

**ASSESSING THE ACCURACY OF THE GROWTH IN THEORETICAL CAPABILITY  
AS PREDICTED BY THE CAREER PATH APPRECIATION (CPA) 1 VS CPA 2**

by

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## **DECLARATION**

I, Ester Kruger, student number **35664967**, declare that this dissertation, entitled **“Assessing the accuracy of the growth in Theoretical Capability as predicted by Career Path Appreciation (CPA) 1 vs CPA 2”**, is my own work, and that all sources that I have used or from which I have quoted have been indicated and acknowledged by means of complete references.

I further declare that ethical clearance to conduct the research has been obtained from the Department of Industrial and Organisational Psychology, University of South Africa, as well as from the participating organisation.

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**ESTER KRUGER**

**28 FEBRUARY 2013**

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## **SUMMARY**

### **ASSESSING THE ACCURACY OF THE GROWTH IN THEORETICAL CAPABILITY AS PREDICTED BY CAREER PATH APPRECIATION (CPA) 1 VS CPA 2**

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The need for the identification and appropriate development of talent in organisations has led to a renewed interest in the accuracy of tools used in this context. The objectives of the study were to: (1) determine whether there is a significant difference in the growth in theoretical capability as predicted by Career Path Appreciation (CPA) 1 and CPA 2 among the sample population, (2) determine whether there is a significant difference in Mode as predicted by CPA 1 and CPA 2 among the sample population, and (3) formulate recommendations for Talent Management and Industrial and Organisational Psychology practices and future research.

The CPA is a tool used for the selection and development of talent nationally and internationally. Limited recent test-retest research has been done regarding the utilisation of the CPA in this context. Scholars in the field of industrial psychology could therefore benefit from follow-up research regarding the validity and reliability of the CPA. The research design is an ex post facto correlational design using longitudinal data of a sample of convenience (N=527).

Overall, the results indicated a significant correlation between CLC for CPA 1 and CPA 2 as well as between Mode for CPA 1 and CPA 2. The CPA as a measure of theoretical capability is consistently accurate between measures and can be used with confidence for the identification and development of talent within organisations.

#### **KEY TERMS**

Stratified Systems Theory, Matrix of Working Relationships, cognition, complexity, theoretical capability, potential, mode, growth curve, flow, talent management.

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## **CHAPTER 1**

### **SCIENTIFIC ORIENTATION TO THE RESEARCH**

The context of this research is the assessment of the accuracy of predictions by Career Path Appreciation (CPA) 1 vs CPA 2 of the growth in theoretical capability. Chapter 1 presents the problem statement and the research aims. It comprises a discussion of the research methodology, with details regarding the empirical study, research design, participants, measuring instruments and statistical analyses. The chapter concludes with an overview of the chapters in this study.

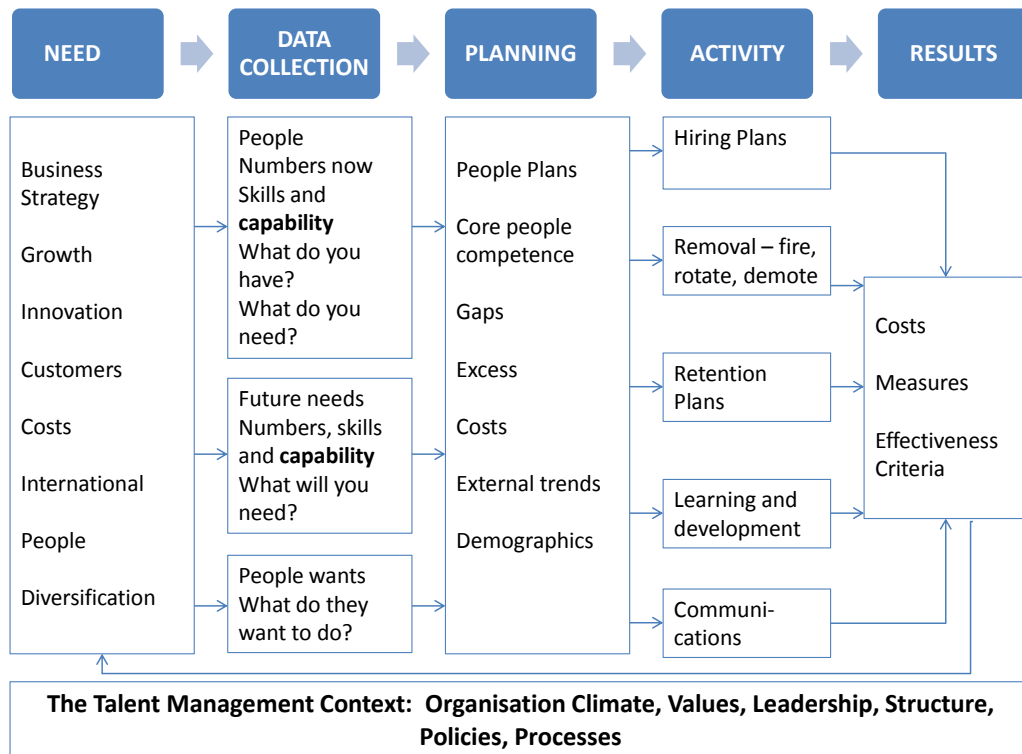
#### **1.1 BACKGROUND AND MOTIVATION**

With the dawn of the new century, organisations find themselves in a world where global, societal and organisational change is an exponentially accelerating force. The environment is characterised by complex, dynamic, volatile and highly competitive forces, and is likely to remain so for the foreseeable future (Tarique & Shuler, 2010). Researchers have identified various aspects of the changing world of work, including the following: 1) Competition between organisations is intensifying as a result of increased productivity of foreign competitors. 2) There are greater numbers of multinational organisations and new world markets are emerging. 3) Technological advances affect every phase of business and create new career paths for individuals. 4) Growth in the service sector is outstripping that in the manufacturing sector and organisational structures will become leaner, flatter and more flexible. 5) Workforces will become more culturally diverse. 6) It will become increasingly difficult to maintain a balance between work and family life (Briscoe, Schuler & Claus, 2009; Friedman, 2005; Greenhaus, Callanan & Godshalk, 2010). In addition to these challenges, most organisations are also facing challenges related to the attraction, development and retention of talent in gaining and sustaining a competitive advantage within this environment (Tarique & Schuler, 2010). A McKinsey research study reveals that 75% of corporate officers are concerned about talent shortages, and a Deloitte study reports that a top priority of 87% of participating HR directors is retaining top talent. The academic literature reports similar trends in research conducted by other consulting and professional research groups (Boudreau & Ramstad, 2005, 2007; Cappelli, 2008a, 2008b; Collings & Mellahi, 2009). Organisations are becoming increasingly aware of the need to utilise all possible

assets not only to survive, but also to achieve a competitive advantage in these turbulent times (Lawler, 2008).

Talent Management has therefore developed a field of practice that aims to support organisations in leveraging key human capital to survive and thrive within this context (Capelli, 2008a). The purpose of Talent Management is to ensure that an organisation has the right talent with the right skills at the right time. However, what may have been the right skills in the past may not meet requirements in the future (Meyer, 2005; Tarique & Schuler, 2010; Goldsmith & Carter, 2010; Berger & Berger, 2011). Human resources therefore represent a significant short-term and long-term investment for organisations around the world. Precise and effective recruitment, selection and development practices are therefore imperative from a financial perspective, but also in relation to the overall individual and organisational effectiveness (Berger & Berger, 2011).

What are the Industrial and Organisational (IO) Psychology implications of these developments, and what is the role of the IO psychologist within this context? As Talent Management deals with potential at all levels, culture, systems, processes and practices need to be approached from a strategic and integrated perspective (Gratton & Ulrich, 2009; Collings & Mellahi, 2009). Gratton and Ulrich (2009) go further in stating that talent is bigger than individuals. They speak of “*general and targeted individual competencies – what people know, do and value—and organisational capabilities ... that create sustainable value for multiple stakeholders—employees, customers and investors*”. According to The CEO’s Guide to Talent Management, “*a structured talent management process will systematically close the gap between the human capital an organization currently has and the leadership talent it will eventually need to respond to tomorrow’s business challenges, because it is aimed at building leadership strength in depth, it creates flexibility to meet rapidly changing market conditions*” (Wellins, Smith & Rogers, 2010). A typical talent management approach therefore has the following basic elements: 1) understanding of the organisational need given the context, 2) data collection, 3) planning, 4) implementation activities, and 5) measurement of results (see figure 1.1):



**Figure 1.1: A Talent Management System (Ashton & Morton, 2005).**

The unique contribution of IO Psychology within this context includes the selection and validation of instruments used in the data-gathering phase of this integrated process. Psychometric instruments provide useful information which minimises the influence of environmental factors in determining individual potential (Kaplan & Saccuzzo, 2010). One such important attribute would be the ability of a person to solve complex problems, often described as the capability, or competence of the individual. The higher a person's post level in an organisation, the greater the capability and competence required to deal with complexity and uncertainty (Meyer, 2005; Snowden & Boone, 2007; Comaroff, 2012).

Devices and methods used to predict individuals' competence and behaviour in a job context have been coming under mounting scrutiny in the international arena (Kaplan & Saccuzzo, 2010). This is associated with the position adopted by the International Labour Organisation (ILO), which is that practitioners need to ensure that the methods employed for the measurement of human abilities, traits and behaviours comply with the guidelines set out by the relevant governing institutions—locally and globally (ILO,

2007). The criteria used to assess the suitability and legal defensibility of such measures have been well researched over the past three-quarters of a century. The standard measurement criteria of reliability, validity, lack of bias and fairness not only apply to psychometric measures, but are also standard across the humanities, for example in the disciplines of sociology, criminology and nursing science (Mauer, 2008).

In South Africa, specifically, the use of assessments to make decisions regarding the employability of an individual has been greeted with sentiments ranging from approval to cynicism in South Africa (Mauer, 2008). The Labour Relations Act (LRA), enacted in 1995, aimed to ensure that organisational employment practices are fair, with specific, job-related and objective criteria against which individuals are measured to assess their employability. The Employment Equity Act (EEA) of 1998 also states that the use of selection instruments is prohibited, unless the user can demonstrate that the instrument used is valid, reliable and fair (Nzama, De Beer & Visser, 2008). Organisations using and providing these instruments therefore need to ensure their compliance, but many organisations still do not continuously research the validity of the methods utilised in making selection or development decisions (Hoffman & McPhail, 1998; Edenborough, 2005; Rees & French, 2010). The value of the instrument is thus unknown and this could possibly result in high costs from a financial and non-financial point of view—for the individual and the organisation (Burnett & Motowidlo, 1998; Schmidt & Rader, 1999).

The Career Path Appreciation (CPA) is an instrument used in the recruitment, mentoring and development of people in a variety of organisations and industries locally and internationally. In South Africa, an average of approximately 3500 CPAs are conducted annually, and this instrument is utilised to assist in the identification of potential talent at an early stage and help organisations to fast-track and develop talent for the future. The CPA provides results indicating the likely rate of growth of theoretical capability in individuals and their organisations. The instrument can therefore assist individuals in making more informed decisions, in pacing themselves in their career growth and preparing for additional responsibilities (Stamp, 1989b). This makes it a tool enabling organisations to find and utilise resources optimally within their organisational context.

Strong evidence that the CPA was a valid predictor of the level of work that individuals were likely to attain was provided in the study by Stamp (1988) in terms of the predicted

incomes of the sample group, in comparison with their actual incomes at the time of the study. In summary, the validity coefficients were  $r = 0.79$ ,  $p \leq 0.001$  for a subsample of 182,  $r = 0.70$ ,  $p \leq 0.001$  for a subsample of 84, and  $r = 0.89$ ,  $p \leq 0.001$  for a subsample of 76. When utilising an advanced version of CPA (Stamp, 1989b), the findings were even better, with correlations of  $r = 0.93$ ,  $p \leq 0.001$  for a subsample of 59, and  $r = 0.92$ ,  $p \leq 0.001$  for a subsample of 124.

These results are notable, especially at the time of writing of the Stamp (1989b) article. The more critical experts mentioned that whatever measure might have been used to predict future job performance, the validity coefficient would inevitably be 0.30. Although things have improved since then, it is still quite unusual for validity coefficients of 0.60 to be reported in similar studies (Mauer, 2008). Despite the prevailing paradigm at the time when Stamp reported the results, the study demonstrated validity coefficients ranging between 0.70 and 0.93 (Stamp, 1988).

In terms of biographical differences, the studies conducted by Stamp and Retief (1996), Retief (2003), Percival, Crous and Schepers (2003) and Kitching (2005) showed the CPA is free of gender bias. Studies that concluded the CPA is free of race bias are, Bluen (1995), Mauer (1997), BioSS SA (1999), Retief (2003) and Percival, Crous and Schepers (2003).

## **1.2 PROBLEM STATEMENT**

A persistent theme over the past few years in public discussion has been the state of skills in the South African economy and society. Within the South African context, the shortage of talent has a historical link, with a legacy of “Bantu education” and highly isolationist economic policies (Daniels, 2007).

Although South Africa has made tremendous strides in resolving political, economic and social challenges, the shortage of professional and managerial skills still remains an obstacle to our future economic growth (Mauer, 2005; Erasmus & Breier, 2009). Acknowledging this constraint, the government is paying renewed attention to skills development as a method of delivering greater efficiency, increased productivity and higher levels of competitiveness. A survey of 803 companies in South Africa revealed

that 35% were worried about lack of skills (Empowerdex, 2006). The emphasis should, however, not simply be on scarce and critical skills. Kraak (2005) mentions the lack of emphasis on “high skills” through the process of talent management to support the growth of a developing economy such as that of South Africa.

The CPA has been used extensively in support of this ideal in South Africa. The specific benefits of the instrument include the following: 1) It is based on Appreciative principles, and thus the process is aimed at valuing the individual, and not merely at deriving an outcome. 2) Potential can be identified without a strong influence being exerted by the variables of opportunity to participate in development activities and exposure, as personal experiences are also incorporated, and nonverbal activities utilised. 3) It is a time-sensitive review mechanism and can therefore help to ensure the appropriate "pacing" of career opportunities as individuals grow over time (Ashton & Kruger, 2010).

A concern regarding the current situation is that Stamp's (1988) findings have not been verified to a satisfactory degree by further research. Within the empiricist tradition of scientific work, it may be accepted that a single validation study would be questioned, especially given the fact that the research was done more than 20 years ago.

The Brunel Institute of Organisational and Social Studies (Bioss), as an international organisation, as well as the growing number of scholars in the field of Industrial Psychology and Human Resources, would undoubtedly benefit from follow-up research on the accuracy of the CPA. From the perspective of South African labour law, as well as the increasingly litigious working community, there will be increasing pressure to offer adequate and persuasive evidence relating to the validity of the CPA on a continuous basis (Mauer, 2008). A study to evaluate the consistency of CPA results under circumstances of repetition and with different practitioners will be conducted. The following research questions arise:

### **1.2.1 Research questions with regard to the literature review**

Research question 1: How are the concepts of complexity, theoretical capability and flow conceptualised and explained in the literature from a Stratified Systems Theory (SST) perspective?

Research question 2: What are the implications of the accuracy of growth in theoretical capability as predicted by the Career Path Appreciation for Talent Management and Industrial and Organisational Psychology practices?

### **1.2.2 Research questions with regard to the empirical study**

Research question 1: Is there a significant difference in the growth in theoretical capability (CLC) as predicted by CPA 1 and CPA 2 among the sample population?

Research question 2: Is there a significant difference in the growth in potential capability (Mode) as predicted by CPA 1 and CPA 2 among the sample population?

Research question 3: Do the various gender and race groups differ between CPA 1 and CPA 2 results?

Research question 4: What recommendations can be formulated for the Talent Management and Industrial and Organisational Psychology practices and future research?

## **1.3 AIMS OF THE RESEARCH**

### **1.3.1 General aim**

The general aim of the study is to: (1) investigate the accuracy of the predictions of growth in theoretical capability by CPA 1 vs CPA 2, and (2) to determine whether individuals from different groups (gender and race) differ regarding these variables.



### **1.3.2 Specific aims**

The specific aims of the study are related to the literature review and the empirical study.

#### *1.3.2.1 Literature review*

In terms of the literature review, the specific aims of this research are to

- conceptualise complexity, theoretical capability and flow from the literature and determine the theoretical relationship between these concepts
- determine the implications of the accuracy in growth in theoretical capability as predicted by the Career Path Appreciation for Talent Management and Industrial and Organisational Psychology practices.

#### *1.3.2.2 Empirical study*

The specific aims of the empirical study are to

- determine whether there is a significant difference between CPA 1 and CPA 2 as predictors of the growth in theoretical capability (CLC) among the sample population.
- determine whether there is a significant difference between CPA 1 and CPA 2 as predictors of the growth in potential capability (Mode) among the sample population.
- empirically investigate whether differences exist between gender and race.
- formulate recommendations for Talent Management and Industrial and Organisational Psychology practices and future research.

### **1.4 THE PARADIGM PERSPECTIVE**

With reference to the paradigm perspective of the research, the relevant paradigms and meta-theoretical assumptions, the market of intellectual resources, are discussed. In terms of discipline, this research focuses on Industrial and Organisational Psychology as the field of application and the sub-discipline of Organisational Psychology.

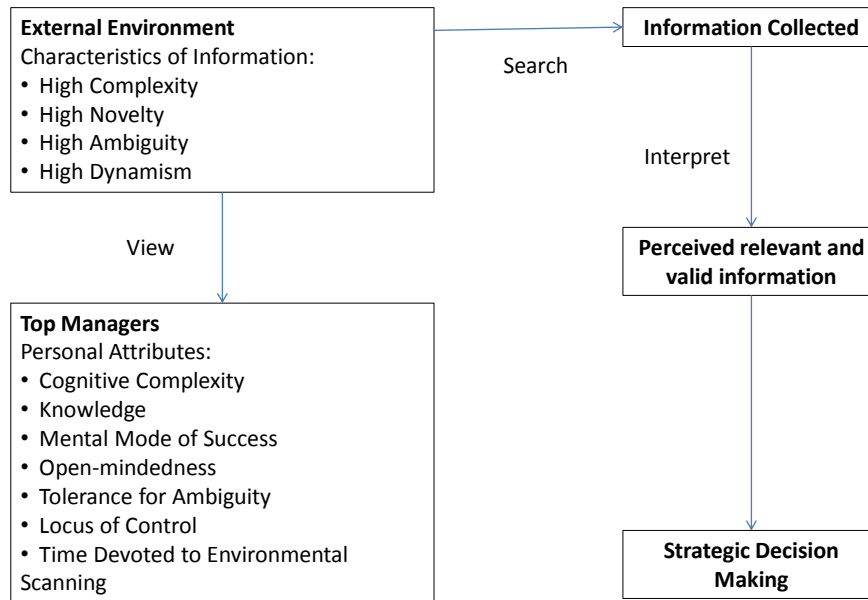
The paradigm perspective refers to a variety of meta-theoretical, theoretical and methodological beliefs, coupled with assumptions underlying the theories and models that form the definitive context of a study (Mouton & Marais, 1996).

#### **1.4.1 Cognitive information processing paradigm**

Thomas Aquinas (Aquinas & Clark, 2000) divided the study of behaviour into two broad categories: (1) *cognitive* (how we know the world), and (2) *affect* (feelings and emotions) as a result of successful studies in this paradigm. The description of “*cognitive*” therefore tends to apply to processes such as memory, association, concept formation, language, attention, perception, action, problem solving and mental imagery. “*Cognition*” refers to the process through which the mind acquires, represents and uses knowledge (Rohmann, 2002, p.67). Although emotion was not previously thought of as a cognitive process, a great deal of research is being undertaken to examine the cognitive psychology of emotion, including individual awareness of strategies and methods of cognition, known as metacognition. The subject matter of psychology, according to Watson (as cited in Bergh & Theron, 2003), should be observable as only the observable can be studied objectively. The mere mention of consciousness and mental representations was not considered to qualify as respectable scientific discussion until the late 1950s. George Miller (1956) turned his attention to numerous studies which showed that the human capacity for thought is limited; he proposed that memory limitations can be overcome by recoding information into chunks, mental representations that require mental procedures for encoding and decoding the information (Boden, 2006).

According to Liang (2004), the world is encoded with information, and therefore essentially consists of systems embedded with varying forms of structure. Information emerged from the capacity to organise and structure systems containing information. This embedded information is not meaningful in itself until it is decoded within an environmental context, which is the process that adds to the complexity of managerial decisions—the availability of information, and the intelligence that can be derived through the process of decoding. Information processing by managers can be described in three steps (Aguilar, 1967; Hambrick & Mason, 1984): (1) “*Viewing*”—which refers to the manager's exposure to the external environment, (2) “*Search*”—which refers to the

collection of information in a structured or unstructured way, (3) “*Interpretation*—which refers to the analysis of information and the assessment of its validity and relevance.



**Figure 1.2: Global Model for Information Processing (Hambrick & Mason, 1984)**

Studies by Armernic and Beechy (1984) and Dollinger (1984) provide further support for the idea that managers who exhibit cognitive complexity process complicated and ambiguous information better. Anshoff and McDonnel (1990) distinguish between (1) the structure of cognition, which is cognitive complexity and the way thinking is organised, and (2) the content of cognition, which deals with knowledge and information.

The focus of Jaques’s research (1986) was the ability of individuals to engage in goal-directed behaviour in problem solving through cognitive processes with which they construct and pattern their world. He considered this concept in direct relation to the world of work, which he defined as “*the exercise of judgment within prescribed limits (real rules and regulations) in order to achieve a goal (objective)*”. This mental process enables individuals to deal with information complexity in terms of how it is analysed, put together, reorganised, judged and reasoned with to draw conclusions and make plans and decisions to take action (Jaques & Clement, 1994, p. 48). Building on the work of Piaget (1983), who determined that intellectual or cognitive development occurs in a

series of steps along a single maturation track, Jaques (1986) departed from this view and looked at specifically adult maturation in terms of:

- stages of maturation along particular levels of complexity that require a matching level of cognitive power, regardless of the age at which the individual reaches that level
- the differences along which individuals mature along different bands, each of which is associated with a different growth rate and potential achievable level

There is thus a maximum level of complexity that any person can cope with at a particular point in his/her development, and this depends on the level of cognitive information processing that person is capable of (Jaques & Clement, 1994). Jaques (1986) discovered that there are four basic ways in which people organise information when involved with problem solving. He refers to these as states, or types of cognitive processes which align with the four types of task complexity which. The following are the four types of cognitive process:

1. *Declarative*: Assertive processing, where reasoning takes place through one or more unconnected arguments. Information is derived from direct associations relevant to the situation at hand. Detailed information is generalised into items of information which can be categorised and used for decision making.
2. *Cumulative*: Reflective articulation where reasoning takes place through two or more linked arguments. Information is therefore organised by comparing and combining the arguments in order to reach a decision.
3. *Serial*. Linear extrapolation, where reasoning takes place through two or more cause and effect sequences. Information is linear and is logically connected to envisaged consequences.
4. *Parallel*. Alternative systems, where reasoning is done through two or more series of cause and effect sequences that are linked and interwoven. Information is dealt with in each of the serial processes in parallel with each other. The processes impact on one another and concentration is focused on categories of exceptional or critical data.

It is, however, important to note that cognitive capability in individuals does not refer to the construct that can be rated by IQ scores in terms of school performance and articulated knowledge, but rather to the ability to deal with complexity (in all spheres of

life) comfortably without being overwhelmed by it. It is, however, worth noting that the development of appropriate psychological tools and orientation is also important in terms of the successful *application* of this ability. The focus is on the maturation of cognitive power in the absence of other variables such as social and economic opportunity to exercise this power in education or employment (Jaques, 1986).

## **1.4.2 Meta-theoretical statements**

The meta-theoretical assumptions represent an important category of assumptions underlying the theories, models and paradigms that form the context for this study. Meta-theoretical values and beliefs have become part of the intellectual climate of a particular discipline in the social sciences (Mouton & Marais, 1990).

### *1.4.2.1 Industrial and organisational psychology*

Industrial and organisational psychology can be described as the application of psychological principles, theory and research to the work setting. The boundaries extend beyond the physical work environment, however, because there are factors like family responsibilities, cultural influences, employment-related legislation and other non-work events that can influence the work behaviour of individuals (Landy & Conte, 2004).

This field recognises the interdependence of individuals, organisations and society as well as the impact of factors such as government influences, consumer awareness, skills shortages and the changing nature of the workforce (Landy & Conte, 2004).

### *1.4.2.2 Organisational psychology*

The field of organisational psychology is concerned with the organisation as a system involving individuals and groups, and the structure and dynamics of the organisation (Bergh & Theron, 2003). By combining research and ideas from social psychology and organisational behaviour, organisational psychology is able to address the motivational and emotional side of work aspects, for example attitudes, fairness, motivation, stress, leadership and teams (Landy & Conte, 2004).

#### 1.4.2.3 *Theoretical models*

This study will present a literature review on the topic of complexity, theoretical capability and flow. The Stratified Systems Theory Model (Jaques, 1978), Stamp's (1981) Matrix of Working Relationships, and Csikszentmihalyi's (1975) Model of Flow will be discussed.

#### 1.4.2.5 *Conceptual descriptions*

The conceptual descriptions that are of relevance to this study are defined below:

##### a) Complexity

Complexity is defined as the number of different variables inherent in a given time and situation, the precision with which they can be clearly identified, and their rate of change (Jaques & Cason, 1994).

##### b) Theoretical capability

Theoretical capability can be defined as the decision-making process in the face of uncertainty (Stamp, 1981; Jaques 1986; Ashton & Kruger, 2010), and is therefore directly related to the individual's ability to deal with complexity. It also involves the way people's theoretical capability grows or unfolds over time (mode) (Stamp, 1981; Ashton & Kruger, 2008)

##### c) Flow

Flow can be defined as the state of total absorption in a task or activity resulting in an enjoyable experience that people will seek, even at great cost, and for the sake of enjoyment of the task or activity (Csikszentmihalyi, 1975).

##### d) Career path appreciation

The CPA process is a systematic appreciative interview lasting approximately two to four hours that links the scope of a person's capacity to exercise judgement with the

organisational requirement to do work at a particular level of complexity (Lewis, 1993). Taking the form of a “*guided conversation*” with an individual about the past, present and future of their working life, it is a procedure for exploring and understanding the relationship between people and their working lives (Lewis, 1993; Stamp 1989b; Ashton & Kruger, 2008).

### 1.4.3 Central hypotheses

The hypotheses of the study are formulated as follows:

H<sub>1</sub>: There is a significant relationship between individual Current Level of Capability (CLC) as measured by CPA 1 and CPA 2.

H<sub>2</sub>: There is a significant relationship between individual Mode as measured by CPA 1 and CPA 2.

H<sub>3</sub>: Individuals from differing gender and race will not differ significantly in CLC and Mode.

## 1.5 RESEARCH DESIGN

Sellitz (as cited in Mouton & Marais, 1990, p. 32), defines research design as the arrangement of conditions for collection and analysis of data in a manner that aims to combine relevance to the research purpose with economy in procedure. The research design will be an ex post facto correlational design using longitudinal data.

### 1.5.1 Research variables

According to Christensen (1997), a variable is any characteristic of a phenomenon that can vary across organisms, situations and environments. The focal variable in this study is theoretical capability. The dependent variable is current theoretical capability as measured by CPA 2, and the independent variable predicted current theoretical capability as measured by CPA 1, moderated by age and mode (growth curve).

### **1.5.2 Type of research**

This study will be conducted within the context of quantitative research. Quantitative research can be described as that approach to research that is more highly formalised as well as more explicitly controlled, with a range that is more exactly defined (Mouton & Marias, 1990).

### **1.5.3 Unit of analysis**

Members or elements of the population are the unit of analysis (Welman & Kruger, 1999). The unit of analysis in this research consists of individuals for which there are two CPA results in the Bioss database. They will comprise a collection of individuals that constitute the employees of various organisations in different business sectors. The scores of the biographical subgroups in particular sectors will be analysed. The external validity of the study will be ensured by the use of a structured approach in the literature review as well as by the systematic undertaking and presentation of the empirical study. A convenience sample will be used, which will limit the possibilities for generalisation to the broader population. The reliability of the instrument will be established.

## **1.6 RESEARCH METHOD**

The study consists of a literature review and an empirical study

### **Phase 1: Literature review**

Step 1: Complexity, Theoretical Capability and Flow

The first aim in this phase is to conceptualise Complexity and describe the applications of this theory within organisational practice. This will include the conceptualisation of the concept of Theoretical Capability in holistic terms in line with the Stratified Systems Theory (SST) of work complexity selected for this research, as well as the concept of Flow to provide the context. The Career Path Appreciation will be discussed as the measuring instrument for the study.



## **Phase 2: Empirical study**

The empirical study will be presented in the form of a research article in chapter 3. The research article (chapter 3) outlines the core focus of the study, the background to the study, trends from the research literature, the potential value added by the study, the research design (research approach and research method), the results, a discussion of the results, the conclusions, the limitations of the study and recommendations for practice and future research. Chapter 4 integrates the research study and discusses the conclusions, limitations and recommendations in more detail.

### **1.7 DIVISION OF CHAPTERS**

Chapter 1: Scientific orientation to the research

Chapter 2: Literature review: Complexity, Theoretical Capability and Flow

Chapter 3: Research article

Chapter 4: Conclusions, limitations and recommendations

### **1.8 CHAPTER SUMMARY**

In this chapter the research problem was presented and formulated. This was followed by a discussion of both the general aim of the study and the specific aims. The research design and methodology were presented and the divisions of the chapters indicated.

Chapter 2 presents the literature review on Complexity, Theoretical Capability and Flow.

## CHAPTER 2

### LITERATURE REVIEW: COMPLEXITY, THEORETICAL CAPABILITY AND FLOW

Chapter 2 conceptualises the constructs of Complexity, Theoretical Capability and Flow.

#### 2.1 COMPLEXITY

In scientific terms, the study of complexity can be defined as "the study of the phenomena which emerge from a collection of interacting objects" (Johnson, 2007). Definitions are often tied to the systems paradigm as it relates to a set of interrelated parts or elements. Other definitions of complex systems include the following:

- *A system that is complex, in the sense that a great many independent agents are interacting with each other in a great many ways (Waldrop, 1993).*
- *You generally find that the basic components and the basic laws are quite simple; the complexity arises because you have a great many of these simple components interacting simultaneously. The complexity is actually in the organisation—the myriad possible ways that the components of the system can interact (Waldrop, 1993).*

Complexity has been used as a metaphor to explain organisations, and is seen as an accurate description of how organisations function (Morgan, 2006). The features of organisations as complex systems are the following: **Firstly**, *sensitivity to initial conditions*. This means that a minute difference in the initial conditions can make a highly significant difference with the passage of time. The classic formulation of this comes from meteorology, when trying to investigate the properties of complex systems such as weather systems. **Secondly**, the perspective from complexity theory is that it is impossible to fully control what happens to a system, and therefore no single element can have sufficient complexity to comprehend the system as a whole. **Thirdly**, a key concept mentioned in writing about complexity and organisations is the *edge of chaos*. The term was coined by Chris Langton (Langton, 1990), when he discovered that as he changed the value of a particular variable his simulation exercises, the system suddenly exhibited ordered behaviour and then became disordered again. This is often exhibited in the organisation, especially when changes are introduced.

According to Sargut and McGrath (2011), there are three properties that determine the complexity of an environment:

1. The impact of multiplicity, which refers to the number of interacting variables.
2. The impact of interdependence in term of the interconnectedness of the elements.
3. The impact of diversity, which refers to the heterogeneity of the elements.

The more complex the environment, the greater the degree of multiplicity, interdependence and diversity present in the decision making. The result is a situation where the initial conditions do not have a predictable outcome and the relationships between the elements cannot be reduced to clearly predictable interactions (Meyers, 2009; Sargut & McGrath, 2011).

### **2.1.1 Stratified Systems Theory (SST)**

The research on these elements of complexity carried out under Jaques (1978) for approximately 35 years provided insight into the interpretation of the concept and the way it could be understood in terms of a variety of environments. Jaques's (1978) focus on measurement in the social sciences was motivated by his view that the social sciences were lagging behind the physical sciences (Bioss SA, 2002). Utilising social analysis as the research methodology, the research was essentially observational in character, without initial hypotheses or preconceptions. Jaques (1996) conducted research on his organisational theory and its implications for over fifty years, during which time he published over twenty books as well as approximately eighty articles on the subject. His aim was to establish a proper scientific route for the social sciences, grounded by his knowledge and experience in medicine, psychiatry and psychoanalysis (Stamp, 2000).

Jaques (1978) was specifically interested in the work of John Isaac and Roland Gibson on levels of abstraction, where they identified six discrete levels ranging from primitive behaviour to the development of highly abstract geometries (Jaques, 1978). The idea of levels within a managerial organisation and their interplay with complexity became the focus of his enquiry and research (Jaques, 1990). All organisations have some form of hierarchical structure or managerial organisation. Understanding the relationship between this structure and complexity of work is essential in the effective use of talent

and energy (Jaques, 1990). The consequent research conducted revealed the emergence of two complementary phenomena that fundamentally describe a framework explaining the difference between jobs in terms of time frame and uncertainty, as related to increased levels of complexity.

Jaques (1978) defines complexity in terms of the level of difficulty of the tasks a person is required to complete. He states that “*the true source of difficulty in any problem lies in its complexity*”, explaining further that “*the complexity in a task lies not in the goal but in what you have to do in order to get there*”. Jaques (1996) argues that “*complexity may be defined in terms of the number of variables that have to be dealt with in a given time in a situation, the clarity and precision with which they can be identified, and their rate of change.*” Work not only becomes more complex, but can also be separated into distinct categories of complexity based on the interplay between discretion, judgement and experience (Jaques & Cason, 1994).

Jaques (1996) constructed an instrument for measuring the maximum periods of time over which people at work are required by the organisation to exercise discretion, make judgements and commit resources on its behalf. He called this instrument 'the time-span of discretion' (TSD) and used it to produce an explicit formulation of a depth structure of levels of work (Ashton & Kruger, 2008). Jaques (1996:132) found that the manager's time-span of discretion is one of the key measurable attributes of complexity, and defined it as “*the targeted completion time of the longest task or task sequence in a role*”. Using a manager's time-span of discretion as a measure of complexity, Jaques (1996) concluded that the boundaries in a managerial hierarchy increase logarithmically from 1 day to 3 months (Level 1), 3 months to 1 year (Level 2), 1 year to 2 years (Level 3), 2 years to 5 years (Level 4), 5 years to 10 years (Level 5), 10 years to 20 years (Level 6), 20 years to 50 years (Level 7) and 50 years + (Level 8).

He also observed that at each managerial level there is an increase in complexity between the levels marked by the increased time-span, as the pathways created to achieve goals are constructed in more uncertain and abstract conditions because of the following (Lewis & Jacobs, 1992):

- there are more variables to take into account;
- more of the variables are intangible;

- there is an increasing interaction of variables; and
- results are further into the future.

Jaques's (1996, p.12) research revealed "*a series of higher and higher levels of inherent complexity in work which corresponds to the levels of capability in individuals*".

### **2.1.2 Matrix of Working Relationships (MWR)**

The Matrix of Working Relationships (MWR) was developed by Gillian Stamp (1981), and is based on research that started in the mid 1940s at the Brunel Institute of Organisational and Social Studies (Bioss) under Jaques (1978). With increased complexity, less complex levels are not obsolete, but rather become an integrated part of the new levels. The pattern that emerges is a matrix where the vertical axis represents extension into wider contexts and increased complexity, and the horizontal axis represents the different themes of the work needed to cope with them. The key point here is that the work of one level is incorporated into the work of the next, but the work at the new level is different in type—different in two ways.

- **First**, there is the fact that a new element is added.
- **Second**, the work of the preceding level is now understood and appreciated in a new, more complex way (Ashton & Kruger, 2008).

Each level of work is therefore a necessity and has its own unique value to add within the environment in which it achieves objectives. As the environment presents more uncertainty and complex challenges, a new and different level of work needs to emerge to adequately deal with the challenge. At this new level, work has a different character in that it includes a more complex perception of the previous levels, plus an extra dimension of its own. The levels of complexity identified are summarised in the table 2.1 below.

**Table 2.1: Levels of Complexity (Stamp, 1991)**

| Level | Theme and Objective   | Responsibilities  | Creativities<br>Vulnerabilities  |
|-------|---|---|--|
| 7     | <p><b>CORPORATE PRESCIENCE</b></p> <p>Judge the needs of current and nascent societies and regional groupings and decide what types of strategic entities to provide in the future to satisfy them.</p> | <ul style="list-style-type: none"> <li>- Stating and disseminating the vision and values of the institution;</li> <li>- Designing contexts for the future of the institution in locations or activities that may appear peripheral but will eventually be seen to have strategic advantage;</li> <li>- Producing new strategic units by acquisition, merger or joint venture and, where appropriate, divesting;</li> <li>- Considering how the values of the corporation may best be expressed in host cultures with different value systems and social and political economies.</li> </ul> | <ul style="list-style-type: none"> <li>- Generating images and designs for new forms of institution that will contribute to viability in as yet undefined conditions, nations, groupings of nations.</li> </ul> <p>For example:</p> <ul style="list-style-type: none"> <li>- Members of the world-wide body of the Anglican Communion considered how it might be possible to contribute to shaping future alignments of nations. This required influence not only through the belief of individual members but also through a sensitive and low-key institutional presence in specific places judged to be potentially open to Christian influence;</li> </ul> <p>Members of the Main Board of a global company created two new strategic units dedicated to technologies and organisational structures that could have a substantial influence on socio-economic conditions in newly industrialising nations.</p> |

| Level | Theme and Objective   | Responsibilities  | Creativities   | Vulnerabilities   |
|-------|---|---|--|---|
| 6     | <p style="text-align: center;"><b>CORPORATE CITIZENSHIP</b></p> <p>The economic, social, technological, political, religious and ecological contexts for existing strategic units</p> | <ul style="list-style-type: none"> <li>• Monitor, obtain, interpret and shape information re international context</li> <li>• Protect strategic units against excessive turbulence</li> <li>• Alert strategic units to opportunities, influence and pressures</li> <li>• Represent organisation in multi-national arena</li> <li>• Translate vision into mission</li> </ul> | <ul style="list-style-type: none"> <li>• A group working together as colleagues trusted in each others' fields for the sake of the whole</li> <li>• International networks of intelligence which can protect, inform and challenge strategic units</li> <li>• Long-term strategies for clusters of strategic units</li> <li>• Creation of new knowledge/ technologies with no immediately envisaged application</li> </ul> | <ul style="list-style-type: none"> <li>• Balance between looking outward to current and emergent international trends, and inward to specific national environments of strategic units</li> <li>• Tendency to emphasise one at the expense of the other</li> <li>• 'Presence' of corporation in multi-national scene</li> <li>• Vision and Mission</li> </ul> |
| 5     | <p style="text-align: center;"><b>STRATEGIC INTENT</b></p> <p>Strategic intent of institution</p> <p>External and internal well-being of organisation itself</p>                      | <ul style="list-style-type: none"> <li>• Represent organisation to external socio-economic context (through Board)</li> <li>• Be source of mission</li> <li>• Be source of both current and new technologies</li> <li>• Represent organisation to itself</li> <li>• Relate separate functions of Level 4</li> </ul>   | <ul style="list-style-type: none"> <li>• External and internal well-being of organisation, responsive, integrated and viable in face of economic, social and technological change</li> <li>• New knowledge which goes beyond a defined field with a view to potential application within a decade</li> </ul>   | <ul style="list-style-type: none"> <li>• Balance outward and inward responsibilities</li> <li>• Tendency to divide between MD and deputy, or over time between successive MDs</li> <li>• Exemplar of mission</li> <li>• Balance between symbol and detail of technologies</li> </ul>  |

| Level | Theme and Objective   | Responsibilities  | Creativities  | Vulnerabilities   |
|-------|---|---|---|---|
| 4     | <p style="text-align: center;"><b>STRATEGIC DEVELOPMENT</b></p> <p style="text-align: center;">Interaction between the mission, the current means, and 3-5 year change projects</p>   | <ul style="list-style-type: none"> <li>• Develop new means to meet changed mission</li> <li>• Coordinate and supply resources for established means</li> <li>• Terminate means that are no longer realising mission</li> </ul>  | <ul style="list-style-type: none"> <li>• Flexibility of means in response to changing ends</li> <li>• Development of new processes/ technologies to realise mission</li> <li>• Pride in balance between flexibility and established means</li> <li>• Original links between established pieces of knowledge</li> </ul>                              | <ul style="list-style-type: none"> <li>• The relationship itself - if ends unclear and/or poorly communicated, cannot translate into means</li> <li>• Assumption that improvement or operating process constitutes development</li> <li>• Coordination of operating units</li> </ul>                        |
| 3     | <p style="text-align: center;"><b>PRACTICE</b></p> <p style="text-align: center;">Current practices to provide services/making products in their own terms and for their own sake</p> | <ul style="list-style-type: none"> <li>• Imagine all possible ways</li> <li>• Select some in light of local conditions</li> <li>• Make most of people, finances and technologies in order to realise the ways chosen</li> </ul> | <ul style="list-style-type: none"> <li>• An operating unit which is an operating unity</li> <li>• Refinements of professional practice</li> <li>• Improved technological and personnel systems</li> <li>• Setting operating part of organisation in local community</li> <li>• Standing for organisation as an entity in local community</li> </ul> | <ul style="list-style-type: none"> <li>• Balance in imagining ideas - tendency towards too few or too many</li> <li>• Balance of cohesion and technologies, especially in rapid change</li> <li>• Sensitivity to local conditions</li> <li>• Balance between pride in process and clinging to it</li> </ul> |



| Level | Theme and Objective  | Responsibilities   | Creativities  | Vulnerabilities  |
|-------|--|--|---|--|
| 2     | <p style="text-align: center;"><b>SERVICE</b></p> <p>Service to situations, customers, clients, work at Level 1, purpose of organisation</p>           | <ul style="list-style-type: none"> <li>• Comprehend the particular situation by exploration and appraisal</li> <li>• State why work is to be done in a particular way</li> <li>• Explain/demonstrate how a particular task is to be done</li> </ul>                            | <ul style="list-style-type: none"> <li>• Refinement of practice with regard to particular applications</li> <li>• Vertical trust - gathering subordinates around the mission and purpose of the organisation</li> <li>• Exemplar of integrity and integration of the organisation in, for example, responsibility for recommending and enacting safety regulations</li> </ul> | <ul style="list-style-type: none"> <li>• Balance of being a part of subordinate group in actual work and apart from it on behalf of the organisation. Tendency to direct energy either to signalling differences or blurring them</li> <li>• Expectation that will represent purpose of organisation which has been poorly or ambiguously communicated</li> <li>• Balance between a proper appreciation of the particular and preoccupation with it</li> </ul> |
| 1     | <p style="text-align: center;"><b>QUALITY</b></p> <p>Making or doing something that is concrete and essential to the viability of the organisation</p> | <ul style="list-style-type: none"> <li>• Use continuous, sensuous judgement in the treatment of physical raw material as it is transformed</li> <li>• Use continuous, sensitive judgement in the treatment of people in the course of meeting their immediate needs</li> </ul> | <ul style="list-style-type: none"> <li>• Creativity of all other levels is immanent here</li> <li>• Touch and feel watchfulness for subtle variations in response to the material being worked on</li> <li>• Loyalty, lateral trust among members of the group</li> </ul>   | <ul style="list-style-type: none"> <li>• Balance between actual direct response to material in process of working and receiving instructions on how working should proceed</li> <li>• The fact that there is no need to put into words the nature of the judgements being made</li> <li>• The assumption (by others) that at this level judgement is not being exercised, and that there is therefore no need to communicate mission/ purpose</li> </ul>       |

On the basis of the research, the MWR model as illustrated in Figure 2.1, emerged as a comprehensive and useful model of organisational behaviour and dynamics (Ashton & Kruger, 2008). It describes work in terms of unique themes of complexity, where different but matching theoretical capability is required for each work theme. This model provides an alternative way of looking at organisations, their employees and their environment in a manner that provides an integrated framework or context for understanding organisational functioning, addressing important business issues, all organisational development and human capital related interventions, and it provides a common understanding of organisational complexity among diverse stakeholders (Ashton & Kruger, 2008). The Matrix of Working Relationships helps to transform aspiration into reality by demonstrating how the various themes can be interwoven within several levels of work, thereby adding unique value (Ashton, Calitz & Solms, 2009).

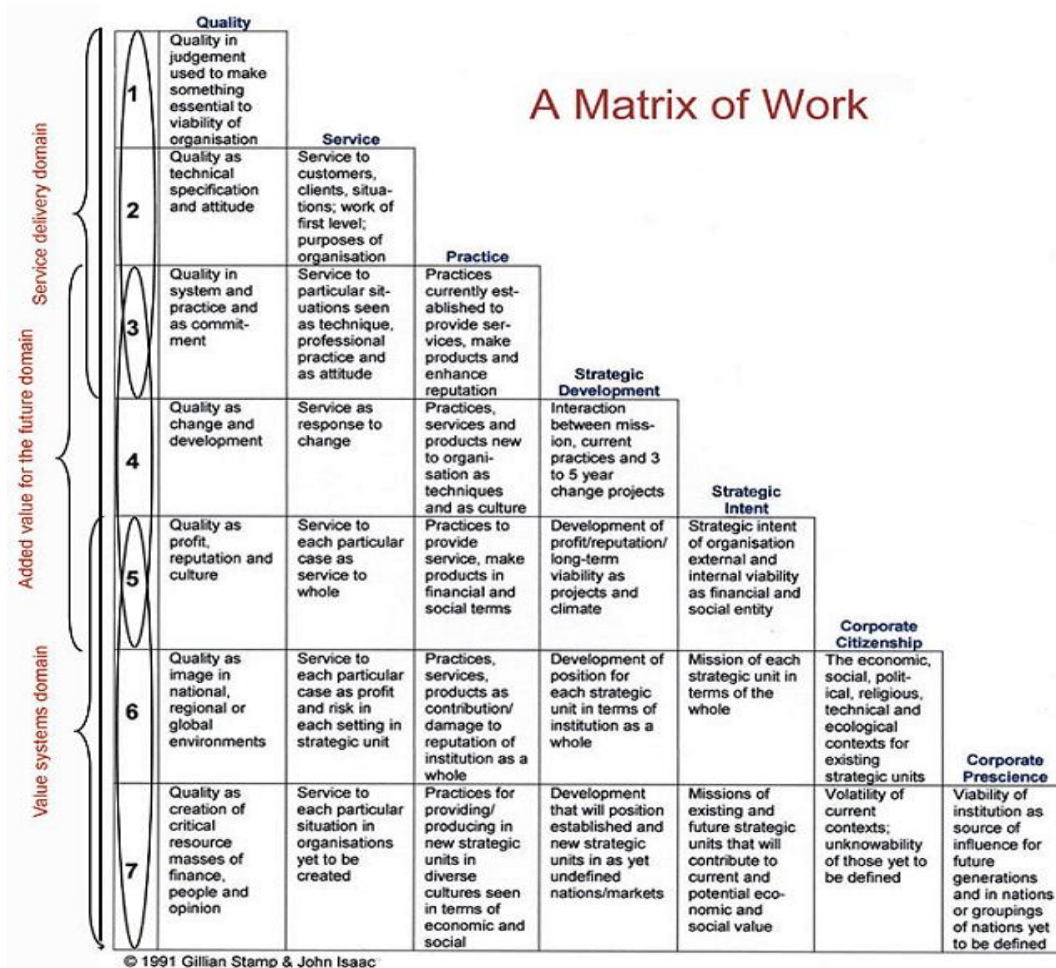


Figure 2.1: A Matrix of Work (Ashton & Kruger, 2010)

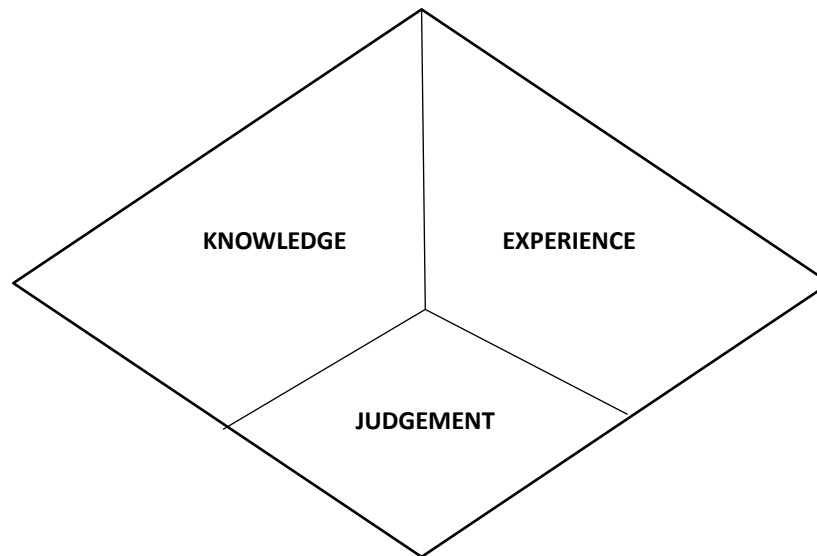
## 2.2 THEORETICAL CAPABILITY

In tracing the origin and general meaning of the word “capability”, most definitions express it as the quality of being capable; having the power or ability (skill or aptitude) necessary to do something—physically, intellectually or legally (Oxford, 2012). Capabilities can also be seen as the alternative combinations of functioning a person is feasibly able to achieve. *“Formulations of capability have two parts: functioning and opportunity freedom—the substantive freedom to pursue different functioning combinations”* (Alkire & Deneulin, 2009). A business-oriented definition states that *capability* is *“a measure of the ability of an entity (department, organisation, person or system) to achieve its objectives, especially in relation to its overall mission”*. The general implication is that the term “capability” refers to an ability that is measurable and finite, and that there is a variable (unequal) range of ability across individuals or systems (Ashton, Calitz & Solms, 2009).

Capability, in relation to SST and MWR, can be defined as the decision-making process in the face of uncertainty (Ashton, Calitz & Solms, 2009), and is therefore directly related to the individual's ability to deal with complexity. Capability involves individuals' “take” on a situation, or how they scan and read a setting or context (also known as sunesis), as well as an element of how people exercise their judgement in a particular situation (also called phronesis). Further, it involves how peoples' theoretical capability grows or unfolds over time (mode). Research studies have shown that one of the prerequisites for sound judgement is being able to “get one's head around” the complexities of the challenge presenting within a given context (Ashton & Kruger, 2008).

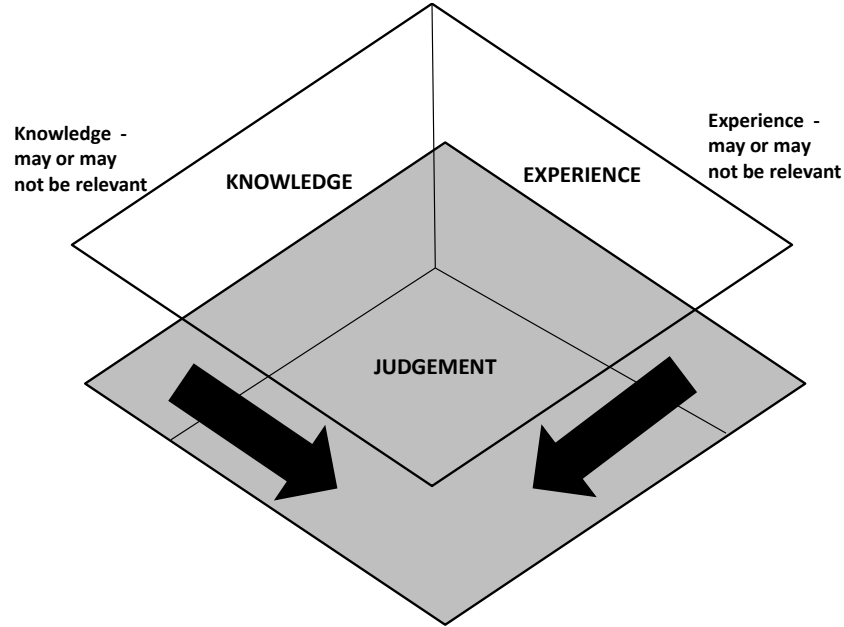
Jaques (1965) defined work as *“the application of knowledge and the exercise of discretion within prescribed limits in order to achieve a goal within a stated completion-time”*. He emphasised that, while knowledge is one of the tools of work, it is not the work itself—*“in work knowledge alone will not see you through.....you are confronted.....by problems which have no absolutely correct answer. You have to use knowledge and judgement in interaction”*. Rules of the organisation in the form of policies, procedures and other controls which are objectively set form the prescribed limits within which decision making takes place. These controls indicate the things that must be done; they define the confines of the work and environment within which discretion can be exercised. Jaques (1986) came to the conclusion that when organisations

were able to operate in familiar conditions of minimum uncertainty, judgement might be less important than knowledge and experience (as demonstrated in figure 2.2).



**Figure 2.2: Knowledge, Experience and Judgement in Stable Conditions (Jaques, 1986)**

The past two decades have seen major shifts and changes in the world of businesses and organisations. These shifts are due to various factors, including but not limited to, changes in demographics, increased globalisation, technological development and the emergence of new markets. This era has been characterised by perpetual change, and as a result of the complex nature of organisations and the environment within which they operate, people experience frequent and growing uncertainty (Ragsdell, West & Wilby, 2002). One of the consequences is a change in the knowledge/ experience/ judgement requirements. Knowledge and experience may or may not be relevant as things change, and may require continuous updating. As demonstrated in Figure 2.3, the result is that judgment—the capacity to deal with the inevitable residues of uncertainty—becomes the resource on which people need to rely in their decision making (Jaques, 1986).

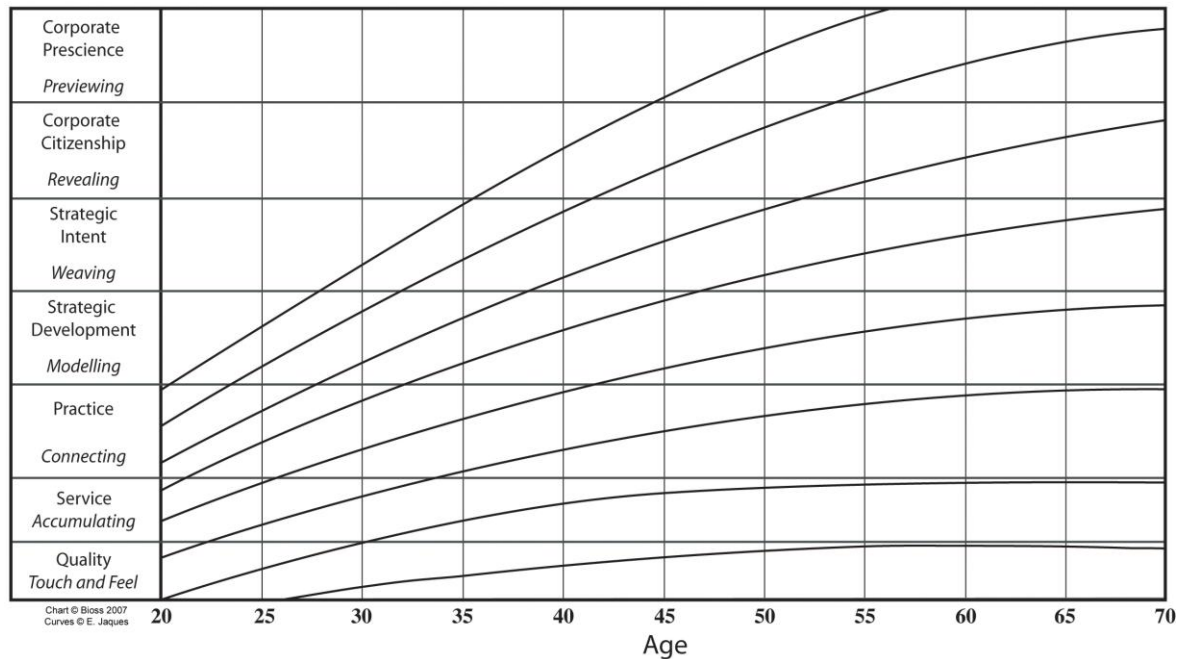


**Figure 2.3: Knowledge, Experience and Judgement in New Uncertain Conditions (Jaques, 1986)**

### **2.2.1 Growth in theoretical capability (potential capability)**

Jaques (1972) studied the earning progression of many hundreds of individuals at different levels in various organisations in the earlier part of his research, and derived an array of curves indicating regular patterns of growth of earnings. He subsequently developed the hypothesis that these curves might also represent growth in individual theoretical capability to utilise their discretion at wider and more complex levels. According to Stamp (1988), longitudinal research utilising CPA evaluations has strengthened this hypothesis and it now forms the basis of a set of growth curves based on the evidence that:

- the theoretical capability of individuals grows at different but broadly predictable rates throughout adult life;
- as individuals mature, they are able to take responsibility and carry accountability for different levels of work.



**Figure 2.4: An Array of Growth Curves (Stamp, 1988)**

The growth in “theoretical capability” therefore refers to “*what you do when a decision does not fall out of the data*”—you use your judgement and discretion. As illustrated in Figure 2.4, these growth curves are grouped into “development curves”, which indicates an active link between individual theoretical capability and the organisational level of work requirement, as well as the maximum point of development in the corresponding level of work (Stamp, 1988).

### 2.3 FLOW

Flow can be defined as the mental state of operation in which the person is fully immersed in what he or she is doing by a feeling of energised focus, full involvement, and success in the process of the activity (Csikszentmihalyi, 1975). When a person is in flow, energy and emotion are focused and aligned to the task at hand. Being in flow can cause spontaneous joy and a feeling of psychological and physical wellbeing.

Csikszentmihalyi and Rathunde (1993) identify the following ten factors as accompanying an experience of flow:

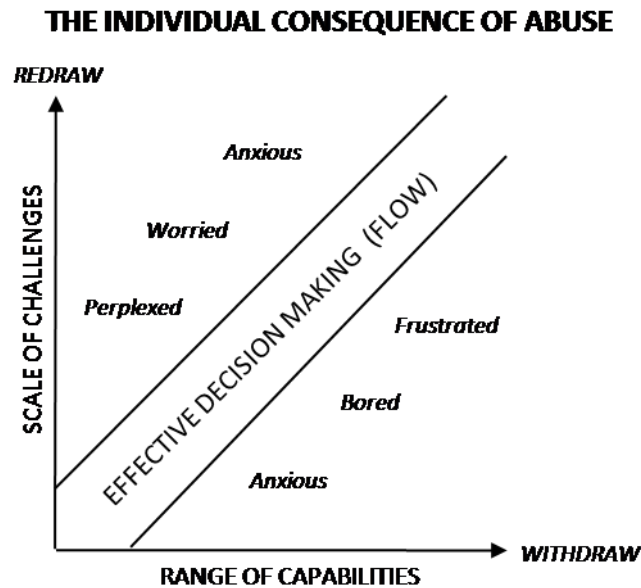
1. Goals are attainable. The challenge of the role aligns appropriately with one's skills set and capabilities.
2. High concentration and engagement in the activity, with the opportunity to focus and to delve deeply into the task.
3. A loss of self-consciousness, and the merging of action and awareness.
4. One's subjective experience of time is distorted, and it seems to pass quickly.
5. Successes and failures in the course of the activity are apparent.
6. Balance between ability level and challenge
7. A sense of personal control over the situation, task or activity.
8. The activity is intrinsically rewarding and meaningful, so there is an effortlessness of action.
9. A lack of awareness of bodily needs such as hunger or fatigue.
10. Absorption in the activity with the merging of action and awareness.

Csikszentmihalyi (2003) further states that with increased experiences of flow, people experience “*growth towards complexity*”, in which people flourish as their achievements grow, and with that comes the development of increasing “*emotional, cognitive, and social complexity*”. But the situation is never static and as the balance between complexity and capabilities slips perplexity or frustration may emerge (Csikszentmihalyi, 2003). If the balance is not restored, the activity or task demands more energy; self-awareness becomes self-consciousness which may be expressed in worry or boredom. When challenges and capabilities are severely out of balance, a state of considerable anxiety, also described as “*self-clumsiness*” takes over (Csikszentmihalyi, 2003; Ashton & Kruger, 2010). The consequences for the individual are summarised in figure 2.5 below.

Mismatch between capabilities and challenges/work complexity can be thought of as abuse, which can take the following forms:

- **abuse as misuse** - when the work to be done outstrips what a person feels able to do;  
or

- **abuse as disuse** - when what there is to do fails to challenge what a person feels capable of doing



**Figure 2.5. Individual Experience of Work (Csikszentmihalyi, 2003)**

For a misused person whose challenges/complexity at work slightly outweigh his/her capabilities, the experience is perplexity and the person finds it difficult to:

- distinguish between what should be done now and what could be delegated
- resist the temptation to do those things which make him/her feel good
- avoid working long hours (Csikszentmihályi, 2003)

When misuse is more extreme, individuals become worried as they find it difficult, for example, to:

- order actions and set them in an order;
- choose between alternative courses; and
- judge the correct moment to act.



In the most extreme cases of misuse, individuals become anxious as they become completely overwhelmed by uncertainty and they begin to undergo the experience of being unable to function.

This position leads to one of two outcomes. The individual either:

- withdraws by leaving the organisation; or
- redraws his or her role by tapering the boundaries, denying the complexity of the work, and settling down to work at a lower level that does not meet organisational needs (Csíkszentmihályi, 2003).

When a person is disused and the theoretical capability exceeds the challenge/complexity of the work:

- frustration and boredom increase;
- tasks are increasingly perceived as chores;
- the level of work is too low to encourage engagement; and
- there is a propensity to oscillate between lack of enthusiasm and artificial enthusiasm.

In the most extreme case of disuse, individuals become anxious as the familiar overwhelms the unfamiliar. They begin to experience an inability to function, and lose touch with their own sense of theoretical capability (Csíkszentmihályi, 2003).

This position leads to one of two outcomes:

- the individual either disengages; or
- change his or her role by expanding its boundaries and then tries work at a higher level of complexity than the level required by the organisation (Csíkszentmihályi, 2003).

Ultimately, both misused and disused individuals represent a pool of wasted human resources.

Both individuals and organisations can benefit from ensuring that individuals are in flow with their work demands by:

- matching each individual's current level of theoretical capability with work pitched at an appropriate level; and
- ensuring that account is taken of each individual's growing potential capability over time (Ashton & Kruger, 2008);

## **2.4 IMPLICATIONS FOR TALENT MANAGEMENT PRACTICES**

Organisations are increasingly becoming aware of the need to utilise all possible assets not only to survive, but also to achieve competitive advantage in these turbulent times. In a recent study, 85% of respondents saw capitalising on human capital and leveraging of intellectual assets as vital to achieve their strategic goals (Lawler, 2008). Yet, it seems that companies are sometimes at a loss as to what this implies, and what developments in systems and practices are required. The following quote summarises this apparent gap between the growing reality and actual practice: *“We spend four months per year on the budget process, but we hardly spend any time talking about our talent, our strengths and how to leverage them, our talent needs and how to build them. Everyone is held accountable for their budget. But no one is held accountable for the strength of their talent pool. Isn't it the talent we have in each unit that drives our results? Aren't we missing something?”* Jim Robbins, CEO of Cox Communications (Handfield-Jones, Michaels & Axelrod, 2001). Talent Management has been put forward as the practice-based solution for the past few years, but it seems that organisations are still finding it difficult to align strategy with systems and practices in this context.

Talent can be described as people with exceptional abilities, especially a company's most valued employees (Lawler, 2008). Referring to talent as something of value, this definition goes further by indicating that this value lies in the potential, abilities and skills of individuals in line with organisational requirements. Talent is also described as an indicator of one's capacity to learn, grow, and develop new skills for future use (Lawler, 2008; Tarique & Schuler, 2010). This includes the speed with which people or organisations adapt to new challenges.

According to Gratton and Ulrich (2009), talent is bigger than individuals: *“general and targeted individual competencies—what people know, do and value—and organisational capabilities ...*

*that create sustainable value for multiple stakeholders —employees, customers and investors”* (Gratton & Ulrich, 2009). As stated in the CEO’s Guide to Talent Management: *“a structured talent management process will systematically close the gap between the human capital an organization currently has and the leadership talent it will eventually need to respond to tomorrow’s business challenges. Because it is aimed at building leadership strength in depth, it creates flexibility to meet rapidly changing market conditions”* (Wellins, Smith & Rogers, 2010). Talent Management therefore implies finding and retaining the right people to deal with the theoretical capability to grow and deal with the increasing complexity of the changing organisational context.

As individuals we try to find challenges that stretch but do not overwhelm or underwhelm us in each stage of our growth. A leader is responsible for combining and pacing those individual growth paths for the good of the organisation as well as the individuals themselves. According to Stamp (2000), the CPA provides results indicating the likely rate of growth in theoretical capability and organisations can therefore make more informed decisions regarding the pacing and preparation of employees for additional responsibilities to ensure a continued flow and engagement experience, and is therefore a valuable tool enabling organisations to find and utilise resources optimally within their organisational context.

## **2.5 CHAPTER SUMMARY**

This chapter presented the literature review relating to this study. Complexity, theoretical capability and flow have all been conceptualised in this chapter by summarising previous views on and definitions of the constructs. The main concepts relevant to these three constructs were also identified and briefly explained.

Chapter 3 discusses the empirical findings of the study in the form of a research article.

## CHAPTER 3

### \*RESEARCH ARTICLE: ASSESSING THE ACCURACY OF THE GROWTH IN THEORETICAL CAPABILITY AS PREDICTED BY CAREER PATH APPRECIATION (CPA) 1 VS CPA 2

#### ABSTRACT

**Orientation:** The need for the identification and appropriate development of talent in organisations has led to a renewed interest in the accuracy of tools used to identify the theoretical capability of individuals, and their rate of growth over time.

**Purpose:** The objectives of the study were to: (1) determine whether there is a significant difference in the growth in theoretical capability as predicted by Career Path Appreciation (CPA) 1 and CPA 2 among the sample population, (2) determine whether there is a significant difference in Mode as predicted by CPA 1 and CPA 2 among the sample population, and (3) formulate recommendations for Talent Management and Industrial and Organisational Psychology practices and future research.

**Motivation for the study:** The CPA has become an increasingly important tool for the selection and development of talent nationally and internationally. Limited recent test-retest research has been done regarding the utilisation of the CPA in this context. Scholars in the field of industrial psychology and human resources could therefore benefit from follow-up research regarding the validity and reliability of the CPA.

**Research design, approach and method:** The research design is an ex post facto correlational design using longitudinal data of a sample of convenience (N=527) within the Bioss SA database.

**Main findings:** It is clear from the analysis that the assessment scores taken at different times on the same person correlate strongly, and these correlations are highly statistically significant for both Current Level of Capability (CLC) and Mode.

**Practical/managerial implications:** The CPA as a measure of theoretical capability is consistently accurate between measures and can be used with confidence for the identification and development of talent within organisations.

**Contribution/value-add:** These findings contribute to the consistent follow-up research required in the context of ensuring the reliability of tools utilised in the recruitment and development of employees in organisations.

**Key terms:** Stratified Systems Theory, Matrix of Working Relationships, cognition, complexity, theoretical capability, potential, mode, growth curve, flow, talent management.

### **3.1 INTRODUCTION**

The following section aims to clarify the focus and background of the study. General trends found in the literature will be highlighted, and the objectives and potential value added by the study will be outlined.

#### **3.1.1 Key focus of the study**

Although South Africa has made tremendous strides in resolving political, economic and social challenges, the shortage of professional and managerial skills remains an obstacle to future economic growth. Acknowledging this constraint, the government is paying renewed attention to skills development as a method of delivering greater efficiency, increased productivity and higher levels of competitiveness (National Planning Commission, 2011). Within this context, there is an increasing need for the selection, development and retention of individuals with the required organisational skills and abilities (Pankl, Theiss-White & Bushing, 2010). Scientific devices and methods are used to enhance the employers' decision making in this regard, by providing scientific information regarding the individual. From the perspective of South African labour law, and in view of the increasingly litigious nature of the working community, there will be increasing pressure to offer adequate and persuasive evidence relating to the validity of tools on a continuous basis (Mauer, 2008).

The CPA has been used extensively in the context of the selection and development of talent. The specific benefits of the instrument include the following: 1) It is based on Appreciative principles, and the process is therefore aimed at valuing the individual, and not just deriving an outcome. 2) Potential can be identified without a strong influence being exerted by the variables of opportunity to participate in development activities and exposure, as personal experiences are also incorporated, and nonverbal activities utilised. 3) It is a time-sensitive review mechanism and can therefore help to ensure the appropriate “pacing” of career opportunities as they grow over time (Ashton & Kruger, 2010). The key focus of the study is to evaluate the consistency of CPA results under circumstances of repetition conducted with different practitioners.

### **3.1.2 Background to the study**

Talent Management has developed a field of practice that aims to support organisations in leveraging key human capital in order to survive and thrive in this context (Cappelli, 2008a). The purpose of talent management is to ensure that an organisation has the right talent with the right skills at the right time (Meyer, 2005; Tarique & Schuler, 2010; Goldsmith & Carter, 2010; Berger & Berger, 2011).

Devices and methods used to predict individuals' competence and behaviour in a job context have been coming under mounting scrutiny in the international arena (Mauer, 2008). This is associated with the position adopted by the International Labour Organisation, which is that practitioners need to ensure that the methods employed for the measurement of human abilities, traits and behaviours comply with the guidelines set out by the relevant governing institutions—locally and globally (Nzama, De Beer & Visser, 2008). Organisations using and providing these instruments therefore need to ensure their compliance, but many organisations still do not continuously research the validity of the methods utilised to make selection or development decisions (Hoffman & McPhail, 1998; Edenborough, 2005; Rees & French, 2010).

### **3.1.3 Trends from the research literature**

The Career Path Appreciation (CPA) is an instrument used in the recruitment, mentoring and development of people in a variety of organisations and industries, both locally and internationally (Stamp, 1989). Strong evidence that the CPA was a valid predictor of the level of work that individuals were likely to attain was provided in Stamp's (1988a) study in terms of the predicted incomes of the sample group, in comparison with their actual incomes at the time of the study. In summary, the validity coefficients were  $r = 0.79$ ,  $p \leq 0.001$  for a subsample of 182,  $r = 0.70$ ,  $p \leq 0.001$  for a subsample of 84, and  $r = 0.89$ ,  $p \leq 0.001$  for a subsample of 76. When utilising an advanced version of CPA (Stamp, 1989b), the findings were even better, with correlations of  $r = 0.93$ ,  $p \leq 0.001$  for a subsample of 59, and  $r = 0.92$ ,  $p \leq 0.001$  for a subsample of 124.

These results were significant in the context of the time of writing of the article, when experts used to say that whatever measure might have been used to predict future job performance, the validity coefficient would inevitably be 0.30. Although there has been a development in this

thinking, it is still quite unusual for validity coefficients of 0.60 to be reported in similar studies (Mauer, 2008).

In terms of biographical differences, the studies conducted by Stamp and Retief (1996), Retief (2003), Percival, Crous and Schepers (2003) and Kitching (2005) showed the CPA is free of gender bias. Studies that concluded the CPA is free of race bias are, Bluen (1995), Mauer (1997), BioSS SA (1999), Retief (2003) and Percival, Crous and Schepers (2003).

#### **3.1.4 Research objectives**

The objectives of the study were to: (1) determine whether there is a significant difference in the growth in theoretical capability as predicted by CPA 1 and CPA 2 among the sample population, (2) determine whether there is a significant difference in the mode as predicted by CPA 1 and CPA 2 among the sample population, and (3) formulate recommendations for Talent Management and Industrial and Organisational Psychology practices and future research.

#### **3.1.5 The potential value-add of the study**

The Brunel Institute of Organisational and Social Studies (BioSS), as an international organisation, as well as the growing number of scholars in the field of Industrial Psychology and Human Resources, would undoubtedly benefit from follow-up research on the accuracy of the CPA (Mauer, 2008). From the perspective of South African labour law, and in view of the increasingly litigious nature of the working community (Mauer, 2008; Gondwe, 2011), there is likely to be increasing pressure to offer adequate and persuasive evidence relating to the validity of the CPA on a continuous basis (Mauer, 2008). The key focus of this study will be to evaluate the consistency of CPA results under circumstances of repetition and with different practitioners.

#### **3.1.6 Literature review**

The following section provides an overview of the theoretical constructs in terms of the CPA.

### 3.1.6.1 Complexity

Definitions of complexity are often tied to the systems paradigm as it relates to a set of parts or elements which are interrelated. Other definitions of complex systems include the following:

- *system that is complex, in the sense that a great many independent agents are interacting with each other in a great many ways* (Waldrop, 1993).
- *You generally find that the basic components and the basic laws are quite simple; the complexity arises because you have a great many of these simple components interacting simultaneously. The complexity is actually in the organisation—the myriad possible ways that the components of the system can interact* (Waldrop, 1993).

The research on these elements of complexity carried out under Jaques's (1996) auspices showed the emergence of two complementary phenomena that fundamentally describe a framework explaining the difference between jobs in terms of time frame and uncertainty, as it relates to increased levels of complexity. He states that "*the true source of difficulty in any problem lies in its complexity*", and adds that "*the complexity in a task lies not in the goal but in what you have to do in order to get there*". Jaques (1996) argues that "*complexity may be defined in terms of the number of variables that have to be dealt with in a given time in a situation, the clarity and precision with which they can be identified, and their rate of change*". Work not only becomes more complex, but it can also be separated into distinct categories of complexity based on the interplay between discretion, judgement and experience (Jaques & Cason, 1994).

*Level 1 (Quality Theme):* Time span up to three months, with direct judgement following a linear path while concrete actions are performed.

*Level 2 (Service Theme):* Time span of three months to one year, utilising diagnostic accumulation to customise solutions in order to resolve specific situations.

*Level 3 (Practice Theme):* Time span between one and two years, using serial processing to make decisions about alternative paths in ensuring effectiveness and efficiency through best practice methodologies.

*Level 4 (Strategic Development Theme):* Time span from two to four years using parallel processing to make decisions regarding the alignment of current means with future intent or organisational mission.



*Level 5 (Strategic Intent Theme):* Time span of five to ten years using declarative judgement to ensure the external and internal wellbeing of the organisation as well as determine the strategic intent.

*Level 6 (Corporate Citizenship Theme):* Time span of ten to twenty years, using whole world diagnostic accumulation to create sustainable economic, social, technological, political, religious and ecological contexts for existing strategic units.

*Level 7 (Corporate Prescience Theme):* Time span of more than twenty years to judge the needs of current and future societies and regional groupings, and decide what types of strategic entities to provide in future to satisfy their needs.

### 3.1.6.2 Theoretical capability

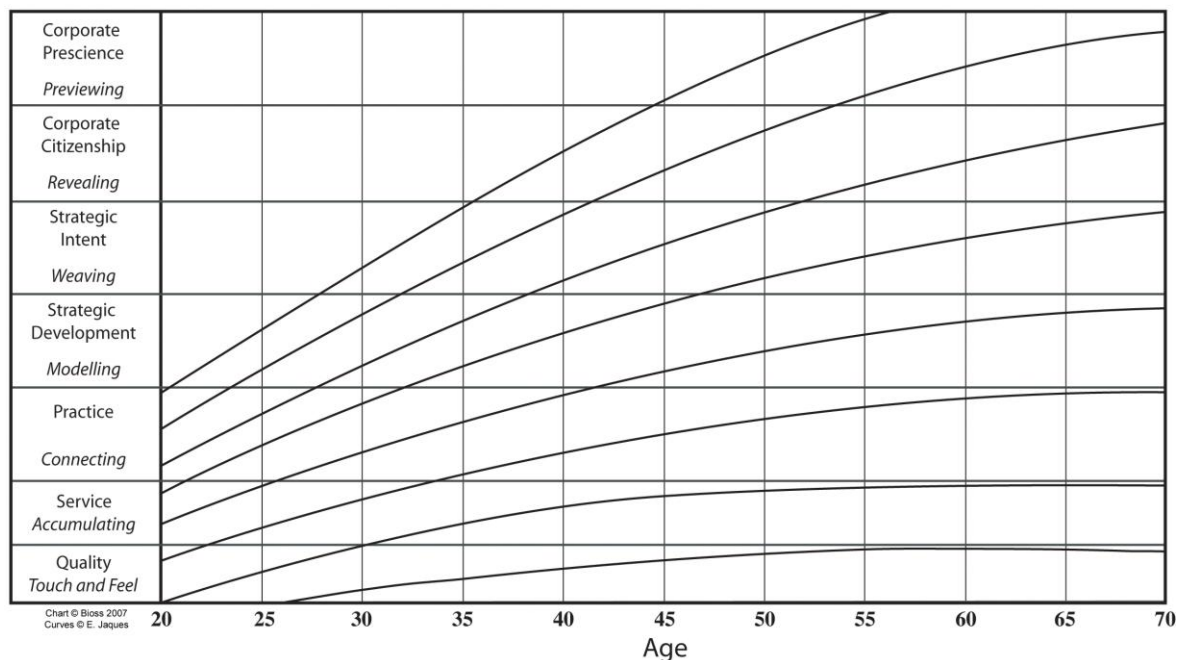
In tracing the origin and general meaning of the word “capability”, most definitions express it as the quality of being capable; having the power or ability (skill or aptitude) necessary to do something—physically, intellectually or legally (Oxford, 2010). A business-oriented definition states that *capability* is “a measure of the ability of an entity (department, organisation, person or system) to achieve its objectives, especially in relation to its overall mission”. The general implication is that the term *capability* refers to an ability that is measurable and finite, and that there is a variable (unequal) range of ability across individuals or systems (Ashton, Calitz & Solms, 2009).

Capability, in relation to Stratified Systems Theory (SST), can be defined as the decision-making process in the face of uncertainty (Ashton, Calitz & Solms, 2009), and is thus directly related to the individual's ability to deal with complexity. Capability involves individuals’ “take” on a situation, or how they scan and read a setting or context (also known as sunesis), as well as an element of how people exercise their judgement in a particular situation (also called phronesis). It also involves the way people’s theoretical capability grows or unfolds over time (mode) (Ashton & Kruger, 2008).

In order to understand how capability grows over time, Jaques studied the earning progression of many hundreds of individuals at different levels in various organisations in the earlier part of his research, and derived an array of curves indicating regular patterns of growth of earnings (Jaques, 1986; Jaques, 1996). He subsequently developed the hypothesis that these curves

might also represent growth in the theoretical capability of individuals to utilise their discretion at wider and more complex levels (Jaques, 1986; Jaques, 1996; Ashton & Kruger, 2008). According to Stamp (1988), longitudinal research utilising CPA evaluations has strengthened these hypotheses and it now forms the basis for a set of growth curves based on the evidence that :

- the theoretical capability of individuals grows at different but broadly predictable rates throughout adult life;
- as individuals mature, they are able to take responsibility and carry accountability for different levels of work.



**Figure 3.1: An Array of Growth Curves (Stamp, 1988)**

The growth in *theoretical capability* therefore refers to “*what you do when a decision does not fall out of the data*”—you use your judgement and discretion (Stamp, 1988). As illustrated in Figure 3.1, these growth curves are grouped into *development curves*, which indicates an active link between individual theoretical capability and the organisational level of work requirement, as well as the maximum point of development (potential capability) in the corresponding level of

work (Stamp, 1988). Matching individual growth in capability with the corresponding level of work is critical in maximising individual capability and inducing a state of *flow* (Csikszentmihalyi, 1975; Csikszentmihalyi, 2003).

### 3.1.6.3 *Flow*

Flow can be defined as the mental state of operation in which the person is fully immersed in what he or she is doing by a feeling of energised focus, full involvement, and success in the process of the activity (Csikszentmihalyi, 1975). When in flow, energy and emotion are focused and aligned to the task at hand. Being in flow can cause spontaneous joy and a feeling of psychological and physical wellbeing.

Csikszentmihalyi (2003) further states that with increased experiences of flow, people experience “*growth towards complexity*”, in which people flourish as their achievements grow, and with that comes development of increasing “*emotional, cognitive, and social complexity*”.

But the situation is never static and, as the balance between complexity and capabilities slips, perplexity or frustration may emerge (Csikszentmihalyi, 2003). If the balance is not restored, the activity or task demands more energy; self-awareness becomes self-consciousness which may be expressed in worry or boredom (Csikszentmihalyi, 2003). When challenges and capabilities are severely out of balance, a state of considerable anxiety, also described as “self-clumsiness” takes over (Ashton & Kruger, 2010).

As individuals we try to find challenges that stretch but do not overwhelm or underwhelm us in each stage of our growth. A leader is responsible for combining and pacing those individual growth paths for the good of the organisation as well as the individuals themselves (Handfield-Jones, Michaels & Axelrod, 2001; Goldsmith & Carter, 2010). The CPA provides results that indicate the likely rate of growth of theoretical capability and organisations can therefore make more informed decisions in the pacing of and preparation for additional responsibilities to ensure continued flow and engagement experience (Stamp, 2000), and is thus a tool that enables organisations to find and utilise resources optimally within their organisational context.

In light of the preceding literature review, the following hypotheses will be empirically tested:

H<sub>1</sub>: There is a significant relationship between individual current level of capability (CLC) as measured by CPA 1 and CPA 2.

H<sub>2</sub>: There is a significant relationship between individual Mode as measured by CPA 1 and CPA 2.

H<sub>3</sub>: Individuals from differing gender and race will not differ significantly in CLC and Mode.

## **3.2 RESEARCH DESIGN**

The review of the relevant literature briefly outlined in the preceding introduction constitutes the foundation for the research design and the methodology presented in this section.

### **3.2.1 Research approach**

The research design will be an ex post facto correlational design using longitudinal data.

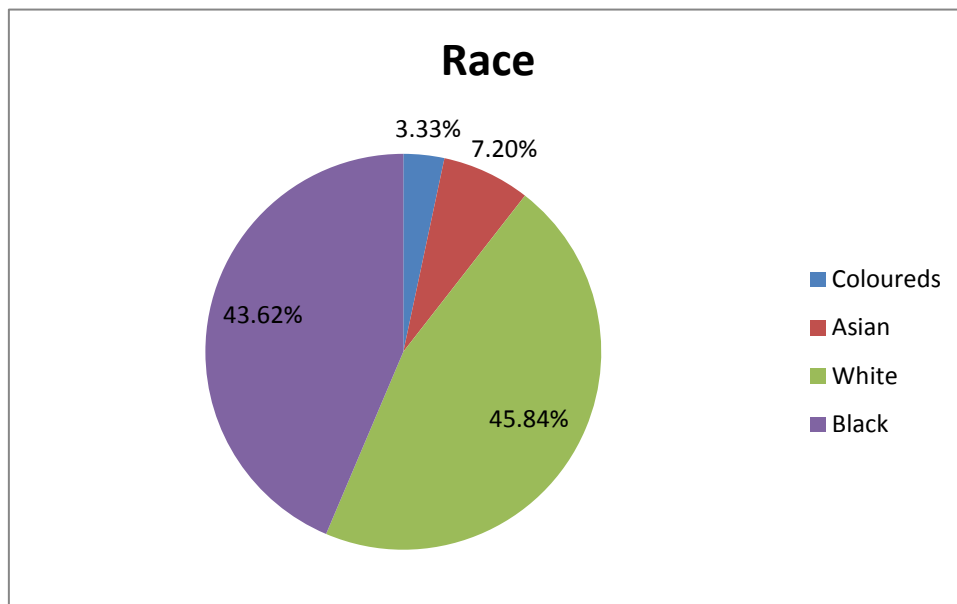
### **3.2.2 Research method**

This section discusses the research method followed in this study in terms of the research participants, measuring instrument, research procedure and statistical analyses.

#### *3.2.2.1 Research participants*

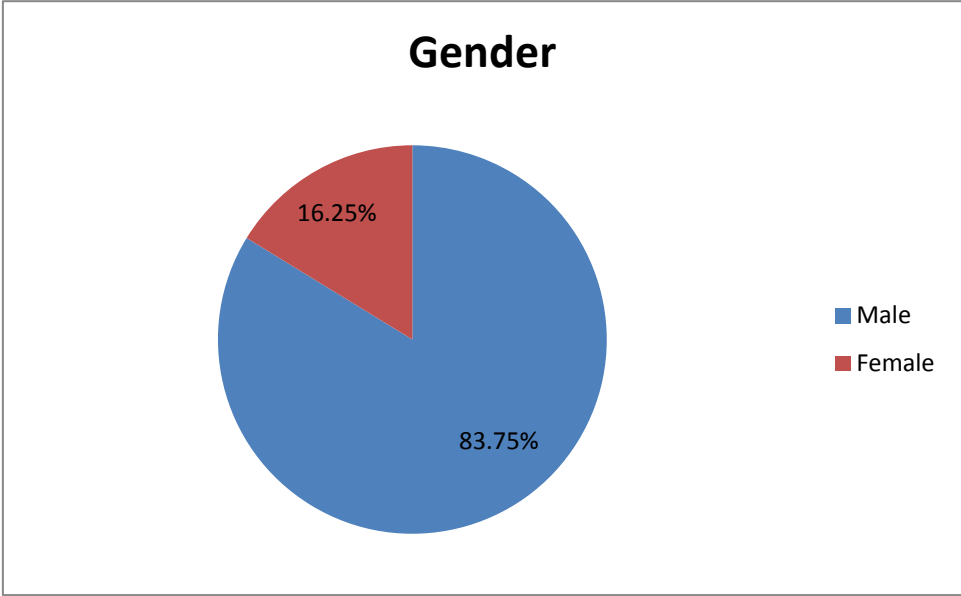
The data was extracted from the Bioss SA Genie database, which houses the data of the entire population of CPAs that have been completed internationally, for the following variables: date of birth, dates of first and second applications, age at first and second applications, Current Level of Capability at first and second applications, Mode at first and second applications, practitioner at first and second applications, highest level of education at first and second applications, job category at first and second applications, nationality, race, and gender. Out of approximately 75,000 records in the database, **527** useable records were found, and a convenience sample

was therefore used. Unfortunately, not all records were complete. The reasons for the missing data appear to be attributable to errors in capturing the data, failure by practitioners to source the data, or an excess of political correctness.



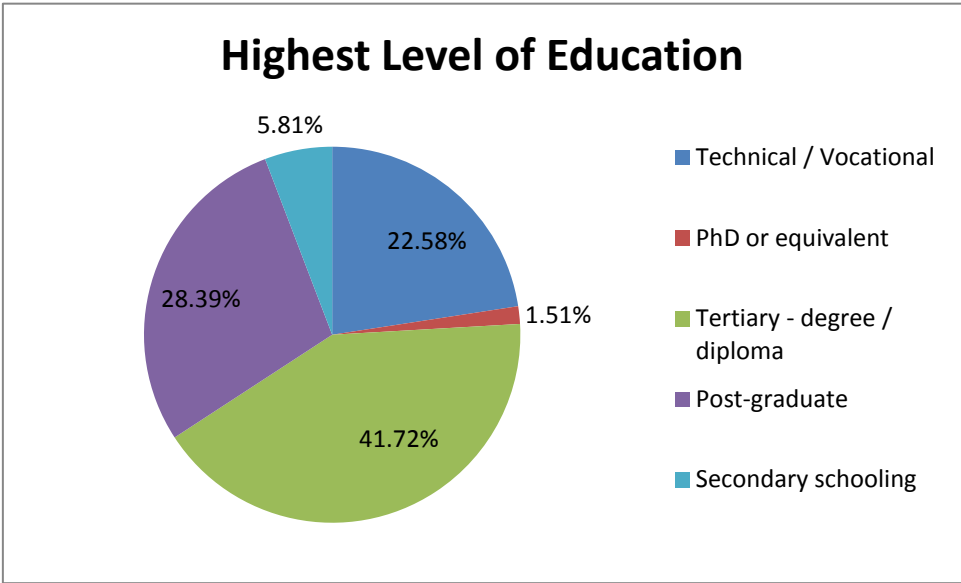
**Figure 3.2: Pie chart percentages according to race categories**

Of the 527 case records, information on race was available for 454 candidates. As depicted in Figure 3.2, it should be noted that the percentages of Coloureds and Asians were 3.3 and 7.2 respectively, which certainly implies that their results should be interpreted with a good deal of care. One candidate was listed as “Hispanic” and was treated as white in the more detailed analyses.



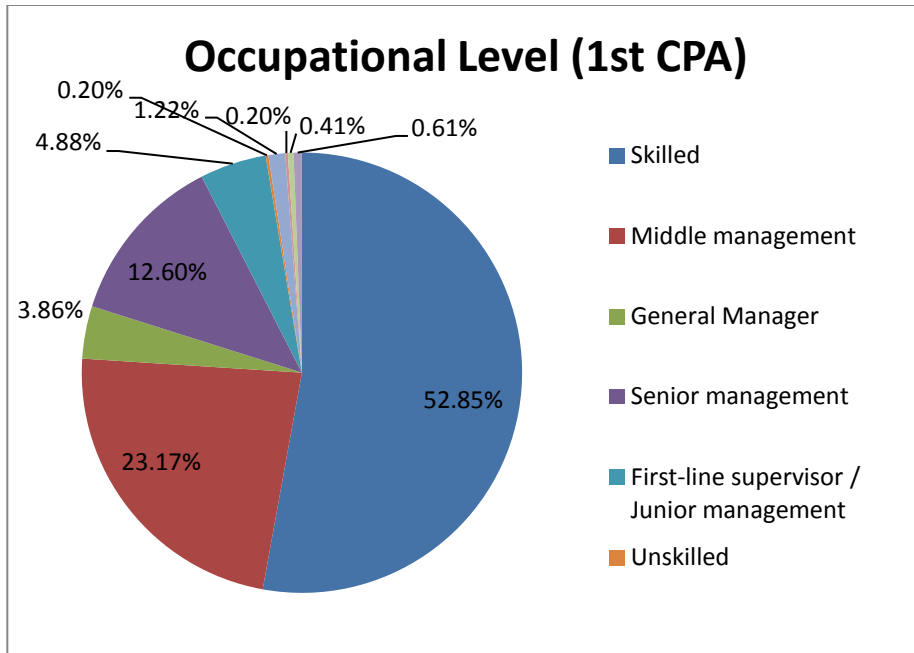
**Figure 3.3: Pie chart percentages according to gender categories**

As illustrated in Figure 3.3, there were 84% males and 16% females in the sample.



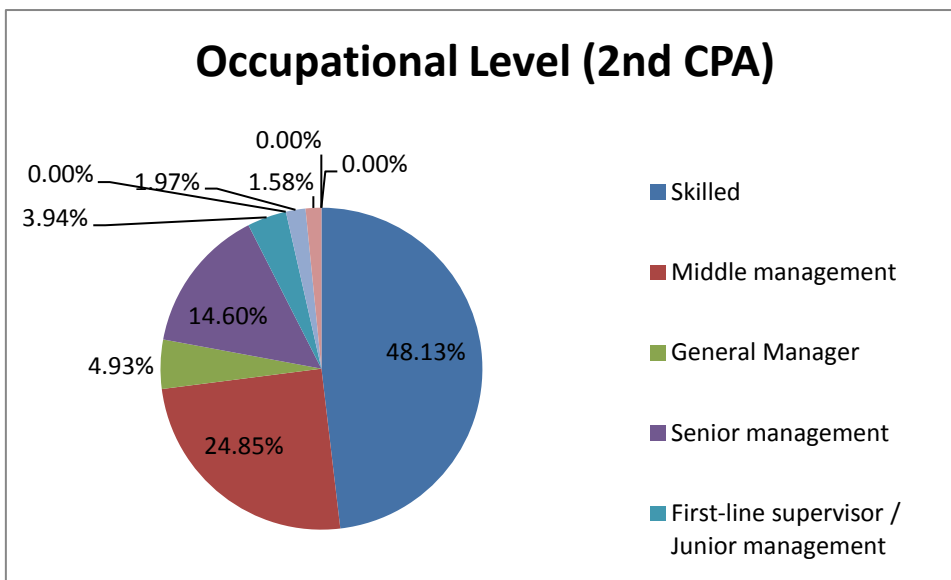
**Figure 3.4: Pie chart percentages according to highest level of education categories**

As evident in Figure 3.4, participants with Technical/Vocational training made up 22.58% of the sample, PhD or equivalent 1.51%, Tertiary degree/diploma 41.72%, Post-graduate 28.39, and Secondary schooling 5.81%.



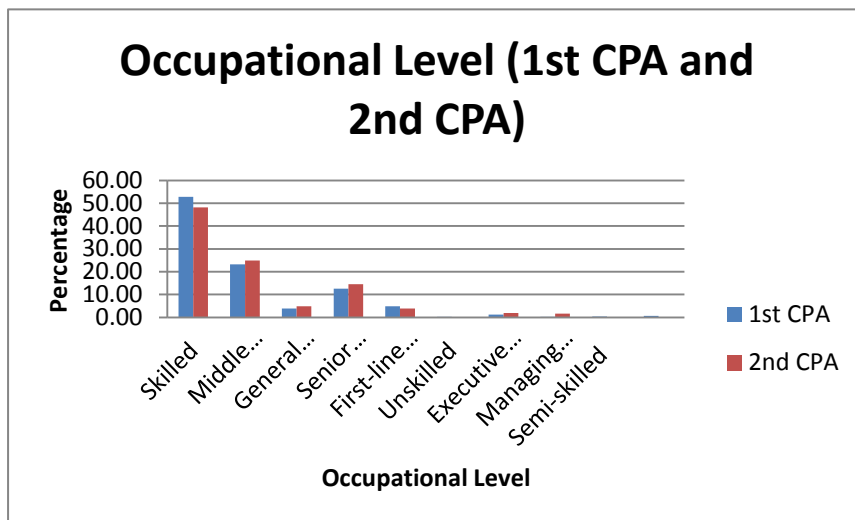
**Figure 3.5: Pie chart percentages according to occupational level categories (first CPA)**

As illustrated in Figure 3.5, more than half of the candidates occupied skilled positions (52.85%), while 23.2% were middle managers, 12.6% senior managers, 3.9% general managers, and 1.4% occupied positions as chief executive officers and executive directors at the first CPA.



**Figure 3.6: Pie cart percentages according to occupational level categories (2nd CPA)**

As depicted in Figure 3.6 and 3.7, more than half of the sample group occupied skilled positions at the second CPA (52.85%), while 23.2% were middle managers, 12.6% senior managers, 3.9% general managers, and 1.4% occupied positions as chief executive officers and executive directors.



**Figure 3.7: Bar graph percentages of occupational level categories (CPA 1 vs CPA 2)**

### 3.2.2.2 Measuring instrument

The CPA process is a complex interview of approximately two to four hours that links the scope of a person's capacity to exercise judgement with the organisational requirement to do work at a particular level of complexity (Lewis, 1993). Taking the form of a "guided conversation" in four phases (nine sets of phrase cards, a symbol card task, a career history interview and feedback), it is a procedure for exploring and understanding the relationship between people and their working life (Ashton & Kruger, 2008). The CPA results take the form of an overall indication of current work capability as well as the highest predicted future work capability according to empirically derived progression or growth curves, termed "Mode" by Jaques (1996).



The purpose of an Appreciation is thus four-fold (Ashton & Kruger, 2008):

- a) to strengthen the individual's understanding of the way s/he uses judgement in making the decisions called for at work;
- b) to arrive at a view about the scope of their judgement-making;
- c) to consider the conditions that would best allow them to use their judgement, now and in the future;
- d) to increase the overall effectiveness of the organisation of which they are a part.

It is important to mention that assessment of capability is one of the many considerations which a manager would take into account when selecting individuals. The general level to which the individual can aspire is important, but specific issues such as technical knowledge, relevant experience and interpersonal skills and so on must be considered as well. The CPA takes a holistic view of the basic ability of an individual to operate at a certain level of complexity rather than in a specific position (Stamp, 1981). The following is a summary of the relevant statistical information that is available on the CPA (Mauer, 2005):

In terms of test-retest reliability, personnel in the Royal Navy underwent the CPA, which was then re-administered five, 11, 16 and 18 years later. The test-retest reliability coefficients varied between 0.71 and 0.93 (Mauer, 2005). The test-retest reliability coefficients were computed for a sample of 75 people who had more than one CPA result in 2003. Coefficients of between 0.77 and 0.95 were found (Mauer, 2005). A meta-analysis was done to summarise the most significant research regarding the validity and reliability of the CPA (see table 3.1).

**Table 3.1: Meta-analysis on validity and reliability research for the CPA**

| Author(s)                | Topic   | Sample description   | Reliability  | Validity  |
|--------------------------|---|--|--|---|
| Bioass (1985)            | Study on validity of the CPA                                      | n = 362 (employees in three British companies and one South African company)   |  | Correlation of .89 was found between predicted theme of complexity and actual theme of complexity achieved between 4 and 15 years later.  |
| Stamp, G. (1988)         | Longitudinal Research into methods assessing managerial potential | n = 282. Age 21-55. Education = PhD to primary school. Follow-up: 84 over 10 years Oil, 35 over 5-13 years Multinational Engineering, 38 over 10 years Fertilizer co., 124 over 4-6 years in Mining. |  | I r = 0,79, p ≤ 0,001 (Subsample n = 182).<br><br>I r = 0,70, p ≤ 0,001 (Subsample n = 84).<br>I r = 0,89, p ≤ 0,001 (Subsample n = 76), refined version of CPA.<br>I r = 0,93, p ≤ 0,001 (Subsample n = 59).<br>I r = 0,92, p ≤ 0,001 (Subsample n = 124). |
| Bioass (1989)            | Study on validity of the CPA                                      | n = 182 (employees of 2 British companies, and 2 South African companies)  |  | CPA results compared with actual attained work performance between 4 and 13 years later - validity co-efficient of .89 was found.   |
| Bioass (1991)            | Study on reliability - CPA practitioners                          | n = 28   | Reliability co-efficient amongst different CPA practitioners ratings of Current Level of Capability (CLC) was .87, and wrt their modes it was .88. |   |
| Bioass (1991)            | Study on validity of the CPA                                      | n = 188 managers   |  | CPA results compared with manager's actual managerial level of complexity. Correlation computed to be between .7 and .9.  |
| Mushayandebvu, A. (1991) |   | n = 74 in the mining industry (Botswana)   | Test-retest by reassessment of CPA protocols. Mode: 74 matches, no mismatches. Intermode: 67 matches, 7 mismatches.                                |   |

| Author(s)  | Topic   | Sample description   | Reliability                      | Validity   |
|--|---|--|----------------------------------|--|
| Mauer, K.F. (1992)                                       | A summary of the statistical information on the CPA           | n = 25 military officers and 3 civilians   |                                  | Co-efficient of .59 was found between CPA and Kegan's Breadth Perspective  |
| Lewis, P. (1993)   | Career Path Appreciation (CPA) Data Reduction and Analysis    | 148 active duty army officers  | Interrater reliability was 0.81. |  |
| McIntyre, R., Jordan, P., Mergen, C. & Jacobs, TO (1993) | Brief Summary of The Construct Validity of the CPA: 3 studies | 87 university students between the ages of 21 and 59<br><br>98 university students between the ages of 20 and 46 |                                  | <p><i>p</i> ≤ 0,05 only:</p> <p><i>Study 1</i></p> <p>KAI &amp; Current level (0,25), Most preferred phrase card in each set (0,69), &amp; Least preferred phrase card in each set (-0,59).</p> <p><b>Mastermind</b> nil</p> <p><b>MCPL</b> &amp; Most preferred (0,26)</p> <p><b>GRE</b> nil</p> <p><b>Age</b> &amp; Current level (0,42)</p> <p><i>Study 2</i></p> <p><b>KAI</b> &amp; Most preferred (0,43), Least preferred (-0,44), Phrases (0,25).</p> <p><b>Gender</b> &amp; Symbol (-0,26)</p> <p><b>LEP</b> &amp; Most preferred (0,45), Least preferred (-0,53), Phrases (0,36)</p> <p><b>WPT</b> &amp; Symbol (0,33)</p> <p><b>CDA</b> &amp; Least preferred (-0,35)</p> <p><b>CDK</b> &amp; Most preferred (0,28)</p> <p><b>COT</b> &amp; Most preferred (0,28), Least preferred (-0,37)</p> |

| Author(s)  | Topic  | Sample description   | Reliability                                | Validity   |
|--|--|--|--|--|
|  |  | 100 university students between 18 and 61                                |  | <p><i>Study 3</i></p> <p><b>Age</b> &amp; Most preferred (0,35), Phrases (0,41).</p> <p><b>N</b> &amp; Symbol (-0,35), Most preferred (-0,25), Phrases (-0,28).</p> <p><b>E</b> &amp; Most preferred (-0,25), Phrases (-0,23).</p> <p><b>O</b> &amp; Symbol (0,22), Most preferred (0,55), Least preferred (-0,39), Phrases (0,45).</p> <p><b>C</b> &amp; Most preferred (-0,24), Least preferred (0,27).</p> <p><b>CFIT</b> &amp; Symbol (0,35), Least preferred (-0,26).</p> <p><b>Int</b> &amp; Symbol (0,27), Most preferred (0,70), Least preferred (-0,48), Phrases (0,26)</p> |
| Bioss (1993)<br><br>McIntyre, R.,<br>Hamil, L, and<br>Jacobs, T.O.<br>(1994) | Study on the reliability of the CPA<br><br>Brief Summary of The Construct<br>Validity of the CPA | n = 57 Army Officers<br><br>286 students between<br>the ages of 18 to 61 | Reliability co-efficient of .81 was found. | <p>*MMPPC[1] 0,69</p> <p>Modest correlations</p> <p>+ correlation but magnitude not specified.</p> <p>+ correlation with career decision making.</p> <p>+ correlation with creativity.</p> <p>+ correlation with LEP (cognitive complexity)</p> <p>+ correlation with Wonderlic personnel Test.</p> <p>- correlation with neuroticism (NEO).</p> <p>+ correlation with openness.</p> <p>+ correlation with iNtuiting.</p> <p>+ correlation with Thinking.</p> <p>+ correlation with Perceiving.</p> <p>+ correlation with CFIT.</p>  |

| Author(s)                       | Topic   | Sample description   | Reliability   | Validity  |
|---------------------------------|---|--|---|---|
| Bluen, S. (1995)                | Psychological Assessment Validation Study in a Division.  | n = 542 (190 Executives, 192 Technical, 65 Operations, 70 Marketing, 136 Finance and 61 Human Resources) |   | CPA level, verbal ability, arithmetic reasoning and ego strength explained 42% of the variance in salary. Recorded "high flyers" has greater intelligence, CPA Mode and Type, Extroversion, Venturesome and Carefree personality traits.        |
| Rossan, S and Topham, D. (1996) | The Assessment of Capability: The reliability and validity of the CPA as a means of assessment  | n = 15 (volunteers ages 23 - 48. Video taped interview and subsequently rated by 2 other interviewers)   | Current level = 95% mean agreement. Spearman's $p > .9$ on current level = 94% mean agreement. Spearman's $p = .73, .49, .58$ . Mode = 92% mean agreement. Spearman's $p = .82, .78, .74$ . Wilcoxon signed rank test = no statistically significant difference between raters. | CLC: Spearman's $p = .46 \leq 0.001$ . 90% mean agreement between predictions and actual current job level. No Wilcoxon differences. Mode: $p = .35$ . 91% mean agreement.  |
| Mauer, K.F. (1997)              | An Evaluation of the Selection Procedures used by Company X for the Purpose of Selecting BOP Operators, Supervisors, Team Leaders and Process Artisans, with Comments on Selected Legal Implications. | 487 managerial level staff   |   | Ranging between 0.23 and 0.57 between Current level, Mode and Style   |
| Ashton, L. (2000)               | Towards the validation of the Modified Career Path Appreciation (MCPA) for South African conditions   | n = 22 (specialist and managers in the mining industry)  |   | Correlation: CLC CPA and MCPA (n = 20) was .84. Correlation Mode CPA and MCPA (n = 18) was .86. With statistical outliers included is was .75 and .67 respectively.   |
| Stamp, G. (12001)               | Levels of Complexity  |  |   | Constructs discussed include Cheng Yi, Wisdom Traditions, Goldstein and Scheerer (1939), Erikson (1963), Levinson (1978). Harvey, Hunt and Schroder (1961). Piaget, Kegan and Kitchener as well as Graves, Willber, Isaacs, Jaques and Hoebeke. |
| Jacobs, T.O. (2002)             | Memorandum from National Defence Security   | n = 142  | Interrater reliability measured. The key relationship is between the Current Level each estimated = .926. This is an extraordinary level of agreement.  |   |

| Author(s)   | Topic  | Sample description                | Reliability  | Validity  |
|---|--|-----------------------------------|--|---|
| Noble, H. (2002)                                  | Relationship between the Career Path Appreciation (CPA) & the Initial Recruitment Interview Schedule (IRIS). | n = 97                            | Correlations: CPA (current) and IRIS (current) = .618, CPA (5 years) and IRIS (5 year)s = .602, CPA (10 years) and IRIS (10 years) = .594, CPA (15 years) and IRIS (15 years) = .637, all at the 0.01 level. |   |
| Mauer, K.F (2003)                                 | New findings on the test-retest validity of the CPA  | n = 75 (male = 49, female = 26)   | CLC (male) = .83, CLC (female) = .95<br>Mode (male) = .77, Mode (female) = .95   |   |
| Percival, G., Crous, F., and Shepers, J.M. (2003) | New evidence of a relationship between capability and job complexity   | n = 161 in the telecoms industry  | The reliability coefficient of the first scale was 0.75, and the second 0.46 according to Cronbach's Alpha coefficient.  | CLC against job complexity, phi-coefficient = 0.888 (p< 0.001). 5 year projection, phi-coefficient was 0.665 (p< 0.001). 10 year and 15 year projection, phi-coefficients were 0.714 (p<0.001) and 0.755 (p<0.001) respectively. 78.8% of the variance of job complexity could be attributed to individual capability at the current level.   |
| Distiller, K and Mauer, K.F (2004)                | The relationship between MCPA Data Scores and the final MCPA Validation Interview Findings.                  | n = 98                            | Correlation: Current Level of Capability (CLC) by using MCPA Validation interviews and the MCPA score was 0.81. Mode established by means of the MCPA Validation Interviews and the MCPA score was 0.66.     |   |
| Mauer, K.F., and Coustas, C. (2007)               | Valuing talent: Measure, Consult, Coach and Develop. Paper presented at SIOPSA                               | 117 employees in banking industry |  | No BarOn EQi factors loaded on CPA dimensions   |
| De Kock, F (2010)                                 | CPA & CPP - Construct Validity   | n = 268                           |  | The results show a highly statistically significant positive relationship (p < .001), between CPA and CPP measures of Current Capability, but that this relationship is too weak (r = .230) to suggest that the tests measure the same single broad underlying construct. Strong evidence of construct validity of both measures requires other strategies of construct validation. |

| <b>Author(s)</b>      | <b>Topic</b>  | <b>Sample description</b> | <b>Reliability</b>  | <b>Validity</b>  |
|-----------------------|---|---------------------------|---|--|
| Sale, R. (2010)       | MCPA Validation study overview (MCPA electronic CLC to validated CLC)   | n = 1882                  |   | 588 of cases remained unchanged, 60% of cases raised or lowered within one sub level, and 96% of cased raised or lowered within one level.   |
| Mauer, K.F. (2011)    | How accurately does the card chosen in each set of the CPA reflect a candidate's CLC and Mode?                                      | n = 180                   | The correlations between eventual CLC and the estimates of a candidate's CLC for each card-set range between 0.64 and 0.78. When the candidates' choices are used as predictors of their eventual CLCs, one can only explain 17.6% of the variance. |  |
| De Kock, F.S. (2012)  | Company Z 360-degree measurement – Intercorrelations of Study Variables   | n = 204                   |   | Concurrent validity evidence. No significant correlations: CLC with Talent Classification, and Mode with Skills and Experience   |
| Comaroff, Yael (2012) | Capacity for Complexity, Intelligence and Personality   | n = 266                   |   | Verbal IQ unrelated to either current or future potential for handling complexity. WAIS-III subscales not related to handling complexity for CLC or Mode. Achievement via Independence - moderate predictor of both CLC and Mode, all other independent variables weak predictors. |
| De Kock, F.S (2012)   | The relationship between capability and emotional intelligence of a South African employee sample: An exploratory data-mining study | n = 107                   |   | No correlation between capability and total EQ. Subscale correlations between Mode and: (1)Independence (0.26), (2) Stress Management (0.23), (3) Impulse Control (0.23), (4) Problem Solving (0.21), and (5) Adaptability (0.2)   |

### 3.2.2.3 *Research procedure*

Ethical clearance and permission to conduct the study were obtained from Bioss SA, as well as from the supervisory academic institution. Individuals sign a consent form that grants Bioss SA permission to enter the data onto the Genie database, and use the data (anonymously) for research purposes. Only participants with two CPA results completed at different times by different practitioners were used. CPA 1 represents the first CPA completed by the participant, and CPA 2 represents the second CPA completed at a later date.

### 3.2.2.4 *Statistical analyses*

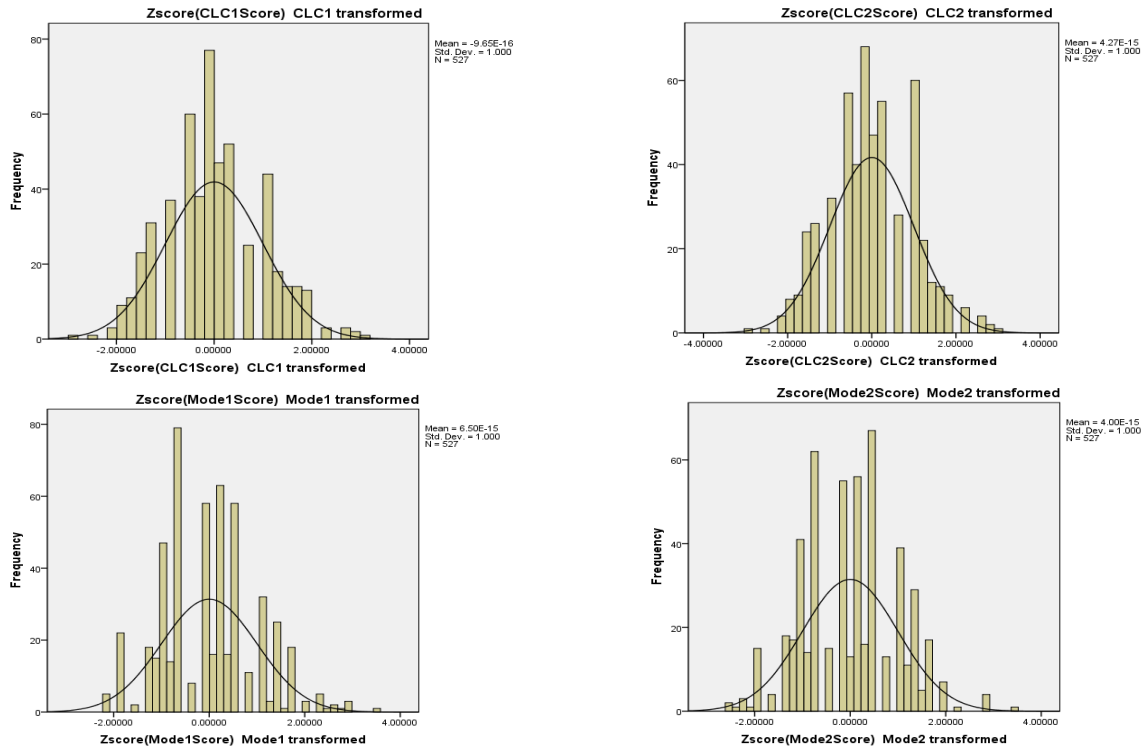
SPSS (SPSS Inc., 2012) was used to analyse the data. Descriptive statistics (including standard deviations, kurtosis, skewness, and means) were used to describe the data. The statistical analyses involved a Pearson product-moment correlation coefficient for the CLC and the Modes to provide the required information for the analysis. A one-way ANOVA was done for testing differences between gender and race. Bonferroni scores were calculated to test for significant mean differences between different groups within the race category.

## **3.3 RESULTS**

### **3.3.1 Data cleaning and assumptions**

It is critically important to verify assumptions before doing a statistical analysis in order to ensure the accuracy of data and any conclusions based on the data. One of the key rationales behind hypothesis testing is that the data are normally distributed, and if this is not inherent in the data set, assumptions might be flawed (Field, 2009).

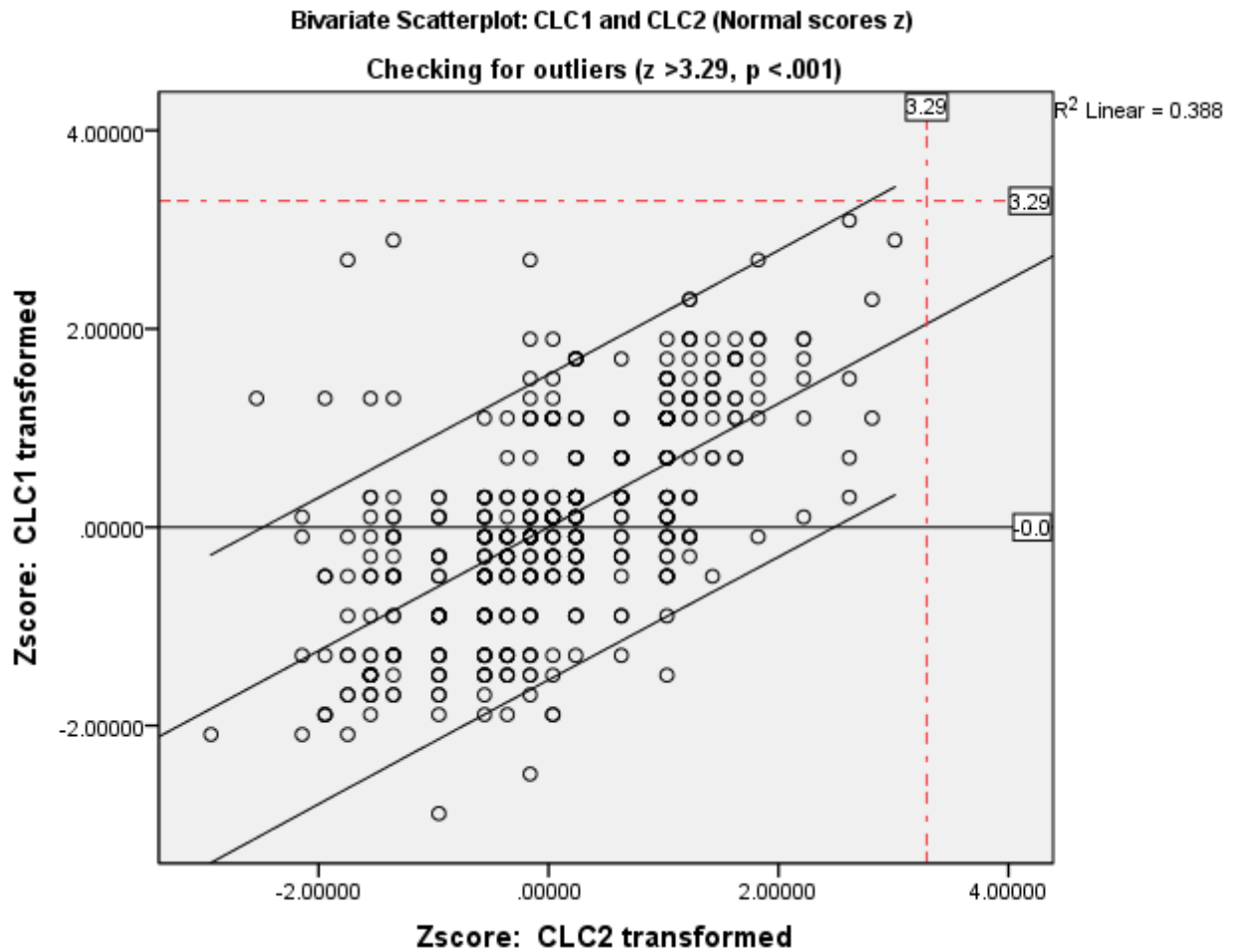




**Figure 3.8: Distribution curves for CLC 1 and 2, and Mode 1 and 2**

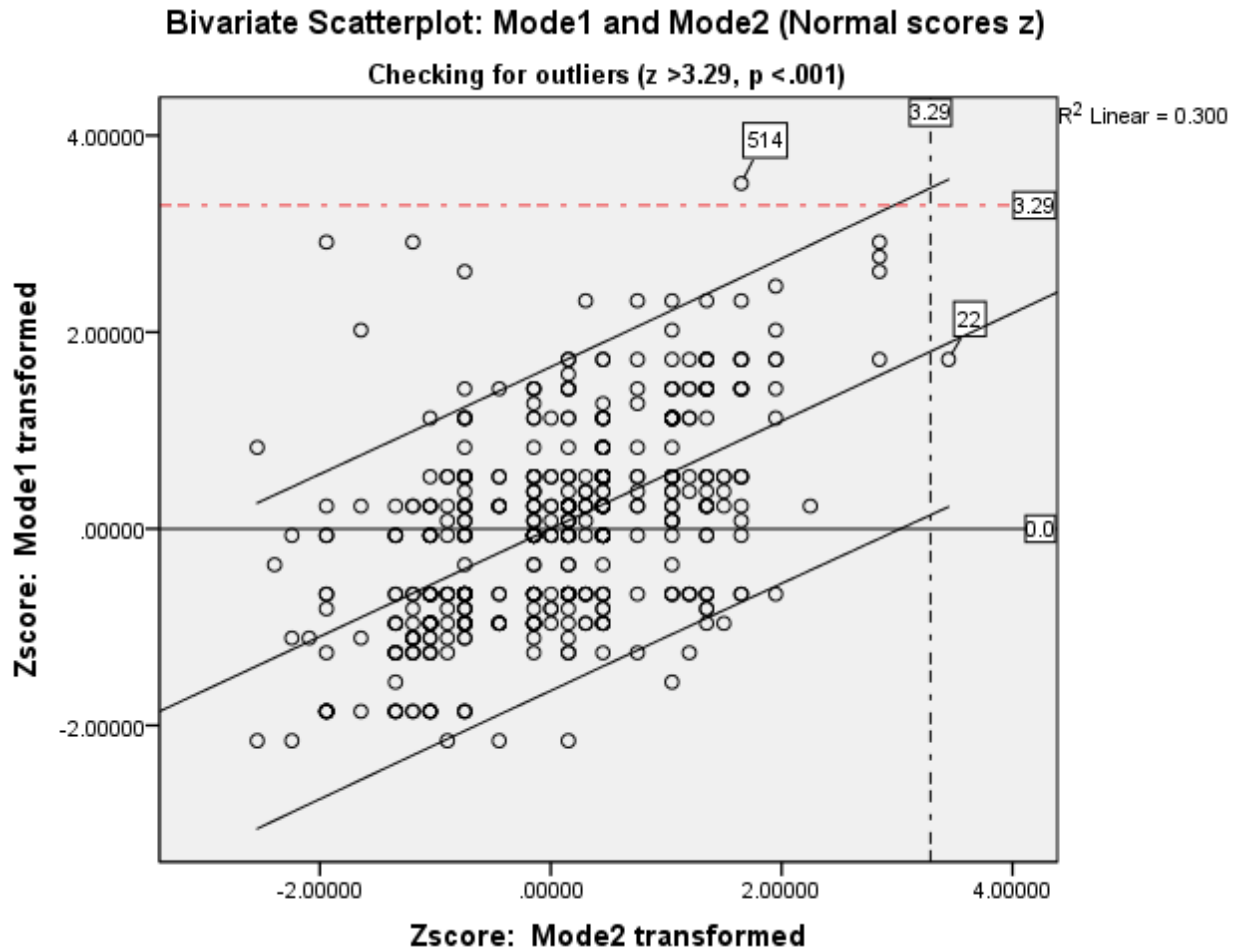
It is therefore evident from Figure 3.8 that the data tend towards normality. Assessing the standardised scores of the study variables to scan for possible extreme values or outliers was the first step in the process of data cleaning.

To identify specific cases of outliers, the following scatterplots were used:



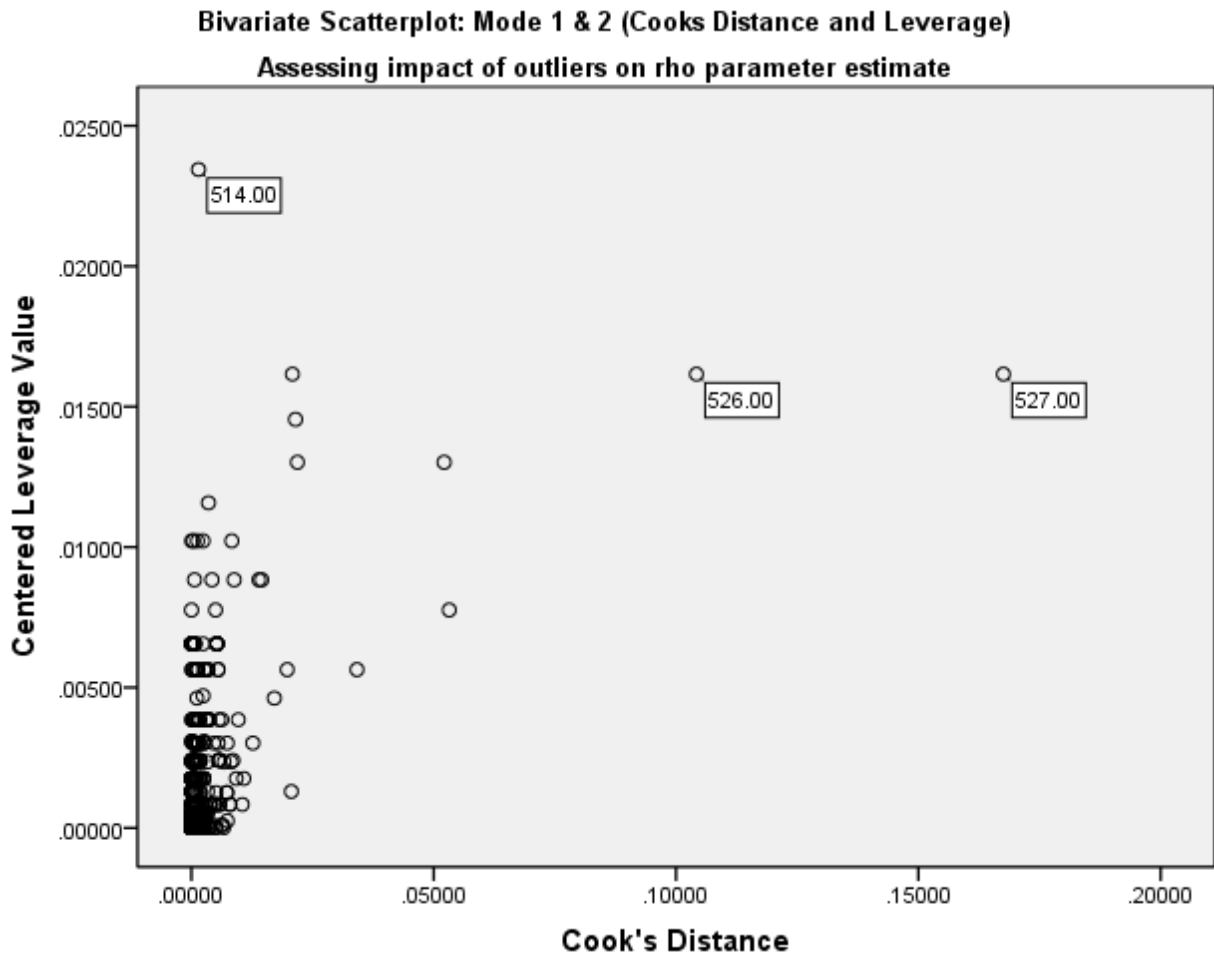
**Figure 3.9: CLC: Assessment of univariate outliers, with  $z = 3.29$  ( $p < .001$ ) and 95% confidence intervals indicated**

In the scatterplot illustrated in Figure 3.9, it is clear that no outliers were identified to be beyond the  $z = 3.29$  ( $p < .001$ ) line.



**Figure 3.10: Mode: Assessment of univariate outliers, with  $z = 3.29$  ( $p < .001$ ) and 95% confidence intervals indicated**

As illustrated in Figure 3.10, two univariate extreme values were identified in case 22, and 514 in the transformed Mode. Mode 1 and Mode 2 were regressed to assess the multivariate outliers, as well as errors in prediction and extreme cases through Mahalanobis distance, Cook's distance, leverage, standardised residuals and normal QQ plots.



**Figure 3.11: *Bivariate scatterplot Mode 1 and 2 (Cook's distance and leverage)***

As depicted in Figure 3.11, four additional outliers were identified from this analysis. The established cut-off criterion of  $z > 3.29$ ,  $p < .001$  was utilised to identify the cases of extreme outliers. Based on the analysis of results with identified extreme values included, the effect was significant. These cases therefore have an extremely low probability (less than one in one thousand) of being part of the same population sampled, and have therefore been deleted. The effect can be illustrated by comparing the means, standard deviations and intercorrelations obtained prior to and after the deletion of extreme values.

**Table 3.2*****Descriptive statistics before deletion of extreme values***

|        | Minimum | Maximum | Mean | Std<br>Deviation | Skewness |
|--------|---------|---------|------|------------------|----------|
| CLC 1  | 1.75    | 5.50    | 3.56 | 0.63             | 0.24     |
| CLC 2  | 1.75    | 5.50    | 3.60 | 0.63             | 0.15     |
| Mode 1 | 2.50    | 7.25    | 4.31 | 0.84             | 0.35     |
| Mode 2 | 2.25    | 7.25    | 4.37 | 0.84             | 0.12     |

Note: n = 527

Table 3.2 reports descriptive statistics before the deletion of extreme values. As expected, the mean scores for Modes 1 and 2 are higher than CLC one and two. The low skewness indicates that the data are likely to be normally distributed.

**Table 3.3*****Correlations before extreme values deletion***

|        | CLC 1   | CLC2    | Mode 1  | Mode 2 |
|--------|---------|---------|---------|--------|
| CLC 1  | -       | -       | -       | -      |
| CLC 2  | 0.623** | -       | -       | -      |
| Mode 1 | 0.837** | 0.443** | -       | -      |
| Mode 2 | 0.443** | 0.840** | 0.548** | -      |

Note: \*\*Significance is taken at  $p < .001$

Table 3.3 reports correlations before the deletion of extreme values for the CLC and Mode for measurements 1 and 2. Furthermore, table 3.3 suggests that there are highly significant correlations between all measurements. The correlation between CLC 1 and Mode 1 (0.837), and CLC 2 and Mode 2 (0.84) is the strongest in the data set.

**Table 3.4*****Descriptive statistics after the deletion of extreme values***

|        | Minimum | Maximum | Mean | Std<br>Deviation | Skewness |
|--------|---------|---------|------|------------------|----------|
| CLC 1  | 1.75    | 5.50    | 3.55 | 0.61             | 0.20     |
| CLC 2  | 1.75    | 5.50    | 3.61 | 0.62             | 0.16     |
| Mode 1 | 2.50    | 6.75    | 4.28 | 0.81             | 0.25     |
| Mode2  | 2.25    | 6.75    | 4.38 | 0.82             | 0.09     |

Note: n = 521

Table 3.4 reports descriptive statistics after the deletion of extreme values. The minimum scores remained the same before and after the deletion of extreme values, but it is notable that the maximum score for Mode decreased by one point. This also had a slight impact on the mean scores of all the items. The standard deviation for all the items decreased; skewness for CLC increased slightly, and skewness for Mode decreased slightly, but they remained within acceptable ranges of  $-1,00 \leq x \leq 1,00$  (Rosnow & Rosenthal, 1998).

**Table 3.5**  
***Correlations after deletion of extreme values***

|        | CLC 1   | CLC 2   | Mode 1  | Mode 2 |
|--------|---------|---------|---------|--------|
| CLC 1  | -       | -       | -       | -      |
| CLC 2  | 0.670** | -       | -       | -      |
| Mode 1 | 0.832** | 0.484** | -       | -      |
| Mode 2 | 0.480** | 0.834** | 0.591** | -      |

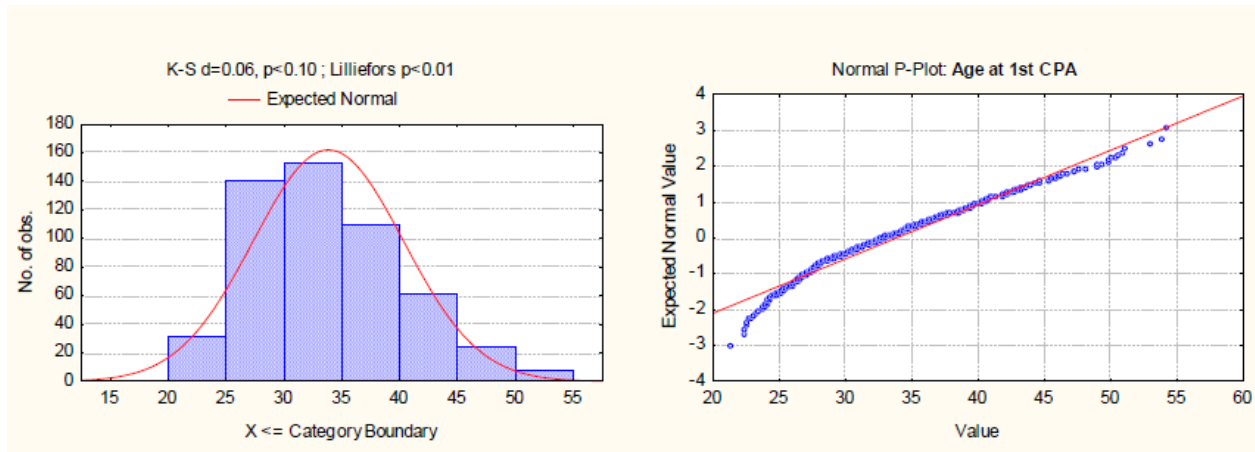
Note: \*\*Significance is taken at  $p < .001$

Table 3.5 reports correlations after extreme values. Most correlations increased by at least 0.037, and there was only a slight decrease in the correlation between CLC 1 and Mode 1, and CLC 2 and Mode 2. It is therefore clear from this output that the extreme values had a disproportionately large influence on the parameter estimates.

### 3.3.2 Descriptive statistics

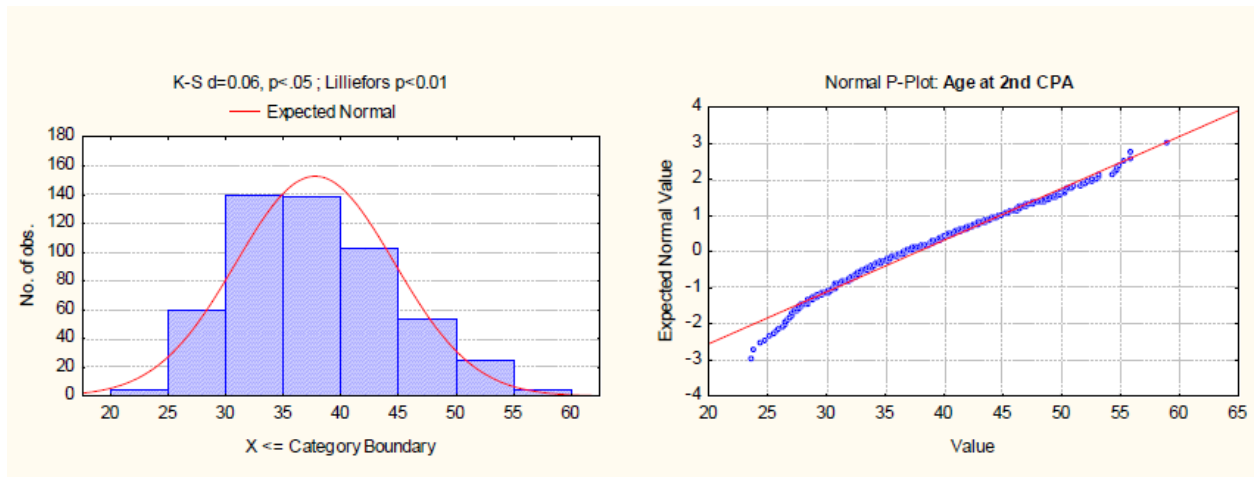
The following descriptive statistics are important for this study:

### 3.3.2.1 Age of candidates at time of assessment



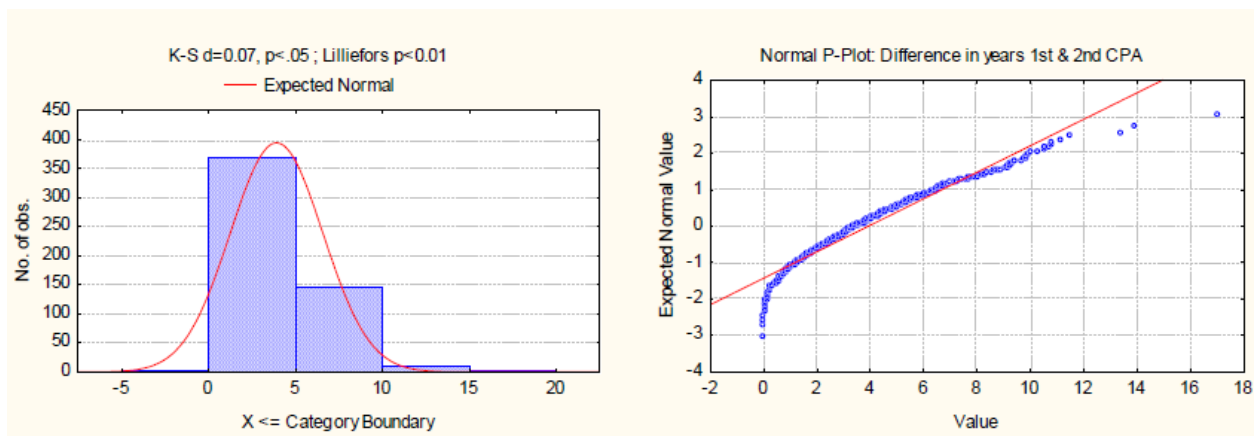
**Figure 3.12: Age at time of first CPA**

As demonstrated by the distribution curve in of the age at the first CPA in Figure 3.12, most of the candidates were between 28 and 40 at the time of their first CPA.



**Figure 3.13: Age at time of second CPA**

As demonstrated in Figure 3.13 above, the candidates were older at the second application of the CPA. In both figures, the distribution is not normal, as shown in the Lilliefors probability. This can be attributed to the greater spread of age above the mean than below.



**Figure 3.14: Age differences between first and second application of the CPA**

As depicted in Figure 3.14, approximately 68% of the 527 observations were re-evaluated in less than five years, which may be attributed to the volatility of the South Africa job market, specifically in relation to the pressures that are on companies to comply with the employment equity legislation. In South Africa, the collective effect has been very high levels of “*head-hunting*” for skilled and managerial candidates of female as well as African descent, with consequent job-hopping and the reassessment of prospective employees by different employers as part of the recruitment process (Mauer, 2008).

**Table 3.6**

***Age of candidates at time of first and second assessment***

|  | Mean  | Median | Variance | SD   | Skewness | Kurtosis |
|--|-------|--------|----------|------|----------|----------|
| Age at first CPA                             | 33.84 | 33.02  | 42.04    | 6.48 | 0.56     | -0.13    |
| Age at second CPA                            | 37.76 | 36.91  | 47.35    | 6.88 | 0.43     | -0.34    |
| Age differences between first and second CPA | 3.91  | 3.47   | 7.09     | 2.66 | 0.95     | 1.21     |

Note: n = 527

Table 3.6 reports an analysis of the ages of candidates at the time of the first and second assessment. The average difference in years between the first and second application of the CPA is 3.9 years. The skewness and kurtosis indicate a normal distribution of the age at first and second CPA, but not for the age differences between the first and second CPA.



### 3.3.3 Correlational results

**Table 3.7**

***Pearson correlation CLC 1, CLC 2, Mode 1 and Mode 2***

|        | CLC 1   | CLC 2   | Mode 1  | Mode 2 |
|--------|---------|---------|---------|--------|
| CLC 1  | -       | -       | -       | -      |
| CLC 2  | 0.670** | -       | -       | -      |
| Mode 1 | 0.832** | 0.484** | -       | -      |
| Mode 2 | 0.480** | 0.834** | 0.591** | -      |

Note: \*\*Significance is taken at  $p < .001$

The central hypothesis for this study is: There is a significant relationship between individual Current Level of Capability (CLC) as measured by Career Path Appreciation 1 and Career Path Appreciation 2. There is a significant relationship between individual Mode as predicted by CPA 1 and that predicted by CPA 2.

Based on the correlational data reported in Table 3.7, it is evident that the CPA, CLC and Mode results taken at different times by different practitioners correlate strongly and therefore have high statistical significance. For CLC the intercorrelation is  $r = .670$ ,  $r^2 = .49$  ( $p < .001$ ), and for Mode it is  $r = .591$ ,  $r^2 = .35$  ( $p < .001$ ). Individuals who obtain “high” results in the first process also obtain “high” results in the second process, and vice versa. The relationship for CLC results is more consistent than for Mode results. On the basis of the results, the central hypothesis for this study can be accepted.

### 3.3.4 Inferential statistics: Test for significant mean differences

#### 3.3.4.1 Gender

**Table 3.8**  
**ANOVA: Mean differences (gender) (n=521)**

|        | Mean |        | f     |
|--------|------|--------|-------|
|        | Male | Female |       |
| CLC 1  | 3.59 | 3.41   | 6.08* |
| Mode 1 | 4.31 | 4.30   | 0.01  |
| CLC 2  | 3.62 | 3.47   | 4.12* |
| Mode 2 | 4.37 | 4.38   | 0.02  |

Note: \*  $p \leq 0.05$

As reported in table 3.8, the one way analysis of variance showed that mean differences between male and female on CLC 1, yielding an F ration of  $F(1,519) = 6.08$ ,  $p = .014$ , and CLC 2 yielding an F ratio of  $F(1,519) = 4.12$ ,  $p = .043$ , was significant. Mode 1 and Mode 2 results were not significant.

#### 3.3.4.2 Race

**Table 3.9**  
**ANOVA: Mean differences (race) (n=454)**

|        | Mean  |       |          |       | f     |
|--------|-------|-------|----------|-------|-------|
|        | Asian | Black | Coloured | White |       |
| CLC 1  | 3.54  | 3.46  | 3.23     | 3.64  | 3.03* |
| Mode 1 | 4.24  | 4.32  | 4.10     | 4.32  | 0.69  |
| CLC 2  | 3.56  | 3.48  | 3.43     | 3.72  | 4.30* |
| Mode 2 | 4.41  | 4.33  | 4.43     | 4.45  | 1.12  |

Note: \*  $p \leq 0.05$

As reported in Table 3.9, the one way analysis of variance showed there is a significant mean difference between the groups in both CLC 1  $F(4,399) = 3.03$ ,  $p = .018$  and CLC 2  $F(4,399) = 4.30$ ,  $p = .002$ . Post hoc analyses using the Bonferroni post hoc criterion for significance indicated that the CLC 2 of the black sample group ( $M = 3.48$ ,  $SD = 0.63$ ) was significantly lower in the white sample group ( $M = 3.72$ ,  $SD = 0.62$ ),  $F(4,399) = 4.30$ ,  $p =$

.003. Pair wise comparisons of CLC 1, Mode 1 and Mode 2 between the racial groups were not significant.

**Table 3.10**

***Summary of decisions regarding the research proposition and research hypotheses***

|                | Proposition  | Decision           |
|----------------|--|--------------------|
|                | Proposition stated: The growth in theoretical capability as predicted by Career Path Appreciation (CPA) 1 vs CPA will be accurate. | Accepted           |
|                | Hypothesis   |                    |
| H <sub>1</sub> | There is a significant relationship between individual Current Level of Capability (CLC) as measured by CPA 1 and CPA 2.           | Accepted           |
| H <sub>2</sub> | There is a significant relationship between individual Mode as measured by CPA 1 and CPA 2.  | Accepted           |
| H <sub>3</sub> | Individuals from differing gender and race will not differ significantly in CLC and Mode.  | Partially accepted |

**3.4 DISCUSSION**

The objectives of the study were to: (1) determine whether there is a significant difference in the growth in theoretical capability as predicted by Career Path Appreciation (CPA) 1 and CPA 2 among the sample population, (2) determine whether there is a significant difference in Mode as predicted by CPA 1 and CPA 2 among the sample population, and (3) formulate recommendations for Talent Management and Industrial and Organisational Psychology practices and future research. The sample participants were predominantly white and black, with at least five years' working experience, and were employed mainly in senior specialist or managerial positions. Considering the large sample size (n=521), the results may be generalised as being representative of the sample population of employees in South African organisations.

### **3.4.1 Overall results**

Overall, the results indicated a significant correlation between CLC for CPA 1 and CPA 2 as well as between Mode for CPA 1 and CPA 2. These findings are in line with previous research conducted on the CPA, where the first result was accurately verified by the second result (Mauer, 2005). As is evident from the scatterplots (indicating 95% confidence intervals), as well as the normal QQ plot, it is clear that, for the majority of cases, individuals who obtain high scores in the first assessment also obtain high scores in the second assessment, and vice versa. However, a minority of cases do not follow this pattern, that is, they score well on one assessment but not on the second. The relationship between CLC 1 and CLC 2 is stronger than that for Mode 1 and Mode 2, and thus CLC scores are somewhat more consistent than Mode scores.

It must also be noted that the current analysis does not take into account differences in time intervals between the two assessments across individuals. It is evident that the analyses yield different results when extreme values (cases that are extremely unlikely to be part of the same population sample) are used. This effect can be noticed when comparing means, standard deviations and intercorrelations obtained prior to, and after, the deletion of these extreme values.

The results also show significant differences when comparing the CLC of the race and gender sample group. This could be explained by companies testing women and black groups earlier in their career as part of Employment Equity imperatives in South Africa (Mauer, 2008; Ashton & Kruger, 2010). The difference in potential capability, as measured by Mode, did not yield results indicating any significant differences.

### **3.4.2 Differences in socio-demographic groups**

Overall the results indicated very few areas of significant difference between the number of biographical variables.

#### *3.4.2.1 Gender*

The respondents consisted of more males than females. There were significant differences

in the CLC scores of males and females, but not in Mode scores. This is not consistent with previous studies done by Stamp and Retief (1996), BioSS SA (1999), Percival, Crous and Schepers (2003) and Kitching (2005).

#### *3.4.2.2 Race*

The population distribution in this sample group cannot be considered representative as the percentages of coloureds and Asians were 3.3 and 7.2 respectively, and thus the results cannot be generalised. Significant differences were found in these population groups, specifically in the CLC results, which is not in line with the overall results of studies by BioSS SA (1999), Percival, Crous and Schepers (2003) and Kitching (2005). Differences in the black and white population have, however, been reported in a study by Stamp and Retief (1996).

### **3.5 CONCLUSIONS**

The findings of the present study have yielded new insights, which have added and confirmed the validity of the existing information available on the CPA. A comprehensive overview of the conclusions formulated for the study is provided in chapter 4.

Overall, it can be concluded that the CPA is consistent across measurements, indicating a high level of test-retest reliability. A higher or lower CLC in the first CPA will be repeated in the second CPA. This is also consistent when looking at Mode results. A higher Mode in CPA 1 will be repeated in CPA 2. The results show that significant differences can be observed for gender and race in terms of CLC results, but not for Mode scores. The current theoretical capability at the time of measurement differs for these groups, but no significant difference can be observed for the potential capability measured for these groups. Organisations using the CPA to assist and support selection, recruitment and development decisions, specifically within the Talent Management context, can therefore confidently rely on the first CPA result, and there is no need to repeat the assessment unless unique circumstances are evident.

### **3.6 LIMITATIONS**

Despite the relatively strong magnitude of the correlations, they are probably underestimates as a result of artificial deflation created by the highly homogenous convenience sample, which restricts the range of possible scores. The precise impact of this deflationary effect has not been analysed in this data set. Extreme values with an extremely low probability of being part of the same sample have been deleted as a result of their notable impact on the analysis when comparing the means, standard deviations and intercorrelations.

### **3.7 RECOMMENDATIONS**

Only the core recommendations will be discussed in this section, as the recommendations will be elaborated on in more detail in chapter 4. The findings of the study confirm the existence of significant relationships between CPA 1 and CPA 2 in terms of CLC and Mode results. The findings provide confirmation of previous study results, and ensure the continuous evaluation of the validity and reliability of the use of the CPA in the talent management environment in organisations. It is recommended that future research studies include a more heterogeneous sample, and use longitudinal data over a longer period of time. These studies also need to include an analysis of the prediction of theoretical capability as measured by the CPA, versus actual applied capability as measured in work performance.

### **3.8 CHAPTER SUMMARY**

This chapter reported on the findings of the empirical research on the accuracy of the growth in theoretical capability as predicted by CPA 1 vs CPA 2. The findings have been integrated to reflect key observations regarding the relationship between the variables that are relevant for the present study. Chapter 4 discusses the conclusions and limitations of the study and makes recommendations for practice and future research.

## CHAPTER 4

### CONCLUSIONS, LIMITATIONS AND RECOMMENDATIONS

Chapter 4 focuses on the conclusions drawn from this research study. In addition, the chapter highlights the limitations of both the literature review and the empirical results of the study and presents recommendations for the practical application of the findings and also for future research studies.

#### 4.1 CONCLUSIONS

The following section focuses on the formulation of conclusions based on both the literature and the empirical study.

##### 4.1.1 Conclusions in respect of the literature review

The general aim of this study was, firstly, to conceptualise complexity, theoretical capability and flow from an SST perspective and, secondly, to identify the implications of the accuracy in growth in theoretical capability as predicted by the Career Path Appreciation for Talent Management and Industrial and Organisational Psychology practices.

###### *4.1.1.1 The first aim: conceptualise complexity, theoretical capability and flow from the literature and determine the theoretical relationship between these concepts*

This first aim was realised in chapter 2. In particular, the following conclusions may be drawn:

It may be concluded from the literature review that, despite the research which has been conducted into complexity, theoretical capability and flow, further refinement of the conceptualisation of these concepts is required.

For the purposes of this study, the approach to complexity was based on the work of Jaques's (1978) and Stamp's (1981) view of the construct. Stamp's definition of "capability" specifically includes specifically the aspect of how comfortable an individual feels when

required to make a decision in highly complex environments (Kitching, 2005). Being comfortable about making decisions in ambiguous and uncertain situations means that one has to rely on one's discretion and judgement, and be comfortable in doing so. The organisational challenge requires that people in positions that require them to perform more complex and abstract tasks need to possess the capabilities to cope and function successfully, and hence possess the ability to rely on their own judgement (Stamp, 1989).

It may be concluded from the literature review that, in view of the comprehensive overview of the literature on this construct, a single common definition still needs to be conceptualised and operationalised. Exactly what underpins the construct of capability is not sufficiently clear and varies in the literature. However, despite the fact that capability is defined as a relatively stable dispositional orientation, it is possible that environmental factors might impact an individual's ability to apply this in a work context (Ashton & Kruger, 2010). Further research is therefore required in terms of the moderating effects of other variables on theoretical and potential capability.

*4.1.1.2 The second aim: to identify the implications of the accuracy in growth in theoretical capability as predicted by the Career Path Appreciation for Talent Management and Industrial and Organisational Psychology practices*

This second aim was realised in chapter 2. Based on the literature review, it may be concluded that previous studies show a high level of consistency in CPA results when re-tested. Such a relationship would, clearly, be of importance in talent management practices. The CPA's consistency and accuracy suggest what positions would offer an optimal "flow" experience, and how an individual's career might be paced in future, to ensure a continued match between individual capability and work complexity which, in turn, would affect organisational performance (Ashton & Kruger, 2010).

Increased organisational support in terms of enabling individual potential capability is likely to result in an increase in both organisational and employee performance. It may, therefore, be concluded that in order to achieve a productive and healthy workforce organisations could use CPA results to support talent management practices.



The CPA as a measure of capability is also different from traditional approaches, as it is based on the operationalisation of SST theory, and not relying on classical test theory (Mauer, 2008). The CPA is administered through a systematic appreciative interview where lived experience is probed where a practitioner comes to an understanding of the capability an individual is comfortable applying at any given stage in their career path. This conceptualisation of the individual career path is nested in the growth curves demonstrated in chapter 2, figure 2.4. This path will give an accurate prediction of the likely rate of growth in increasing amounts of complexity and individual will be comfortable with throughout his or her career (Stamp, 1981). It can also be concluded on the basis of the literature review that CPA results are consistent over repeated measures. Accordingly, the conclusion is drawn that CPA 1 results, in terms of CLC and Mode, will be an accurate prediction of CPA 2 results in terms of CLC and Mode.

#### **4.1.2 Conclusions regarding the empirical study**

There were four main aims relating to the empirical study undertaken in this research:

1. To determine whether there is a significant difference in the growth in theoretical capability (CLC) as predicted by CPA 1 and CPA 2 among the sample population.
2. To determine whether there is a significant difference in the growth in potential capability (Mode) as predicted by CPA 1 and CPA 2 among the sample population.
3. To empirically investigate whether differences exist between gender and race.
4. To formulate recommendations for Talent Management and Industrial and Organisational Psychology practices and future research.

Based on the findings, the proposition stated, namely that the growth in theoretical capability as predicted by Career Path Appreciation (CPA) 1 vs CPA will be accurate, is accepted. Hypothesis H<sub>1</sub>, there is a significant relationship between Current Level of Capability (CLC) as measured by CPA 1 and CPA 2, is also accepted. Hypothesis H<sub>2</sub>, namely that there is a significant relationship between individual Mode as measured by CPA 1 and CPA 2, is also accepted. Hypothesis H<sub>3</sub>, individuals from differing gender and race will not differ significantly in CLC and Mode, is only partially accepted.

The following conclusion was drawn regarding the first research aim:

*4.1.2.1 The first research aim: To determine whether there is a significant difference in the growth in theoretical capability (CLC) as predicted by CPA 1 and CPA 2 among the sample population.*

Overall, the conclusion is reached that there is no significant difference in the growth in theoretical capability as predicted by CPA 1 and CPA 2 among the sample population. This conclusion is based on the following research findings:

High scores in CPA 1 were repeated in CPA 2, and the probability of achieving a high score in CPA 1, and a low score in CPA 2 (and vice versa) is very low. This was evident in the theoretical capability as measured in the CLC scores.

Based on the results, it can also be concluded that CPA is an accurate tool in repeated applications, and only one CPA measure is required to inform CLC in making Talent Management decisions. This conclusion is also based on the results achieved from the second research aim.

*4.1.2.2 The second research aim: to determine whether there is a significant difference in the growth in potential capability (Mode) as predicted by CPA 1 and CPA 2 among the sample population.*

High scores in CPA 1 were repeated in CPA 2, and the probability of achieving a high score in CPA 1, and a low score in CPA 2 (and vice versa) is very low. This was evident in the potential capability as measured in the Mode scores.

Based on the results, it can also be concluded that CPA is an accurate tool in repeated applications, and only one CPA measure is required to inform Mode in making Talent Management decisions.

4.1.2.3 *The third research aim: to empirically investigate whether differences exist between gender and race.*

The following conclusions were drawn:

a) *There are significant differences in the CLC for male and female participants.*

It would seem that males and females have different results in terms of their theoretical capability as measured by CLC in both CPA 1 and CPA 2.

b) *There are no significant differences in the Mode for male and female participants.*

The measure of potential capability (Mode) did not yield any significant differences in males and female participants in CPA 1 and CPA 2.

c) *Race tends to have a significant effect on CLC of participants.*

There were significant differences in the CLC measures of CPA 1 and CPA 2 between the various race groups, specifically comparing the white and black sample in CLC 2. The detailed analysis did not show any other comparative group differences.

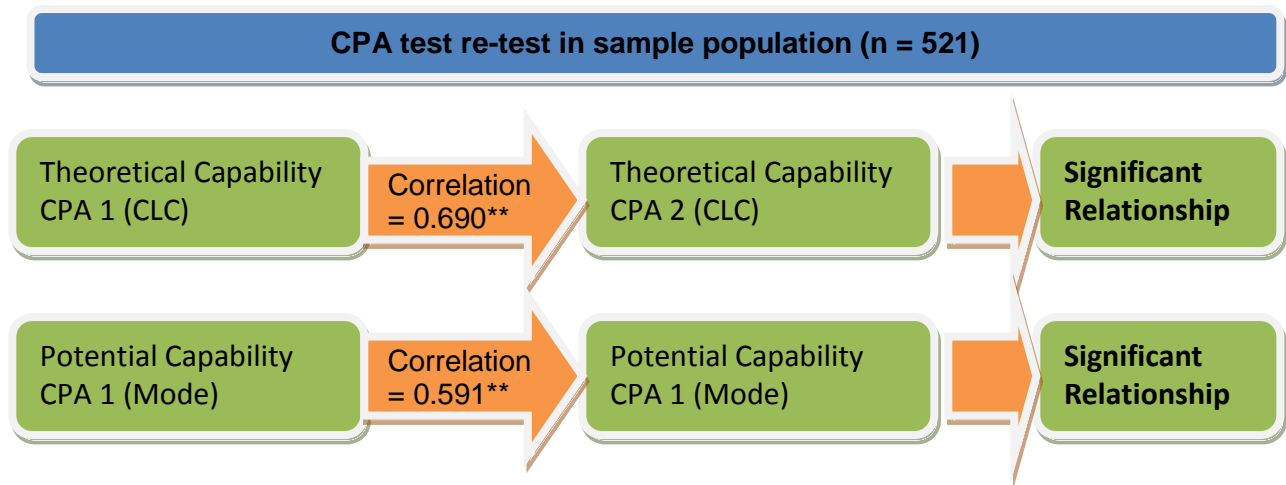
d) *Race have no significant effect on the Mode of participants.*

The measure of potential capability (Mode) did not yield any differences in white, black, coloured or Asian participants when comparing CPA 1 and CPA 2.

#### **4.1.3 Conclusions regarding the central hypothesis**

In respect of the central hypothesis it may be concluded that a significant relationship exists between CPA 1 and CPA 2 measures of theoretical and potential capability. Furthermore, differences in respect of gender and race were significant, specifically in the CLC measurements. The empirical study yielded statistically significant evidence in support of the central hypothesis.

These conclusions are summarised in Figure 4.1.



**Figure 4.1. Overview and summary of core conclusions**

#### **4.1.4 Conclusions regarding the contribution of this study to the field of industrial and organisational psychology**

Both the findings from the literature review and the empirical results have contributed new knowledge in the manner described below to the field of both Industrial and Organisational Psychology and, in particular, to the utilisation of the CPA in the context of Talent Management.

The literature review provided considerable insight into the importance of matching individual capability with the complexity of the environment, in order to ensure flow. In particular, the significant relationship between CPA 1 and CPA 2 results provided valuable verification of the results in previous studies.

The conclusions drawn from the literature review indicate that practitioners should consider theoretical models of complexity, capability and flow when working in the context of Talent Management. The theoretical relationship between these variables and the differences in race and gender in these candidates need to be considered.

The study has highlighted the fact that differences between biographical groups do play a role in terms of theoretical capability, but not potential capability. This finding is obviously of particular relevance within the multicultural South African context.

## **4.2 LIMITATIONS OF THE STUDY**

Limitations in terms of both the literature review and the empirical study have been identified. The limitations of this study will be discussed in the following section.

### **4.2.1 Limitations of the literature review**

In view of the comprehensive overview of the literature on this construct, a single common definition still needs to be conceptualised and operationalised. It is not sufficiently clear exactly what underpins the construct of capability and views vary in the literature. However, despite the fact that capability is defined as a relatively stable dispositional orientation, it is possible that environmental factors might impact on an individual's ability to apply this in a work context (Ashton & Kruger, 2010). Further research is therefore required in terms of the moderating effects of other variables on theoretical and potential capability.

In this study, the literature review was limited to the SST (Jaques, 1965), and MWR (Stamp, 1981) models. In light of the scientific confines of this study, other models and paradigmatic perspectives were not considered.

### **4.2.2 Limitations of the empirical review**

A significant aspect of this research, which impacts on an array of potential limitations, is the use of a pre-existing archival database through Bioss SA. This meant that the researcher had to rely on the organisation to collect and extract the data accurately. As the CPA is mainly used for managerial levels upwards, the sample was highly specialised and fell predominantly within a narrow age range and an upper CPA Capability and Mode range. Therefore, generalisability is complicated as the sample was made up of a restricted range of 521 individuals. This impacts on the study and creates limitations as the sample is not

entirely representative of the population from which it was drawn. Care should thus be applied therefore be taken in interpreting the results, as the sample represented a narrow range and hence population validity was limited (Johnson & Christensen, 2012).

Despite the relatively strong magnitude of the correlations, they are probably underestimates as a result of artificial deflation created by the highly homogenous convenience sample, which restricts the range of possible scores. The precise impact of this deflationary effect has not been analysed in this data set. Extreme values with an extremely low probability of being part of the same sample have been deleted as a result of their notable impact on the analysis when comparing the means, standard deviations and intercorrelations. The reported correlation could also be deflated by inter-rater reliability, which has not been incorporated in the data analysis, thereby placing an upper limit on the correlation between these two variables.

Despite the aforementioned limitations, the results of this study did contribute to both the empirical analysis of CPA results in terms of CLC and Mode, as well as the analysis of differences between the biographical groups. Accordingly, the findings of this study could be used to good effect to inform Talent Management practices using the CPA in future.

### **4.3 RECOMMENDATIONS**

Based on the findings, conclusions and limitations of this study, the following recommendations for both Industrial and Organisational Psychology and further research are offered.

#### **4.3.1 Recommendations for Talent Management and Industrial and Organisational Psychology**

The general aim of this study was to: (1) investigate the accuracy of the predictions of growth in theoretical capability by CPA 1 vs CPA 2, and (2) to determine whether individuals from different groups (gender and race) differ regarding these variables.

It is important to design Talent Management programmes enable organisation successfully navigate the highly complex, dynamic, volatile and highly competitive forces - not just now, but also with a future perspective (Tarique & Shuler, 2010; Berger & Berger, 2011). Talent Management have become an extremely important issue within organisations, especially in view of the fact that organisations are becoming increasingly aware of the need to utilise all possible assets not only to survive, but also to achieve a competitive advantage in these turbulent times (Lawler, 2008). Research confirm that, about 85% of respondents saw leveraging human capital is vital to achieving strategic goals, yet a persistent theme over the past year in public discussion has been the state of skills in the South African economy and society (Daniels, 2007). A survey of 803 companies in South Africa revealed that 35% were worried about lack of skills (Empowerdex, 2006). The emphasis should, however, not simply be on scarce and critical skills. Kraak (2005) mentions the lack of emphasis on “high skills” through the process of talent management to support the growth of a developing economy such as that of South Africa.

According to Ashton and Morton (2005), a typical talent management approach has the following basic elements: (1) understanding of the organisational need given the context, (2) data collection, (3) planning, (4) implementation activities, and (5) measurement of results (see figure 1 in chapter 1). Many organisations have implemented talent management programmes designed to according to this approach, and these initiatives have included the use of devices and methods to predict individuals' competence and behaviour as part of the data collection in the job context. Instruments providing valid and reliable information on determining individual potential to solve problems with increasing levels of complexity, which minimises the influence of environmental and biographical factors is thus essential (Kaplan & Saccuzzo, 2010). It is therefore important that Industrial and Organisational psychologists working in this field ensure that the devices used are valid, reliable and free of bias. Developing differentiated and tailored development routes that can accommodate an individuals' unfolding capability over time as measured by these devices, will improve the engagement of those identified as talent and avoid perceptions of under-utilisation (Csíkszentmihályi , 2003; Ashton & Kruger, 2010).

### **4.3.2 Future research**

The data were obtained from a database where the researcher had no knowledge of the organisation's situation and the reasons for re-administering the CPA to the sample group. With reference to the limitations of using archival data, it is recommended that in future research data should be obtained through other means as well. Future researchers should take responsibility for obtaining such information themselves to ensure that the information is current, and that data quality is within the researchers' control. This would enable researchers to rely on their own interpretation of the results, and gain more insight into the psychometric properties of the assessments.

This study included disproportionate numbers of participants in terms of gender, race, educational level and occupational level, primarily because of the convenience sampling procedure used to select individuals who had undergone two CPA assessments. Future research can focus on seeking to use a pre-determined sample with a wider range of individuals across different levels in the organisation. This will ensure a more representative sample of the population to establish greater external validity. This includes using a sample of individuals from varied demographic backgrounds to ensure that the sample is more representative and generalisable.

The sample size, although adequate for the purposes of this research, could be improved on in order to allow for better generalisations to the South African population. Future research could involve using more widely diverse instruments which represent different theoretical angles of the broader constructs of capability.

## **4.4 INTEGRATION OF THE RESEARCH**

This study investigated the accuracy in the growth of theoretical capability as measured by CPA 1 vs CPA 2. The results suggest that a relationship does, indeed, exist between these variables and that this relationship may provide insight into talent management practices.



Research is an important factor in respect of talent management, as it not only assists human resource practitioners, but also managers, by asking the relevant questions necessary for maintaining a successful talent management programme. Research has proved that structured and formalised talent management are critical in addressing organisational current and future human capital and strategic concerns, although it is still difficult to determine overall return on investment of these processes (Gratton & Ulrich, 2009; Capelli, 2008a). The validity and reliability of devices and methods, like the CPA, used to assist organisations in precise and effective decisions regarding the utilisation of human capital are therefore imperative from a financial, individual dignity and organisational effectiveness perspective (Berger & Berger, 2011).

In conclusion, the findings of the study confirmed the accuracy in predicting the growth in theoretical capability in repeated measures of the CPA. The knowledge gained in terms of the significant relationship between theoretical capability (CLC), and potential capability (Mode) have practical implications for talent management practices. It is trusted that this research will inform organisational practices aimed at using accurate devices in data gathering as part of talent management.

#### **4.5 CHAPTER SUMMARY**

By focusing on both the literature review and the empirical study, this chapter discussed the conclusions drawn from this study as well as the possible limitations of the study. Recommendations were offered in respect of talent management practices as well as recommendations for future research. Finally, the study was integrated by highlighting the fact that the results supported the existence of a significant relationship between CPA 1 and CPA 2 results in terms of CLC and Mode.

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