the competency domain. Each of the softs skills listed was then rated on a Likert Scale from 1 to 5. Not important at all = 1, slightly unimportant = 2, average = 3, slightly important = 4 and very important = 5. The last column points to the average rating from all 10 interviewees, as a value out of 5. These

average rating values were used to determine the overall rankings, as indicated in brackets, on the right side of each soft skill listed in the table.

With the senior construction manager, all 13 of the soft skills in the competency domain were regarded as crucial; and the interviewees seemed less challenged to decide on their specific ranking. It was no surprise to see that leadership skills hurdled into the first position [100 %] with integrity and decision-making skills that followed closely in second place, with a percentage of 98 %. Both, problem-solving/critical thinking skills and the negotiating skills moved into third place [96 %]. Conflict resolution skills shared the fourth place, with motivation [94 %]; and communication skills, work ethics and attitude followed in fifth place with 92 %. The sixth position was teamwork [90 %], followed by stress management [86 %] and flexibility [84 %].

The interviewees' rationale around these results was that a senior construction manager would need to have a deep level of understanding and ability to utilise all 13 soft skills involved and listed in this research study. The senior construction manager is confronted with a significant number of workforce issues on a daily basis. This includes stakeholders, professional teams, specialist sub-contractors, health and safety managers, general labour, community members, public members, environmentalists and permanent staff. At this stage, the senior construction manager typically takes full responsibility for the construction project.

Interviewee 4 suggested that he views the senior construction manager more as a role model, than to be on the ground. The senior construction manager should not get involved with the minor management activities on a daily basis, but rather with the overall steering of the project. He must have the ability to keep the motivation and attitudes high if the project is in the cauldron and is going through difficult situations.

The senior construction manager is less task-specific; therefore his/her leadership skills are most important. The senior construction manager must have the abilities to predetermine the objective and goals of the construction project. He must be able to efficiently manage, facilitate and motivate the people involved in the construction project to achieve these objectives and goals. He/she must have the vision to see the bigger picture in the company; and how the project fits into the canvas.

Decision-making skills and integrity were in the second place [98 %], followed by negotiation skills and problem-solving/critical-thinking skills in the third place [96 %]. The fourth place was shared by conflict-resolution skills and motivation [94 %]. Communication skills, work ethics and attitude were in fifth place [92 %], followed by teamwork with 90 %. Stress management finished in seventh position, with 86 %; and lastly, there was flexibility with 84 %.

The communication skills and work ethics slightly changed between the junior, middle career and senior construction manager. Work ethics moved down from a third position with the junior [84 %] to a fourth position [88 %] in the middle career, into a fifth position for a senior [92 %]. Communication moved up on the ranking list, its importance in terms of percentage increased. Communication skills were in third place with 76 %; and it moved up in the rankings to the fourth position [88 %] and ended up in the fifth place [92 %]. Again, it is important to notice that although it moved down in terms of rankings, its importance in terms of percentage actually increased.

To be able to see if the older interviewees deviated from the younger ones, the data were presented in a radar figure, as illustrated in Figure 33 below. The 10 interviewees were divided into 5 age brackets [32 – 39 yrs], [40 – 49 yrs], [50 – 59 yrs], [60 – 69 yrs] and [70 – 79 yrs]. The averages of the Likert Scale results in Table 35, within each age bracket, were calculated and placed next to that specific soft skill.

As illustrated in Figure 33 below, all the interviewees agreed that leadership skills are most important at this stage of the senior construction manager's career.

The older interviewees [60 – 69yrs] displayed less importance in the communication skills and conflict-resolution skills. The oldest interviewee agreed with the less importance of conflict-resolution skills, but added problem-solving and critical-thinking skills. The other interviewees age ranged from [32 – 59 yrs] mostly stressed that all 13 soft skills in the competency domain are essential for the senior construction manager to be successful on a construction project.

Figure 34 illustrates below the fact that all 13 of the soft skills in the competency demand are important for a construction manager to be successful on a construction project. Although, the importance of each soft skill varied between the different experience levels of the construction managers; it seems from Figure 33 that leadership skills, negotiating skills, decision-making skills and stress management increased the most between the three different levels of experience.

It also appears that regardless of the experience level one is at, certain softs skills should approximately stay the same. Teamwork, work ethics, flexibility, attitude and their integrity were regarded as those specific soft skills that a junior, middle career and senior construction manager must almost equally possess.

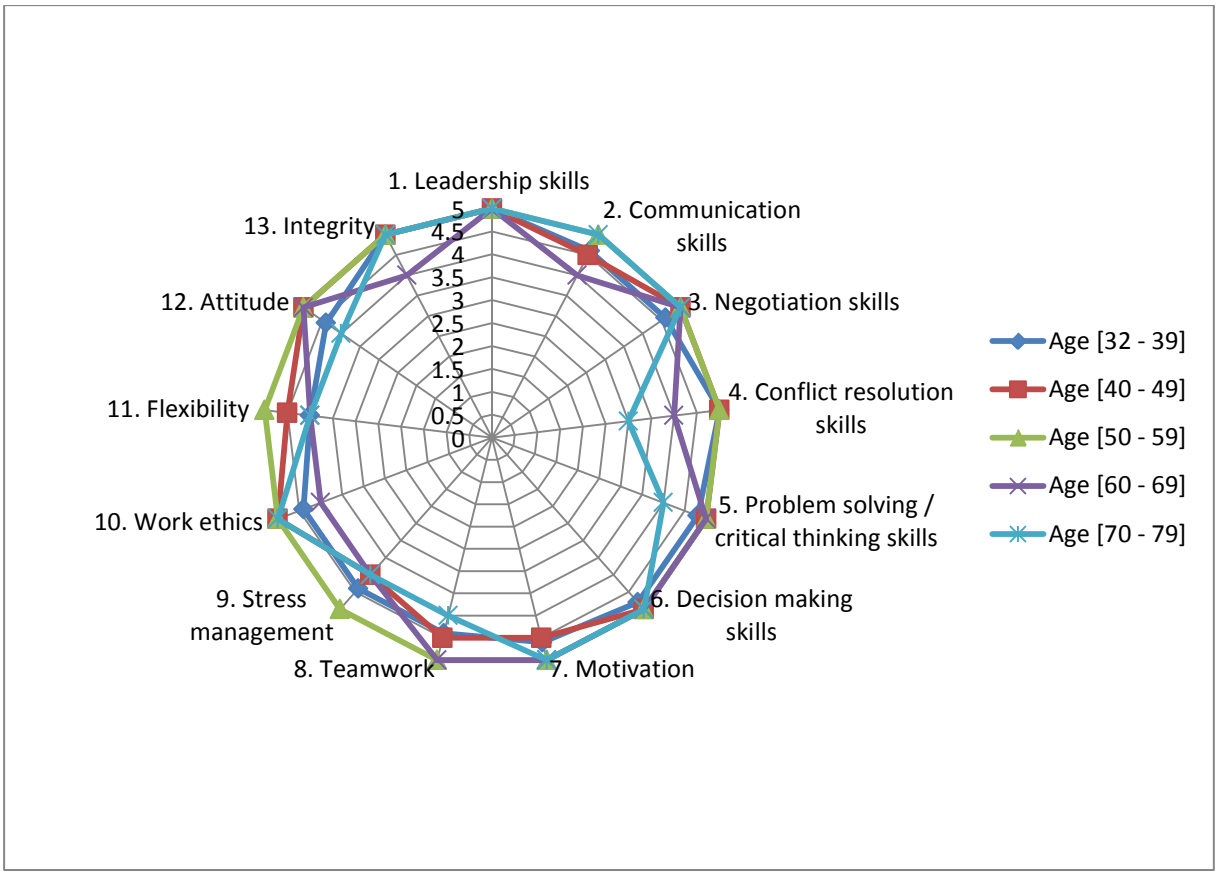


**Figure 33: The comparison of different age-group opinions on the soft skills in the competency domain [CM; 10+ yrs]**

Communication skills, conflict-resolution skills and motivation appear to increase steadily between the different experience levels. Whereas problem-solving and critical thinking look as if there is a significant jump from a junior level to a middle-career level. It is almost indifferent between a middle career and senior construction manager.

What Figure 34 also suggests is that all the different levels of experience need to inherit these 13 soft skills in the competency domain. As the construction manager's experience increases, the importance of being able to utilise and balance all these soft skills interchangeably increases significantly.

**Table 36: Reliability statistics for soft skills in the competency domain [CM 10+ yrs'experience]**

| **Scale: ALL VARIABLES** | | |
|---|---|---|
| Scale: ALL VARIABLES - Reliability Statistics - December 13, 2017 | | |
| Cronbach's Alpha | Cronbach's Alpha Based on Standardized Items | N of Items |
| 0.823 | 0.788 | 13 |

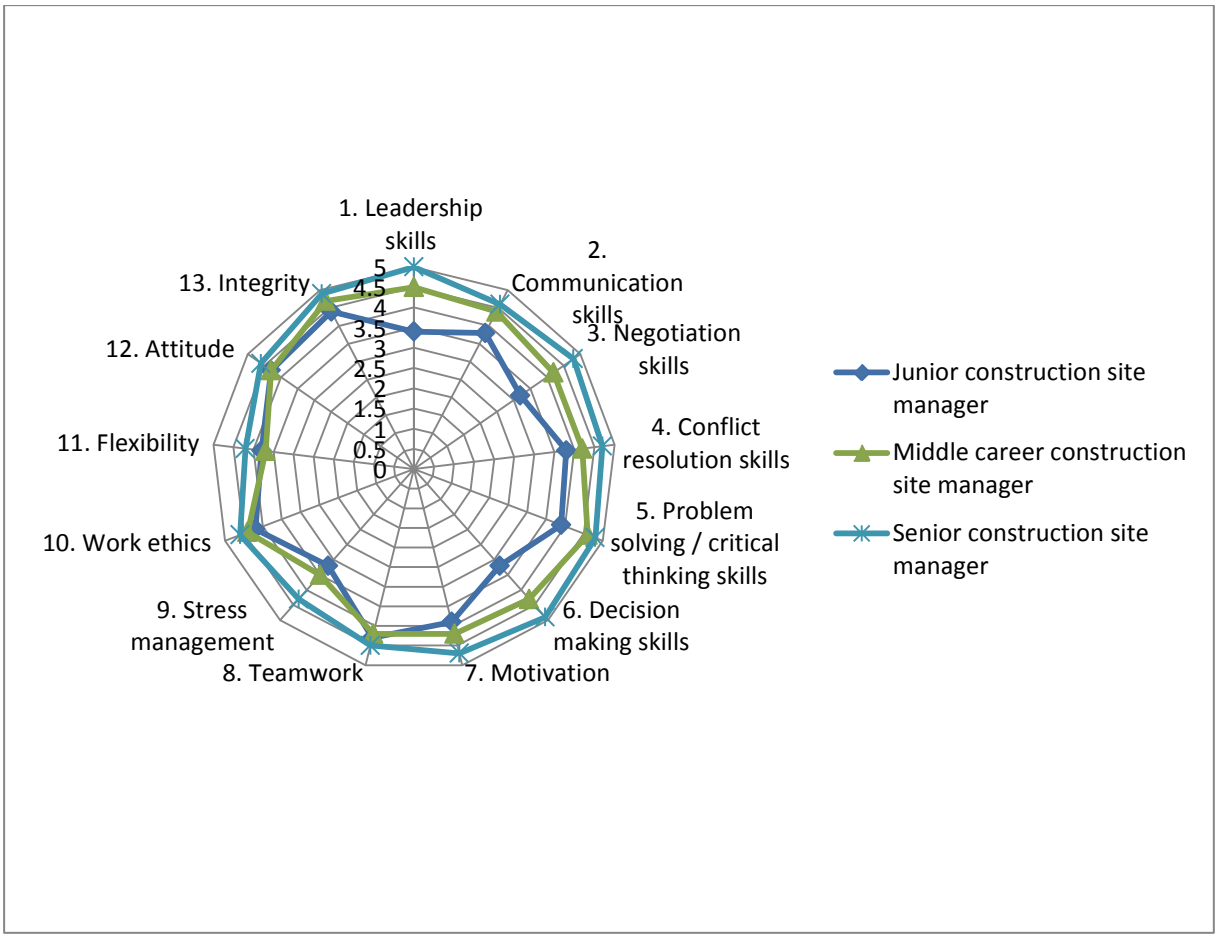


**Figure 34: A comparison of the opinions of the soft skills in the competency domain between the different experience levels [junior, middle & senior]**

The alpha coefficient for the thirteen items [soft skills in the competency domain; CM 10+ yrs. experience] is 0.823, as illustrated in Table 36 above, suggesting that the items have a relatively high internal consistency, thus measuring the same underlying concept.

(Note that a reliability coefficient of 0.70 or higher is considered 'acceptable' in most social science research situations.)

### 5.5.17 (Q24) Which soft skills do you feel are missing in the list above?

This question was asked to determine whether there are other softs skills that were excluded in the current list. All of the interviewees had consensus that all 13 softs skills in the competency domain were complete. Some of the interviewees did add other possible soft skills; but they agreed that these additional soft skills could slot in under the headings of the current list available, as illustrated in Figure 29.

**Table 37: What each interviewee added to the list of current soft skills needed in the competency domain**

| No | Description of additional soft skills | Interviewee 1 | Interviewee 2 | Interviewee 3 | Interviewee 4 | Interviewee 5 | Interviewee 6 | Interviewee 7 | Interviewee 8 | Interviewee 9 | Interviewee 10 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Open to criticism | x | — | — | — | — | — | — | — | — | — |
| 2 | Honest | x | — | — | — | — | — | — | — | — | — |
| 3 | Intuition | — | x | — | — | — | — | — | — | — | — |
| 4 | Politics | — | — | — | x | — | — | — | — | — | — |
| 5 | Acknowledgement | — | — | — | — | x | — | — | — | — | — |
| 6 | Sense of humor | — | — | — | — | — | x | — | — | — | — |
| 7 | Finacial control | — | — | — | — | — | — | x | — | — | — |

Interviewee 1 suggested that in their company, some of the senior-construction managers are not open for constructive criticism from lower senior staff. This can typically create unnecessary conflict on the construction site, which could lead to problems to achieve the objectives of the project. He also suggested that a construction manager must be honest. He further stated that honesty might fall under integrity or other categories of work ethics.

Interviewee 2 said that intuition (leadership skills) is important for him; because the construction manager must also have the ability to predict that something can go wrong and be proactive in that area. This intuitive skill will increase as his/her relevant site experience increases.

The political side of a project can fall under communication on a project. Interviewee 4 further suggested that it is important to play the right politics between the construction manager and the consultants and/or professional members on the project. Politics is the ability to push consultants and/or professional members, within limits, in an ethical manner to try and get the best out of each project.

Interviewee 5 accentuated that a manager must have the ability to give acknowledgement (leadership/motivation) where needed. He further suggested that by giving people acknowledgement makes them feel good, thereby motivating and reinforcing good behaviour. This would boost the individual's confidence and he/she would put more effort into their work and increase productivity on a daily basis.

According to interviewee 6, it is important for a construction manager to laugh sometimes, thus must have a sense of humour. He further explains that this can fall under stress management and; that humour is needed; otherwise, you will not survive in the construction industry.

The oldest interviewee suggested that financial controls are vital, and that this could fall under the competency domain of the soft skills needed.

### 5.5.18 (Q25) In your opinion, do construction managers need a specific personality profile to fit into the construction-industry environment?

This is a very important question for this research study. The previous questions suggested that there is a need for construction managers who have the ability to apply certain soft skills within the competency domain, interchangeably, to be successful on a construction project. With this question, the researcher would like to determine, whether in addition to these 13 soft skills, a proposed purpose-fit personality can be identified for a construction site-manager. It was also needed to establish whether such a specific personality is essential for a construction manager, which would enjoy building a career in the construction industry.

Interviewee 1 suggested that he thinks many of these aspects can be taught; but he agreed that there is a specific personality profile for a construction manager. All interviewees except 1 and 7 suggested that they believe a construction manager should definitely have a specific personality profile. Interviewee 7 agreed with the other interviewees, but added that a construction manager does not have to be a robust individual to be successful. He regards himself as more of an introvert than an extrovert, which could be contradictory to the image of a construction manager. Interviewee 10 generally agreed with the other interviewees; but he also suggested that he did not think that there is only one type of personality for a construction manager. He further mentioned that he believes that there could be more than one type of personality who could work in construction; and not necessarily only one. This can reinforce the idea of what interviewee 7 suggested that more than one specific type of personality could be successful in the construction industry.

### 5.5.19 (Q26) If yes, how would you view an ideal personality fit for construction management?

If the interviewees in the previous question suggested that a specific personality profile is needed, it was important to establish what they see as a compatible personality for a construction manager.

Interviewees 1, 9 and 10 proposed that the construction manager should be someone who has the ability to work within chaos, under stress and still be assertive in his/her way of operation. Interviewee 1 further mentioned that if a construction manager has a very high intelligence quotient [IQ], but does not have the necessary emotional intelligence [EQ], since he/she could still be unsuccessful as a construction manager. According to the interviewees 2 and 9, the construction industry is demanding; and therefore a construction manager needs to have tenacity. The correct people skills are required to work in this difficult environment during the execution of his/her different responsibilities. Interviewee 2 further suggested that

the construction manager must have the personality to want to make things work. He/she must have enough creativity to read, interpret the architects' plans and find ways to make it workable and craft something tacit.

Interviewees 3, 5 and 10 suggested that a construction manager must be a team player and be determined to reach the project goals. Although he/she must pursue the project's goals, he/she must have the ability to be steadfast, fair and to show understanding in certain circumstances.

Interviewee 4 recommended that the construction manager should be a hard-working, dynamic, self-motivated, ambitious, flexible and objective individual. Interviewees 4 and 5 further elaborated on the idea that a construction manager's personality should lean more towards being an extrovert than an introvert. Interviewees 5, 9 and 10 also explained that a construction manager must have a strong personality, but still have the support of the people working with him/her. Interviewees 9 and 10 also recommended that a construction manager must be able to effectively want to listen to people; but make his/her own decisions.

Interviewee 6 suggested that a construction manager must be a lateral thinker, thus have the ability to think outside of the box; the ability to approach obstacles through the use of alternative or innovative methods or a combination thereof.

Interviewees 7, 8 and 10 agreed that he/she must enjoy being in a practical environment. Interviewees 8 and 10 further elaborated that the construction manager must be equally comfortable being a team player or working individually.

Interviewee 1 explained that he believed that many of the leadership skills can be taught, where interviewee 8 suggested that a construction manager should be a natural born leader.

Both interviewees 9 and 10 agreed that a construction manager must have the personality to enjoy working outside, and to manage conflict on a daily basis. Interviewee 10 added that he/she must have the discipline to work long hours in a difficult environment.

All the results were then placed under the seven main dimensions of SAPI. What was interesting was that all the personality characteristics that were mentioned by the interviewees could be divided into five of the seven main dimensions of SAPI. The main dimensions that did not have any personality fit for a construction manager were section 2 [Negative Social-Relational disposition] and section 7 [Social Desirability].

#### 5.5.20 (Q27) The lifestyle of the construction manager forms part of his/her personality.

Most of the interviewees wanted to know what the researcher meant by lifestyle. When the researcher pointed to the footnote, they were all able to answer the question. The question

was asked to see whether lifestyle is an important aspect to consider before deciding to become a construction manager. If the construction industry believes that the people in an organisation are their most valuable resource, it is important to have guidance on the personality that would best fit that specific lifestyle. If the construction manager's personality fits the lifestyle; he / she might remain active, being content on construction sites, as indicated by Question 28. This question can also be linked to Question 10, where the researcher scrutinised the different scenarios on how to retain construction managers in a company.

Table 39 was divided into columns based on a Likert Scale, with values from 1 to 5. Strongly disagree = 1, disagree = 2, neither agree nor disagree = 3, agree = 4; and strongly agree = 5. The last column indicates the average rating from all 10 interviewees, as a value out of 5. These interviewees suggest with 96 % confidence [4,8/5] that the lifestyle of the construction manager forms part of his/her personality.

**Table 38: The lifestyle of the construction manager forms part of his/her personality**

| **Description** | **Likert Scale [1- 5]** | | | | | **Ave Rating** |
|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | |
| | Strongly Disagree | Disagree | Neither Agree nor Disagree | Agree | Strongly Agree | |
| | **O** | **O** | **O** | **O** | **O** | |
| Interviewee 1 | | | | | X | **4,8** |
| Interviewee 2 | | | | | X | |
| Interviewee 3 | | | | X | | |
| Interviewee 4 | | | | | X | |
| Interviewee 5 | | | | | X | |
| Interviewee 6 | | | | | X | |
| Interviewee 7 | | | | | X | |
| Interviewee 8 | | | | | X | |
| Interviewee 9 | | | | | X | |
| Interviewee 10 | | | | X | | |

The construction site-manager in South Africa must have a personality that can work outdoors, in a dusty work environment, enjoy working on large, low-skilled, labour-intensive construction sites; and not be bothered to work long hours under constant stress. He/she

must be comfortable to move from one project to another, being separated from family and friends.

It can at this stage be suggested that the lifestyle of the construction manager must fit his/her personality. This can again influence the quality of work life and be a relevant factor to consider for job satisfaction.

### 5.5.21 (Q28) If the construction manager has a specific profile, will it increase the probability that he/she will stay active as a successful construction manager, his/her as career choice?

In the previous 3 three questions [25, 26 and 27] the researcher received feedback from the 10 interviewees who suggested a specific personality type is needed to be a construction manager. The interviewees also proposed that it is important for the lifestyle of the construction manager to fit his/her personality.

Question 28 is then asked to further investigate whether the interviewees believed that a construction manager, with a more purpose-fit profile would stay active in the construction industry. Thus, is it worthwhile to use personality testing to assist in the recruitment process of a construction manager? Would it be meaningful to use personality tests when selecting students to enrol for a construction-management degree?

The interviewees unanimously [100 %] agreed that the construction manager would stay active as a construction manager, if he/she has the correct personality profile.

### 5.5.22 (Q29) In your opinion, which of the following issues takes priority during the recruitment and selection process of a construction manager.

The interviewees suggested that a construction manager must have a specific personality; his/her lifestyle must fit this personality; and that a spot-on profile would retain him/her in the construction industry. This idea was then further expanded by trying to indicate whether a person-job fit [PJ], or a person-organisation fit [PO], or both are important during the recruiting and selecting process.

The interviewees again suggested that both PJ and PO are needed during the recruitment and selection process. Interviewee 10 acknowledged that he had never been involved in such a recruitment and selection process. He did recommend that he would definitely consider both PJ & PO.

Interviewee 2 specifically mentioned that both of these aspects are very important. He elaborated further and explained that he is currently experiencing this specific problem. They have employed a construction manager with a strong PJ, but a weak PO. The new recruit finds it difficult to fit in with the culture of the organisation; and this creates discontent. This

then leads to the individual being demotivated and spills over to the other employees on the project, thereby affecting the productivity on the construction site.

**5.5.23 (Q30) Rank the importance of the following identified South African Personality Inventory [SAPI] items in each section for a construction manager with 10 years' or more experience (where 1 = not important at all, 2 = slightly important, 3 = average, 4 = slightly important and 5 = very important. Also prioritise each section with the overall ranking for each item per section as you deem them to be important (where 1 = highest ranking/heaviest weight and 7 = lowest ranking/lightest weight.**

The South African Personality Inventory [SAPI] was used to determine the personalities of each of the 10 interviewees. The SAPI instrument can be utilised; and it is applicable in all spheres of assessment of non-clinical personality, such as job selection and counselling.

According to Hill et al., "*the authors calculated Cronbach's alpha coefficients for the various facets, in order to assess the reliability of the facets they had measured. According to Frisbie (1988), highly acceptable reliabilities for standardised tests will yield test scores between 0.85 and 0.95. The guidelines that Cicchetti (1994) described suggest that one should regard clinical significance as unacceptable, when a reliability coefficient is below 0.70. One should regard reliability coefficients of between 0.70 and 0.79 as fair; and reliability coefficients of between 0.80 and 0.89 as good; and reliability coefficients of 0.90, or above as excellent. However, one could regard a reliability coefficient of 0.70 or higher as acceptable during the research and when developing instruments (see Nunnally and Bernstein, 1994).*"

It was suggested that personality can play an important supportive role in selecting a purpose-fit construction manager. It was then needed to put forward a possible personality profile for such an individual. The 10 interviewees rated the importance on a Likert Scale, of each SAPI item under the 7 main sections. After each item was rated, the interviewees needed to prioritise each of the 7 main sections, according to their importance.

**Table 39: Illustrates which of the SAPI items in section 1, according to the interviewees, are deemed more important and what weight section 1 should carry**

| | | Interviewees | | | | | | | | | | [2] | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | *Priority #* | Ave Rating |
| **SAPI Section 1** | ***Priority #*** | ***1*** | ***1*** | ***1*** | ***3*** | ***2*** | ***3*** | ***1*** | ***3*** | ***3*** | ***3*** | ***2.1*** | |
| Empathy | | 3 | 3 | 4 | 3 | 4 | 3 | 3 | 5 | 2 | 3 | | 3.3 |
| Facilitating | | 4 | 4 | 5 | 4 | 2 | 5 | 5 | 5 | 3 | 3 | | 4 |
| Integrity | | 5 | 4 | 4 | 5 | 5 | 5 | 5 | 5 | 4 | 5 | | 4.7 |
| Interpersonal Relateness | | 5 | 5 | 3 | 4 | 4 | 4 | 3 | 4 | 4 | 4 | | 4 |
| Social Intelligence | | 4 | 4 | 5 | 5 | 3 | 4 | 3 | 5 | 3 | 3 | | 3.9 |
| Warm-Heartedness | | 3 | 4 | 4 | 3 | 3 | 3 | 4 | 5 | 4 | 2 | | 3.5 |

All the interviewees needed some guidance and clarification to be able to answer this question.

Section 1 was all about positively managing relationships with others (Positive Social-Relationship Disposition). It seemed that again all the interviewees regarded integrity as very important [94 %]. In leading position was the ability to give guidance, to motivate others, to give them instructions, advice and encouragement – with an 80 % rating (facilitating). This second position was shared by interpersonal relatedness, being accommodating in one's relationship and actively maintaining relationships via forgiveness and helpfulness, by preserving the peace. The need to relate to others, to understand them and their feelings (social intelligence) was in the third place [78 %]. Warm-heartedness, thus being considerate, protective and supportive of others, as well as being approachable and attentive to other's needs was in the fourth place [70 %].

Lastly, was the ability to value and show compassion towards others and their needs and emotions (empathy) with 66 %. The interviewees suggested that section 1 should carry the second most weight of all 7 sections, with an average priority of 2,1 (where 1 = most weight and 7 the least weight).

**Table 40: Illustrates which of the SAPI items in section 2, according to the interviewees, are deemed more important and what weight section 2 should carry**

| | | Interviewees | | | | | | | | | | [7] | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | *Priority #* | Ave Rating |
| **SAPI Section 2** | ***Priority #*** | ***2*** | ***7*** | ***7*** | ***7*** | ***7*** | ***7*** | ***7*** | ***7*** | ***7*** | ***6*** | ***6.4*** | |
| Arrogance | | 1 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 4 | | 1.4 |
| Conflict-Seeking | | 1 | 4 | 1 | 2 | 1 | 1 | 1 | 1 | 1 | 3 | | 1.6 |
| Deceitfulness | | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 3 | | 1.2 |
| Hostillity-Egoism | | 1 | 3 | 2 | 1 | 1 | 1 | 1 | 2 | 1 | 2 | | 1.5 |

With section 2, the idea was about approaching relations with others more controversially (Negative Social-Relationship Disposition). It was no surprise to the researcher that the interviewees gave this section an overall ranking of 7. In construction, a person who is arrogant, always seeking conflict, being deceitful and only thinking of himself/herself would struggle to survive on a construction project. Actively deceiving others, cheating them and fooling them by creating a false impression of oneself was rated lowest [17 %]. This suggests that this trait is the one you would seek least in such an individual. Seeing oneself as better as and more important than others, by being arrogant and pompous, was rated second lowest [20 %]. Hostility-egoism (aggressively self-promoting, by being self-centred, focusing exclusively on one's own needs and desires and simultaneously being abusive, denigrating and being critical towards others) was in third place [21 %]. Lastly, there was conflict-seeking

with a percentage of 22,8 %; being socially disruptive, intrusive and indiscreet about the private affairs of others.

**Table 41: Illustrates which of the SAPI items in section 3, according to the interviewees, are deemed more important, and what weight section 3 should carry**

| | | Interviewees | | | | | | | | | | [5] | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | *Priority #* | Ave Rating |
| **SAPI Section 3** | *Priority #* | *5* | *5* | *6* | *5* | *4* | *6* | *6* | *4* | *6* | *4* | ***5.1*** | |
| Emotional Balance | | 5 | 4 | 4 | 5 | 4 | 4 | 5 | 5 | 5 | 4 | | 4.5 |
| Negative Emotionality | | 5 | 1 | 3 | 1 | 1 | 1 | 2 | 1 | 1 | 2 | | 1.8 |

Section 3 referred to the tendency of a person to be impulsive and to fluctuate between emotions and by being composed in difficult situations (Neuroticism). Emotional balance, thus showing respect, knowledge and acceptance of self and one's emotions and being composed in difficult positions, was seen as an important trait. Emotional balance was rated high with a percentage of 90 %; feeling nervous, worried and being afraid of various things (negative emotionality) was indicative of a personality trait that is not sought after [36 %]. Neuroticism also ranked relatively low [5] in the overall ranking.

**Table 42: Illustrates which of the SAPI items in section 4, according to the interviewees, are deemed more important and what weight section 4 should carry**

| | | Interviewees | | | | | | | | | | [4] | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | *Priority #* | Ave Rating |
| **SAPI Section 4** | *Priority #* | *6* | *4* | *3* | *4* | *5* | *4* | *4* | *6* | *4* | *5* | ***4.5*** | |
| Playfulness | | 2 | 4 | 4 | 4 | 4 | 3 | 4 | 3 | 3 | 4 | | 3.5 |
| Sociability | | 3 | 4 | 5 | 3 | 4 | 5 | 3 | 3 | 4 | 3 | | 3.7 |

Section 4 indicated the tendency toward being sociable and talkative, interacting with people in a spontaneous manner by having fun and telling stories that make people laugh (Extraversion). Playfulness, thus being lively, enjoying having fun and making others laugh and having the tendency to see the positive side of life rated [70 %]. Interviewee 6 further elaborated and explained that sometimes one must have the ability to laugh at oneself, or the situation. Being easy-going and talkative and enjoying having people around oneself rated the highest in section 4, with a percentage of 74 % (Sociability). Extraversion ranked one higher than Neuroticism, ending at position 4.

**Table 43: Illustrates which of the SAPI items in section 5, according to the interviewees, are deemed more important and what weight section 5 should carry**

| | | Interviewees | | | | | | | | | | [1] | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | *Priority #* | Ave Rating |
| **SAPI Section 5** | *Priority #* | *3* | *3* | *2* | *1* | *1* | *2* | *2* | *1* | *2* | *2* | ***1.9*** | |
| Achievement Orientation | | 5 | 4 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | | 4.9 |
| Orderliness | | 5 | 4 | 4 | 4 | 5 | 5 | 4 | 5 | 5 | 5 | | 4.6 |
| Traditionalism-Religiosity | | 2 | 4 | 4 | 2 | 4 | 4 | 3 | 4 | 4 | 2 | | 3.3 |

Section 5 referred to the orientation toward achievement, order and traditionalism (Conscientiousness). Achievement orientation, being motivated, persevering, ambitious and hard-working towards achieving things in life was rated at 98 %. Being organised, neat, punctual, precise and thorough in everything one does (Orderliness) rated 92 %. Traditionalism-Religiosity, being traditional by respecting one's own culture and being religious, rated relatively low compared with the previous two items in this section [66 %]. This can suggest that being religious is a less important factor to consider. Conscientiousness ranked the highest in the overall ranking, ending at position 1.

**Table 44: Illustrates which of the SAPI items in section 6, according to the interviewees, are deemed more important and what weight section 6 should carry**

| | | Interviewees | | | | | | | | | | [3] | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | *Priority #* | Ave Rating |
| **SAPI Section 6** | ***Priority #*** | ***4*** | ***2*** | ***4*** | ***2*** | ***3*** | ***1*** | ***3*** | ***2*** | ***1*** | ***1*** | ***2.3*** | |
| Broad-Mindedness | | 4 | 4 | 4 | 4 | 2 | 5 | 5 | 5 | 5 | 4 | | 4.2 |
| Epistemic Curiosity | | 5 | 4 | 4 | 5 | 3 | 5 | 5 | 5 | 5 | 4 | | 4.5 |
| Intellect | | 4 | 4 | 5 | 5 | 5 | 5 | 4 | 5 | 5 | 4 | | 4.6 |

Section 6 referred to the quality of being well-informed and observant of external and internal things, being a rational and progressive thinker, and acquiring new experiences, knowledge, skills and ideas (Openness). Broad-mindedness, being imaginative and seeking new experiences and ideas rated 84 %. Being inquisitive, investigative and eager to acquire new information (Epistemic curiosity) was rated at 90 %. Intellect, being knowledgeable, a quick learner, adaptable, articulate, innovative and perceptive was rated relatively high, with a percentage of 92 %. Openness ranked the 3rd highest in the overall ranking

**Table 45: Illustrates which of the SAPI items in section 7, according to the interviewees, are deemed more important and what weight section 7 should carry**

| | | Interviewees | | | | | | | | | | [6] | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | *Priority #* | Ave Rating |
| **SAPI Section 7** | ***Priority #*** | ***7*** | ***6*** | ***5*** | ***6*** | ***6*** | ***5*** | ***5*** | ***5*** | ***5*** | ***7*** | ***5.7*** | |
| Negative Impression Management | | 1 | 2 | 2 | 1 | 1 | 1 | 3 | 1 | 1 | 2 | | 1.5 |
| Positive Impression Management | | 4 | 4 | 4 | 5 | 5 | 5 | 4 | 5 | 4 | 3 | | 4.3 |

Negative impression management referred to the tendency to give a negative self-description/self-impression; this rated relatively low with 30 %. The tendency to give a positive self-descriptive/self-impression (Positive Impression Management), rated again the opposite with 86 %. Social Desirability ranked sixth lowest in the overall ranking.

**Table 46: Illustrates which of the SAPI items were considered as the most important and least important personality traits**

| No | SAPI Items | SAPI Section | Ave Rating | Percentage |
|---|---|---|---|---|
| 1 | Achievement Orientation | 5 | 4,9 | 98 % |
| 2 | Integrity | 1 | 4,7 | 94 % |
| 3 | Orderliness | 5 | 4,6 | 92 % |
| | Intellect | 6 | 4,6 | 92 % |
| 4 | Emotional Balance | 3 | 4,5 | 90 % |
| | Epistemic Curiosity | 6 | 4,5 | 90 % |
| 5 | Positive Impression Management | 7 | 4,3 | 86 % |
| 6 | Broad-mindedness | 6 | 4,2 | 84 % |
| 7 | Facilitating | 1 | 4 | 80 % |
| | Interpersonal Relatedness | 1 | 4 | 80 % |
| 8 | Social Intelligence | 1 | 3,9 | 78 % |
| 9 | Sociability | 4 | 3,7 | 74 % |
| 10 | Warm-heartedness | 1 | 3,5 | 70 % |
| | Playfulness | 4 | 3,5 | 70 % |
| 11 | Empathy | 1 | 3,3 | 66 % |
| | Traditionalism-religiosity | 5 | 3,3 | 66 % |
| 12 | Negative Emotionality | 3 | 1,8 | 36 % |
| 13 | Conflict-seeking | 2 | 1,6 | 32 % |
| 14 | Hostility-egoism | 2 | 1,5 | 30 % |
| | Negative Impression Management | 7 | 1,5 | 30 % |
| 15 | Arrogance | 2 | 1,4 | 28 % |
| 16 | Deceitfulness | 2 | 1,2 | 24 % |

It was interesting to see which individual SAPI item was considered by the interviewees as the most important and the least important for a construction manager to inherit. As illustrated by Table 46 above, achievement orientation was the most vital item and not surprisingly; integrity was in second place; reinforcing the concept that the interviewees contemplate a construction manager with sound integrity as very important. Orderliness was in third position, with emotional balance and epistemic curiosity jointly in fourth place. Positive impression management ended up in fifth position; and broad mindedness followed in sixth. Jointly in the seventh place were facilitating and interpersonal relatedness.

Social intelligence followed in eighth place, with sociability in ninth and warm-heartedness joining playfulness in the tenth spot. Empathy shared the eleventh position with traditionalism-religiosity.

The following personality items are what one typically does not want to see in a construction manager. Deceitfulness is the personality trait that is the least sought after; and arrogance followed in second place.

Hostility-egoism and negative impression management jointly held the third-least preferred personality trait position, with conflict-seeking in the fourth place. Lastly, there was negative emotionality that was rated to be the fifth least-desirable personality trait for a construction site-manager to possess.

Table 47 below illustrates section 2 [Negative Social-Relational Disposition] with the highest Cronbach Alpha value. This section was also indicated by the interviewees as an item in personality that they would not like to see in a construction manager. It can then be suggested that there is a correlation with regard to the fact that they agree that section 2 describes the negative aspects.

**Table 47: The correlation coefficient between Cronbach Alpha and SAPI's ranking**

| | **Rank** | **Cronbach Alpha [SAPI 7 main dimensions]** | **SAPI 7 main dimensions** |
|---|---|---|---|
| **Positive** | 1 | 2 | 6 |
| | 2 | 6 | 5 |
| | 3 | 1 | 1 |
| | 4 | 4 | 4 |
| | 5 | 5 | 7 |
| | 6 | 3 | 3 |
| **Negative** | 7 | 7 | 2 |
| | | ***Correlation Coefficient*** | **0.872** |

The results further indicated that section 2 [Negative Social-Relational Disposition] had the highest Cronbach Alpha value, where the SAPI indicated section 6 [Intellect/Openness]. Section 7 [Social Desirability] indicated the lowest Cronbach Alpha value, with section 2 [Negative Social-Relational Disposition] of the SAPI. Figure 35 below illustrates the notion that except for the first and the last-ranked sections, the variations between Cronbach Alpha and the SAPI results are very small or virtually identical.

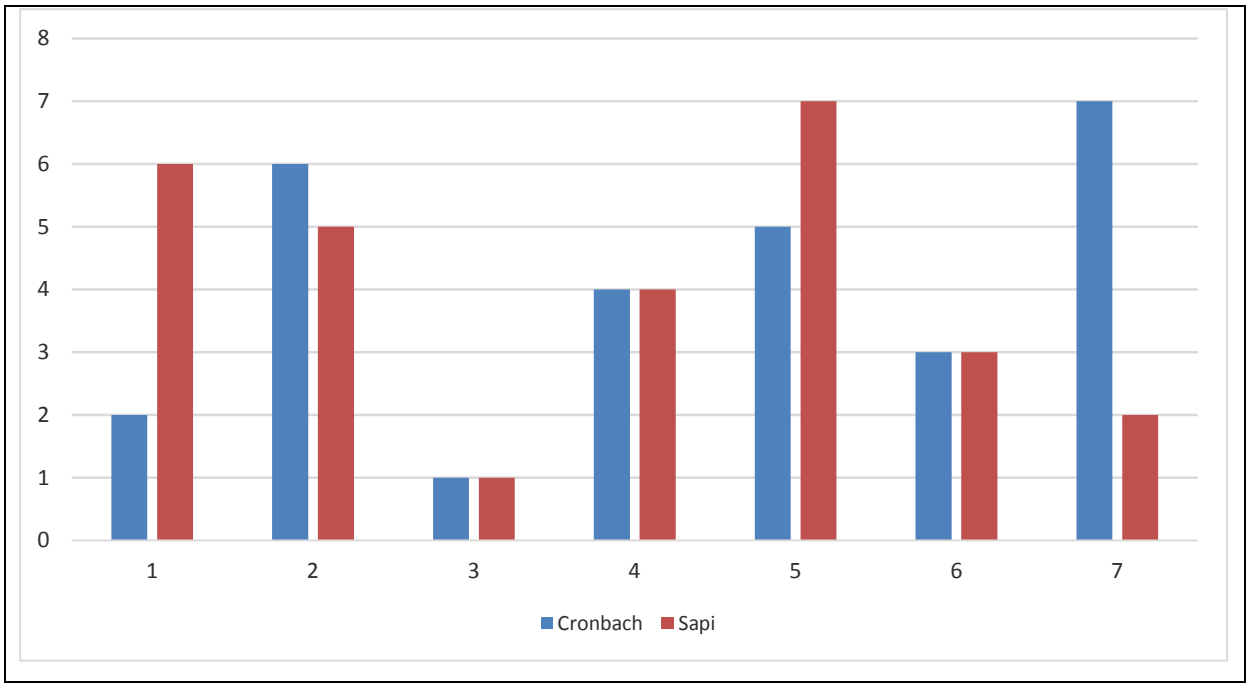


**Figure 35: The correlation coefficient between Cronbach Alpha and SAPI's ranking**

## 5.6. Part C: Interviewees personally directed questions

### 5.6.1 (Q31) Describe yourself, in terms of the characteristics (including both soft skills and personality) discussed in the questionnaire.

This question aimed to determine if there were any other soft skills or personality traits that the questionnaire missed so far. All the interviewees' answers were tabled to see if there were any possible overlaps between the soft skills suggested by them. The interviewees found this question more difficult in the sense that it is not easy to explain your own strong characteristics.

Table 48 below was divided into 4 main columns with the number of characteristics on the left, adding up to a total of 19 different characteristics. To the right of the numbers column is the list of different characteristics (including both softs skills in the competency domain and personality) that the interviewees indicated to describe themselves.

**Table 48: Illustrates how each interviewee describes him/her in terms of both soft skills in the competency domain and personality**

| No | Required characteristics | Interviewees | | | | | | | | | | Total # |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | |
| 1 | Driven / ambitious | X | | | X | | | X | X | X | X | 6 |
| 2 | Leadership skills | X | X | | X | | | | X | X | X | 6 |
| 3 | Communication skills | | | | X | X | X | | X | X | | 5 |
| 4 | Inspirational / motivation | X | X | | X | | | | | X | | 4 |
| 5 | Positive attitude | X | | X | | | | | | | X | 3 |
| 6 | Business skills | X | | | | | | | X | | X | 3 |
| 7 | Sociable | | | X | | X | X | | | | | 3 |
| 8 | Lateral thinker | X | | | | | X | | | | | 2 |
| 9 | Decision management skills | | X | | | X | | | | | | 2 |
| 10 | Negotiation skills | | | X | X | | | | | | | 2 |
| 11 | Work ethics | | | | X | | | | X | | | 2 |
| 12 | Problem solving | | | | X | | | X | | | | 2 |
| 13 | Team & individual player | | | | | X | | X | | | | 2 |
| 14 | Organised | X | | | | | | | | | | 1 |
| 15 | Open & honest | X | | | | | | | | | | 1 |
| 16 | Integrity | | | X | | | | | | | | 1 |
| 17 | Social intelligence | | | X | | | | | | | | 1 |
| 18 | Stress management | | | | X | | | | | | | 1 |
| 19 | Conflict management | | | | | X | | | | | | 1 |

The characteristic (including both soft skills and personality) that was repeated the most between the different interviewees were being ambitious/driven and leadership skills. Communication was second most mentioned and thirdly was the ability to inspire or motivate people. Having a positive attitude, sound business skills and being sociable were fourthly most mentioned. The fifthly most repeated were the ability to be a lateral thinker, decision management skills, negotiation skills, work ethics, problems solving skills and being a team player, but also have the ability to work individually. The rest of the list was only mentioned once, being organised, integrity, being open and honest, sound social intelligence, ability to manage stress and handle conflict.

### 5.6.2 (Q32) In your opinion, how can a company improve your lifestyle as a construction manager?

It is important to see what current measures companies use to improve the lifestyle of a construction manager. To determine what can further improve their lifestyle, but also indicate what the interviewees feel was the most important factors that can improve their lifestyle.

As illustrated in Table 49 below, all the interviewees agreed that a good market related salary is most important. They further elaborated that although money is a very lucrative way to make it worthwhile for the construction manager, it is not everything. Construction managers will leave their current company of employment for another one, if the latter company gives a better work environment. According to interviewee 1 "*a better work environment can suggest to give the construction manager the freedom to speak his/her mind and others must actively listen. Bonuses and other incentives must not be rewarded only once a year, but rather bi-annually or quarterly. These rewards should be transparent to prevent wrong perceptions to manifest between construction managers*". Recognition and acknowledgement must be rewarded on a regular basis for good work during the duration of the construction project. Interviewees 3, 6 and 7 emphasised the significance of "*giving employees the opportunity to earn shares within the company*". Interviewee 9 mentioned that they "*receive an extra living allowance if we need to execute a project away from our homes*".

Interviewees 1, 2, 3 and 8 suggested that *"the construction company must give job security and the construction manager must have the necessary support and resources on each construction project, as this assist in reducing stress*". Interviewee 2 mentioned that "*continuous training and education is needed to constantly improve the construction managers' skills and abilities"*. To create opportunities and challenges, but also communicate the companies short and long-term vision for the individual is essential. According to interviewees 3, 7 and 8 this "*can assist the individual to focus on the project and give much needed job security and direction*".

According to interviewee 5, the "*long working hours can be reduced by better planning during the initial phases of the project*". Interviewee 4 suggested that "*it is important for the construction manager to be able to schedule leave during construction projects*". He further explained that "*flexible working hours can also be implemented on construction projects that allows for it*". Interviewee 10 elaborated more on the concept of "*giving the construction manager one week vacation between the end of a project and the start of a new project*".

It is important to "*rotate responsible people every weekend*" as interviewees 4, 5 and 9 suggested; they further explained and recommended that "*socialising events within the company is needed*".

**Table 49: Illustrates each interviewee's opinion on how to improve the lifestyle of a construction manager**

| No | Improved lifestyle factors | Interviewees | | | | | | | | | | Total # |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | |
| 1 | They must receive lucrative intrinsic and extrinsic rewards. The company must be transparent with awarding rewards. | X | X | X | X | X | X | X | X | X | X | 10 |
| 2 | Give sound training were it is needed. | | X | | | | | | | | | 1 |
| 3 | Ensure needed resources on projects and support to assist. Ensure job security to reduce stress. | X | X | X | | | | | X | | | 4 |
| 4 | Reduce working hours. | | | | | X | | | | | | 1 |
| 5 | Socialise events within the company. | | | | X | X | | | | X | | 3 |
| 6 | Opportunity to take leave within the duration of projects. | | | | X | | | | | | | 1 |
| 7 | Rotating people responsible to work weekends. | | | | X | X | | | | X | | 3 |
| 8 | Opportunity for more flexible working hours. | | | | X | | | | | | | 1 |
| 9 | Equity in company, such as shares. | | | X | | | X | X | | | | 3 |
| 10 | Create opportunities for the individual. Company communicate their short and long-term vision for individual | | | X | | | | X | X | | | 3 |
| 11 | Receive living allowance if working on a project away from home. | | | | | | | | | X | | 1 |
| 12 | Give at least 1 week vacation between the end of one project and the start of the new project. | | | | | | | | | | X | 1 |

### 5.6.4 (Q33) Are you happy with your choice of profession – and why?

This aim of the question was to see if there is an interviewee that was not satisfied with his/her choice as a construction manager. It was then further important to see what the reasons were for him/her being satisfied or unsatisfied.

All the interviewees were satisfied with their career choice as a construction manager, except for interviewee 9. She was the only female interviewee in the group and elaborated on the "*difficulty of working in the construction industry. The difficulty when starting a family, managing stress and to leave work-related problems at work and prevent it from spilling over to your personal life, that can create further conflict*". She also referred to the issue of "*cultures that do not accept female authority and that makes it extra difficult to be successful*".

Interviewees 1, 5 and 6 mentioned that they "*enjoy [our] work, as the construction industry is very dynamic*". There is never a dull moment; rather, the job is with plenty of challenges and opportunities. They elaborated further and mentioned that it is "*satisfactory to work with people, with different skill levels, on a daily basis*".

According to interviewees 2 and 5, they mostly enjoy the "*personal growth experience – during and after each completed construction project*". The physical and emotional aspects around all construction projects generate gratifying challenges.

Interviewees 3, 4 and 5 further elaborated and suggested that "*creativity is needed in the construction industry; and there are always different challenges to overcome, that keep [us] interested*". Interviewees 4 and 5 also explained that "*construction projects are not static; and there are always goals, targets and milestones to overcome*".

Interviewee 7 divided his construction experience into two categories. The first was where he operated in large companies (corporate environment); were there were always meetings, reports and specific deadlines to meet. The second category is where he works for himself as a construction manager on his own projects. *"This total freedom and self-control over each aspect of the construction process is very satisfactory*".

Interviewee 8 explained that there are two paths for the construction manager; and he would have enjoyed it more "*if he could move into the corporate side of his company*". Because he operated for too long on the construction site side, the opportunity to move into the corporate realm has closed for him.

According to interviewee 10, he enjoys the fact that he is "*not bound to an office*". He also finds it satisfactory to start a project and see it develop into a completed building.

### 5.6.5 (Q34) If you could turn back time, would you choose your profession differently – and why?

The last question was asked of the various interviewees to see if they had another chance to start over in life again, would they still choose to become a construction manager?

All the interviewees, except for 3, 9 and 10 mentioned that they would still have studied construction management; but interviewees 6 and 8 suggested "*doing things differently*".

Interviewee 3 suggested that he would most probably have considered becoming a surgeon. His "*precise hand-working skills and high level of integrity would mostly lean towards this profession*". Interviewee 5 mentioned that he cannot think of any other industry that gives you the opportunity to construct something tangible and overcome so many obstacles. Interviewee 6 said that he "*would most probably have studied further and completed a Master's degree in real estate"*.

Interviewee 8 would leave South African shores at an earlier stage in his life as he believes that the "*construction industry in other countries is not so challenging; and it is more flexible in work-life issues*".

Interviewee 9 definitely indicated that she "*would not have studied the same degree*", but is still not sure what else she would have studied. Interviewee 10 elaborated that he would rather have studied engineering; "*as it is easier to design a structure and to give it to the construction manager than to execute it oneself*".

## 5.7. Conclusion

The research data obtained from the structured interviews were adequate to answer the research questions. With the data collected from all 10 expert interviewees, the researcher was able to conclude that a construction manager's level of soft skills and a purpose-fit personality profile are needed, in order to be successful in the construction industry.

The different interviewees that participated in the structured interviews covered a wide range of ages. The ages ranged from 32 to 71 years; and they were divided into age brackets. A large percentage of the interviewees [70 %] were between 32 – 47 years; 10 % were between 48 – 63 years; and 20 % were above 64 years.

The interviewees were mostly responsible for projects with a contract value ranging between > R40 - > R130 million, where 40 % of the interviewees were located between the contract values > R40 – R130 million (CIDB Grading 8); and 60 % were positioned at a contract value of > R130 million (CIDB Grading 9). What was noteworthy was that 50 % of these interviewees were under the age of 40. This showed that construction managers should be able to take responsibility for relative complex projects from a relatively young age.

Most of the interviewees [85 %] were involved in construction projects where structural complexity was most significant. Under structural complexity, they were all involved where the size (number of elements) played a role; and 70 % where the independence of elements also contributed to the complexity. Only 25 % of the project complexity was uncertain; where 30 % were uncertain as regards goals; and 20 % were uncertain as regards the methods.

The interviewees indicated that the sectors they were involved with under these different complexities were mostly in the industrial and office/retail sector [80 %]. Furthermore, 50 % also referred to larger residential sectors; and only 30 % were involved in civil engineering and roadworks; although the latter was only through facilitating and co-ordinating between the actual civil works and the construction itself.

A total of 60 % of the projects (under the project complexity and different sectors) were both managing specialists, sub-contractors and their technical abilities were needed to successfully complete the project. Only 30 % of the interviewees were involved where their technical abilities weighted heavily; and only 10 % were managing specialist sub-contractors only. It may then be concluded that it is important for a construction manager to have both sound technical and managerial abilities, in order to effectively manage a construction site.

The results in the structured interview also showed that the construction companies used different methods to ensure maturity; and that the necessary practical skills were achieved at this younger age group. The construction companies placed the younger individual under the mentorship of a senior construction manager on a complex project. This coaching method would only be successful if the junior construction manager has the ability to learn through first and second observation, and if his/her attitude is positive. The relationship between the junior and senior construction manager must be one of trust and understanding. The junior construction manager must feel free to ask questions; and the senior construction manager must have patience and the ability to convey the answer effectively. The correctness of the previous experience obtained from the senior construction manager would also determine the outcome of the effectiveness of the mentorship.

The alternate method used was to give the junior construction manager a project with less complexity, until he/she shows the potential to execute larger, more complex projects. During this process, the junior construction manager would readily receive support and guidance.

Under this concept of shortening training periods of younger construction managers; so that they can add value to their company more quickly, virtual reality and 3D printing surfaced as possible alternatives. Virtual reality can be used to assist a construction manager to run simulations of the same project, but to receive different possible outcomes. This can assist not only to familiarise the construction manager, but also to visualise the results of the possible outcomes of different decisions. In the area of health and safety, virtual reality can contribute not only when there is an actual project involved, but also during the training of construction-management undergraduates. The ability to simulate bending schedules through the virtual realm can assist the undergraduate to enhance much-needed practical skills. 3D printing possibilities will need further research; but they can definitely assist in reducing the learning curve of such an individual.

During the structured interviews, it was realised that between the 5 different construction companies involved; there was a difference in the responsibility for an individual with the same title. The construction manager in a larger company must be more of a manager, facilitating people and processes on the construction site. In smaller construction companies, the same individual must be more practical and hands-on; although managing people and facilitating processes was still important.

The results further indicated that there is definitely a shortage of skilled construction managers with more than 10 years' experience in the South African construction industry. The most difficult individual to source is the skilled middle manager; the senior construction managers earn too high a salary to accommodate them into the fold of the companies involved in the research study. Many of the skilled construction managers leave South African shores to work in other countries; and this creates a brain drain in the industry. The

unstable economic cycles also contribute to the uncertainty of job security; where some of the construction managers are subjected to retrenchments. The results consequently indicated that young construction managers must be able to manage more complex construction projects at an early career stage, in order to fill these gaps in the market.

These willing junior construction managers are then recruited by construction companies for a specific sector. Previous successfully completed projects would assist such an individual to obtain the specified work, especially if they are similar projects; as this can reduce the learning curve. In addition to previous practical experience, construction companies will typically source individuals who show characteristics, such as responsibility, trustworthiness, independence, patience, initiative – in other words, a disciplined professional, with a good attitude who has goals in life. This individual must also show potential in people-management, problem-solving, leadership, financial affairs, decision-making skills; and he/she must be able to work in teams with different dynamics.

It is difficult to source such an individual, but even more difficult to retain them in a construction company. The most important factor is to pay the construction managers a market-related salary. The employer must give living allowances on projects away from home and opportunities to earn company shares. Although a lucrative salary is a good starting point; transparent intrinsic and extrinsic reward systems must be in place. To have an annual bonus is needed, but short-term incentives, such as acknowledgement for achieving monthly targets help to keep the motivation high.

Companies must investigate the possibility of giving company bonuses, and also project bonuses. The results showed that a decent salary alone is not sufficient to retain these individuals. It is important to create a motivating environment for them to operate in. This motivating environment can include aspects, such as continuous training, reduced working hours, weekend-work rotation between employees, opportunities to take leave during construction projects, short leave periods between the end and start of projects, team-building and socialising events, constant communication between both the employer and the employees on short and long-term visions. Ensuring job security and giving the necessary resources to assist them to complete the project. It is important to create an environment in which the construction manager can execute the project without interference from other more senior individuals, but also to be accountable for such decisions. Constructive criticism is also needed on all levels within the company.

Because the South African construction industry is labour-intensive, labour productivity will have a significant effect on the productivity of the project; therefore a construction manager must have the ability to effectively manage the human capital side on a construction project. Failure to do so would increase frustration; decrease personnel morale and eventually lead to a decline in productivity.

Tertiary education in construction management and proper practical experience are crucial; but without the necessary soft skills, the construction manager would not be successful on a project. The level of effectiveness needed will vary between a junior, middle management and senior construction manager. The junior-construction manager would be more task-specific, but still need soft skills to survive the first 5 years on the construction site. The middle-career construction manager would need some support and seek advice from more senior construction managers. The senior construction manager would be more involved with human interactions on several different levels. Thus, he/she would be less technical and more soft-skill oriented.

As the construction manager grows in seniority, the ability to apply these softs skills becomes increasingly more important.

The research results further concluded that soft skills, the cultivation thereof, and the ability to interchangeably apply them with Bono's six thinking hats are essential for a successful construction manager on a construction project. In addition, the construction manager's level of effectiveness on the construction project would be determined by the ability to balance these softs skills. An advanced soft skill level would be more effective on a construction project, than a less advanced soft skill level. Without the necessary softs skills the construction manager will struggle to effectively manage a construction project successfully.

The list of 13 soft skills identified in the competency domain, were all very important; although the level of importance changed with seniority. With the junior construction manager, integrity ranked the highest [88 %], with attitude and teamwork in second position [86 %]. Work ethics [84 %] in third, position with problem solving/critical thinking and motivation jointly in fourth place [78 %]. Fifthly, were communication skills, conflict resolution skills and flexibility [76 %]; leadership skills were ranked sixth [68 %], followed by negotiation skills, decision-making skills and stress management [64 %].

The rankings of the soft skills in the competency domain for a middle career construction manager changed from the junior construction managers' situation. Integrity was still ranked the highest [94 %], but problem-solving/critical thinking skills moved into second position. Leadership skills moved into third place [90 %], with work ethics and communication skills in fourth position [88 %]. Decision-making skills and attitude jointly held the fifth position [86 %] and negotiation, conflict resolution, motivation and teamwork were in sixth position [84 %]. Flexibility was in seventh position [74 %]; and lastly, there was stress management [70 %].

With the senior construction manager the importance of the different soft skills in the competency domain varied again from a junior and middle career construction manager. With the senior construction manager, leadership skills jumped into the first position [100 %] with integrity and decision making skills in second position [98 %]. Problem solving/critical thinking skills and negotiation skills moved into third position [96 %]. Conflict resolution skills

and motivation were jointly in the fourth position [94 %], with communication skills, work ethics and attitude in fifth place [92 %]. The sixth position was teamwork [90 %] followed by stress management [86 %] and lastly, flexibility [84 %].

The level of importance of each soft skill in the competency domain changes between all three experience brackets. Although the rankings of the soft skills vary between the different experience brackets, the importance in terms of percentage, increased mostly from a junior, middle career towards a senior construction manager. The results can then conclude that a diverse set of soft skills in the competency domain are needed at different experience levels. As the seniority level increase, the ability of a construction manager to use all 13 soft skills in the competency domain, becomes more critical i.e. leadership skills, negotiation skills, decision making skills and stress management increased the most between the 3 experience levels.

The structured interview further concluded that there is a specific personality profile for a construction manager and that his/her lifestyle must form part of it. The construction manager in South Africa must have a personality that can work outdoors, in a dusty work environment, enjoy working on large, low skilled, labour intensive construction projects and not be bothered to work long hours under constant stress. This individual must be comfortable to move from one project to another, being separated from family and friends. The research results emphasised the fact that it is important for the construction company to ensure during their recruitment and selection process that both person-job fit [PJ] and person-organisational fit [PO] is applied. If the construction manager have this specific personality profile, both PJ & PO, it will increase the probability that he/she will stay active as successful construction manager as a career choice.

The results of the SAPI inventory 7 sections for construction managers' with 10+ years' experience showed that section 5 [Conscientiousness] must carry the most weight. Section 5 included items such as achievement orientation, orderliness and traditionalism-religiosity. Section 1 [Positive Social-Relationship Disposition] followed closely in second position with items such as, empathy, facilitating, integrity, interpersonal relatedness, social intelligence and warm-heartedness. In third place was section 6 [Openness] that referred to items such as broad-mindedness, epistemic curiosity and intellect. Items such as playfulness and sociability were under section 4, which followed in fourth position. Section 3 [Neuroticism] with items such as emotional balance and negative emotionality was in fifth position and section 7 [Positive Impression Management] with items such as negative impression management and positive impression management in sixth position. Lastly, the least important was section 2 [Negative Social-Relationship Disposition] with items such as arrogance, conflict-seeking, deceitfulness and hostility-egoism.

The individual items listed in the SAPI inventory that scored the highest rankings was achievement orientation [98 %], integrity [94 %], orderliness [92 %], emotional balance and epistemic curiosity [90 %], positive impression management [86 %], broad-mindedness [84 %], facilitating & interpersonal relatedness [80 %], social intelligence [78 %], sociability [74 %], warm-heartedness and playfulness [70 %]; and lastly, empathy and traditionalism-religiosity [66 %]. The characteristics that were necessary to form a significant part of the personality profile of a construction manager were: negative emotionality [36 %], conflict seeking [32 %], hostility-egoism and negative impression management [30 %], arrogance [28 %]; and the least-wanted one was deceitfulness [24 %].

These results of the SAPI inventory items agreed with the industry expert opinions that a construction manager must be ambitious, driven, organised and possess the necessary social intelligence; have sound leadership, communication, decision-management, conflict management, negotiation, problem-solving and business skills. He/she must be able to work with teams, as well as with individuals, be inspirational; and have the ability to motivate people under difficult environmental conditions, have a positive, sociable attitude and high levels of integrity and work ethics.

Lastly, the research results revealed that the industry proved to be difficult for the lifestyle of a female, especially when starting a family. The interviewees, except for the female, all enjoyed their profession and did not want to work in any other environment. What was clear was the fact that some of the expert interviewees enjoyed working with their hands. As young adults, they were furniture makers; or they enjoyed doing woodwork. Some grew up on farms where they had to be able to find practical and workable solutions; while simultaneously saving money.

Although the interviewees mostly agreed that they enjoyed working in the construction industry, some suggested that they would choose different professions if they could turn back time, i.e. professions in the construction industry that lean more towards designing were easier to do on a computer, than to physically execute them; lifestyle issues and the fact that other professions in the construction industry seemed to carry more ‘professionalism’ with other team members.

In Chapter Six a possible personality profile for the industry-construction managers was suggested; and the results were mapped with the third-year construction-management students that participated in this research study. The focus was to see whether there are any deviations in the results between the two groups tested; as this could give the researcher guidance towards the type of students in which the tertiary institution invests.

The online SAPI results from the industry-construction managers were further evaluated and discussed, in order to determine the main dimensions that are most important for a construction manager and least important to possess.

# CHAPTER 6

# The South African Personality Inventory (SAPI Results)

## 6.1. Introduction

In the 21st century, one would ideally prefer to use an instrument that could test an individual's personality profile to try and forecast the probability of that person being a purpose-fit candidate for the position. Through optimal utilisation of increasing scarce resources a construction company can survive through growth and profitability. This means that it is necessary to create an effective and efficient use of human talent, to have a high quality and competent work force, through continuous acquisition and maintenance. The real added value would then depend on the quality of the fit that is formed between the employee, their work, the organisation and the environment (Swanepoel *et al*. 2000; Mouton, 2017).

Researchers have indicated that there is a positive link between personality and performance outcomes; although some suggested a very low validity (Kinder and Robertson, 1994; Swanepoel *et al*. 2000; Roberts *et al*. 2007; Williamson *et al*. 2007;Tyagi, 2008. Reddock *et al*. 2011). Van der Walt (1998), cited by Van der Merwe (2002) stated that previous research indicated psychometric tests are about four times more effective than screening interviews.

According to Mouton (2017), personality represents an influential determinant of job performance.

In Chapter 6, the SAPI results are analysed and discussed. This section of the research study focuses on construction managers with a B.Sc. degree in construction management, with 10+ years of experience on construction site management. The results of the students that participated are also discussed; and after mapping their results with the industry experts, some suggested that various conclusions could be made.

## 6.2. Online SAPI personality test results

For the construction-management industry participants the sample ($N$ = 10) included both males and females from the general population in Gauteng. These industry individuals were selected on the basis of their experience in specific construction sectors, their age and the fact that they operate in the Gauteng area. The sample consisted of 10 white participants (9 males; 1 female; age 32 to 71 years).

The student group sample ($N$ = 16) included students in their 3rd year of construction management studies enrolled at the University of Pretoria, University of the Free State and Nelson Mandela University. The students participated voluntarily; and therefore, not all four of the major ethnic groups could be tested. This sample consisted of 13 white participants

(12 males; 1 female; age 21 to 22 years), 2 black participants (1 male; 1 female; age 21 to 23 years) and 1 Indian participant (1 male; 0 females; age 22 years).

The SAPI instrument was administered in English; and it consisted of 188 questions. A 5-point Likert scale from 1 (strongly disagree) to 5 (strongly agree) was used. The SAPI version that was used contained seven main dimensions. Under each of the seven main dimensions was a variation of the sub-dimensions, which contained typical SAPI questions in the text, as illustrated in Table 50 below.

**Table 50: SAPI's version that consisted of the seven main dimensions, their sub-dimensions and an example of the typical question text**

| No | Main Dimensions | Number of questions | Sub-dimensions | Number of questions | SAPI question text example |
|---|---|---|---|---|---|
| 1 | Social Relational Positive | 54 | Empathy | 7 | "I take others feelings into account" |
| | | | Facilitating | 10 | "I help people realise their potential" |
| | | | Integrity | 13 | "I tell the truth" |
| | | | Inter Personal Relateness | 9 | "I talk to others to resolve differences" |
| | | | Social Intelligence | 4 | "I relate well to others" |
| | | | Warm-Hartedness | 11 | "I listen to other people's problems" |
| 2 | Social Relational Negative | 34 | Arrogance | 6 | "I am better than others" |
| | | | Conflict Seeking | 7 | "I provoke others" |
| | | | Hostile Egoism | 14 | "I abuse my power over others" |
| | | | Deceitfulness | 7 | "I cheat" |
| 3 | Neuroticism | 18 | Emotional Balance | 8 | "I am calm in most situations" |
| | | | Negative Emotionality | 10 | "I easily get nervous" |
| 4 | Extraversion | 13 | Playfulness | 6 | "I laugh a lot" |
| | | | Sociability | 7 | "I have good social skills" |
| 5 | Conscientiousness | 28 | Achievement Orientated | 11 | "I am a motivated person" |
| | | | Orderliness | 13 | "I finish things I have started" |
| | | | Traditionalism-Religiosity | 4 | "I am a religious person" |
| 6 | Intellect / Openness | 23 | Broadmindedness | 6 | "I am full of new ideas" |
| | | | Epistemic Curiosity | 6 | "I am eager to learn" |
| | | | Intellect | 11 | "I make good decisions" |
| 7 | Social Desirability | 18 | Negative Impression Managemer | 10 | "I sometimes regret my decisions" |
| | | | Positive Impression Management | 8 | "I think about my options before I make a choice" |
| | | 188 | | 188 | |

The construction managers from industry completed their online personality test after their personal one-on-one interview had been completed. Three of the participants completed the personality test during September 2017; and the remaining seven did so during October 2017. The seven main dimensions of the SAPI results are indicated in Table 51. Approximately 4000 people are already in the data base and the raw count of all the sub-dimensions is added together; after which, the average raw data for the main dimension are

transformed into a norm. The norm is a distribution spread from 1 to 9, as illustrated in Table 51 below.

The industry online SAPI personality test results indicated that these individuals scored the highest in Intellect/Openness [84,08 %], followed by Conscientiousness [80,23 %]. Positive Social-Relational Disposition was in third position [79,48 %], with Extraversion [74,61 %] and Social Desirability [73,88 %] following. The two main dimensions that scored the lowest were: Negative Social Relational Disposition [42,82 %] and Neuroticism [47,44 %].

**Table 51: SAPI's seven main dimension results from the construction managers in industry**

| | socrelp | socrelp _norm | socreln | socreln _norm | extrav | extrav _norm | con | con _norm | neur | neur _norm | intelopen | intelopen _norm | sd | sd _norm |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 4.3704 | 7 | 2.2353 | 6 | 3.6154 | 5 | 4.1538 | 6 | 1.9444 | 4 | 4.7826 | 8 | 3.6667 | 5 |
| | 4.0000 | 5 | 2.2647 | 6 | 3.8462 | 6 | 4.0000 | 5 | 2.2222 | 4 | 4.3043 | 7 | 3.9444 | 6 |
| | 4.1667 | 6 | 2.2059 | 6 | 3.3846 | 4 | 4.1154 | 5 | 3.0000 | 7 | 4.6957 | 8 | 3.8333 | 6 |
| | 4.0185 | 6 | 2.3824 | 6 | 4.4615 | 8 | 4.5385 | 7 | 2.0556 | 4 | 4.3913 | 7 | 3.8889 | 6 |
| | 3.9074 | 5 | 2.2059 | 6 | 3.6923 | 5 | 3.8077 | 4 | 2.7778 | 6 | 3.8696 | 5 | 3.2778 | 4 |
| | 4.0185 | 6 | 1.8235 | 5 | 3.3077 | 4 | 3.5385 | 3 | 1.9444 | 4 | 4.1304 | 6 | 3.5000 | 5 |
| | 4.1667 | 6 | 1.8824 | 5 | 4.6154 | 8 | 4.6923 | 8 | 2.4444 | 5 | 4.3913 | 7 | 3.9444 | 6 |
| | 3.5370 | 4 | 2.0294 | 5 | 2.8462 | 3 | 3.3846 | 2 | 2.1667 | 4 | 3.2174 | 4 | 3.7778 | 6 |
| | 3.5185 | 4 | 2.4118 | 7 | 3.1538 | 4 | 3.5769 | 3 | 3.0000 | 7 | 4.0000 | 6 | 3.3333 | 4 |
| | 4.0370 | 6 | 1.9706 | 5 | 4.3846 | 7 | 4.3077 | 6 | 2.1667 | 4 | 4.2609 | 6 | 3.7778 | 6 |
| AVE | **3.9741** | | **2.1412** | | **3.7308** | | **4.0115** | | **2.3722** | | **4.20435** | | **3.6944** | |
| Percentage | **0.7948** | | **0.4282** | | **0.7462** | | **0.8023** | | **0.4744** | | **0.840870** | | **0.7389** | |
| Ranking # | **3** | | **7** | | **4** | | **2** | | **6** | | **1** | | **5** | |

An interesting observation at this point is the fact that when the industry group manually rated the seven main dimensions and their respective sub-divisions, their results were different. As illustrated in Table 51 above, it is clear that what the industry perceived as more important differed from the actual online SAPI personality-test results.

Table 52 indicates that within the main dimension of Positive Social-Relational Disposition, it was only Interpersonal Relatedness values that were constant. The overall percentage from the manual [78 %] was also reduced relative to the actual online SAPI personality test [68 %]. The test results varied between the actual SAPI online personality test, when compared to the manually completed test, i.e. Question 30 in Chapter 5 (to positively manage relations with others).

**Table 52: The difference between the online SAPI test results compared to the manual assessment results of section 1 [Positive Social Relational Disposition]**

| | empathy _sapi | empathy _manual | facilitating _sapi | facilitating _manual | integrity _sapi | integrity _manual | interrl _sapi | interrl _manual | socialintel _sapi | socialintel _manual | warmheart _sapi | warmheart _manual |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 4.3704 | 3 | 2.2353 | 4 | 3.6154 | 4 | 4.1538 | 5 | 1.9444 | 4 | 4.7826 | 4 |
| | 4.0000 | 4 | 2.2647 | 5 | 3.8462 | 4 | 4.0000 | 3 | 2.2222 | 5 | 4.3043 | 4 |
| | 4.1667 | 5 | 2.2059 | 5 | 3.3846 | 5 | 4.1154 | 4 | 3.0000 | 5 | 4.6957 | 5 |
| | 4.0185 | 4 | 2.3824 | 2 | 4.4615 | 5 | 4.5385 | 4 | 2.0556 | 3 | 4.3913 | 3 |
| | 3.9074 | 2 | 2.2059 | 3 | 3.6923 | 4 | 3.8077 | 4 | 2.7778 | 3 | 3.8696 | 4 |
| | 4.0185 | 3 | 1.8235 | 4 | 3.3077 | 5 | 3.5385 | 5 | 1.9444 | 4 | 4.1304 | 3 |
| | 4.1667 | 3 | 1.8824 | 4 | 4.6154 | 5 | 4.6923 | 4 | 2.4444 | 5 | 4.3913 | 3 |
| | 3.5370 | 3 | 2.0294 | 5 | 2.8462 | 5 | 3.3846 | 3 | 2.1667 | 3 | 3.2174 | 4 |
| | 3.5185 | 3 | 2.4118 | 3 | 3.1538 | 5 | 3.5769 | 4 | 3.0000 | 3 | 4.0000 | 2 |
| | 4.0370 | 3 | 1.9706 | 5 | 4.3846 | 5 | 4.3077 | 4 | 2.1667 | 4 | 4.2609 | 3 |
| AVE | **3.97407** | **3.3** | **2.14119** | **4** | **3.73077** | **4.7** | **4.01154** | **4** | **2.37222** | **3.9** | **4.20435** | **3.5** |
| Percentage | **0.79481** | **0.66** | **0.42824** | **0.8** | **0.74615** | **0.94** | **0.80231** | **0.8** | **0.47444** | **0.78** | **0.840870** | **0.7** |
| Ranking # | **3** | **5** | **6** | **2** | **4** | **1** | **2** | **2** | **5** | **3** | **1** | **4** |
| *Total_SAPI* | 3.40569 | | | | | | | | | | | |
| *Total_Manual* | 3.9 | | | | | | | | | | | |
| *Total %_Section 1_SAPI* | 0.68114 | | | | | | | | | | | |
| *Total %_Section 1_Manual* | 0.78 | | | | | | | | | | | |

Negative Social-Relational Disposition is indicated in Table 53 below. Again, the sub-dimension rankings results differed from the online SAPI personality test compared to the manual-assessment results. The overall percentage from the manual test [28,5 %] increased when compared to the actual online SAPI personality test [60,7 %].

It is evident from Table 53, that during the manual assessment the industry individuals indicated that they did not want to work with, or be such an individual; although the online SAPI personality results suggested that these individuals are more inclined to approach relations with others more conservatively.

**Table 53: The difference between the online SAPI test results when compared to the manual assessment results of section 2 [Negative Social Relational Disposition]**

| | arrogance _sapi | arrogance _manual | confseek _sapi | confseek _manual | deceit _sapi | deceit _manual | hosego _sapi | hosego _manual |
|---|---|---|---|---|---|---|---|---|
| | 2.5000 | 2 | 2.2353 | 4 | 3.6154 | 1 | 4.1538 | 3 |
| | 2.5000 | 1 | 2.2647 | 1 | 3.8462 | 1 | 4.0000 | 2 |
| | 1.5000 | 1 | 2.2059 | 1 | 3.3846 | 1 | 4.1154 | 2 |
| | 2.6667 | 1 | 2.3824 | 1 | 4.4615 | 1 | 4.5385 | 1 |
| | 2.0000 | 1 | 2.2059 | 1 | 3.6923 | 1 | 3.8077 | 1 |
| | 2.1667 | 1 | 1.8235 | 1 | 3.3077 | 1 | 3.5385 | 1 |
| | 2.3333 | 1 | 1.8824 | 2 | 4.6154 | 1 | 4.6923 | 1 |
| | 2.1667 | 1 | 2.0294 | 1 | 2.8462 | 1 | 3.3846 | 1 |
| | 2.6667 | 4 | 2.4118 | 3 | 3.1538 | 3 | 3.5769 | 2 |
| | 2.1667 | 1 | 1.9706 | 1 | 4.3846 | 1 | 4.3077 | 1 |
| AVE | **2.26668** | **1.4** | **2.14119** | **1.6** | **3.73077** | **1.2** | **4.01154** | **1.5** |
| Percentage | **0.453336** | **0.28** | **0.428238** | **0.32** | **0.746154** | **0.24** | **0.802308** | **0.30** |
| Ranking # | **3** | **4** | **4** | **1** | **2** | **3** | **1** | **2** |
| *Total_SAPI* | 3.037545 | | | | | | | |
| *Total_Manual* | 1.425 | | | | | | | |
| *Total %_Section 1_SAPI* | 0.607509 | | | | | | | |
| *Total %_Section 1_Manual* | 0.285 | | | | | | | |

Neuroticism is indicated in Table 54 below. The sub-dimension ranking results differed from the online SAPI personality test, when compared to the manual-assessment results. The overall percentage from the manual test [59 %] increased slightly from the actual online SAPI test [65,35 %]. During the manual assessment, the industry individuals indicated that they do not want to work with, or be an individual who is emotionally negative. Thus, feelings of anger or nervousness, being worried and being afraid of various things must not be part of a construction manager's personality profile.

The online SAPI results suggest that these individuals are again more inclined to have the tendency towards impulsive behaviour, to fluctuate between emotions and to be composed in difficult situations. Emotional Balance [showing respect, knowledge and acceptance of oneself and one's emotions and being composed in difficult situations] decreased from the manual-assessment results [90 %] to the online SAPI personality test results [78,5 %].

**Table 54: The difference between the online SAPI test results when compared to the manual assessment results of section 3 [Neuroticism]**

| | emobal _sapi | emobal _manual | negem _sapi | negem _manual |
|---|---|---|---|---|
| | 4.3750 | 4 | 2.2000 | 1 |
| | 4.0000 | 4 | 2.4000 | 3 |
| | 3.8750 | 5 | 3.7000 | 1 |
| | 4.2500 | 4 | 2.3000 | 1 |
| | 3.6250 | 5 | 3.1000 | 1 |
| | 4.1250 | 5 | 2.0000 | 1 |
| | 4.0000 | 5 | 2.8000 | 1 |
| | 3.8750 | 5 | 2.2000 | 2 |
| | 3.1250 | 4 | 3.1000 | 2 |
| | 4.0000 | 4 | 2.3000 | 1 |
| AVE | 3.9250 | **4.5** | 2.6100 | **1.4** |
| Percentage | 0.7850 | **0.90** | 0.5220 | **0.28** |
| Ranking # | | | | |
| | | | | |
| *Total_SAPI* | 3.2675 | | | |
| *Total_Manual* | 2.95 | | | |
| *Total %_Section 1_SAPI* | 0.6535 | | | |
| *Total %_Section 1_Manual* | 0.59 | | | |

Negative Emotionality [feeling angry or nervous, worried and being afraid of various things] increased significantly from the manual assessment [28 %] to the online SAPI personality test results [52,2 %].

The main dimension in section 4 is Extraversion. This is the tendency to being sociable and talkative, interactive, interacting with people in a spontaneous manner by having fun and telling stories that make people laugh. The results indicated that the online SAPI personality test and the manual assessment were almost identical, with insignificant small variations, as illustrated in Table 55.

The sub-dimension rankings results were found to be similar to the online SAPI personality test compared to the manual-assessment results. The overall percentage from the manual

assessment [72 %] increased slightly to the actual online SAPI personality test [74,49 %]. During the manual assessment, the industry individuals indicated they do feel that playfulness and sociability are needed; as it is important to build relationships during teamwork. Playfulness [being lively, enjoying having fun, making others laugh, and having the tendency to see the positive side of life] increased slightly from the manual assessment [70 %] to the online SAPI personality test [73 %].

**Table 55: The difference between the online SAPI test results when compared to the manual assessment results of section 4 [Extraversion]**

| | play _sapi | play _manual | sociability _sapi | sociability _manual |
|---|---|---|---|---|
| | 3.3333 | 4 | 3.8571 | 4 |
| | 3.8333 | 4 | 3.8571 | 5 |
| | 3.8333 | 3 | 3.0000 | 3 |
| | 4.6667 | 4 | 4.2857 | 4 |
| | 3.5000 | 3 | 3.8571 | 4 |
| | 3.0000 | 2 | 3.5714 | 3 |
| | 4.5000 | 4 | 4.7143 | 3 |
| | 2.5000 | 4 | 3.1429 | 3 |
| | 3.1667 | 4 | 3.1429 | 3 |
| | 4.1667 | 3 | 4.5714 | 5 |
| AVE | **3.65000** | **3.5** | **3.79999** | **3.7** |
| Percentage | **0.730000** | **0.70** | **0.759998** | **0.74** |
| Ranking # | **2** | **2** | **1** | **1** |
| | | | | |
| *Total_SAPI* | 3.724995 | | | |
| *Total_Manual* | 3.6 | | | |
| *Total %_Section 1_SAPI* | 0.744999 | | | |
| *Total %_Section 1_Manual* | 0.72 | | | |

It is clear from Table 55 that sociability [being easy-going and talkative and enjoy having people around oneself] also increased a little from the manual assessment [74 %] to the online SAPI personality test [75,99 %]. Furthermore, it seems that sociability is slightly more important than playfulness in both the online SAPI personality test, as well as the manual assessment.

Section 5 consists of the main dimension, conscientiousness, as illustrated in Table 56. The sub-dimensions under this section is achievement-orientation [being motivated, persevering, ambitious and hard-working, in order to achieve things in life], orderliness [being organised, neat, punctual, precise and thorough in everything one does] and traditionalism-religiosity [being traditional by respecting one's own culture and being religious]. The results indicated that the manual assessment decreased from 95 % to 84,93 % in the online SAPI personality test results.

**Table 56: The difference between the online SAPI test results compared to the manual assessment results of section 5 [Conscientiousness]**

| | achievement _sapi | achievement _manual | orderliness _sapi | orderliness _manual | tradrel _sapi | tradrel _manual |
|---|---|---|---|---|---|---|
| | 5.0000 | 4 | 4.6154 | 4 | 4.2500 | 4 |
| | 4.3636 | 5 | 3.9231 | 4 | 3.5000 | 4 |
| | 4.7273 | 5 | 3.8462 | 5 | 3.2500 | 4 |
| | 4.8182 | 5 | 4.2308 | 5 | 4.2500 | 4 |
| | 3.9091 | 5 | 4.0769 | 5 | 3.7500 | 4 |
| | 4.1818 | 5 | 3.8562 | 5 | 2.5000 | 4 |
| | 4.8182 | 5 | 4.3846 | 4 | 3.0000 | 2 |
| | 4.0000 | 5 | 3.6923 | 4 | 3.5000 | 3 |
| | 4.0909 | 5 | 3.7692 | 5 | 3.7500 | 2 |
| | 4.0909 | 5 | 4.5385 | 5 | 3.2500 | 4 |
| AVE | 4.4000 | **4.9** | 4.0933 | **4.6** | 3.5000 | **3.5** |
| Percentage | **0.880000** | **0.98** | **0.818664** | **0.92** | **0.700000** | **0.70** |
| Ranking # | **1** | **1** | **2** | **2** | **3** | **3** |
| | | | | | | |
| *Total_SAPI* | 4.24666 | | | | | |
| *Total_Manual* | 4.75 | | | | | |
| *Total %_Section 1_SAPI* | 0.849332 | | | | | |
| *Total %_Section 1_Manual* | 0.95 | | | | | |

Table 56 reflects the ranking for both the online SAPI test results and the manual assessment. These remained the same. Achievement orientation is in the first position [achievement_sappi 88 %; achievement_manual 98 %], followed by orderliness [orderliness_sapi 81,86 %; orderliness_manual 92 %] and traditionalism-religiosity [tradrel._sappi 70 %; tradrel._manual 70 %] in the third position. Both achievement-orientation and orderliness indicated a significant decline from the manual assessment to the online SAPI personality test. Traditionalism-Religiosity was lower than the other two sub-

dimensions, as some of the industry individuals believed that being religious is less importance in the context of construction work.

Section 6 consists of the main dimension, Intellect/Openness, as illustrated in Table 57 below. The sub-dimensions under this section are broad-mindedness [being imaginative and seeking new experiences and ideas], epistemic curiosity [being inquisitive, investigative and eager to acquire new information] and intellect [being knowledgeable, a quick learner, adaptable, articulate, innovative and perceptive]. The results indicated that the manual assessment slightly decreased [87 %] when compared to the online SAPI personality test results [83,83 %].

**Table 57: The difference between the online SAPI test results when compared to the manual assessment results of section 6 [Intellect/Openness]**

| | broadmind_sapi | broadmind_manual | episcur_sapi | episcur_manual | intellect_sapi | intellect_manual |
|---|---|---|---|---|---|---|
| | 5.0000 | 4 | 5.0000 | 4 | 4.5455 | 4 |
| | 4.3333 | 4 | 4.1667 | 4 | 4.3636 | 5 |
| | 4.6667 | 5 | 4.5000 | 5 | 4.8182 | 5 |
| | 4.1667 | 2 | 3.8333 | 3 | 4.8182 | 5 |
| | 4.0000 | 5 | 4.0000 | 5 | 3.7273 | 5 |
| | 4.5000 | 4 | 4.0000 | 5 | 4.0000 | 4 |
| | 4.5000 | 4 | 4.3333 | 5 | 4.3636 | 5 |
| | 2.8333 | 5 | 3.5000 | 5 | 3.2727 | 4 |
| | 4.1667 | 4 | 4.1667 | 4 | 3.8182 | 4 |
| | 4.1667 | 5 | 4.0000 | 5 | 4.4545 | 5 |
| AVE | 4.2333 | **4.2** | 4.1500 | **4.5** | 4.2182 | **4.6** |
| Percentage | **0.846668** | **0.84** | **0.830000** | **0.90** | **0.843636** | **0.92** |
| Ranking # | **1** | **3** | **3** | **2** | **2** | **1** |
| | | | | | | |
| *Total_SAPI* | 4.19167 | | | | | |
| *Total_Manual* | 4.35 | | | | | |
| *Total %_Section 1_SAPI* | 0.838334 | | | | | |
| *Total %_Section 1_Manual* | 0.87 | | | | | |

The intellect-manual assessment indicated intellect at 92 %; whereas the intellect-sapi test results presented a significant lower percentage, at 84,36 %. Episcur_manual also decreased from 90 % to an 83 % in the episcur-sapi test results. Both

broadmindedness_manual [84 %] and broadmindedness_sapi [84,66 %] indicated an almost indifference in their final results. The sub-dimensions SAPI personality test results further indicated that all three items are almost equal in importance with very little variance between each of them.

From Table 57 above, it can be concluded that the industry online SAPI test results suggest that it is important that the individual possess the quality of being well-informed and observant of external and internal things, being a rational and progressive thinker, and acquiring new experiences, knowledge, skills and ideas.

Section 7 is the last of the main dimensions, Social Desirability. Negative impression management is the tendency to give a negative self-description/self-impression; and positive impression management is just the opposite of the latter. The results indicated that the online SAPI personality test and the manual assessment were almost identical with insignificant variations, as illustrated in Table 58.

**Table 58: The difference between the online SAPI test results when compared to the manual assessment results of section 7 [Social Desirability]**

| | sd_neg_sapi | sd_neg_manual | sd_pos_sapi | sd_pos_manual |
|---|---|---|---|---|
| | 2.300 | 2 | 3.625 | 4 |
| | 2.100 | 2 | 4.000 | 4 |
| | 2.200 | 2 | 3.875 | 4 |
| | 2.300 | 1 | 4.125 | 5 |
| | 3.100 | 1 | 3.750 | 4 |
| | 2.600 | 1 | 3.625 | 4 |
| | 2.200 | 1 | 4.125 | 5 |
| | 2.100 | 3 | 3.625 | 4 |
| | 3.100 | 2 | 3.875 | 3 |
| | 2.600 | 1 | 4.250 | 5 |
| AVE | **2.4600** | **1.6** | **3.8875** | **4.2** |
| Percentage | **0.4920** | **0.32** | **0.7775** | **0.84** |
| Ranking # | | | | |
| | | | | |
| *Total_SAPI* | 3.17375 | | | |
| *Total_Manual* | 2.9 | | | |
| *Total %_Section 1_SAPI* | 0.63475 | | | |
| *Total %_Section 1_Manual* | 0.58 | | | |

The overall percentage from the manual assessment [58 %] increased slightly in the actual online SAPI personality test [63,47 %]. During the manual assessment, the industry individuals indicated that they do feel that there is no place for negative impression management in the construction industry.

An interesting observation in the results from Table 58 was that the manual assessment results of negative-impression management were lower than the online SAPI personality test results [sd_neg_sapi 49,2 %; sd_neg_manual 32 %]. The positive impression management that was quite important for the industry individuals indicated a lower importance in the actual online SAPI personality test [sd_pos_sapi 77,75 %; sd_pos_manual 84 %].

Furthermore, it was fascinating was that the 16 construction-management 3rd year construction management students and the 10 industry construction managers' online SAPI personality results were found to be remarkably similar, as presented in Figure 36 below.

There was only one main dimension that suggested a deviation between the industry and the student group. Section 7 [Social Desirability] that forms part of the sub-dimensions, negative impression management and positive impression management. The industry group results were found to be higher [73,88 %] compared to the students' group [64,51 %].

Section 3 [Neuroticism] suggested a slight deviation between both groups, with the industry group results marginally lower [47,44 %] than the students' group [49,58 %]. This result might suggest that if a larger research sample size were used, the deviation variation might increase further.

Both section 1 [Positive Social-Relational Disposition] and section 5 [Conscientiousness] presented almost identical results between the industry group and the students' group, with a negligible deviation between the two groups [socrelp_industry 79,48 %; socrelp_student 79,09 % and con_industry 80,23 %; cons_student 80,67 %].

This can suggest that the industry group and the 3rd year construction-management students involved in the study have a similar personality profile, which indicates that the students, who enrolled for the construction management degree, fitted the industry personality profile. Although, one should mention that the sample size for both the industry and the student group were sufficient according to Stoker (1981), but there were 3rd year construction management students that did not want to participate in the research study. These 3rd year construction management students do not form part of the research results.

The SAPI seven main dimensions from the online SAPI personality industry test deviated slightly from the manual assessment. As illustrated in Table 59 below, section 6 [Intellect/Openness] in both cases stayed in the first position. The quality of being well-informed and observant of external and internal things, being rational and a progressive

thinker and acquiring new experiences, knowledge, skills and ideas is of the utmost importance for a construction manager.

Section 5 [Conscientiousness] stayed in second place; orientation towards achievement, order and traditionalism and section 1 [Positive Social-Relational Disposition] remained in third place; positively managing relations with others.

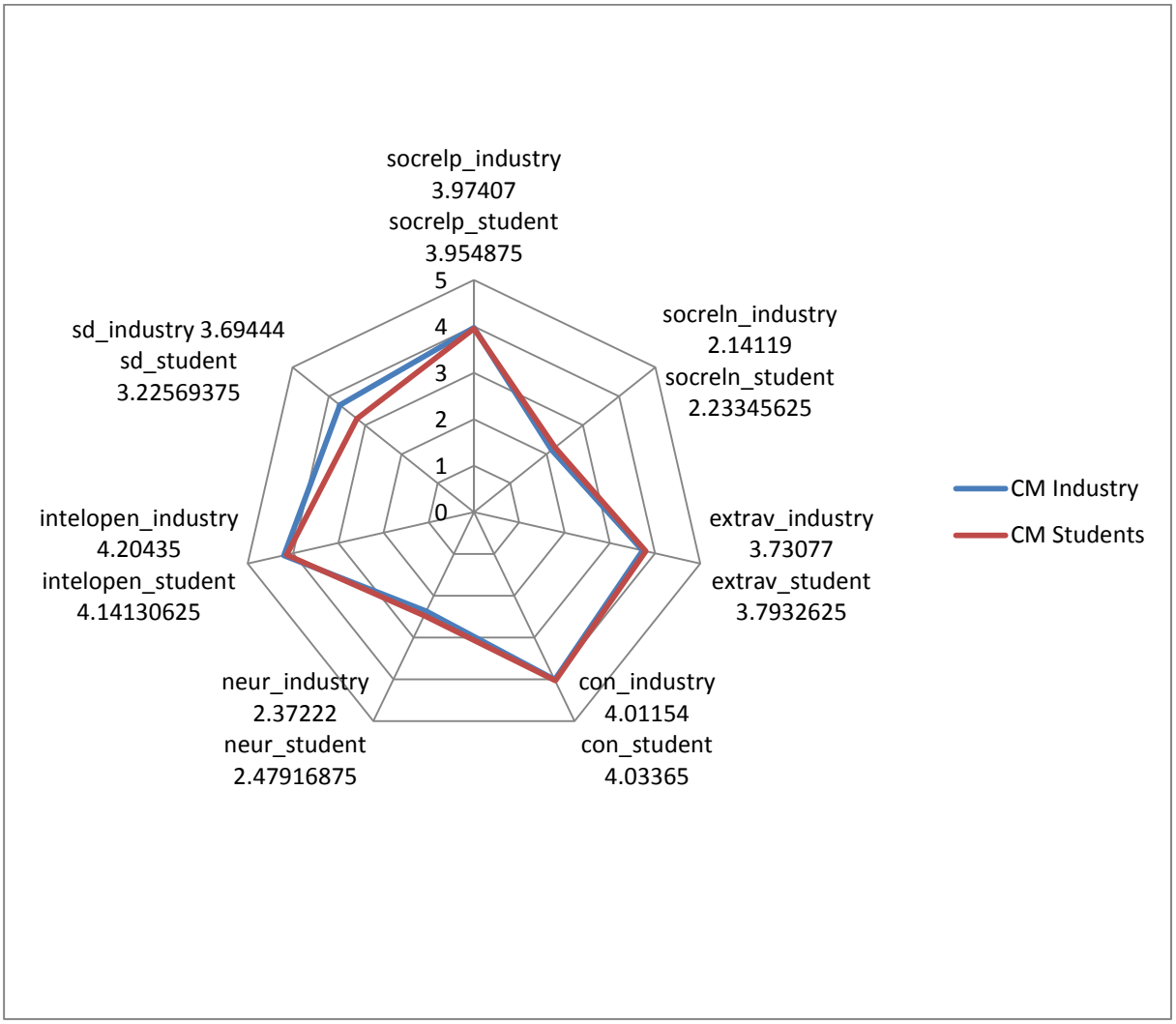


**Figure 36: The similarity between the construction management students and the industry construction managers' online SAPI personality results**

Section 4 [Extraversion] is in fourth position; the tendency towards being sociable and talkative, interactive, interacting with other people in a spontaneous manner by having fun and telling stories that make people laugh. Both groups also agreed that section 2 [Negative Social-Relational Disposition; approaching relations with others more controversially] is the least important of the seven main dimensions.

Section 7 [Social Desirability] changed from the manual assessment that was in sixth position to the fifth position in the online SAPI personality test. The results also indicated that

section 3 [Neuroticism; the tendency of a person to be impulsive and to fluctuate between emotions and by being composed in difficult situations] dropped down from the manual fifth position to the sixth position in the online SAPI personality test.

The seven main dimensions from the industry online SAPI personality test results are ranked, according to their scores from one to seven at the left-hand side of Table 59. Just to the right of the seven main dimensions, their specific sub-dimensions are indicated. Each of their items' scores out of five and the percentages from the SAPI online personality test and the manual assessment are presented.

Each sub-dimension item was ranked individually, according to their scores out of five, for both the online SAPI personality test results and the manual assessment, as indicated in Table 59 [right-hand side].

The manual assessment indicated that there were more sub-dimension items that overlapped with the same ranking position and less with the online SAPI personality test. What was further interesting was the fact that the industry group emphasised the importance of integrity; and that it is pivotal to form part of the fabric of a construction manager. One of the interviewees mentioned the fact that everybody interviewed would state this; but it is not how everybody operates in the industry. This statement is verified by the online SAPI personality-test results. The manual assessment results indicated that integrity is rated as second most important; although the online SAPI personality test results indicated integrity and deceitfulness in the twelfth position.

In both groups, the results indicated that achievement orientation is the most important sub-dimensional item. This result makes sense; as the construction manager had to chase milestones and deadlines to avoid heavy penalties. Furthermore, this can also point to why integrity and deceitfulness changed between the online SAPI personality test and the manual assessment. The latter can also suggest why the online SAPI personality test results ranked sub-dimensional items, such as, broad-mindedness [2], intellect [3], warm-heartedness [4], epistemic curiosity [5] and orderliness, [6] as being very important.

The construction manager must have the ability to work in teams and think outside the box. Continuously searching for better construction methods and the technology that is available is critical for survival and success: to be able to see the bigger picture, and still focus on specific details. He/she must have the intellectual capacity to manage all aspects of the construction process effectively; and be organised, neat, punctual, precise and thorough in everything they do during the project.

Empathy [8] and emotional balance [9] were positioned approximately in the middle of the online SAPI personality test results, with social intelligence [16] positioned lower. This can

suggest that valuing and showing compassion towards others by showing sensitivity towards their needs and emotions, as well as, showing respect, knowledge and acceptance of oneself and one's emotions, and being composed in difficult situations are more important than social intelligence. The ability to relate to others by the understanding of them and their needs is of less importance than empathy and emotional balance.

**Table 59: The difference between the online SAPI test results when compared to the manual assessment results and their respective rankings**

SAPI Seven Main Dimensions

| | sapi _online | sapi _rank # | industry _manual | manual _rank # |
|---|---|---|---|---|
| Positive Social-Relational Disposition | 0.79481 | 3 | 0.780 | 3 |
| Negative Social-Relational Disposition | 0.42823 | 7 | 0.285 | 7 |
| Neuroticism | 0.47444 | 6 | 0.630 | 5 |
| Extraversion | 0.74615 | 4 | 0.720 | 4 |
| Conscientiousness | 0.8023 | 2 | 0.850 | 2 |
| Intellect / Openness | 0.84087 | 1 | 0.886 | 1 |
| Social Desirability | 0.73888 | 5 | 0.580 | 6 |

| Main Dimensions | Sub-dimensions | SAPI Score | SAPI % | Manual Score | Manual % | SAPI Sub-Dimensions # | Sub-dimensions SAPI Revised # | Sub-dimensions manual Revised # |
|---|---|---|---|---|---|---|---|---|
| # 1. Intellect / Openness | *Broad-Mindedness* | 4.23334 | 0.846668 | 4.2 | 0.84 | 2 | *Achievement Orientation (1)* | *Achievement Orientation (1)* |
| | *Epistemic Curiosity* | 4.15000 | 0.830000 | 4.5 | 0.90 | 5 | *Broad-Mindedness (2)* | *Integrity (2)* |
| | *Intellect* | 4.21818 | 0.843636 | 4.6 | 0.92 | 3 | *Intellect (3)* | *Orderliness (3)* |
| | | | | | | | *Warm-Heartedness (4)* | *Intellect (3)* |
| # 2. Conscientiousness | *Achievement Orientation* | 4.40000 | 0.880000 | 4.9 | 0.98 | 1 | *Epistemic Curiosity (5)* | *Emotional Balance (4)* |
| | *Orderliness* | 4.09332 | 0.818664 | 4.6 | 0.92 | 6 | *Orderliness (6)* | *Epistemic Curiosity (4)* |
| | *Traditionalism-Religiosity* | 3.50000 | 0.700000 | 3.3 | 0.66 | 14 | *Interpersonal Relateness (7)* | *Broad-Mindedness (5)* |
| | | | | | | | *Hostillity-Egoism (7)* | *Positive Impresssion Management (5)* |
| # 3. Positive Social-Relational Disposition | *Empathy* | 3.97407 | 0.794814 | 3.3 | 0.66 | 8 | *Empathy (8)* | *Facilitating (6)* |
| | *Facilitating* | 2.14119 | 0.428238 | 4.0 | 0.80 | 18 | *Emotional Balance (9)* | *Interpersonal Relateness (6)* |
| | *Integrity* | 3.73077 | 0.746154 | 4.7 | 0.94 | 12 | *Positive Impresssion Management (10)* | *Social Intelligence (7)* |
| | *Interpersonal Relateness* | 4.01154 | 0.802308 | 4.0 | 0.80 | 7 | *Sociability (11)* | *Sociability (8)* |
| | *Social Intelligence* | 2.37222 | 0.474444 | 3.9 | 0.78 | 16 | *Integrity (12)* | *Warm-Heartedness (9)* |
| | *Warm-Heartedness* | 4.20435 | 0.840870 | 3.5 | 0.70 | 4 | *Deceitfulness (12)* | *Playfulness (9)* |
| | | | | | | | *Playfulness (13)* | *Empathy (10)* |
| # 4. Extraversion | *Playfulness* | 3.65000 | 0.730000 | 3.5 | 0.70 | 13 | *Traditionalism-Religiosity (14)* | *Traditionalism-Religiosity (10)* |
| | *Sociability* | 3.79999 | 0.759998 | 3.7 | 0.74 | 11 | *Negative Emotionality (15)* | *Conflict-Seeking (11)* |
| | | | | | | | *Social Intelligence (16)* | *Negative Impression Management (11)* |
| # 5. Social Desirability | *Negative Impression* | 2.46000 | 0.492000 | 1.6 | 0.32 | 16 | *Negative Impression Management (16)* | *Hostillity-Egoism (12)* |
| | *Positive Impresssion* | 3.88750 | 0.777500 | 4.2 | 0.84 | 10 | *Arrogance (17)* | *Arrogance (13)* |
| | | | | | | | *Facilitating (18)* | *Negative Emotionality (13)* |
| # 6. Neuroticism | *Emotional Balance* | 3.92500 | 0.785000 | 4.5 | 0.90 | 9 | *Conflict-Seeking (18)* | *Deceitfulness (14)* |
| | *Negative Emotionality* | 2.61000 | 0.522000 | 1.4 | 0.28 | 15 | | |
| # 7. Negative Social-Relational | *Arrogance* | 2.26668 | 0.453336 | 1.4 | 0.28 | 17 | | |
| | *Conflict-Seeking* | 2.14119 | 0.428238 | 1.6 | 0.32 | 18 | | |
| | *Deceitfulness* | 3.73077 | 0.746154 | 1.2 | 0.24 | 12 | | |
| | *Hostillity-Egoism* | 4.01154 | 0.802308 | 1.5 | 0.30 | 7 | | |

It was uncharacteristic to see that the sub-dimension item, facilitating, fell from the manual assessment's sixth position to the online SAPI personality test results jointly occupied eighteenth position. It is very important for a construction manager to give guidance, uplifting and motivating people involved on the project, through their lives by giving them advice, instructions and encouragement. As mentioned in the literature section, construction managers that work in the construction industry must work in harsh environmental conditions, under tremendous pressure, and still have the power to persuade people to complete their work and keep them motivated.

For this reason, the research suggests that this could be a possible shortcoming within the industry individuals that participated in the research study.

Lastly, there were the sub-dimension items that were more trivial; and these were expected to rank low on the list. Sub-dimension items, such as negative impression management [16], arrogance [17] and conflict-seeking [18] should not surface strongly in a construction manager's fabric. The construction manager would not have the support of the people involved in the project and not be able to positively lead the workforce if these sub-dimension items surface strongly. There might be instances when the construction manager needs to be superior enough to not be pushed around during the project, thus also not being afraid of constructive conflict.

The construction manager definitely should not have a negative impression management; as this would lean towards a low self-esteem, which would influence the outcome of the project in a negative way.

## 6.3. Conclusion

### 6.3.1. Online SAPI personality test results compared between the industry construction managers and the 3rd year construction management students

The online SAPI personality results suggested a remarkably similar profile between the industry group and the students' group. Profile mapping between the groups indicated a variance in section 7 [Social Desirability; negative-impression management and positive impression management]. The industry group rated lower in the negative-impression management and higher in the positive-impression management [industry_sd_neg 42,2 %; students_sd_neg 64,75 %; industry_sd_pos 84 %; students_sd_pos 76,09 %].

There was furthermore, a slight deviation in section 3 [Neuroticism], where the student group indicated a higher percentage than the industry group.

The industry online SAPI personality test main dimension results indicate that these individuals scored the highest in Intellect/Openness [84,08 %], followed by

Conscientiousness [80,23 %]. Positive Social-Relational Disposition was in third position [79,48 %], together with Extraversion [74,61 %] and Social Desirability [73,88 %]. The two main dimensions that scored the lowest were Neuroticism [47,44 %] and Negative Social-Relational Disposition [42,82 %].

The student online SAPI personality test main dimension results indicate that these individuals scored the highest in Intellect/Openness [82,82 %], followed by Conscientiousness [80,67 %]. Positive Social-Relational Disposition was in third position [79,09 %], with Extraversion [75,86 %] and Social Desirability [64,51 %]. The two main dimensions that scored the lowest were Neuroticism [49,58 %] and Negative Social-Relational Disposition [44,66 %].

### 6.3.2. Industry online SAPI personality test results compared with the manual assessment results

The main dimension items' results indicated a slight difference between the industry online SAPI personality test and the manual-assessment results. Section 6 [Intellect/Openness] in both cases stayed in the first position. Section 5 [Conscientiousness] stayed in second place and section 1 [Positive Social-Relational Disposition] was in third place. Section 4 [Extraversion] was in fourth position; and both groups agreed that section 2 [Negative Social-Relational Disposition] is the least important of the seven main dimensions. Section 7 [Social Desirability] changed from the manual assessment that was in sixth position to the fifth position in the online SAPI personality test.

The results also showed that section 3 [Neuroticism] dropped down from the manual fifth position to the sixth position in the online SAPI personality test.

The manual assessment indicated that there were more sub-dimension items that overlapped with the same ranking position and less with the online SAPI personality test. The manual-assessment results indicated that integrity is rated as the second-most important, although the online SAPI personality test results indicated integrity and deceitfulness in the twelfth positions.

In both groups, the results indicated that achievement orientation is the most important sub-dimension item. Empathy [8] and emotional balance [9] were positioned approximately in the middle of the online SAPI personality test results list, with social intelligence [16] positioned lower. It was peculiar to see that the sub-dimension item, facilitating, fell from the manual assessment sixth position to the online SAPI personality test results, jointly in the eighteenth position. For this reason, the research can suggest that this could be a possible shortcoming within the industry individuals that participated in the research study.

Lastly, there were sub-dimension items that were more trivial; and they were expected to rank low on the list. Sub-dimension items, such as negative-impression management [16], arrogance [17] and conflict-seeking [18] should not surface strongly in a construction manager's behaviour.

Although further research and testing should be conducted, the results suggested that the 3rd year construction-management students have a similar profile to the industry-construction managers. The industry construction managers also perceived certain items in the manual assessment as being more important, than that revealed in the online SAPI personality test.

Chapter Seven presents the summary and conclusions of this research study. The aim of the thesis is to suggest the soft skills needed in the competency domain for a construction manager and the suggested profile for a construction manager in South Africa. The latter is further linked with the current needs of the industry and the profession itself.

# PART C

## CHAPTER 7

## Conclusions and Suggestions

### 7.1. Introduction

This chapter presents the summary and conclusions of this research study. The aim of the thesis is to suggest a profile for the construction manager in South Africa, and to link this with the current needs of the industry and the profession itself.

The thesis consists of seven sections, namely: the research proposal (Chapter 1); the literature study (Chapter 2); the literature on personality profiles (Chapter 3); the research design and methodology (Chapter 4); the empirical research findings (Chapter 5); the online SAPI personality test results (Chapter 6); and finally, the conclusions and suggestions in this chapter.

The premise upon which this research study is based is that a construction manager requires a specific profile, with a specific educational background, knowledge and experience that is needed to ensure the success of a project. During the selection process, the personality traits associated with the profile of a successful construction manager would assist in selecting a purpose-fit candidate. This would not only assist in successful projects; but it could also increase the probability that the construction manager would be satisfied on a construction site for a longer sustainable period.

The research questions of this study can be divided as follows:

1. What is a possible profile of a construction manager, according to the South African Personality Inventory (SAPI) test?
2. What management skills does the industry require from a construction manager?
3. What soft skills in the competency domain does industry require from a construction manager?
4. Build a model to indicate the soft skills in the competency domain of a construction manager.
5. Does the South African Personality Inventory (SAPI) test select a construction manager who meets the profile requirements of the industry?

## 7.2. Study overview

The demand for infrastructure and building programs in a changing society is becoming more apparent. With the current widening gap in experienced skills, projects will become even more complex; and eventually too demanding to maintain the successful management by construction site management professionals. The only way to ensure that the construction industry will keep up with what society is demanding, is to ensure that the industry selects the best students; and is able to retain them when they reach a higher level of competence.

The construction industry loses construction managers after a few years, creating a gap that cannot be filled overnight. Students that apply for studies in this industry and do not have the correct personality trait to work in construction site environments under stressful conditions will continually increase the gap. Sometimes highly skilled construction managers can be easily lured from the demands of construction site management to other industries – for higher salaries with better working conditions and a better work-life balance.

With the 'baby boomers' slowly exiting the construction industry, taking with them their critical skills and leaving no replacements, a gap will be created that will be problematic to fill; thus purpose-fit candidates may have to be headhunted from as early as school level. They can then be presented with bursaries and a guarantee of work after their studies are completed – to assist in creating a pool of purpose-fit candidates that are more likely to stay and grow in the industry.

### 7.2.1 The complex soft skills in the competency domain interaction model

It is for this reason important to establish the core essential soft skills that a construction manager would need to cultivate, in order to be able to manage future construction projects. In previous studies, researchers supplied summaries of the various qualities that indicated the specific soft skills and competencies (as illustrated in Table 1) that a construction manager graduate needs to possess.

The construction industry needs strong effective manager-leaders (Table 20), otherwise the industry would fail to survive. This individual must on a continuous basis seek creative and alternative construction methods and technology to apply on complex projects. He must determine the best options for effective communication on various projects. The construction manager must be able to articulate difficult ideas and concepts through all the levels on the construction site: from educated professionals to people without any educational backgrounds at all.

In South Africa, the construction manager must not only be able to convey information effectively through barriers like, gender, age, personalities, perceptions and a difficult work environment, but also in different cultures and languages.

The construction manager must be able to negotiate with suppliers, professional teams, clients and the labour force. He/she must continuously negotiate for much-needed resources and be able to be persuasive at the critically right time to tilt the balance in his/her favour. It is important that the construction manager does not respond immediately to counter-claims; and learns to take time to reflect back and learn from previous experiences.

Conflict is unavoidable on a construction site; and a construction manager will deal with it on a daily basis. It is necessary for him/her to be able to identify possible dysfunctional conflicts; and to resolve them before they escalate.

As an effective manager-leader, the construction manager can use or stimulate constructive conflict between teams and team members, in order to assist with creativeness.

The construction manager must have the ability to execute divergent and convergent thinking. Problems that arise on construction sites almost always have more than one possible solution; but the results of the outcomes could vary vastly in terms of the consequences. He/she must have the ability to motivate oneself and see these obstacles as a positive challenge. In most situations, the construction manager must be able to solve problems, while thinking on his/her feet. With ill-structured problems, where the path is unclear, he/she must have the skill to, within a reasonable timeframe, find an effective solution.

A more experienced construction manager would find it easier to solve problems than their younger counterparts, because of their large knowledge base of previously completed projects.

Each decision that the construction manager makes will have an influence on the outcomes of the project. The construction manager should not spend time on routine or repetitive decisions. Other individuals in the team can be trained to take these types of decisions on the construction site. He/she must focus more on serious problems or typical problems that have not previously occurred. There are different decision-making tools available; and the construction manager must have the ability to know when and how to select them.

South African construction sites are labour-intensive; and the construction managers are confronted with human issues on a regular basis. He/she must ensure that everybody involved on the project must have an aligned-commitment towards the outcomes of the project. He/she must uplift and keep everybody enthusiastic throughout the duration of the project; and ensure that specific goals are explained and agreed upon; constantly making

sure that all the relevant people have received the latest information, such as revised plans, specifications, schedule changes, scope changes and changes in the conditions of the contract.

The construction manager must be flexible as a leader; and his/her positive attitude must be supported from top management down to every single worker and sub-contractor on the construction site.

Melvin (1979) has summarised a construction manager; as someone who needs specific skills different from those seen in other professions. The construction manager must be a businessman, builder, lawyer, financier, army general, gambler; and an educator (Melvin, 1979). Within this context, the literature review focused on which of these soft skills in the competency domain overlap between the various different researches already completed. An in-depth literature research study was then conducted on each one of these identified soft skills in the competency domain that continuously overlap.

As a construction project involves many incongruent views; it was realised that Bono's 'six thinking hats' can also be used at this stage to support these soft skills; and to see whether they can fortify the idea of an increase in productivity, thus linking these soft skills in the competency domain with an increase in productivity (Sheth, 2012).

The construction manager must have the ability to apply these soft skills – using these soft skills to manoeuvre between the six thinking hats. The construction manager must have the ability to use these interchangeable soft skills in combination or separately; and to float between the six thinking hats to make sound decisions. This ability would increase his/her effectiveness on a construction site. These interchangeable soft skills and six thinking hats can be used by the construction manager to transform into any single one, or a combination of Melvin's professions. The construction manager's previous experience would also influence the level on which he/she can use Melvin's different professions effectively. The practical case studies were used to indicate the possibility of adding another two professions to Melvin's already long list of professions. Four practical case studies were used to test and see where these interchangeable soft skills can be applied by the construction manager.

As these case studies are practical examples, only some of the difficult issues were used to illustrate the possible workings of the model; and not all the aspects were needed to complete these projects. The complex soft skills in the competency domain's interaction model were derived from the literature review and tested against the case study examples, to indicate if it was a suitable model, as illustrated in Figure 36. The aim of the case studies was to practically illustrate that Melvin's professions were the results of the thirteen typical soft

skills in the competency domain, interpreted by means of Bono's six thinking hats; and consequently, they are relevant.

The practical case studies indicated the possibility of adding two more professions to Melvin's already long list of professions. It is becoming very important for construction entrepreneurs to understand the impact of the construction processes on the environment. Whether the construction enterprise outsources this function for complex projects or absorbs it in-house for less complex projects, the construction manager must ultimately execute and manage around all the environmental issues specific to his/her site. This impacts from the costing perspective, managing the Environmental Management Plan during construction to carrying the risk of possible penalties that could be incurred.

The second profession that was missing on Melvin's original list was Occupational Health and Safety (OHS). In 1979, the OHS did not play such an important role in South Africa; whereas today, the OHS Act is enforced on construction sites. It is expected of the construction manager to ensure a safe working environment for anyone that enters the construction site premises; and he/she can be held accountable for any injuries incurred through negligence. The necessary OHS required equipment for a construction site would definitely have an influence in terms of initial cost that the construction-management team would incur.

The complex soft skills in the competency domain interaction model further concluded that even though a construction manager inherits all these softs skills [and has the ability to interchangeably apply them through different levels of experience] he/she will struggle to be successful if the construction company fails to provide a motivating climate within which to operate. From this point of view, one can then state that the construction manager can assist in creating a motivating climate in which to operate; but it is not possible to motivate his/her subordinates or team members directly. The construction manager can only create this motivating climate if he/she knows the forces within each individual participating on the project (project environment) and the specific individual self. This will determine the level of motivation for each member participating on the project. This will change from person to person; since no two individuals are identical. Some people would like to work over weekends and earn extra money; others would rather take additional leave to enjoy more family time. As Coetsee (2002) stated that if one of the factors in the formula is missing, then the results would be zero. Project aligned-commitment = knowledge x information x empowerment x rewards and recognition x shared vision (Coetsee, 2002).

Table 21 reinforced the idea that extrinsic and intrinsic rewards are very important; but without a motivating environment, the construction manager would not be motivated.

Figure 37 further indicates that the construction manager's personality profile should fit in with the company's culture. In large companies, the construction manager needs to operate differently than in smaller companies. Smaller companies could find that a construction manager that was sourced from a large company does not fit into their fold. The specific construction manager's previous experience would also influence whether a company will employ him/her for a project. Companies typically want to keep construction managers within their expert domain i.e. if the construction manager has 10 years of site experience in RDP housing they would possibly not select the individual to execute a mall or a skyscraper.
The size of the company, the scope of the project; and the personality of the individual will further impact on the performance.

### 7.2.2 The industry construction manager's sample composition

Most of the interviewees were involved in construction projects where structural complexity was most significant. Under structural complexity, they were all involved; where the size (number of elements) played a role; and where the independence of elements also contributed to the complexity. This can indicate that technical skills are very important for these young individuals.
The interviewees indicated that the sectors in which they were involved under these different complexities were mostly in the industrial and office/retail sector. Furthermore, 50 % also referred to larger residential sectors; and only 30 % were involved in civil engineering and roadworks. The latter was only through facilitating and co-ordinating between the actual civil works and the construction itself. Most of these industry construction managers are involved in typical warehouses, multi-storey office blocks, hotels, shopping malls, bushveld lodges, retirement villages, residential estates, affordable housing; and reconstruction and development programmes (RDPs).
A total of 60 % of the projects (under the project complexity and different sectors) were both managing specialist sub-contractors; and their technical abilities needed to successfully complete the project. Only 30 % of the interviewees were involved where the technical abilities weighted heavily; and only 10 % managing specialist sub-contractors. Table 20 further reinforced the idea that technical skills are important; but leadership skills are far more significant.

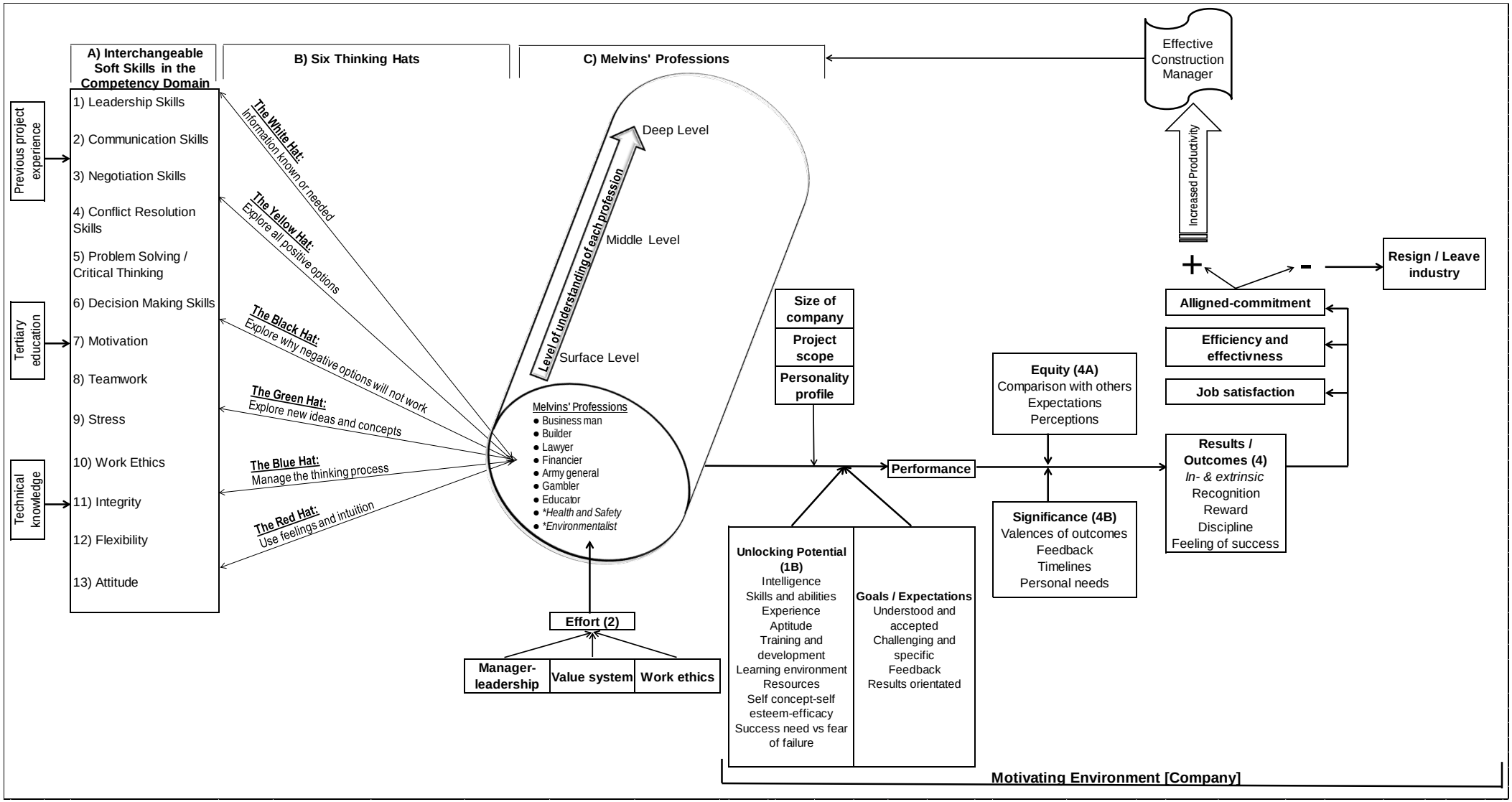


**Figure 37: The complex soft skills in the competency domain interaction model (Othman, 2014; Jarad, 2012; Strydom *et al.* 2015; Seth, 2012; Coetsee, 2002; Melvin, 1979)**

## 7.3. The South African Personality Inventory (SAPI)

Although further research and testing should be conducted for more precise and detailed results, the results of the conducted SAPI tests suggested that the 3rd year construction-management students have a similar profile to that of the industry-construction managers. The industry-construction managers also perceived certain items in the manual assessment as more important, than that which was revealed in the online SAPI personality test, such as integrity.

Profile mapping between the groups indicated a variance in section 7 [Social Desirability; negative impression management and positive impression management]. The industry group rated lower in the negative-impression management and higher in the positive-impression management. There was further a slight deviation in section 3 [Neuroticism] where the student group indicated a higher percentage than the industry group.

The industry/student online SAPI personality test's main dimension results indicated that these individuals scored the highest in Intellect/Openness, followed by Conscientiousness. Positive Social-Relational Disposition was in third position, with Extraversion and Social Desirability. The two main dimensions that scored the lowest were Neuroticism, and lastly, Negative Social Relational Disposition.

Section 2 [Negative Social-Relational Disposition] had the highest Cronbach Alpha value. This section was also indicated by the interviewees, as an item in personality that they would not like to see in a construction manager. It could then be suggested that there is a correlation with regard to the fact that they agreed with the negative aspects described in section 2. The results further indicated that section 2 [Negative Social-Relational Disposition] had the highest Cronbach Alpha value, where the SAPI indicated section 6 [Intellect/Openness]. Section 7 [Social Desirability] had the lowest Cronbach Alpha value, with section 2 [Negative Social-Relational Disposition] of the SAPI. It was noted that except for the first and the last ranked sections, the variations between Cronbach Alpha and the SAPI results were identical or very little.

### 7.3.1 The construction manager profile

The construction-management students must do practical work for a year before they start their studies. This will give them a better understanding of the work conditions, pressure and the work-life balance associated with the construction industry; as this is not tested in the online SAPI personality test. The difficulty of working in the construction industry can only be experienced during practical work. The difficulty when starting a family, managing stress and to leave work-related problems at work and prevent them from spilling over to your personal

life, can create further conflict. For female construction managers, there is the issue of cultures that do not accept female authority; and that makes it even more difficult to be successful. It is obvious that the construction manager has a special character, with a specific educational background, knowledge and the experience needed to ensure the success of a project. This person would also need a personality trait or traits that will assist him or her on the road to the successful completion of projects.

During the selection process, personality traits associated with the profile of a successful construction manager would assist in selecting a purpose-fit candidate. This could not only assist in successful projects, but also increase the probability that the construction manager would be satisfied on a construction site for a longer sustainable period.

Fewer construction managers leaving the industry (taking their experience and expertise to their new workplace) should slowly create an elite pool with the appropriate levels of critical skill sets.

This retained expertise would be vital to the survival and even the expansion of the South African construction industry. After the relevant literature study was scrutinised; and the SAPI results were received, a possible profile for a construction manager could be formulated, as follows:

### 7.3.2 SAPI and the thirteen soft skills in the competency domain

The main dimensions within SAPI that proved to be the most important sections were: (1) openness/intellect; (2) conscientiousness; and (3) positive social-relational disposition, as illustrated in Table 60. Table 60 is divided into three main columns: SAPI [Main Dimensions]; SAPI [Sub-Dimensions]; and SAPI [Characteristics].

The construction manager must be someone who is well-informed and observant of external [outside the company] and internal [within the company] issues that could influence the outcome of the project. He/she must be a progressive and rational thinker to find practical solutions for difficult problems. To effectively improve a construction project, this individual must constantly seek new experiences, knowledge, skills and ideas. Every day is different; and plans can typically change a few times during a day. Obstacles and challenges occur on a daily basis; consequently, it is important to be adaptable to constant change, with never a boring moment. The construction manager cannot have all the resources that he/she always needs on a project; and he/she must therefore be innovative and continuously able to find new ways to achieve the project goals within these constraints. A construction manager with more experience should have the ability to find more solutions to solve a problem, make better decisions, and resort to the best possible outcome.

In this environment of constant change, the construction manager must be able to learn and adapt to new information rapidly. The lack of necessary skills forces young construction managers to tackle the huge responsibility of managing relatively large construction sites. This can create even more stress in an already very stressful environment.

Conscientiousness was also indicated as a strong predictor for a construction manager. It is important for such an individual to persevere, to be ambitious and to be hard-working. The construction manager must be self-driven and pro-active, in order to minimise possible problems that could occur on the project. Construction projects always have deadlines, problems and difficulties that need to be resolved under tremendous pressure. He/she must keep everybody motivated, who is involved in the project.

Construction projects are most of the time very difficult to manage; and it is not always easy to motivate individuals in the robust construction site environment. Being organised, neat, precise and punctual with managing all aspects of a construction site is very important. Most construction managers fail in their paper work, especially when claims and disputes arise. This typically has a definite negative impact on the outcomes of the dispute, as well as on the progress and motivational climate of the project.

In the multi-cultural context of the South African industry, the construction manager must also respect different cultural and religious aspects. Although, religion would not determine whether such an individual is successful, or not, on a project, it does indicate that such an individual would probably be more trustworthy.

Construction managers must understand and be sensitive towards the needs of everybody on the construction site. If the construction site is situated in an area, where it is very cold or hot, working hours should be altered, as required. In some instances, the people involved in the project go through difficult family issues, where a more sensitive approach is required. Construction managers must be approachable at all times during the project, to give advice and instructions, as and where needed. If the project is running into trouble; and it falls behind schedule, people might have to work over weekends for long periods. In some cases, the construction site is lit-up and construction work continues until late at night.

The stress levels increase; as quality becomes an issue; people get tired and demoralised. During these difficult times, the construction manager must have the ability to give the necessary guidance, upliftment and motivation, as and when needed. He/she must be able to forgive people if mistakes occur, and accommodate sub-contractors in tight schedule situations. Construction managers must create a site culture of being dependable, loyal, honest and fair. He/she must be fair towards everybody, and create loyalty between teams.

With the responsibility-assigned matrix (RAM); the construction manager can empower dependable individuals to take responsibility and be accountable for their actions.

**Table 60: SAPI: Most important personality traits for a construction manager**

| SAPI [Main Dimensions] | SAPI [Sub-dimensions] | SAPI [Characteristics] |
|---|---|---|
| **Openness [1]**<br>*(The quality of being well-informed and observant of external and internal things, being a rational and progressive thinker and acquiring new experiences, knowledge, skills and ideas)* | ***Broad-Mindedness***<br>*(Being imaginative and seeking new experiences and ideas)*<br>***Epistemic Curiosity***<br>*(Being inquisitive, investigative and eager to acquire new information)*<br>***Intellect***<br>*(Being knowledgeable, a quick learner, adaptable, articulate, innovative and perceptive)* | Imaginative, seeking new experiences, seeking new ideas, inquisitive, investigative, eager to acquire new information, knowledgeable, quick learner, adaptable, articulate, innovative, perceptive. |
| **Conscientiousness [2]**<br>*(Orientation toward achievement, order and traditionalism)* | ***Achievement Orientation***<br>*(Being motivated, perseverant, ambitious and hard-working towards achieving things in life)*<br>***Orderliness***<br>*(Being organised, neat, punctual, precise and thorough in everything one does)*<br>***Traditionalism-Religiosity***<br>*(Being traditional by respecting one's own culture and being religious)* | Being motivated, perseverant, ambitious, hard-working, focus to achieve things, organised, neat, punctual, precise, thorough, being religious, respect own culture. |

| SAPI [Main Dimensions] | SAPI [Sub-dimensions] | SAPI [Characteristics] |
|---|---|---|
| **Positive Social-Relational Disposition [3]**<br>*(Positively managing relations with others)* | ***Empathy***<br>*(Valuing and showing compassion to others by showing sensitivity towards their needs and emotions)*<br>***Facilitating***<br>(Guiding, uplifting and motivating others through their lives by giving them advice, instructions and encouragement)<br>***Integrity***<br>*(Being consistently dependable, loyal, honest and fair towards others)*<br>***Interpersonal Relatedness***<br>*(Being accommodating in one's relationships and actively maintaining relationships through forgiveness, helpfulness and by preserving peace)*<br>***Social Intelligence***<br>*(Relating to others by being understanding of them and their feelings)*<br>***Warm-Heartedness***<br>*(Being considerate, protective, supportive of others as well as being approachable and attentive to others' needs)* | Value compassion, sensitivity towards needs & emotions, guiding, uplifting, motivating, give advice, instructions,ncouragements, dependable, loyal, honest, fair, accommodating, forgive, helpfulness, peace, understand feelings, considerate, protective, supportive, approachable, attentive. |

Extraversion and social desirability did not feature as important; as the last main dimensions; but they did prove to be positive additional personality traits (see Table 61 below). Without a tendency to be sociable and talkative, much-needed interaction might be hampered. Personality traits for a construction manager are of paramount importance. A summary of the most important traits is presented in Table 60 and additional personality traits are presented in Table 61.

Construction managers must also have the ability to see the comical side of life, to survive every day. If he/she is not approachable and does not enjoy having people around all the time; it would be difficult to operate in the construction industry. Again, although being playful and sociable have their place on a construction site; they are not critical personality traits that one would need on a daily basis.

It is necessary for a construction manager to have a positive self-image; as this will reflect well for the company; and to an extent give security to everybody involved on the project. The construction manager would also have to be able to absorb vast critique that flows from various decisions that have been made. One should, however, be careful that this does not spill over to becoming an arrogant person.

**Table 61: SAPI: Additional personality traits of a construction manager**

| SAPI [Main Dimensions] | SAPI [Sub-dimensions] | SAPI [Characteristics] |
|---|---|---|
| **Extraversion [4]** *(Tendency toward being sociable and talkative, interacting with people in a spontaneous manner by having fun and telling stories that make people laugh)* | **Playfulness** *(Being lively, enjoying's having fun and making others laugh and having the tendency to see the positive side of life)* **Sociability** (Being easy-going and talkative and enjoy having people around oneself) | Lively, fun, making others laugh, positive side of life |
| **Social Desirability [5]** | **Negative Impression Management** *(The tendency to give a negative self-description/self-impression)* **Positive Impression Management** *(The tendency to give a positive self-description/self-impression)* | Easy-going, talkative, enjoy people |

Extraversion and social desirability are additional personality traits for a construction manager to possess. Extraversion is the tendency to be sociable and playful. The characteristics are the ability to see the positive side of life, being lively and being able to make people laugh. With social desirability, the tendency to give a negative or positive self-description is emphasised. These characteristics consist of being easy-going, talkative and enjoying being around people.

There are certain personality traits that are not favourable for a construction manager to possess; these are neuroticism and negative social-relational disposition that are presented in Table 62 below. Neuroticism indicates the tendency for a person to be impulsive and to fluctuate between emotions. The construction manager must not have the tendency to be impulsive. He/she must not always have all the answers, but within a reasonable timeframe, to resolve the issue. This individual should reflect back before they reply to claims and issues. Construction manager's emotions should not fluctuate and easily be aggravated during negotiations, meetings and general labour issues.

Because the construction industry is so complex, the construction manager must be able to handle stress well. If he/she is a very nervous individual, worried all the time and afraid to make important decisions, he/she would fail as a construction manager. The construction manager must rather show respect, knowledge and acceptance, where needed, and be composed in difficult situations, to be able to make rational decisions and conduct educated calculations.

Table 62 further indicates that a negative social-relational disposition is also a main dimension that should not be part of the personality of a construction manager. The construction manager needs to work with people all the time for the duration of the project and build relationships for possible future projects.

There is, consequently, no place for an individual that thinks he/she is better or more important than another person or team member. Neither would it be good if the construction manager is actively deceiving others or cheating them. Integrity in the industry is highly valued; and a deceitful individual could do irreparable damage to the project and the construction company's image. Being disruptive, intrusive and indiscreet about the private affairs of others would break the trust, and be detrimental to the trustful relationships cultivated between teams and individuals. Table 35 indicates that a construction manager with 10 or more years of experience must have high levels of integrity.

**Table 62: SAPI: Personality traits that is not favourable for a construction manager**

| SAPI [Main Dimensions] | SAPI [Sub-dimensions] | SAPI [Characteristics] |
|---|---|---|
| **Neuroticism [6]** *(The tendency of a person to be impulsive and to fluctuate between emotions by being easily aggravated and apprehensive)* | Emotional Balance *(Showing respect, knowledge and acceptance of self and one's emotions and being composed in difficult situations)* Negative Emotionality (Feeling angry or nervous, worried | Feeling angry, nervous, worried, being afraid |

| | | |
|---|---|---|
| | and being afraid of various things) | |
| **SAPI [Main Dimensions]** | **SAPI [Sub-dimensions]** | **SAPI [Characteristics]** |
| **Negative Social-Relational Disposition [7]** *(Approaching relations with others more controversially)* | Arrogance<br><br>*(Seeing oneself as better and more important than others, by being arrogant and pompous)*<br><br>Conflict-Seeking<br>(Being socially disruptive, intrusive and indiscreet about the private affairs of others)<br><br>Deceitfulness<br>*(Actively deceiving others by being fake, cheating them, and/or fooling them, by creating a false impression of oneself)*<br><br>Hostility-Egoism<br>*(Aggressively self-promoting, by being self-centred, focusing exclusively on one's own needs and desires and simultaneously being abusive, denigrating and critical towards others)* | Arrogance, disruptive, intrusive, indiscreet, pompous, cheating, deceitful, self-centred, abusive, denigrating |

## 7.4. Contribution to knowledge

- Melvin's professions are still applicable today, although by now outdated. Health and Safety and Environmentalist were added to the current list.
- Industry requires construction managers to be more matured at an early stage in their career. This is because it is the most difficult to find skilled middle management individuals.
- All thirteen soft skills identified in the literature research are pivotal for a construction manager within each experience level and he/she will not be successful without it.
- Although the hierarchy of soft skills changed over all three experience levels the importance of each soft skill increased with seniority.
- The industry construction manager's perception of integrity is higher than what the actual SAPI results indicated.

- The effectiveness of the construction manager on a project will be determined by the level of the ability to apply these soft skills interchangeably within each of Melvin's professions.
- The most important factor to retain skilled construction managers within a company is for the company to ensure a sound work environment.
- A construction manager working for a large company will not necessarily fit into the fold of a small company and vice versa.
- The industry construction managers have a similar personality profile than the 3rd year construction management students, which indicates that the participating universities invest resources in the appropriate type of student.
- The SAPI results indicated that the most important characteristics for a construction manager is: (1) imaginative, seeking new experiences, seeking new ideas, inquisitive, investigative, eager to acquire new information, knowledgeable, quick learner, adaptable, articulate, innovative, perceptive and ranked almost equivalent in importance; (2) being motivated, perseverant, ambitious, hard-working, focus to achieve things, organised, neat, punctual, precise, thorough, being religious, respect own culture; (3) value compassion, sensitivity towards needs and emotions, guiding, uplifting, motivating, give advice, instructions, encouragements, dependable, loyal, honest, fair, accommodating, forgive, helpfulness, peace, understand feelings, considerate, protective, supportive, approachable, attentive.
- The following characteristics were of lesser importance, but contribute to a well-balanced construction manager: (4) lively, fun, making others laugh, positive side of life; (5) easy-going, talkative, enjoy people.
- The characteristics that are least sought after in the construction industry is: (6) feeling angry, nervous, worried, being afraid; (7) arrogance, disruptive, intrusive, indiscreet, pompous, cheating, deceitful, self-centred, abusive, and denigrating.
- SAPI testing needs additional face-to-face questions to explain the physical site conditions, work-life balance and the importance of pre-first year enrolment practical experience more explicitly, as students still leave the industry when being exposed to the reality of the construction site.

## 7.5. Recommendations

It can be seen that there are currently challenges that make it even more crucial to select and retain these successful construction managers with the purpose-fit skills, abilities and personality profiles. It is then suggested that the following research should be further investigated:

- The effects of virtual reality and 3D printing in reducing the learning curve of construction managers;
- The possibility to use virtual reality to prepare students for site conditions;
- The importance of practical experience before a student enrols for the construction-management degree;
- The decrease of enrolments of new entrants into construction-management tertiary institutions;
- More online SAPI personality testing for construction managers, quantity surveyors and real estate students;
- Females and their view of construction-management in a South African context.

During the selection process, the SAPI personality test results can be used to assist in identifying B.Sc (Hons) Construction-Management students, who have the behavioural and cognitive traits that are required for the field of construction management. This can be used to increase the probability to enrol a more purpose-fit candidate for the industry to retain. If the Department of Construction Economics incorporates these SAPI personality tests, this could improve the type of student that the University of Pretoria cultivates for industry; thereby, effectively increasing the students' production on-site and increasing the value that such students would add to their companies.

In selecting a more purpose-fit construction manager, this would improve the possibility of a happy individual in the industry. With fewer construction managers leaving the industry (taking their experience and expertise to their new workplace) should slowly create an elite pool with appropriate levels of critical skills sets, closing the crucial middle-management skills gap. This retained expertise would be vital to the survival and even the expansion of the South African construction industry.

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# Appendixes

## Appendix A: Structured Interview Questionnaire

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DEPARTEMENT KONSTRUKSIE-EKONOMIE
DEPARTMENT OF CONSTRUCTION ECONOMICS

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Date: 01 August 2017

**RE: STRUCTURED INTERVIEW**

Instructions:

Answer as an expert individual the questions listed below and formulate an answer to each question that best represents the opinion of a construction manager. The aim of this structured interview is to provide an opportunity for each individual to share his/her experiences, opinions, likes, dislikes and suggestions. The structured interview will be facilitated and data will be analysed using quantitative methods.

The aim (outcome) of this study is to suggest a profile for the construction manager in South Africa and link this with the current needs of the industry and the profession itself. All the data collected will be handled in a confidential manner. Data will be used for the purposes of this PhD research study and article publications only.

***The requirements for individuals to participate in the structured interview:***

***1. B.Sc Construction Management degree***

***2. 10 years or more site experience***

**PART A: GENERAL STATISTICAL QUESTIONS [Use X where applicable]**

1. What is your current age?

   ……..

2. Indicate the highest contract executed in Rand value (as per CIDB contractor grading) where you were the ***responsible*** construction manager on the project.

| | | | |
|---|---|---|---|
| R6.5 – R13 million | > R13 – 40 million | > R40 – 130 million | > R130 million |

3. Indicate the highest contract executed in Rand value (as per CIDB contractor grading) where you were ***involved*** with as a construction manager on the project.

| | | | |
|---|---|---|---|
| R6.5 – R13 million | > R13 – 40 million | > R40 – 130 million | > R130 million |

4. What was the position (title) assigned to you during this project ***involvement*** mentioned in question 3?

   _____

5. The above mentioned project/s was construction specifically or more managing specialist sub-contractor intensive.

| | | |
|---|---|---|
| Construction | Specialist Sub-Contractor | Both |

6. Complexity of projects can be divided into two main measurements. Each measurement can be further divided into two dimensions, as illustrated below:

| **Project Complexity** | |
|---|---|
| **A) Structural** | **B) Uncertainty** |
| *1. Size: Number of elements* | *1. Uncertain in goals* |
| *2. Independence of elements* | *2. Uncertain in methods* |

   Which of the above dimensions do you consider to be relevant, where you were the ***responsible*** construction manager as mentioned in question 2?

7. Indicate your sector of involvement as construction manager.

| | | | |
|---|---|---|---|
| Office / Retail Sector | Industrial Sector | Civil Engineering & Roadworks | Residential Sector |

**PART B: SPECIFIC RESEARCH QUESTIONS: [Use X where applicable]**

8. In your opinion, is there a shortage within the South African construction industry of efficient, skilled construction managers with more than 10 years site experience?

| | |
|---|---|
| Yes | No |

9. If your company recruits new construction managers, what are the 5 most important characteristics required in such an individual?

10. In your company, how do you retain your current key construction managers?

11. Are soft skills[1] needed for a construction manager to be successful on a project?

| Yes | No |
|---|---|

12. In your opinion, is it important to cultivate such soft skills in a construction manager?

| **Likert Scale [1-5]** | | | | |
|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 |
| Not important at all | Slightly unimportant | Average | Slightly important | Very important |
| **O** | **O** | **O** | **O** | **O** |

13. Rate the importance for a construction manager to have the ability to apply such softs skills interchangeably in combination with Bono's six thinking hats[2].

| **Likert Scale [1-5]** | | | | |
|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 |
| Not important at all | Slightly unimportant | Average | Slightly important | Very important |
| **O** | **O** | **O** | **O** | **O** |

14. The level of ease with which the construction manager can balance soft skills with will depend on how effective he/she will be on the project.

| **Likert Scale [1-5]** | | | | |
|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 |
| Strongly Disagree | Disagree | Neither Agree nor Disagree | Agree | Strongly Agree |
| **O** | **O** | **O** | **O** | **O** |

[1] *Snell et al., (2002), cited by Mahasneh and Thabet (2015),* defined soft skills as "the ability and traits that pertain to personality, attitude and behaviour rather than formal or technical knowledge".

[2] ***Six Thinking Hats*** is a system designed by Edward de Bono which describes a tool for group discussion and individual thinking involving six colored hats. 'Six Thinking Hats' and the associated idea parallel thinking provide a means for groups to plan thinking processes in a detailed and cohesive way, and in doing so to think together more effectively. de Bono, Edward (1985). *Six Thinking Hats: An Essential Approach to Business Management. Little, Brown, & Company. ISBN 0-316-17791-1*

15. In your opinion, to what extent will the increase of project productivity be dependent on the construction managers' level of effectiveness?

| **Likert Scale [1-5]** | | | | |
|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 |
| Not important at all | Slightly unimportant | Average | Slightly important | Very important |
| **O** | **O** | **O** | **O** | **O** |

16. Both tertiary education (in construction management) and practical experience is needed for successful construction site management.

| **Likert Scale [1-5]** | | | | |
|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 |
| Strongly Disagree | Disagree | Neither Agree nor Disagree | Agree | Strongly Agree |
| **O** | **O** | **O** | **O** | **O** |

17. In your opinion, are soft skills important in supporting both tertiary education and practical experience?

| **Likert Scale [1-5]** | | | | |
|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 |
| Not important at all | Slightly unimportant | Average | Slightly important | Very important |
| **O** | **O** | **O** | **O** | **O** |

18. In your opinion, to what extent should a ***junior*** construction manager's soft skills support his/her technical skills?

| **Construction manager Experience [Junior 0-5 years]**<br>**Likert Scale [1-5]** | | | | |
|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 |
| Not important at all | Slightly unimportant | Average | Slightly important | Very important |
| **O** | **O** | **O** | **O** | **O** |

19. In your opinion, to what extent should a ***middle career*** construction manager's soft skills support his/her technical skills?

| **Construction manager Experience [Middle Career 5-10 years]**<br>**Likert Scale [1-5]** | | | | |
|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 |
| Not important at all | Slightly unimportant | Average | Slightly important | Very important |
| **O** | **O** | **O** | **O** | **O** |

20. In your opinion, to what extent should an ***experienced*** construction manager's soft skills support his/her technical skills?

| **Construction manager Experience [Senior 10 years or more]**<br>**Likert Scale [1-5]** | | | | |
|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 |
| Not important at all | Slightly unimportant | Average | Slightly important | Very important |
| **O** | **O** | **O** | **O** | **O** |

21. Rank the importance of the following identified soft skills for construction managers with **0 - 5 years**' experience (where 1 = not important at all, 2 = slightly unimportant, 3 = average, 4 = slightly important and 5 = very important).
    ***Also include*** *the overall ranking from 1 – 13 for each skill as you deem important (where 1 = highest ranking / heaviest weight and 13 = lowest ranking / lightest weight).*

| **Construction Site Manager Experience [0 - 5 years]** | | | | | | | |
|---|---|---|---|---|---|---|---|
| No | **Soft Skills Parameter** | **Not important at all……Very important** | | | | | **Overall Rank** |
| | | **1** | **2** | **3** | **4** | **5** | |
| 1 | Leadership skills | | | | | | |
| 2 | Communication skills | | | | | | |
| 3 | Negotiation skills | | | | | | |
| 4 | Conflict resolution skills | | | | | | |
| 5 | Problem solving / critical thinking skills | | | | | | |
| 6 | Decision making skills | | | | | | |
| 7 | Motivation | | | | | | |
| 8 | Teamwork | | | | | | |
| 9 | Stress management | | | | | | |
| 10 | Work ethics | | | | | | |
| 11 | Flexibility | | | | | | |
| 12 | Attitude | | | | | | |
| 13 | Integrity | | | | | | |

22. Rank the importance of the following identified soft skills for construction managers with **5 - 10 years'** experience (where 1 = not important at all, 2 = slightly unimportant, 3 = average, 4 = slightly important and 5 = very important).
***Also include*** *the overall ranking from 1 – 11 for each skill as you deem important (where 1 = highest ranking / heaviest weight and 11 = lowest ranking / lightest weight).*

| Construction Site Manager Experience [5 - 10 years] | | | | | | | |
|---|---|---|---|---|---|---|---|
| No | Soft Skills Parameter | Not important at all……Very important 1 | 2 | 3 | 4 | 5 | Overall Rank |
| 1 | Leadership skills | | | | | | |
| 2 | Communication skills | | | | | | |
| 3 | Negotiation skills | | | | | | |
| 4 | Conflict resolution skills | | | | | | |
| 5 | Problem solving / critical thinking skills | | | | | | |
| 6 | Decision making skills | | | | | | |
| 7 | Motivation | | | | | | |
| 8 | Teamwork | | | | | | |
| 9 | Stress management | | | | | | |
| 10 | Work ethics | | | | | | |
| 11 | Flexibility | | | | | | |
| 12 | Attitude | | | | | | |
| 13 | Integrity | | | | | | |

23. Rank the importance of the following identified soft skills for construction managers with **10 years' or more** experience (where 1 = not important at all, 2 = slightly unimportant, 3 = average, 4 = slightly important and 5 = very important).
***Also include*** *the overall ranking from 1 – 11 for each skill as you deem important (where 1 = highest ranking / heaviest weight and 11 = lowest ranking / lightest weight).*

| Construction Site Manager Experience [10 years or more] | | | | | | | |
|---|---|---|---|---|---|---|---|
| No | Soft Skills Parameter | Not important at all……Very important 1 | 2 | 3 | 4 | 5 | Overall Rank |
| 1 | Leadership skills | | | | | | |
| 2 | Communication skills | | | | | | |
| 3 | Negotiation skills | | | | | | |
| 4 | Conflict resolution skills | | | | | | |
| 5 | Problem solving / critical thinking skills | | | | | | |
| 6 | Decision making skills | | | | | | |
| 7 | Motivation | | | | | | |
| 8 | Teamwork | | | | | | |
| 9 | Stress management | | | | | | |
| 10 | Work ethics | | | | | | |
| 11 | Flexibility | | | | | | |
| 12 | Attitude | | | | | | |
| 13 | Integrity | | | | | | |

24. Which soft skills do you feel are missing in the list above?

_____

_____

_____

25. In your opinion, do construction managers need a specific personality[3] profile to fit into the construction industry environment?

| Yes | No |
|---|---|

26. If yes, how will you view an ideal personality fit for construction management?

_____

_____

_____

_____

_____

_____

_____

27. The lifestyle[4] of the construction manager forms a part of his/her personality.

| **Lifestyle**<br>**Likert Scale [1-5]** | | | | |
|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 |
| Strongly Disagree | Disagree | Neither Agree nor Disagree | Agree | Strongly Agree |
| **O** | **O** | **O** | **O** | **O** |

[3] Personality can be defined as "(a) the sum totals of all physical, mental, emotional and social characteristics of an individual (b) the organised pattern of behavioural characteristics of the individual" Cilliers and Meiring (2014).

[4] Being outdoors, dusty/dirty work environment, large labour force with low skills, moving around from project to project, separated from family, working long hours and working under constant stress.

28. If the construction manager has a specific profile, will it increase the probability that he/she will stay active as successful construction manager as career choice?

| Yes | No |
|---|---|

29. In your opinion, which of the following takes priority during the recruitment and selection process of a construction manager:

| Person-job fit (PJ)[5] | Person-organisation fit (PO)[6] | Both PJ & PO |
|---|---|---|

30. Rank the importance of the following identified South African Personality Inventory (SAPI) items in each section for a construction manager with **10 years' or more** experience (where 1 = not important at all, 2 = slightly important, 3 = average, 4 = slightly important and 5 = very important).

***Also prioritise*** *each section with the overall ranking for each item per section as you deem important (where 1 = highest ranking / heaviest weight and 7 = lowest ranking / lightest weight).*

| | **Construction manager Experience [10 years or more]** | | | | | | |
|---|---|---|---|---|---|---|---|
| No | **SAPI Section 1: Positive Social-Relational Disposition** *(Positively managing relations with others).* | **Not important at all…..Very important** | | | | | **Priority #** |
| | | **1** | **2** | **3** | **4** | **5** | |
| 1 | **Empathy:** *Valuing and showing compassion to others by showing sensitivity towards their needs and emotions.* | | | | | | |
| 2 | **Facilitating:** *Guiding, uplifting and motivating others through their lives by giving them advice, instructions and encouragement.* | | | | | | |
| 3 | **Integrity:** *Being consistently dependable, loyal, honest and fair towards others.* | | | | | | |
| 4 | **Interpersonal Relateness:** *Being accommodating in one's relationships and actively maintaining relationships through forgiveness and helpfulness and by preserving peace.* | | | | | | |

[5] Person-job fit (PJ) is defined as "the compatibility between a person's characteristics and those of the job or tasks that are performed at work" (Sekiguchi, T, 2007).

[6] Person-organisation fit (PO) is defined as "the compatibility between people and entire organisations" (Sekiguchi, T, 2007).

| | Construction manager Experience [10 years or more] | | | | | | |
|---|---|---|---|---|---|---|---|
| 5 | **Social Intelligence:** *Relating to others by being understanding of them and their feelings.* | | | | | | |
| 6 | **Warm-Heartedness:** *Being considerate, protective and supportive of others as well as being approachable and attentive to others' needs.* | | | | | | |
| **No** | **SAPI Section 2: Negative Social-Relational Disposition** *(Approaching relations with others more controversially)* | **Not important at all…..Very important** | | | | | **Priority #** |
| | | **1** | **2** | **3** | **4** | **5** | |
| 1 | **Arrogance:** *Seeing oneself as better and more important than others, by being arrogant and pompous.* | | | | | | |
| 2 | **Conflict-Seeking:** *Being socially disruptive, intrusive and indiscreet about the private affairs of others.* | | | | | | |
| 3 | **Deceitfulness:** *Actively deceiving others by fake, cheating them, and / or fooling them by creating a false impression of oneself.* | | | | | | |
| 4 | **Hostillity-Egoism:** *Aggresively self-promoting, by being self-centred, focusing exclusively on one's own needs and desires and simutaneously being abusive, denigrating and critical towards others.* | | | | | | |
| **No** | **SAPI Section 3: Neuroticism** *(The tendency of a person to be impulsive and to fluctuate between emotions and by being composed in difficult situations.)* | **Not important at all…..Very important** | | | | | **Priority #** |
| | | **1** | **2** | **3** | **4** | **5** | |
| 1 | **Emotional Balance:** *Showing respect, knowledge and acceptance of self and one's emotions and being composed in difficult situations.* | | | | | | |
| 2 | **Negative Emotionality:** *Feeling angry or nervous, worried and being afraid of various things.* | | | | | | |
| **No** | **SAPI Section 4: Extraversion** *(Tendency toward being sociable and talkative, interactive, interacting with people in a* | **Not important at all…..Very important** | | | | | **Priority #** |
| | | **1** | **2** | **3** | **4** | **5** | |

| | Construction manager Experience [10 years or more] | | | | | | |
|---|---|---|---|---|---|---|---|
| | *spontaneous manner by having fun and telling stories that make people laugh.)* | | | | | | |
| 1 | **Playfulness:** *Being lively, enjoyings having fun and making others laugh and having the tendency to see the positive side of life.* | | | | | | |
| 2 | **Sociability:** *Being easy-going and talkative and enjoy having people around oneself.* | | | | | | |

| No | **SAPI Section 5: Conscientiousness** *(Orientation toward achievement, order and traditionalism.)* | **Not important at all…..Very important** | | | | | **Priority #** |
|---|---|---|---|---|---|---|---|
| | | **1** | **2** | **3** | **4** | **5** | |
| 1 | **Achievement Orientation:** *Being motivated, perseverant, ambitious and hard-working towards achieving things in life.* | | | | | | |
| 2 | **Orderliness:** *Being organised, neat, punctual, precise and thorough in everything one does.* | | | | | | |
| 3 | **Traditionalism-Religiosity:** *Being traditional by respecting one's own culture and being religious.* | | | | | | |
| No | **SAPI Section 6: Openness** *(The quality of being well-informed and observant of external and internal things, being rational and progressive thinker and aquiring new experiences, knowledge, skills and ideas).* | **Not important at all…..Very important** | | | | | **Priority #** |
| | | **1** | **2** | **3** | **4** | **5** | |
| 1 | **Broad-Mindedness:** *Being imaginative and seeking new experiences and ideas.* | | | | | | |
| 2 | **Epistemic Curiosity:** *Being inquisitive, investigative and eager to acquire new information.* | | | | | | |
| 3 | **Intellect:** *Being knowledgeable, a quick* | | | | | | |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | *learner, adaptable, articulate, innovative and perceptive.* | | | | | | |
| No | **SAPI Section 7: Social Desirability** | **Not important at all…..Very important** | | | | | **Priority #** |
| | | **1** | **2** | **3** | **4** | **5** | |
| 1 | **Negative Impression Management:** *The tendency to give a negative self-description / self-impression.* | | | | | | |
| 2 | **Positive Impression Management:** *The tendency to give a positive self-descriptive / self-impression.* | | | | | | |

**PART C: INTERVIEWEE PERSONAL DIRECTED QUESTIONS:**

31. Describe yourself, in terms of the characteristics (including both soft skills and personality) discussed in the questionnaire.

32. In your opinion, how can a company improve your lifestyle as a construction manager?

33. Are you happy with your choice of profession – and why?

34. If you could turn back time, would you choose your profession differently – and why?

***Thank you for assisting me with this PhD research study. Your time and knowledge as an expert in this field will be of tremendous value to future construction management students as well as adding value to the industry in itself.***