

**THE DISCRIMINANT VALIDITY OF A CULTURE ASSESSMENT INSTRUMENT:  
A COMPARISON OF COMPANY SUB-CULTURES**

by

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Supervisor: Prof Gert Roodt

October 2002



## STATEMENT

I certify that the dissertation submitted by me for the degree Doctor in Commerce (Leadership in Performance and Change) at Rand Afrikaans University, is my independent work and has not been submitted by me for a degree at another faculty/university.

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LEOPOLD JOHN PETKOON

October 2002

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Leo Petkoon

October 2002

## **ABSTRACT**

### **THE DISCRIMINANT VALIDITY OF A CULTURE ASSESSMENT INSTRUMENT: A COMPARISON OF COMPANY SUB-CULTURES**

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#### **Background**



The point of departure of this study is that a need for a valid and reliable culture assessment instrument exists, especially in the South African context with its variety of cultures. Such an instrument can provide valuable insight into the culture of a company, which is crucial if it wants to compete successfully in today's competitive global economy. In South Africa in particular, a host of transformational imperatives add a unique degree of complexity to understanding company culture.

#### **Literature Research**

The theoretical research objectives of the study focus on the ontology, epistemology and methodologies in respect of the construct "organisational culture". A review of the literature reveals that the construct "organisational culture" is characterised by competing definitions, epistemologies and research paradigms. Controversies exist about virtually all aspects of this construct including the mechanics and extent of its contribution to organisational performance.

The literature confirms, that questionnaires can play an important role in the quantitative analysis of organisational culture (Reichers & Schneider, 1990; Rousseau, 1990). However quantitative assessment of organisational culture has been criticised because of a strong mono-method bias in the field. There is thus a need for a multilevel and multi-method conceptualisation. In this respect, Schein's (1985) three level typology provides a distinctive role for both quantitative and qualitative measurement.

### **Empirical Research Objective**

The primary objective of the empirical research was to determine the ability of the Culture Assessment Instrument of Martins (1989) to validly and reliably distinguish sub-cultures within a specific organisation as well as differences between the culture of a transport organisation and a norm group of different companies representative of various industries. In other words to determine the discriminant validity of the Culture Assessment Instrument.

### **Participants**

For this study two sets of data were used. The primary data were obtained from a sample drawn from a transport organisation. It yielded 593 responses. The majority of respondents are white, male, and in the age group 36 - 45. The secondary data set consists of a convenience sample of 4066 participants from five different companies from various industries. The majority of respondents are white, male, and in the age group 25 – 35.

### **The Measuring Instrument**

The Culture Assessment Instrument of Martins (1989), the focus of this study, consists of six dimensions, covering both the internal and external environments. The internal environment entails five organisational systems, whilst the external environment entails different stakeholder groups. Although the latest version of the instrument consists of 89 items, only the 56 items that were common to all the companies

in the sample were included in the study. These 56 items are proportionally representative of the six dimensions.

### **The Research Procedure**

The primary data set was obtained from a sample drawn from a transport organisation, whilst the secondary data was built from data gathered from participating companies over the last few years. The primary and secondary data were originally gathered mainly with a view to improve the performance of the specific companies. The aim of gathering the information was thus the same in all the cases.

### **Statistical analysis**

The particular statistical procedures were selected for their suitability to test the research hypotheses of the study. These procedures include descriptive statistics, factor analyses, analyses of variance and measures of association. In respect of factor analyses a procedure developed by Schepers (1992) was followed. This procedure includes first as well as second level factor analyses. The Statistical Consultation Service of the Rand Afrikaans University conducted the analyses. All calculations were done by means of the SPSS- Windows program of SPSS - International.

### **Conclusions and Recommendations**

The empirical findings of the study did not support the expectations of the study. It was expected that the instrument would identify significant differences in sub-cultures within a specific transport organisation as well as between that company and a norm group of companies. It did not. Only a small portion of the variance in differences in mean culture scores within the company as well as between the various companies could be attributed to differences in culture. On these grounds it was concluded that the Culture Assessment Instrument of Martins (1989) does not possess discriminant validity.

However, it was found that the instrument is highly reliable and assessed the communalities between companies very well. These communalities are mainly at sur-

face level – the level of artefacts and creations with reference to Schein's (1985) three-level typology. At this level companies may appear to have similar cultures. The reason for this phenomenon is that companies readily embrace the popular management tools and practices in their effort to cope with the fast changing business environment. There is a possibility that the Culture Assessment Instrument detected the outcome of these practices which are common to most companies.

Emanating from the findings of the literature and the empirical research of this study, it is recommended that further research be undertaken to operationalise the construct "organisational culture" at the deeper levels, which are the levels of tacit values, taken for granted assumptions and basic beliefs. The author believes that with proper operationalisation at the more fundamental levels it will be possible to successfully distinguish cultures between companies from the positivistic paradigm.

Finally, it is recommended that the application of the Culture Assessment Instrument be supplemented with methods from the interpretative paradigm for a more comprehensive view on the culture of a company. A comprehensive culture profiling process would aid a guided evolution of company culture in contrast to introducing popular behavioural stimuli that tend to affect the surface level of culture only.

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## **CHAPTER 1: BACKGROUND, PROBLEM STATEMENT AND OBJECTIVES**

### **1.1 Introduction**

A study of relevant literature indicates that organisational culture has a significant impact on the long-term economic performance and productivity of an organisation (Deal & Kennedy, 1982). Consequently, organisational culture is increasingly examined as a means to better understand a corporation's well-being (Lankford & Mintu-Wimsatt, 1999). Many companies have recognised that a primary source of their success is rooted in the culture of the organisation. This is true for companies like Disney, General Electric, Coca-Cola and many other blue chip, "household name" companies.

Organisational culture has fascinated both academics and practitioners alike since the early 1980s, when Peters & Waterman (1982) laid down their eight attributes of excellence in management. Ever since the relationship between organisational culture and organisational performance became clear, leaders have been interested in understanding the culture of their organisations. They have come to realise that proper insight into the cultures of their organisations would enable them to effectively guide them with a view to higher organisational performance and sustainable competitive advantage.

The use of scientific diagnostic tools is necessary to assess and understand organisational culture. Several of these tools, quantitative as well as qualitative, are available in South Africa. The majority of them, however, lack proof of reliability and validity, especially discriminant validity. A gap thus clearly exists in the literature in this respect (see Annexure A).

This study is focussed on this gap. Firstly, the literature will be reviewed on all the relevant aspects relating to assessing organisational culture. Various models of organisational culture will be examined. Secondly, the discriminant validity and reliabil-

ity of a South African culture assessment scale, the Culture Assessment Instrument (CAI) of Martins (1989), will be tested empirically. Recommendations for further research will focus on enhancing diagnostic capability in respect of organisational culture, based on both the literature and empirical research findings of this study.

## **1.2 Background**

In the past 20 years or so, the concept of culture has become an important issue, that has been heightened with the realisation that, through technology and markets, organisations are becoming increasingly global (Kobrin, in Joynt & Warner, 1996).

Erwee, Lynch, Millett, Smith and Roodt, (2001) probably best summarise the current status in respect of organisational culture by stating that it remains one of the most contested areas of academic inquiry within the broader field of organisational studies. It is characterised by competing definitions, epistemologies and research paradigms. Controversies exist about virtually all aspects of this construct including the mechanics and extent of its contribution to organisational performance. However, there is considerable consensus about the importance of organisational culture.

In South Africa additional factors necessitate that organisations gain sound insight into their own cultures. South Africa is a highly heterogeneous society, consisting of many cultural groupings, which manifest in the work place. South Africa has been undergoing major transformation since becoming a democracy and being accepted as a full participant in the global economy. South Africa's success in the global economy will be positively or negatively affected by the ability of individual companies and industries to adapt their cultures to fit the global challenges, without losing their unique characteristics.

The particular transport organisation used in this study was chosen because it has been undergoing profound change on various fronts over the past 20 years. In the first place the transport market was deregulated exposing it to free market competitive forces. A second major change occurred when the organisation changed from a state enterprise to a state-owned public company. A third profound change occurred



with the advent of the country's political transition from a minority ruled regime to an inclusive democracy in 1994. This process accelerated fundamental organisational and demographic changes. The application of corrective instruments like Affirmative Action, Black Economic Empowerment and Reconstruction and Development, to achieve demographic representivity, are amongst the most important change agents introduced into the organisation.

The next paragraph builds a case for conducting a review of the relevant literature on organisational culture as well as motivating the necessity to come to grips with the phenomenon of organisational culture in the South African context.

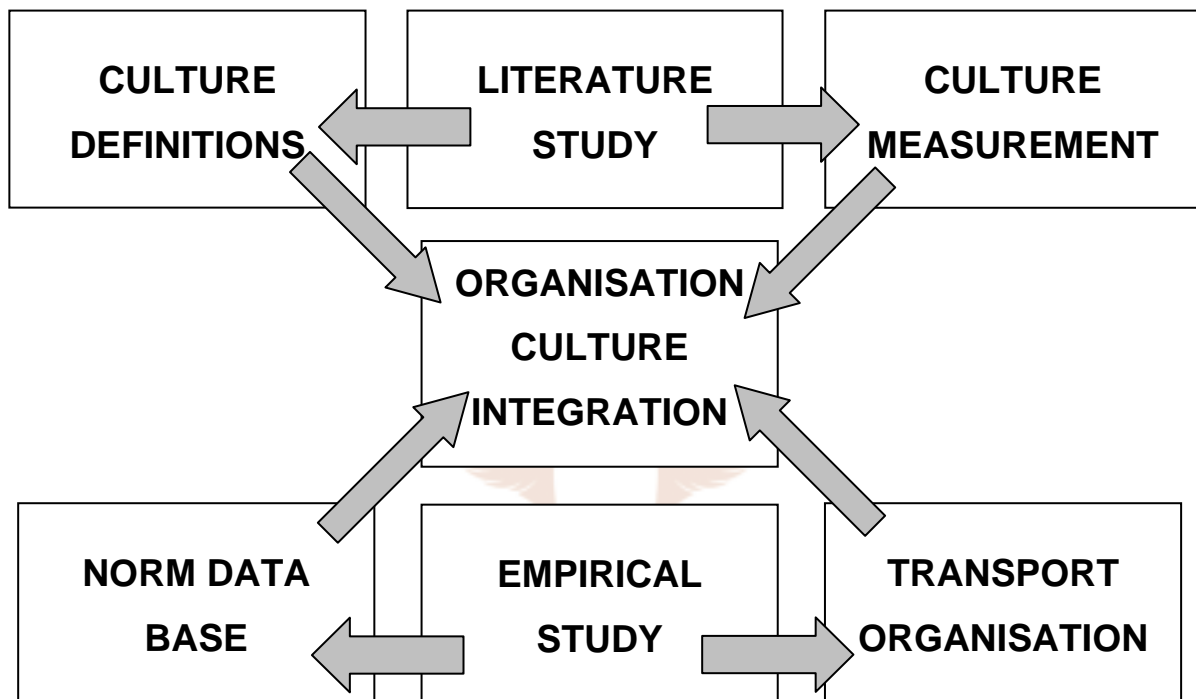
### **1.3 Motivation**

Organisational culture is the very fibre of the organisation. Thus the culture equates to the personality of the organisation (Kilmann, Saxton, Seopa & Associates, 1985), which can either facilitate or restrain change and performance. Differently stated, one can safely say that an organisation has successfully changed only after its culture has changed. For this reason it is crucial to fully understand the culture of the organisation, as well as how it develops and can be changed.

South African companies, as part of the global economy, today compete with the best in the world. In order to compete successfully companies need to be well equipped; in other words they need to have the characteristics of a world-class company. One of the characteristics of a world-class company is its effective organisational culture. Thus, for a company to be world class it is necessary that the company properly understands and manages its culture. Metaphorically speaking an organisation needs to evolve to an appropriate personality to be competitive.

From reviewing the literature it is clear that research to date has not provided clear-cut answers pertaining to a number of culture issues, especially in the South African context. Through the development of a comprehensive culture model the study seeks to fill a gap in the theory on culture. The study will contribute to the better understanding of culture, which will help organisations to better manage their cultures.

Thus, the study not only lends itself to the opportunity of contributing to theory, but also provides an opportunity to add value to practice by developing a measurement model for assessing organisational culture and proving its usefulness. The format of the organisational culture study is summarised in Figure 1.1 The next paragraph frames the problem of culture from a literature review as well as an empirical context with particular emphasis on the South African organisational perspective.



**Figure 1.1: Culture Study**

#### **1.4 Problem Definition**

Various studies (e.g. Hofstede, 1980; Cooke & Szumal, 200) have found that organisational culture differs from country to country, between industries, between organisations and even within organisations (sub-cultures). The typical South African organisation has its own idiosyncrasies, but is characterised by a highly multi-cultural work force.

According to Mouton (2001) most of the methodological research in the field of survey studies has been conducted in the United States. One obvious limitation, therefore, is the applicability of these results to other contexts and countries. Most of the

methodological research in the area of cross-cultural research, although done in various countries (including developing countries), is quite dated and its relevance for current research practice is not obvious. Very little methodological research has been done in developing countries.

The organisational culture instruments developed in other countries may not be suitable for the South African context. Hence a real need exists to validate organisational culture instruments for the South African context.

Although it has been proven by various studies that organisational culture plays an important role in the success or failure of organisations, research to date has not yet provided clear-cut answers to a number of theoretical, practical and methodological issues pertaining to organisation culture.

This study in response examines the culture profile of a South African transport organisation from two perspectives with the view to testing the applicability of a South African Culture Assessment Instrument (CAI)(Martins 1989). Firstly, the transport organisation's sub-cultures are examined on a functional as well as a demographic base. Secondly the transport organisation culture is compared with the cultures of organisations in a norm group of companies. The insight thus gained will help the organisation to make informed decisions about the management of its own culture.

By critically evaluating cultural measurement instruments a body of knowledge is generated on suitability of theoretical dimensions, item-content and format and other issues related to validity and reliability.

#### **1.4.1 Theoretical Issues**

From a theoretical perspective the following key aspects of organisational culture are lacking:

- A clear and generally accepted definition for the construct "organisational culture".

- A comprehensive conceptual model for organisational culture.

#### **1.4.2 Practical Issues**

From a practical perspective assessment instruments that can validly and reliably distinguish sub-cultures within an organisation as well as differences in culture between organisations in South Africa with its rich variety of cultures that meet in the work place, are lacking.

#### **1.4.3 Methodological Issues**

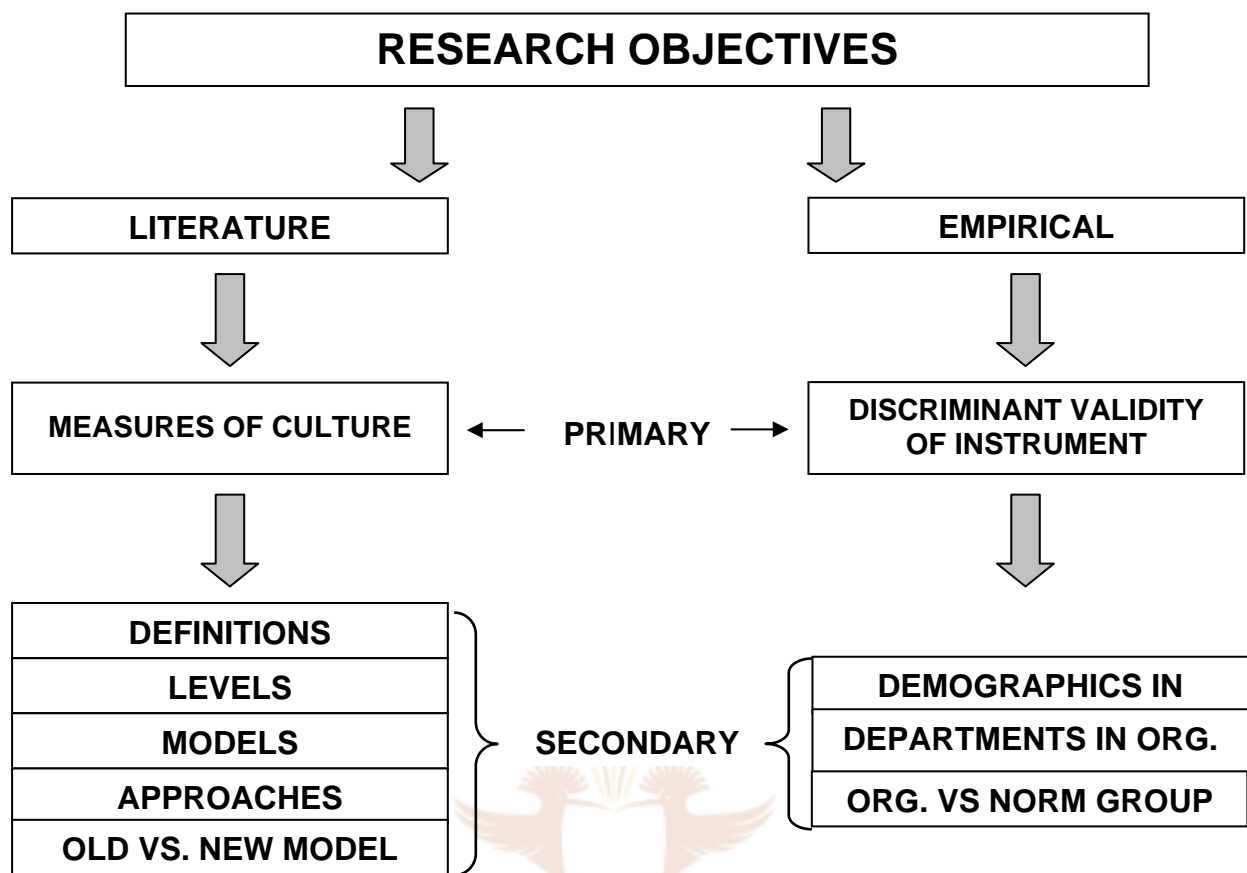
From a methodological perspective, useful and cost effective and practical methods, preferably quantitative, for assessing organisational culture, are lacking.

Based on the above exposition of the research the following research questions are formulated:

- What are the definitions, levels, models, and approaches towards culture in companies?
- Does the CAI have the ability to validly and reliably distinguish sub-cultures within a specific organisation as well as between a specific organisation and a norm group of companies representative of various industries. In other words does it possess discriminant validity?

#### **1.5 Objectives of Research**

The objective of this research is subdivided into literature and empirical objectives. Both the literature objective and the empirical objective in turn consist of a primary objective and secondary objectives as depicted in Figure 1.2.



**Figure 1.2: Research Objectives**

Firstly, a systems model of organisational culture will be developed, based on the study of relevant literature. The model will cover significant aspects of organisational culture. The model will be a synthesis of prominent models of organisational culture and reflect the key determinants, transformation processes and organisational outcomes of organisational culture. The basic logic upon which the model would be developed is illustrated in Figure 1.3. The reasoning intimates that influences such as history and environment, shape organisational personality which in turn impact on the outputs of the individual, the group and the organisation. Secondly, the sub-cultures within a transport organisation will be compared with one another and the differences interpreted. Thirdly, with this model as background, the culture of a transport organisation will be compared with the norm group of South African organisations to identify similarities and differences. These differences and similarities will be quantitatively interpreted.

### 1.5.1 Literature Research

The literature research is divided into a primary research objective and secondary research objectives.

#### 1.5.1.1 Primary Objective of Literature Research

The primary objective of the literature research is to determine the various acceptable ways in which organisational culture is reliably and validly measured and compared across and within companies.

This will entail a review of the literature regarding definitions, levels, models and approaches towards organisational culture, as described in the secondary objectives below.

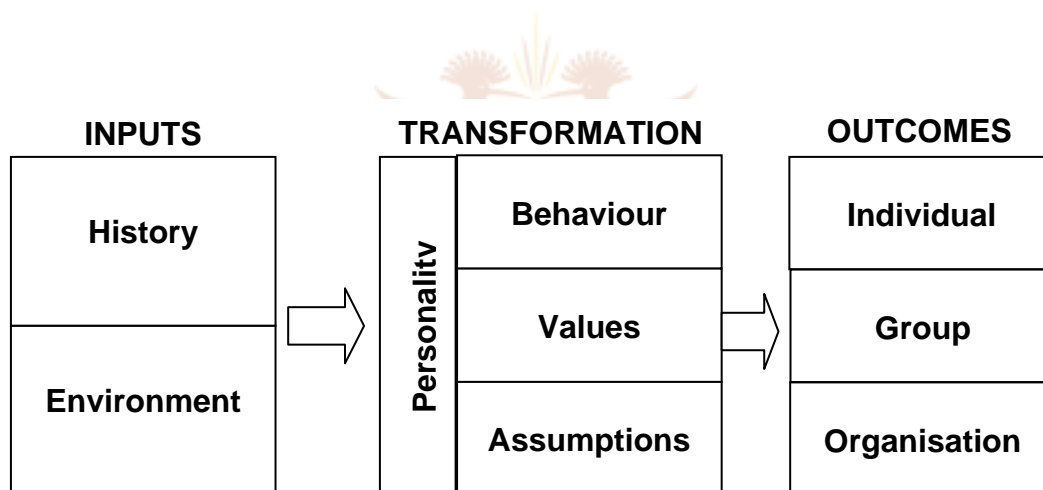


Figure 1.3: Logic on which development of the culture model is based

#### 1.5.1.2 Secondary Objectives of Literature Research

The secondary objectives of the literature review are:

- To define the construct “organisational culture”.
- To identify the various levels of organisational culture.
- To recognise the diverse perspectives of organisational culture.

- To distinguish the various organisational culture research themes.
- To review the different conceptual models of organisational culture and select an appropriate one for this research.
- To identify the different approaches to measuring organisational culture.
- To review validity issues on culture assessment instruments.

## **1.5.2 Empirical Research**

The empirical research is also subdivided into a primary research objective and secondary research objectives.

### **1.5.2.1 Primary Objective of the Empirical Research**

The primary objective of the empirical research is to determine the ability of the CAI to validly and reliably assess and distinguish organisational sub-cultures within an organisation as well as to compare the overall culture of the organisation with that of other organisations in a norm group. In other words to determine the discriminant validity of the CAI.



### **1.5.2.2 Secondary Objectives of the Empirical Research**

The secondary objectives of the empirical research are:

- To analyse and interpret the differences in sub-cultures based on demographic variables and on the various functional departments of the transport organisation, using primary data.
- To analyse and interpret the differences in culture between the transport organisation and the norm group, using secondary data.
- To identify the underlying factor structure of the CAI.
- To compare the CAI with the newly developed culture model.

Based on the research objectives, the next paragraph formulates the relevant hypotheses to be tested in pursuit of a conclusion about the discriminant validity of the Culture Assessment Instrument.

## **1.6 Research Hypotheses and Postulate**

The following hypotheses and postulate were formulated to meet the objectives of the study.

Hypothesis 1: There are significant differences in mean culture scores between the sub-cultures based on demographic variables of the transport organisation.

Hypothesis 2: There are significant differences in mean culture scores between sub-cultures based on various functional departments of the transport organisation.

Hypothesis 3: There are significant differences in mean culture scores between the transport organisation and organisations in the norm group.

Postulate 1: A proper fit exists between the Martins' model of organisational culture and the proposed model.

The next paragraph is a synopsis of current knowledge of organisational culture as encountered in the literature.

## **1.7 Current Knowledge on the Problem**

A review of the literature reveals in brief that:

- Organisational culture differs between countries, industries and companies and even within companies (sub-cultures); This phenomenon can be explained,



amongst others, by the theory which according to Stewart (2001) states that groups emerge around a discipline or problem.

- Numerous models of organisational culture exist. A comprehensive, all-encompassing model, however, is lacking;
- Valid instruments for comparing the culture of an organisation with other organisations are lacking; especially those developed and tested for South African conditions.
- Valid and reliable information on organisational culture instruments is scarce and where it exists it is mainly limited to the popular measures of validity such as construct validity, face validity, content validity and predictive validity (See Annexure A).
- No evidence of the discriminant validity of a South African culture assessment instrument could be found in the literature.

In summary the review of the literature reveals that there is a gap in the literature in respect of valid and reliable culture measuring-instruments, especially instruments with discriminant validity. The literature review also reveals that culture differences could be expected between companies from different industries. The theory of communities of practice lends support to this theory.

The next paragraph highlights the theoretical, practical and methodological value of the research.

## **1.8 Contribution of Research**

It is anticipated that this study will have theoretical as well as practical value. Insights into the various aspects of culture will contribute to theory building, while the new model will help practitioners to more accurately assess organisational culture. This in turn will help practitioners to design and implement quality change programs for enhancing organisational performance.

### **1.8.1 Expected Theoretical Value**

The expected theoretical value of the research is:

- The research will shed light on the issue of sub-culture difference within a specific organisation as well as cultural differences between companies. In effect the discriminant validity of the Culture Assessment Instrument will be assessed;
- The research will provide a systems perspective on organisational culture;
- The research will emphasise the central roles of Schein's (1985) three level typology and the three perspectives in culture research;
- The research will serve as a building block for future research in organisational culture.

### **1.8.2 Expected Practical Value**

The expected practical value of the research is:

- The research will contribute to a very important area ("pressing people issues") of organisational life in South Africa;
- The research will lend support to the important role organisational culture plays in organisational performance;
- The research will provide a framework and criteria for assessing organisational culture in companies;
- The research will enable a company to better understand and manage its culture;
- The research will provide a model of organisational culture that can facilitate organisational change programmes;

### **1.8.3 Expected Methodological Value**

The expected methodological value of the research is:

- The research will provide guidelines for the development of organisational culture scales;
- The research will support the value of quantitative methods in assessing organisational culture;
- The research will reinforce the principles of multi-method, multi-level and linking research.

## **1.9 Chapter Layout**

The chapter layout is as follows:

- Chapter 1: Problem Statement

In this chapter the problem definition, objectives and research hypotheses are stated.

- Chapter 2: Organisational Culture

This chapter reviews the literature on the various ways to study and measure organisational culture. The secondary objectives of the literature review will be addressed in this chapter.

- Chapter 3: Research Method

The research design, participating companies, samples, measurement instrument, research procedure, statistical techniques and hypotheses are discussed in this chapter.

- Chapter 4: Results of Empirical Research

The results and findings of the research will be reported, discussed and interpreted according to objectives of the empirical study.

- Chapter 5: Conclusion and Recommendations

In this chapter conclusions and recommendations are made on the results of both the empirical and literature research.

### **1.10 Summary**

In this chapter the problem statement, objectives and research hypotheses were discussed. The research was put in the context of South Africa as part of the global economy. It was pointed out that the study of organisational culture is truly multi-disciplinary research, drawing from many different fields of study. It also pointed out the potential contribution of the research from a theoretical, practical and methodological perspective. In the next chapter the current knowledge on organisational culture will be discussed based on a review of the literature.



## **CHAPTER 2: ORGANISATIONAL CULTURE**

### **2.1 Introduction**

In this chapter the secondary objectives of the literature review, as stated in Chapter 1, will be discussed. The chapter starts with a review of different definitions of culture. An examination of the latest themes and diverse perspectives of the construct follow this. Then the different models of culture are discussed. The author suggests his own integrative model based on the review of the literature. This model serves as an integrating framework to show where the different elements of this study fit in. The different methods for assessing and categorising organisational culture are discussed and a case is made out for the quantitative measurement of culture. Finally, the need for assessing the validity of culture measurement instruments, especially discriminant validity, is pointed out.

### **2.2 Defining Organisational Culture**

According to Beyer, Hannah and Milton (2000) the usefulness of scientific concepts depends to a large degree on whether they help to isolate and describe something distinctive about the phenomena under study. It is important to ask about any construct that is described, what is not already captured by other constructs. With regard to the construct of culture, organisational researchers should therefore confront the question of what is distinctive about this construct and its use in research. What does it point to in organisations that other constructs miss?

Answering this question is complicated by the fact that both organisational researchers and anthropologists who specialise in studying culture disagree on what culture is and use different sets of words to define the construct.

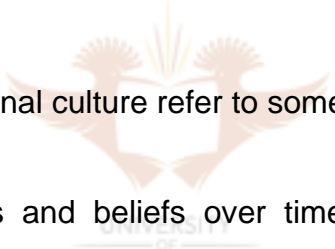
According to Ajiferuke and Boddewyn's (1970, p.154) "*there are almost as many meanings of culture as people using the term*". Kroeber and Kluckhohn (1952) al-

ready suggested in 1952 that there were as many as 164 meanings of the term “*culture*”. Since then it was hoped that the field may have been further refined and a more “common” definition may have been agreed upon. Instead, what culture is and the nature of it, are still hotly contested (Bolman & Deal, 1991).

Fortunately, some areas of overlap can be discerned. Most basic is that there seems to be general agreement that organisational cultures are based in sets of meanings *shared* by some groups of people. This focus on what is shared has been neglected by other constructs used to study organisations and thus give the culture construct a useful distinctiveness for organisational research (Beyer, Hannah & Milton, 2000).

At a basic level, culture may be defined as “*the way we do things around here*” (Deal & Kennedy, 1988, p.4) or “*the way we think about things around here*” (Maull, Brown & Cliffe, 2001, p. 305).

Other definitions of organisational culture refer to some unique characteristics:

- 
- Patterns of shared values and beliefs over time, which produce behavioural norms that are adopted in solving problems (Deal & Kennedy, 1982; Schein, 1990).
  - Culture is to the organisation what personality is to the individual – a hidden yet unifying theme that provides meaning, direction, and mobilisation (Kilmann, Saxton, Serpa & Associates, 1985).
  - Organisational culture is a glue that welds managers together for effective implementation of organisational strategies, and the absence of this glue would bring about disastrous effects on the organisation (Alder & Morris, 1982).

The most commonly accepted definition of culture is the one by Schein (1985, p. 9):

“A pattern of basic assumptions – invented, discovered, or developed by a group as *it learns to cope with its problems of external adaptation and internal*

*integration – that has worked well enough to be considered valid and, therefore, to be taught to new members as the correct way to perceive, think and feel in relation to those processes.”*

In the literature organisational culture often gets confused with the construct “climate”. The approach taken in this study is consistent with Denison’s (1996) view that culture and climate are not strongly differentiated. Instead, they represent different but overlapping interpretations of the same phenomenon.

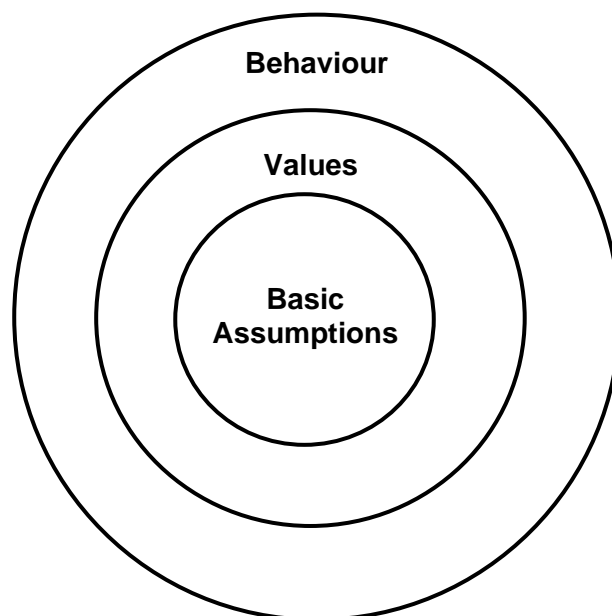
The lack of clarity between researchers on the different meanings of the terms used to describe cultural elements supports the fact that so far it has not been possible to find a common language to define such a complex concept as culture.

### **2.3 The Levels of Organisational Culture**

Many researchers combine culture with another term to define its boundaries. Pizam (1993) for example, argued that culture exists at various levels of society. Accordingly, he created a “hierarchy of cultures.” The national culture is a geographical distinction, based on the physical boundaries of the nation state, whereas industry cultures, occupational cultures, corporate cultures, and organisational structure and managerial practices form distinctive patterns of behaviour of a social unit. Many other authors use similar approaches and define the boundaries of culture through different sub-cultures (Schein, 1985).

Groeschl and Doherty (2000) pointed out that culture consists of several elements of which some are implicit and others are explicit. Most often these elements are explained by terms such as behaviour, values, norms, and basic assumptions. To simplify these manifestations of culture many authors use the layers of an onion as a metaphor (See Figure 2.1). The shallow, first layer is behaviour and represents the explicit culture. The implicit culture includes a second and deeper layer namely values. The core of culture is formed by basic assumptions.

According to Schein (1985), culture may be studied at its most visible level through the examination of its *artefacts and creations*, which include physical space, technology, art, symbols, language, mottoes, and overt behaviour. At the next level are the *values* espoused by individuals as the organisation faces and deals with new situations. These represent “what ‘ought’ to be, as distinct from what is” (p. 15). Finally, at the deepest level of culture are the *basic, underlying assumptions*. When actions that are taken in response to problems of external adaptation or internal integration are seen to be effective, the values on which they were based become accepted as “truth,” sink below the conscious level of culture, and become taken-for-granted assumptions that organisational members use to guide their behaviours and attitudes.



**Figure 2.1: Layers of an Onion**

SOURCE: Groeschl & Doherty (2000, p.14)

Research into the nature of organisational culture tends to follow several main themes, the earliest being whether culture is directly observable behaviour or underlying shared assumptions (Lewis, 1996). Researchers are interested in the difference, because the way one views culture will determine how one studies it (Allaire & Firsirotu, 1984).



## 2.4 Organisational Culture Research Themes

Lewis (1996) identified four themes, i.e.: tangible vs intangible; metaphor vs variable; the effect of culture; creation and transmittance. Maull *et al.* (2001) also identified four themes: culture as a belief system; culture as a learned entity; culture as mental programming; and culture as strategy. The first three themes of Maull *et al.* (2001) are very similar to the themes identified by Lewis (1996). The one theme of Maull *et al.* (2001) i.e. culture as strategy, however, is different from the themes identified by Lewis (1996), and is thus a separate theme. See Table 2.1 for a comparison of the themes identified by Lewis (1996) and Maull *et al.* (2001) respectively. The similar themes are shaded in Table 2.1.

**TABLE 2.1**  
**A COMPARISON OF CULTURE THEMES**

Themes identified by Lewis (1996)	Themes identified by Maull <i>et al.</i> (2001)
Tangible vs Intangible	Culture as a belief system
Metaphor vs Variable	
The Effect of Culture	
Creation and Transmittance	Culture as a learned entity
	Culture as mental programming
	Culture as strategy

### 2.4.1 Tangible vs Intangible

According to Sathe (1983) some authors see culture as intangible shared meanings and basic assumptions, or what he calls “*ideationalists*”; while others see culture as tangible forms, or what he calls “*cultural adaptationists*”. Others again see culture as a mixture of observable forms and non-observable meanings and assumptions. Sathe (1983) found that most authors define organisational culture as a combination of forms and meanings.

In this study, although the important role of underlying assumptions is recognised, the focus is on the more observable behaviours and norms rather than the non-observable meanings and assumptions.

#### **2.4.2 Metaphor vs Variable**

A second theme is whether culture is a variable or a root metaphor of an organisation (Smircich, 1983); that is, whether it is something an organisation has or something an organisation is (Schall, 1983). According to Lewis (1996) most authors who explicitly address this question see culture as a variable, which may be affected by both external and internal stimuli, and which may consciously be managed by the organisation itself.

The metaphoric perspective defines culture as the symbols, ceremonies, stories, rituals, and myths that communicate the organisation's values. Scholars operating from this perspective are primarily concerned with the emerging nature of culture, and they use research methods, usually qualitative in nature, to uncover the participants' perspectives (Lewis, 1996).

Investigators interested in culture as a variable have sought to use reliable, valid, and easily administered quantitative measures. (Klinge & Burgoon, 1995). In this study, although the metaphor of personality is used for organisational culture, the construct is treated as a variable and quantitative measures are applied in analysing it.

#### **2.4.3 The Effect of Culture**

A third theme in the literature is the effect of culture on the organisation. According to Lewis (1996) authors who argue that culture has an impact on the effectiveness of an organisation prefer to see culture as a variable and most authors also argue that patterned group behaviour implies the culture of the organisation. This study is based on the assumption that culture has an effect on organisational performance and thus views culture as a variable.

#### **2.4.4 Creation and Transmittance**

A fourth theme is how culture is created and transmitted; that is, whether behaviour leads to shared feelings or shared feelings to behaviour (Lewis, 1996). According to Sathe (1985) most authors believe that certain behavioural norms initially create the shared feelings, but that reinforcement of these norms by attempts to change attitudes would also be necessary so that people will eventually behave in the desired way even when the external justifications for their behaviour have been removed.

According to Maull *et al.* (2001) some authors view culture as a learned entity. The key feature is that culture is taught to new members as the correct way to behave thus perpetuating organisational survival and growth.

In this study culture is viewed as a learned entity and the relationship between shared feelings and behaviour is regarded as reciprocal, i.e. behaviour leads to shared feelings and shared feelings in turn lead to behaviour.

#### **2.4.5 Culture as Strategy**



Bate (as cited in Maull *et al.*, 2001) fundamentally disagreed with the distinction between strategy and culture. To Bate, the separation of the two has no validity, since the two concepts are synonymous. According to Bate strategy is a culture phenomenon. He viewed any kind of strategy formulation as cultural activity (the development of strategy is cultural development).

To fully understand the complexity of the organisational culture literature, it is necessary to explore the various perspectives of culture that have been adopted by the organisational behaviourists and other researchers in this field (Wilson, 2001). These different perspectives will be discussed in the next section.

## **2.5 Perspectives of Organisational Culture**

Martin and Meyerson (1988) identified the following three major perspectives in organisational culture research.

### **2.5.1 The Integration Perspective**

The integration perspective portrays a strong or desirable culture as one where there is organisation-wide consensus and consistency. Espoused values are consistent with formal practices, which are consistent with informal beliefs, norms and attitudes. Cultural members share the same values, promoting a shared sense of loyalty and commitment. Where inconsistencies, conflict or subcultural differentiation occur, this is portrayed as being a weak or negative culture.

### **2.5.2 The Differentiation Perspective**

The differentiation perspective emphasises that rather than consensus being organisation-wide, it only occurs within the boundaries of a subculture. At the organisational level, differentiated subcultures may co-exist in harmony, conflict or indifference to each other. Van Maanen (1991), in his study of Disneyland, found groups of employees who considered themselves as being distinct. These sub-cultures related to different jobs, different levels of organisational status, gender and class. Claims of harmony from management masked a range of inconsistencies and group antagonisms. What is unique about a given organisation's culture, then, is the particular mix of subcultural differences within an organisation's boundaries.

### **2.5.3 The Fragmentation Perspective**

This approach views ambiguity as the norm, with consensus and dissension co-existing in a constantly fluctuating pattern influenced by events and specific areas of decision making. As stated by Frost, Moore, Louis, Lundberg, and Martin (1991), consensus fails to coalesce on an organisation-wide or subcultural basis, except in

transient, issue-specific ways. Rather than the clear unity of the integration perspective, or the clear conflicts of the differentiation viewpoint, fragmentation focuses on that which is unclear.

Many of the studies in organisational culture focus on only one of these perspectives, arguing whether it and it alone is evident within the organisation. As an example of this, Meyerson (1991) makes the point that much of the popular literature (Deal & Kennedy, 1982; Peters & Waterman, 1982) rests on the mistaken assumption that organisational culture consists of shared meanings and commonalities that are quite homogeneous, monolithic and organisation-wide. Little or no consideration is given to the potential existence of subcultures or dissension unless as an indication of a weak culture.

There are also major methodological differences between the three perspectives. Martin and Meyerson (1988) argued that any culture contains elements that can be understood only when all three perspectives are used. From a senior manager's/director's point of view, the integrationist perspective may be congruent with a manager's desire to see their values and policies shared and followed. Middle management may want to distance itself from senior management and therefore subcultures and a differentiation perspective may be more appropriate. Newcomers and disenchanted shop floor workers may fit in more with the fragmentation perspective.

Therefore, within a company there may be organisation-wide consensus on some issues, consensus only within certain subcultures on other issues and an ambiguous state on the remainder. Schein, in Frost *et al* (1991), suggested that there may be a core set of ideological guidelines within an organisation that require a minimal consensus and consistency, otherwise organisations would not function. Therefore consistency, consensus, harmony and integration may occur, but within the midst of inconsistencies, ambiguities, conflicts, disruption and dissolution. This complexity can cause a major headache.

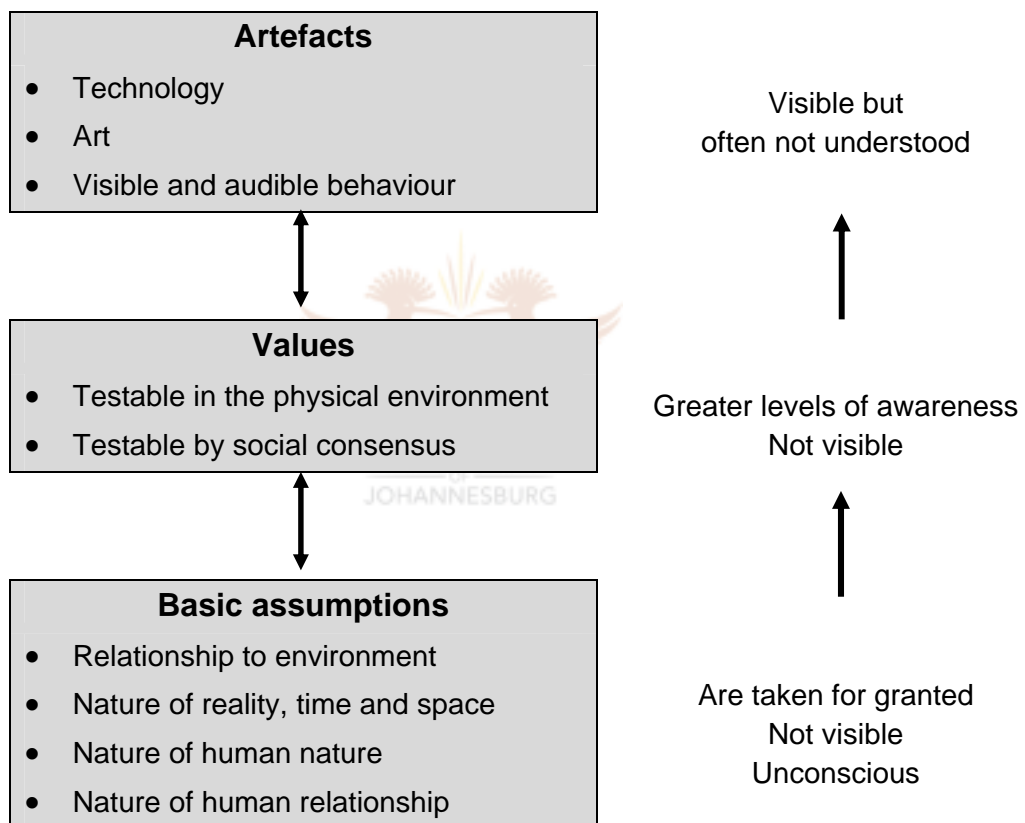
Following is a description of various models of organisational culture that tried to capture the complexity and dynamics of the above discussion.

## 2.6 Models of Organisational Culture

Models of organisational culture are abundant in the literature. Following is a brief description of the more prominent ones.

### 2.6.1 Schein's Model of Organisational Culture

Schein (1985) identifies three levels of culture, i.e. artefacts and creations, values and basic assumptions (See Figure 2.2).



**Figure 2.2: Schein's Levels of Culture**

Adapted from Schein (1985, p.14)

#### 2.6.1.1 Artefacts and Creations

Artefacts are conscious, obvious expressions of culture. Artefacts are visible, tangible and audible demonstration of behaviour supported by organisational norms, val-

ues and assumptions. Artefacts range from physical aspects such as architecture to forms of language to rituals (Schein, 1985). See Table 2.2 for examples of artefacts.

**TABLE 2.2**  
**CLASSIFICATION OF ARTEFACTS**

Type of Artefact	Examples	Authors reporting on artefact
Symbols	Flags, buildings, signs, pictures	(Ott, 1989)
Physical arrangements	Architecture, office design, decorations, dress codes	(Shultz, 1995; Raefaeli & Worline, 2000)
Patterned behaviour	Language, jargon, stories, scripts, tales, myths, jokes, sagas, legends, metaphors, rituals	(Alvesson, 2002; Hatch, 2000; Ott, 1989; Shultz, 1995; Wilsson, 2001)
Role models	Heroes	(Ott, 1989; Schein, 1999).
Ceremonies	Celebrations, rites	(Ott, 1989; Trice & Beyer, 1984)

### 2.6.1.2 Values and Norms

Values represent the principles and standards valued by organisational members. Values indicate what is important to organisational members. Values are the foundation as to what is acceptable and what is not acceptable. That which is considered right and wrong forms a system or an ethical code. Values operate at the level higher than assumptions. Though not obvious, values operate uppermost in members' minds. Organisational members are able to recognise their values especially when challenged by others (Schein, 1985).

Norms are related to values. Norms help to indicate what the expectations are among organisational members. Norms provide the unwritten rules that indicate the expectations in terms of actions applicable in a number of situations. Norms within the business environment could include appropriate dress codes in different situations (Schein, 1985).

The relationship between norms and values is that, what is considered acceptable can be traced to what is valued in a particular culture. Therefore, organisational members share values and conform to norms because the foundational assumptions support the norms and values. Norms and values support the manifestation of more obvious aspects of a culture, the artefacts (Schein, 1985).

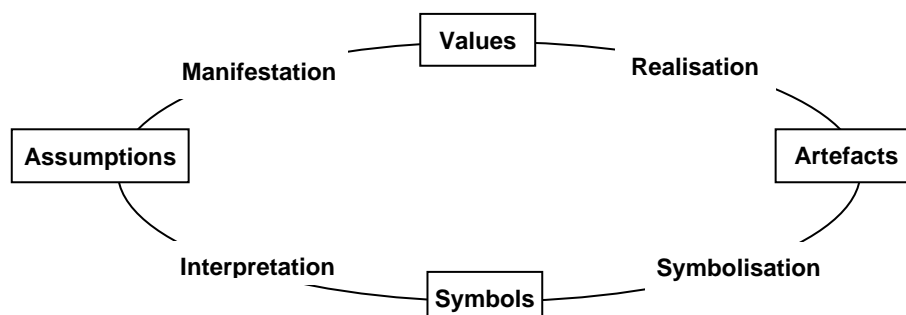
### 2.6.1.3 Assumptions and Beliefs

Assumptions and beliefs are the basis of an organisation’s culture. Where solutions to problem, work continuously, the solution is used unconsciously and becomes the way things are done by the group. Beliefs and assumptions are the foundation of an organisation’s culture. Assumptions are the basis for how organisational members think and feel. Assumptions are unconscious and are taken for granted (Schein,1985).



### 2.6.2 Hatch’s Model of Organisational Culture

Schein’s model was adapted by Hatch (1993), who saw the interaction of artefacts, values, assumptions and symbols as cyclical rather than in terms of Schein’s layered model. Hatch’s (1993) model of culture encompassed basic assumptions, values, artefacts and symbols as indicators of culture. A simplified version of Hatch’s (1993) view of culture is shown in Figure 2.3.



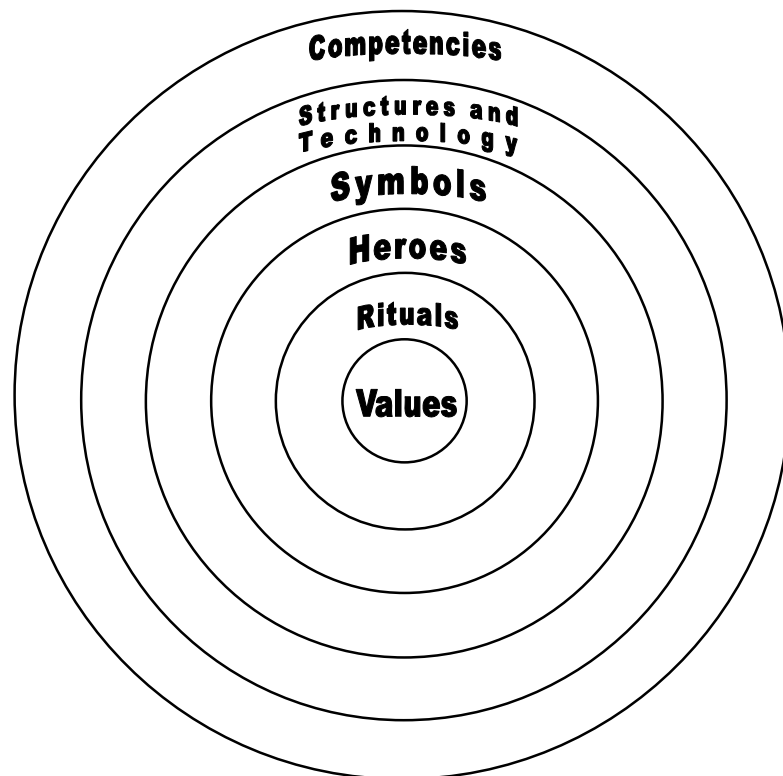
**Figure 2.3: A Dynamic Model of Culture**

Source: Adapted from Hatch (In Ashkanasy *et al.*, 2000, p.250)



### 2.6.3 Hofstede's Model of Organisational Culture

Hofstede attempted to develop a cultural typology for the relationship between organisational cultures and their local national cultures. Figure 2.4 shows the onion diagram model of organisational culture developed by Hofstede *et al.* (1990). It has four main elements; symbols, heroes, rituals and values. The core of culture is formed by values, which are broad tendencies to prefer certain states over others and are the deepest level of culture. Rituals are collective activities that are considered socially essential and heroes are persons who possess characteristics that are highly prized and are often the “winners” or those who get on in an organisation. Symbols are the most overt element of culture and are the gestures, objects or words recognised by those who are part of the same organisational culture.

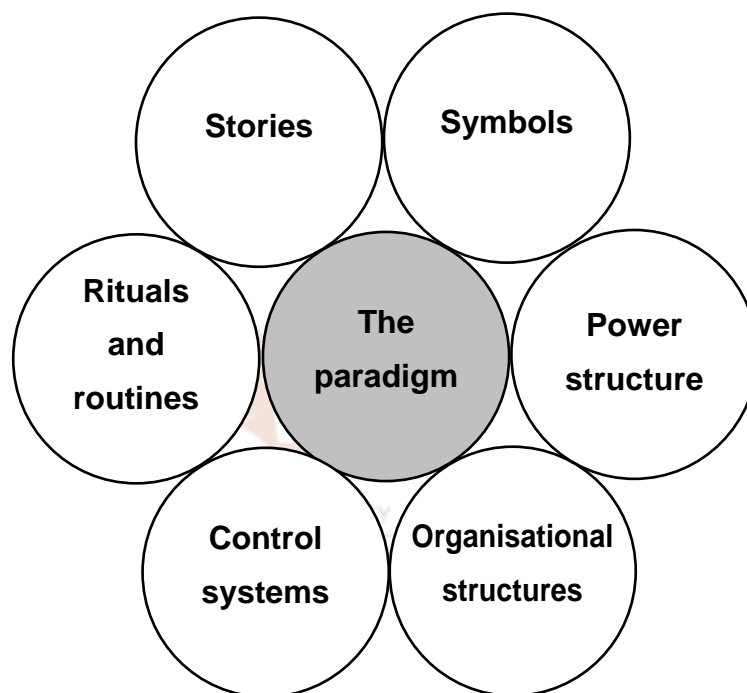


**Figure 2.4: The Hofstede Levels of Organisational Culture**

Source: Adapted from Hofstede as cited in Maull *et al.* (2001, p. 307).

#### 2.6.4 Johnson and Scholes' Model of Organisational Culture

Johnson and Scholes (1998) portrayed culture within an organisation as a web of interlinking concepts and constructs encircling the essential organisational paradigm. This can be looked on as a useful gatekeeper in understanding the broader aspects of culture within an organisation. Figure 2.5 is a representation of Johnson and Scholes' model.



**Figure 2.5: The Cultural Web of an Organisation**

Source: Adapted from Johnson and Scholes (1998, p. 15)

#### 2.6.5 Cooke and Szumal's Model: How Culture Works

In this section the proposal of Cooke and Szumal (2000) of how culture works, is discussed (See Annexure C). The well-known Organisational Culture Inventory (OCI) forms an integral part of the model of Cooke and Szumal (2000) and will be discussed first.

### 2.6.5.1 Organisational Culture Inventory (OCI)

The Organisational Culture Inventory (Cooke & Lafferty, 1987) is a quantitative instrument that measures 12 sets of behavioural norms associated with three general types of organisational cultures: Constructive, Passive/Defensive, and Aggressive/Defensive. Since its introduction, the OCI has been used by thousands of organisations and completed by over 2 million respondents throughout the world. It has been used for a variety of purposes, including testing hypotheses on the relationships among culture, outcomes, and antecedent variables. This wide range of applications has produced an extensive information base regarding the ways in which culture operates in different types of organisations (Cooke & Szumal, 2000).

The following is a brief description of the underlying conceptual framework of the OCI and the behavioural norms it measures. Two underlying dimensions, the first of which distinguishes between a concern for people and a concern for task, define the behavioural norms measured by the OCI. The second dimension distinguishes between expectations for behaviours directed toward fulfilling higher-order *satisfaction* needs and those directed toward protecting and maintaining lower-order *security* needs. Based on these dimensions, the 12 sets of norms measured by the OCI are categorised into three general “clusters” or types of organisational cultures, which are labelled Constructive, Passive/Defensive, and Aggressive/Defensive. (Figure 2.6).

The 12 behavioural norms measured by the OCI are described in Figure 2.6. Constructive cultures encourage members to interact with *people* and approach *tasks* in ways that will help them to meet their higher-order *satisfaction* needs. Passive/Defensive cultures, encourage or implicitly require members to interact with people in ways that will not threaten their own personal *security*. Aggressive/Defensive cultures encourage or drive members to approach *tasks* in forceful ways to protect their status and *security*.

### 2.6.5.2 How Culture Works

Although the operating cultures of organisations have been viewed as a direct function of the assumptions and values shared by members and, in turn, as important determinants of individual and organisational performance, research with the OCI suggests a more complex picture of how culture really works (See Annexure C).

First, the model proposes a disconnect between underlying assumptions and espoused values on the one hand and operating cultures in terms of behavioural norms and expectations on the other.

Secondly, the model proposes a relation between culture and outcomes consistent with, for example, the work of Kotter and Heskett (1992). Their description of the effects of adaptive versus non-adaptive cultures on organisational performance, problem solving, enthusiasm, and innovation suggests that Constructive (as opposed to Defensive) norms should lead to effectiveness. This model, however, shows that a number of other factors are causally related to outcomes – and these factors can suppress or counteract the effects of cultural norms.

Finally, the model displayed in Annexure C proposes that organisational resources and environmental demands play an important role in explaining inconsistencies among values and philosophies, operating cultures, and organisational effectiveness. Resources and demands account for the misattribution often made when organisations with dysfunctional cultures appear to be successful.

<p><b>Constructive Cultures</b></p>	<p>Achievement norms (11): Members are expected to set challenging but realistic goals, establish plans to reach those goals, and pursue them with enthusiasm.</p> <p>Self-Actualising norms (12): Members are expected to enjoy their work, develop themselves, and take on new and interesting tasks.</p> <p>Humanistic-Encouraging norms (1): Members are expected to be supportive, constructive, and open to influence in their dealings with one another.</p> <p>Affiliative norms (2): Members are expected to be friendly, cooperative, and sensitive to the satisfaction of their work group.</p>
<p><b>Passive/ Defensive Cultures</b></p>	<p>Approval norms (3): Members are expected to agree with, gain the approval of, and be liked by others.</p> <p>Conventional norms (4): Members are expected to conform, follow the rules, and make a good impression.</p> <p>Dependent norms (5): Members are expected to do what they're told and clear all decisions with superiors.</p> <p>Avoidance norms (6): Members are expected to shift responsibilities to others and avoid any possibility of being blamed for a problem.</p>
<p><b>Aggressive/ Defensive Cultures</b></p>	<p>Oppositional norms (7): Members are expected to be critical, oppose the ideas for others, and make safe (but ineffectual) decisions.</p> <p>Power norms (8): Members are expected to take charge, control Subordinates, and yield to the demands of superiors.</p> <p>Competitive norms (9): Members are expected to operate in a "win-lose" framework, outperform others, and work against (rather than with) their peers.</p> <p>Perfectionistic norms (10): Members are expected to appear competent, keep track of everything, and work long hours to attain narrowly defined objectives.</p>

**Figure 2.6: Descriptions of the Behavioural Norms Measured by the OCI**

SOURCE: Adapted from Cooke and Szumal (2000, p.149)

### 2.6.5.2.1 The Impacts of Structures, Systems, Technology, and Skills/Qualities on Operating Cultures

The behavioural norms that emerge in organisations are products of members' collective learning regarding what it takes to get things done and succeed – or to stay out of trouble and survive – in the system. In discerning why behaviours are appropriate, members may react cautiously or even sceptically to mission statements, change programs, and what managers “say” they want. Instead, they infer what is expected on the basis of cues or signals from the forces they face on a daily basis.

These forces – which include structures, systems, technologies, and skills/qualities – may or may not be consistent with the more fundamental aspects of the organisa-

tion's culture. Nevertheless, they determine whether members come to believe that they should behave in Constructive versus Defensive ways and shape the true operating culture of an organisation (Cooke & Szumal, 2000).

### **2.6.5.2.2 The Impact of Operating Culture on Outcomes**

Although organisational outcomes are influenced by myriad factors, the OCI norms are expected to have effects that are discernible and significant. Specifically, strong norms for Constructive behaviours should lead to desirable outcomes (e.g., individual motivation, performance, job satisfaction, teamwork, quality of work relations, and quality of customer service) and should minimise undesirable outcomes (e.g., social loafing and stress). Conversely, expectations for Defensive behaviours, particularly those that are Passive, should have the opposite impact, according to the model of how culture works. This has in fact been proved by various studies (Cooke & Szumal, 2000).



### **2.6.5.2.3 The Effects of Resources and Demands**

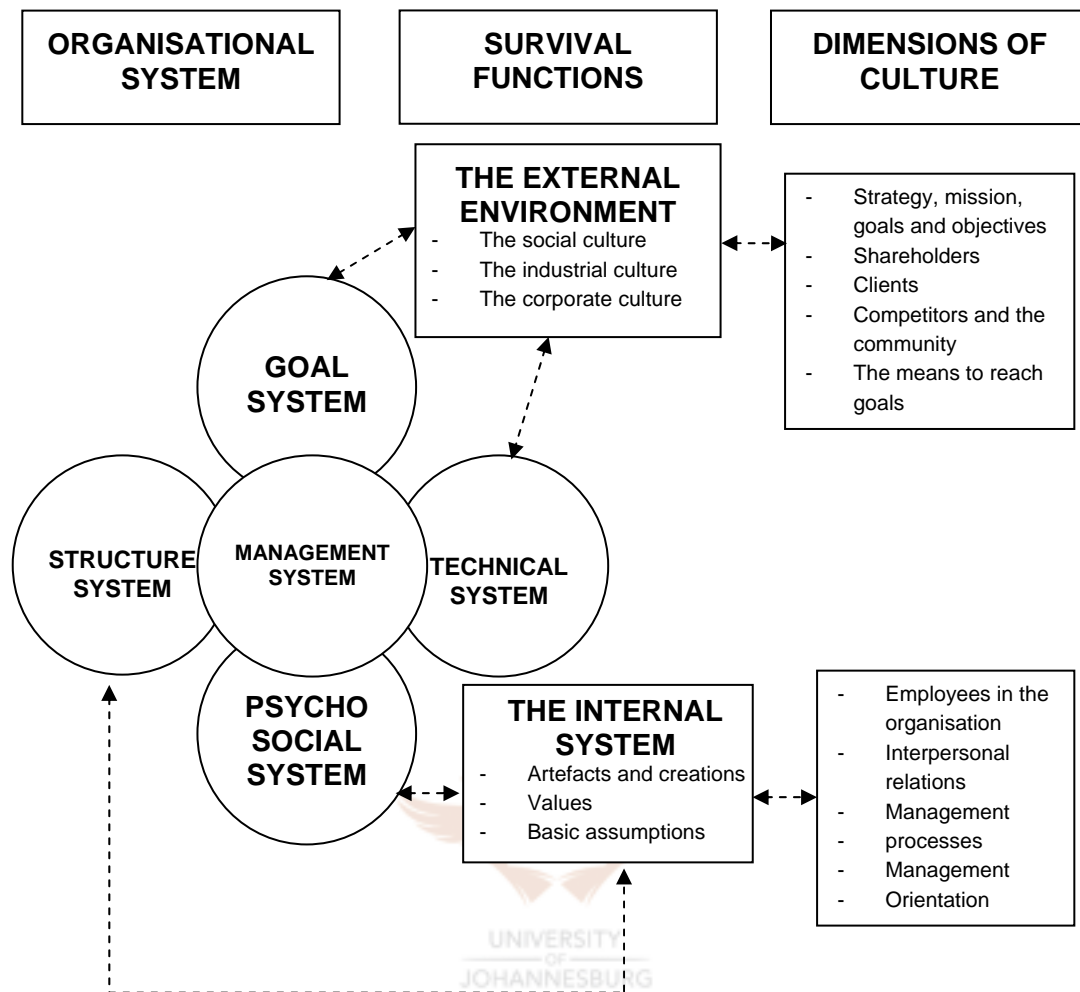
Although culture likely has an impact on effectiveness, Cooke and Szumal's (2000) experience using the OCI, along with the observations of others (e.g. Kotter & Heskett, 1992; Nadler, 1998), suggest that the success of an organisation can also affect all the other variables in the model and create inconsistencies between the different levels of culture and between culture and outcomes. Specifically, the model of how culture works is reinforced by two critical sets of variables: resources and *demands*. The variables in the first set, which are partly based on the organisation's historical performance or effectiveness, include financial reserves, members' technical expertise, and patents and copyrights, as well as more tangible resources. The variables in the second set include demands for performance, efficiency, adaptation, and change. These demands emanate from various sectors of the environment (including customers, suppliers, competitors, and shareholders, as well as the local community and larger society) and, like resources, partly result from the organisation's prior effectiveness and impact on its environment.

As shown in Annexure C, resources and demands influence outcomes at the individual, group, and organisational levels both directly and indirectly. Holding other factors constant, the magnitude of an organisation's resources has a direct and positive impact on such outcomes, whereas the magnitude of the demands placed on it has a negative impact. Organisations with vast resources and little or no competition are simply in an advantageous position to grow and prosper relative to those that have limited resources and are operating in highly competitive and demanding environments. At the same time, resources and demands can influence structures, systems, technologies, and skills/qualities and, in turn, shape the organisation's operating culture. Culture disconnects occur when these factors are more influential in shaping systems and related antecedents than are the espoused values of members or the organisation's mission or philosophy. The direct and indirect effects of resources and demands on outcomes explain why a subset of organisations with Defensive Cultures nevertheless appears to be relatively effective.

#### **2.6.6 The Model on which the CAI is based**

The model of organisational culture, which underpins the CAI, is depicted in Figure 2.7. According to Martins (1989) an organisation is a complex social system in which individual and group activities take place. The various subsystems together form the culture of the organisation. Organisational culture influences the behaviour of employees, suppliers and customers as well as the relationship with the community. Culture has an effect on the internal as well as the external environment and is in turn influenced by both environments. The reason being that the organisation has to continuously adapt to the external environment. In order for the organisation to adapt to the external environment its internal processes also have to change and adapt on a continuous basis.

From Figure 2.7 it can be seen that the model consists of three main elements, i.e. the organisational system, survival functions and dimensions of culture. These elements will be discussed in more detail below.



**Figure 2.7: A model of Organisational Culture**  
 (Martins, 1989,p.92)

### 2.6.6.1 Organisational system

The organisational system consists of five subsystems i.e., goal -, technical -, structural -, psychosocial -, and management subsystem. These five subsystems form the internal subsystem.

The goal subsystem normally consists of various related subordinate objectives that can be linked back to the mission and strategy of the organisation. The mission and the strategy are the main reason for the existence of the organisation and are related to a need that exists in the community.



The technical subsystem refers to the utilisation and application of specialised knowledge and skills, machines, equipment and the layout of facilities which are used in the transformation of inputs to outputs. The technical subsystem truly consists of artefacts and creations.

The structural subsystem flows to a great extent from the goal and technical subsystems and is actually the link between the two. The task expectations as well as the technology have an important influence on the structure of an organisation. Depending on how tasks are grouped, structures of authority are formed and systems of workflow are designed. Other aspects included are reporting lines, work rules and communication flow.

The psychosocial subsystem consists of individuals and groups in the organisation. It is related to the interpersonal and group relationships in the organisation, the climate in the organisation and the motivation to attain a common goal in which individual needs and goals are integrated with those of the organisation.

The management subsystem refers to the way in which the organisation is related to its environment, the setting of goals and objectives, the development of comprehensive strategies and operational plans, the design of structures, the establishment of control processes and the management of human resources (psychosocial subsystem). The management subsystem cuts across the other four subsystems. It justifiably makes out the centre of the organisation as an integrated system. This is because of the influence of the management subsystem on the other systems. The management subsystem does not develop as a result of the other systems. In most cases the management subsystem is where the organisation originated.

The external subsystem consists of the environment in which the organisation operates. The gathering of data from the environment and the interpretation thereof are management functions which need to be carried out on a continuous basis seeing that it is important for the survival of the organisation. The organisation thus has to stay abreast of shareholders, customers, competitors and the community, as well as political, statutory, economic and ecological factors. The way, in which all the exter-

nal factors are dealt with, could have a major impact on the success and survival of the organisation.

As a result of the interaction and reciprocal influence of the various subsystems on one another, a unique culture is created in each organisation, which distinguishes it from other organisations.

### **2.6.6.2 Survival Functions**

From Figure 2.7 it is clear that the two main variables that must be taken into account in assessing the culture of an organisation are:

- The problem of survival and adaptation of the organisation to the external environment, with particular reference to particularly the goals and technological subsystems of the organisation.
- The problem of survival and adaptation of the internal organisational system with reference to the structural and psychosocial subsystems.

### **2.6.6.3 Dimensions of Culture**

Dimensions of culture are subdivided into two categories, i.e. those that relate to the external environment and those that relate to the internal environment (See Figure 2.7).

#### **2.6.6.3.1 Dimensions Relating to the External Environment**

The following dimensions relate to the external environment:

- Strategy, mission, goals and objectives;
- Shareholders, customers, competitors and community; and
- The means to reach goals.

### **2.6.6.3.2 Dimensions Relating to the Internal Environment**

The following dimensions relate to the internal environment:

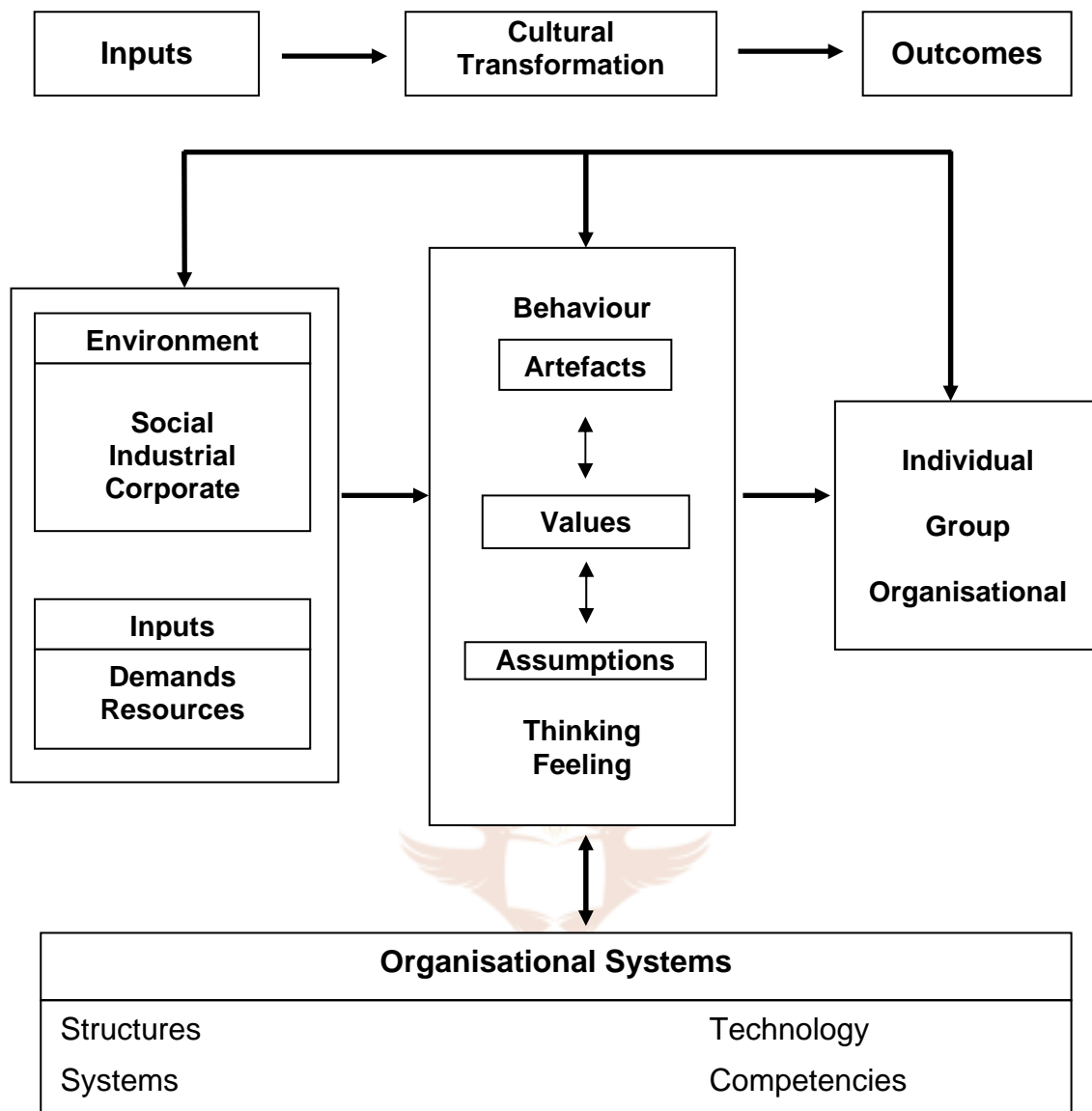
- Employees in the organisation;
- Interpersonal relations;
- Management processes; and
- Management orientation.

These dimensions will be discussed in more depth in section 3.4.

### **2.6.7 An Integrative Model of Organisational Culture**

The author has developed an integrative model of organisational culture based on the work of Cook and Szumal (2000) and Martins (1989) (See Annexure C and Figure 2.7 respectively). The author's model is depicted in Figure 2.8. From Figure 2.8 it can be seen that the main shaper of culture is the environment in which the company operates, particularly the demands of the environment put on the company and its resources. It can further be seen from Figure 2.8 that artefacts, values and assumptions influence behaviour. Artefacts and creations include the organisational systems, i.e. structures, technology, systems and competencies. These artefacts and creations (including organisational systems) reflect the deeper lying values and assumptions held by the company members and influencing their behaviour.

The feedback loop indicates that the model reflects a dynamic view of culture. In other words all the elements of culture have an influence on the other elements and are at the same time influenced by them. This means that as culture evolves a misfit will develop between the various elements. Some of them will develop faster than others. However, over time they will again move closer to each other in order to restore the balance between them.



**Figure 2.8: An Integrative Model of Organisational Culture**

## 2.7 Measuring Organisational Culture

Although the concept of organisational culture has been prominent in organisational and management literature since the 1970s (Barley, Meyer, & Gash, 1988), scholars still disagree on the best way to measure it (see O'Reilly, Chatman, & Caldwell, 1991; Rousseau, 1990). Some writers have suggested the use of multiple methods (e.g., Martin, 1992; Rousseau, 1990), but these methods are often complex, expensive, and time-consuming (Ashkanasy, Broadfoot & Falkus, 2000).

The literature since 1989 on the study, diagnosis and measurement of culture has been sparse. Perhaps this is because there has been so much emphasis on the characteristics of a “quality” culture that managers are no longer concerned about the kind of culture they have; but only about the kind of culture they want to have (Lewis, 1995).

Reynierse and Harker (1986) used a combination of quantitative and qualitative methods to measure culture. The qualitative methods involve interviews and group discussions, while the quantitative method, which they call organisational dynamics, is a survey questionnaire using 95 items on a five-point ordinal scale of definite agreement to definite disagreement. The method aims to provide managers with tangible feedback in managing culture, their “fundamental proposition” being “that you can’t manage organisational culture unless you can measure it” (Reynierse & Harker, 1986, p. 1).

Reynolds (1986) used a questionnaire to measure culture differences between organisations to see if the measured differences relate to differences in performance.

Barnett (1988) outlined details of what he calls a “Galileo tm” or “Galileo analysis” for measuring culture accurately. Some of the methods are common to those used in qualitative approaches, but Barnett quantifies the results. It is considered that the method is too narrow, using only language, symbols and concepts as measurable elements.

Wiener (1988) measured “central value systems” and believes that by measuring the intensity and breadth of key values, one can measure culture.

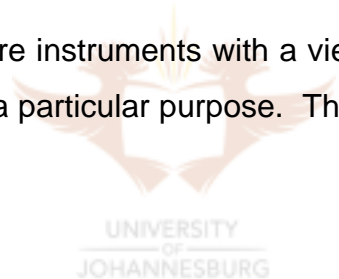
Nossiter and Biberman (1990, p.13) used a technique for studying and diagnosing culture they call “projective drawing and metaphorical analogy fantasising”, where questionnaires ask participants to draw an image and name an animal representing their organisation and department. They believe that the creativity involved may motivate employees to think more about their organisations.

Tucker, McCoy, and Evans (1990) designed a comprehensive questionnaire, developed from interviews and discussions with 50 managers of organisations. They believe results from the questionnaire, which are quantified, will help provide some preliminary information on the organisation's culture to managers attempting to deal with particular situations and problems with their cultures.

Gabriel (1991) saw stories as the basis for the myths that act as coping mechanisms for individuals in organisations. Most of these techniques are as yet too recent for much empirical testing to have been carried out on them.

Lewis (1996) believed the methods suggested by Louis (1981) were likely to be the most successful in uncovering a culture accurately; for they recognise the need to uncover the basic, underlying, often unconscious and usually non-debatable assumptions that organisation members hold.

A need exists to classify culture instruments with a view to make informed decisions about which one to select for a particular purpose. This is the topic under discussion in the next section.



## **2.8 A Case for Quantitative Measurement**

Among authors who suggest some use of quantitative measures are Amsa (1986), Barnett (1988), Bookbinder (1984), Cooke and Rousseau (1988), Desatnick (1986), Hofstede (1986), Reynierse (1986), Reynierse and Harker (1986), Reynolds (1986) and Wiener (1988). What is borne out by the literature, is that questionnaires can play an important role in the quantitative analysis of organisational culture (Reichers & Schneider, 1990; Rousseau, 1990).

Scholars such as Martin (1992) noted that quantitative assessment of organisational culture has been criticised in the past because of a strong mono-method bias in the field. Although Martin argues for a need to include qualitative data in culture studies, the essence of her case is that there is a need for a multilevel and multi-method con-

ceptualisation. In this respect, Schein's (1985) three level typology provides a distinctive role for both quantitative and qualitative measurement.

Further, as the elements of culture become more conscious and observable to participants in a study, they become more accessible to standardised assessment (Rousseau, 1990). For example, according to Ashkanasy *et al.* (2000) it is generally agreed that surveys represent an efficient and standardised means of tapping the shallower levels of Schein's typology. The deepest level of culture, on the other hand, can be investigated only through more intensive observation, focused interviews, and the involvement of organisational members in self-analysis (Ott, 1989; Rousseau, 1990; Schein, 1990). The thrust of this argument is that there is a clear and continuing role for quantitative measures as a means of assessing the less abstract levels of organisational culture.

All quantitative measures of culture are likely to suffer from the same limitations, with the main weakness being that basic assumptions are often non-debatable and unconscious. People's written or oral answers to questions are not necessarily indicative of their basic assumptions.

The usefulness of quantitative measurement may not be restricted to the shallower levels of organisation only. Deal and Kennedy (1982) argue that there may be grounds for maintaining that the three levels of culture are unified especially when a culture is strong. In this case, quantitative measurement of organisational culture may have the potential to tap deeper levels of culture (Ott, 1989; Rentsch, 1990).

Ashkanasy *et al.* (2000) noted that survey methods have characteristics that render them especially useful for organisational culture research. Self-report surveys allow respondents to record their own perceptions of reality. Because behaviour and attitudes are determined not by objective reality but by actors' perceptions of reality (Rentsch, 1990), it is clearly appropriate to focus on perceptions rather than on reality. Further, self-report measures offer internal credibility to organisational members, which is likely to increase the likelihood that members will accept the results of the survey.

Researchers have cited numerous other advantages of survey assessment and of quantitative techniques generally. These include allowing replication and cross-sectional comparative studies, providing an accepted frame of reference for interpreting data, helping the evaluation and initiation of culture change efforts in organisations, and providing data that can be analysed through multivariate statistical techniques (Cooke & Rousseau, 1988; Xenikou & Furnham, 1996). Next the need for assessing the discriminant validity is briefly discussed.

## **2.9 A Need for Assessing Discriminant Validity**

Hofstede (1980) defined culture as the *“collective programming of the mind, which distinguishes the members of one category of people from another”* This definition stresses that culture is collective and not a characteristic of individuals (shared values); is interesting only to the extent that it differentiates between categories of people (Maull *et al.*, 2001).

Yet, despite the fact that it's the differences in culture that makes it an interesting phenomenon, the literature review revealed that reporting on the ability of organisational culture instruments to assess cultural differences between companies is grossly neglected (See Annexure A). From Annexure A it is clear that the literature often reports on the consensual, construct, and criterion validity of organisation culture instruments, but not the discriminant validity of the instruments. Hence, clearly there is a need to assess the discriminant validity of organisational culture instruments.

## **2.10 Summary**

In this chapter the current knowledge on organisational culture according to the secondary objectives of the literature review, as stated in Chapter 1, was discussed. Emphasis was placed on studying, measuring and comparing organisational culture between companies. The chapter started with a review of the various ways in which organisational culture is defined. The latest themes and diverse perspectives regarding organisational culture were examined. Then the different models of organ-



isational culture were discussed. A systems model of organisational culture was proposed. This model serves as an integrating framework to show where the different elements of this study fit in. The various methods for measuring and categorising organisational culture were reviewed. Thereafter the advantages and disadvantages of quantitative measurement were examined. Pointing out the need for assessing the validity of culture measurement instruments, especially the discriminant validity thereof, concluded the chapter.



## **CHAPTER 3: EMPIRICAL RESEARCH METHODOLOGY**

### **3.1 Introduction**

This chapter outlines the empirical research part of the study. In the previous chapter a review of the literature on organisational culture was provided. From the literature review it is clear that culture differs between sub groups within an organisation as well as between organisations from different industries. Against this background the empirical research aims at testing the hypotheses formulated in Chapter 1 in order to reach the overall goal of the study, i.e. to address the discriminant validity of the CAI.

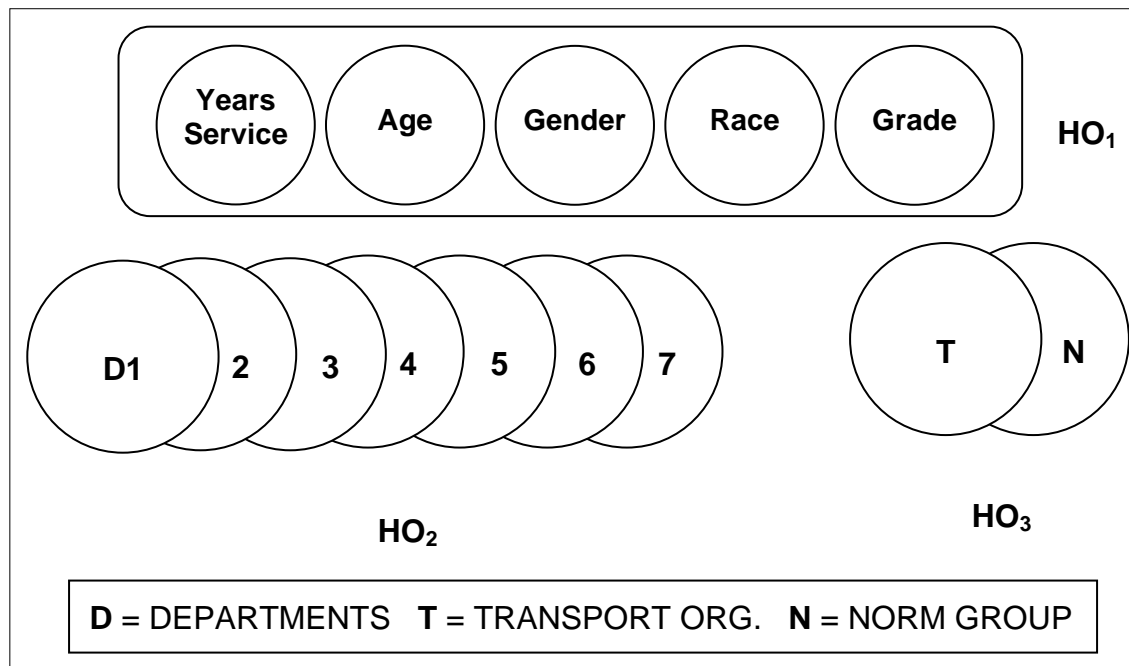
The focus of the study is on the culture differences between various sub groups within a transport organisation. In addition the culture of the division is also compared with the cultures of companies in the norm group. The norm group database was derived from research done by Dr Nico Martins on a number of organisations of a fairly disparate nature in various industries. The foundation of the research is based on Martins (1989) which purports to measure the culture of organisations by means of quantitative surveys. The results of the methodology yield a particular culture profile of the organisation being researched.

This chapter documents the research design, the research participants, the attributes of the CAI, the research process and the statistical procedures employed in this study.

The empirical research endeavours to reach the objectives of the study by testing the hypotheses below as defined in Chapter 1 and depicted in Figure 3.1.

- Hypothesis 1: There are significant differences in mean culture scores between the sub-cultures based on demographic variables of the transport organisation.

- Hypothesis 2: There are significant differences in mean culture scores between the sub-cultures based on various functional departments of the transport organisation.
- Hypothesis 3: There are significant differences in mean culture scores between the transport organisation and organisations in the norm group.



**Figure 3.1: Hypotheses**

The remainder of this chapter provides the rationale for the research design. It also documents the research instrument, the research process and the statistical procedures applied to the data captured in the empirical research.

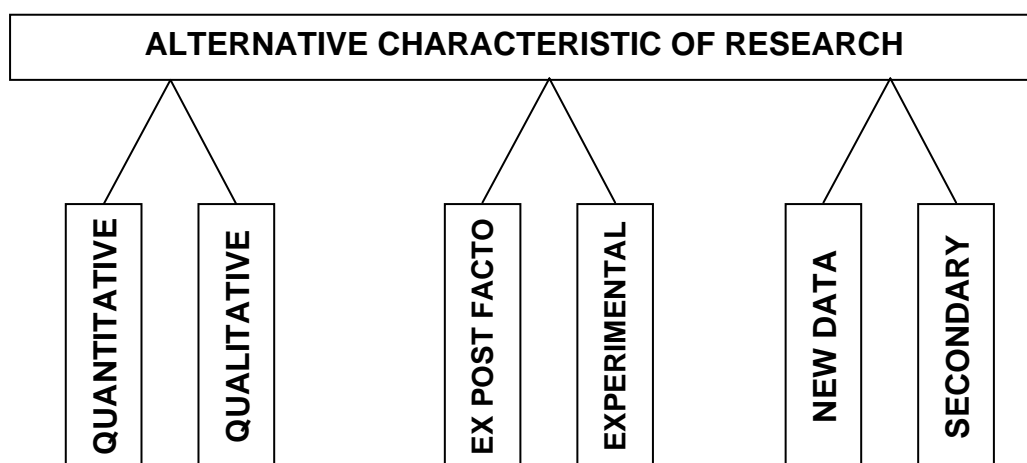
In the next section the research design and supporting rationale is described.

### **3.2 Research Design**

The research design reflects the type of study undertaken to provide acceptable answers to the research problem (Mouton, 2001). According to Kerlinger (1973) research design has two basic purposes, i.e. to provide answers to research questions and to control variance. Research designs are invented to enable the researcher to

answer research questions as validly, objectively, accurately, and economically as possible. The reliability of observations and inferences made during the empirical study are significantly enhanced if the research design is meticulously planned and executed.

In designing the research for this study the aim was to select a design that would satisfy the goals of the research question. In this particular study the purpose is to use the CAI to derive sub culture profiles within an organisation and a culture profile for the organisation as a whole in order to test the discriminant validity of the CAI. The sub culture profiles will be compared with one another, while the organisational culture profile will be compared with the organisations in the norm group. Thus the research questions dictate the research design. The fundamental choices leading to the final research design are shown in Figure 3.2.



**Figure 3.2: Alternative Characteristic of Research**

Following is a brief discussion on each of the characteristics in order to put the study into perspective.

### **3.2.1 Quantitative Research Paradigm Versus the Qualitative Research Paradigm**

There are two well-known and recognised approaches to research, namely the quantitative paradigm and the qualitative paradigm (Schurink & Schurink, 2001). Accord-

ing to these authors the quantitative paradigm is based on positivism, which takes scientific explanation to be nomothetic (i.e. based on universal laws). Its main aims are to objectively measure the social world and to test hypotheses. In contrast, the qualitative paradigm stems from an anti-positivistic, interpretative approach, is holistic in nature and aims at understanding social life and the meaning that people attach to everyday life.

Schurink and Schurink (2001) point out that qualitative and quantitative researchers have different approaches to questions concerning ontology, epistemology and methodology. In terms of ontology the quantitative researcher believes in an objective reality, which could be explained, controlled and predicted by means of natural (cause-effect) laws. Human behaviour can be explained in causal deterministic ways and people can be manipulated and controlled. Qualitative researchers discard the notion of an external, objective reality. They aim to understand reality by discovering the meanings that people in a specific setting attach to it. To these researchers behaviour is intentional and creative and it can be explained but not predicted.

Quantitative researchers use deductive reasoning. In contrast, qualitative researchers use inductive reasoning (Neuman, 1994). Quantitative research takes universal propositions and generalisations as a point of departure, whereas qualitative research aims to understand phenomena within a particular context.

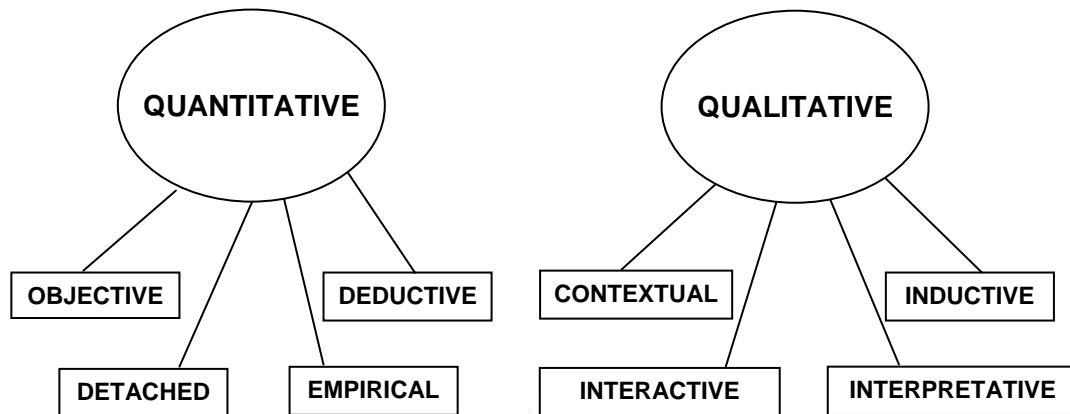
In terms of epistemology the quantitative researcher sees him/herself as detached from, not as part of, the object that s/he studies. The researcher can therefore be objective – does not influence the study object and is not influenced by it. In contrast, the qualitative researcher is subjective because of personal interaction with the subject (object of investigation).

In terms of methodology the quantitative paradigm emulates the physical sciences in that questions or hypotheses are stated and subjected to empirical testing to verify them. In contrast, qualitative methodology is dialectical and interpretative. During the interaction between researcher and subject, the subject's world is discovered

and interpreted by means of qualitative methods. Figure 3.3 summarises the crux of the distinction between qualitative and quantitative research.

From the above it is clear that this study falls predominantly within the quantitative paradigm, which best serves the purpose of this study.

### QUANTITATIVE vs QUALITATIVE RESEARCH



**Figure 3.3: Quantitative vs Qualitative Research**

#### 3.2.2 Ex Post Facto Research

According to Kerlinger (1973, p.379) “ex post facto research is systematic empirical inquiry in which the researcher does not have direct control of independent variables because their manifestations have already occurred or because they are inherently not manipulable. Inferences about relations among variables are made, without direct intervention, from concomitant variation of independent and dependent variables”.

In contrast Kerlinger (1973, p.315) sees experimental research as the “ideal” of science. In his words “an experimental design is one in which the investigator manipulates at least one independent variable” and adds “In ex facto research one cannot manipulate or assign subjects or treatments, because the independent variable or variables have already occurred, so to speak”. He points out that “the main reason for the pre-eminence of the controlled experiment is that the researcher can have

more confidence that the relations he discovers are the relations he thinks they are, since he discovers them under the most carefully controlled conditions of inquiry. The unique virtue of experimental inquiry, then, is control”.

While Kerlinger (1973) contrasts *ex post facto* research with experimental research, he concludes that it would be unwarranted to infer that *ex post facto* research is inferior to experimental research, especially in the social sciences context. It is easy to say that *ex post facto* research is merely correlational. However, such a statement would be an oversimplification. It is more important to get a balanced understanding of the strengths and weaknesses of both kinds of research.

Kerlinger (1973) asserts that *ex post facto* research has three major weaknesses:

- The inability to manipulate independent variables;
- The lack of power to randomise; and
- The risk of improper interpretation.

In other words, compared to experimental research, *ex post facto* research lacks control; this lack is the basis of the third weakness: the risk of improper interpretation. The danger of improper and erroneous interpretations in *ex post facto* research stems in part from the plausibility of many explanations of complex events. However, when guided by proper hypotheses the results of such studies are more valid.

According to Kerlinger (1973), despite the weaknesses, much *ex post facto* research must be done in the social sciences because many research problems in the social sciences do not lend themselves to experimental inquiry. Many of the research problems in the social sciences lend themselves to controlled inquiry of the *ex post facto* kind, which is also true for this study.

### **3.2.3 The Use of Data**

Primary and secondary data were used in this study. Both methods of gathering information have strengths and weaknesses depending on the objectives to be met. A

distinctive strength of primary data is the fact that it is gathered to suit a particular purpose (Kerwin, 1992). One of the advantages of using secondary data is that it saves time and money (Steward & Kamins, as cited by Saunders *et al.*, 1997).

### **3.2.4 Research Design Choice**

With the above in mind research design was constructed to reflect the following characteristics:

- It falls within the quantitative research paradigm;
- It is of the *ex post facto* kind;
- It is based on primary as well as secondary data.

### **3.3 Underlying Theoretical Model**

The CAI is based on the model as discussed in paragraph 2.6.6.

### **3.4 The Measurement Instrument**

As mentioned before the measurement instrument applied in the study is the CAI (See Annexure B). The instrument was developed and validated for South African conditions. The overall reliability (Cronbach Alpha) of the instrument is 0,933. The internal consistency of the dimensions varies between 0,655 and 0,932.

The questionnaire consists of two parts, viz.:

- Section A: Questions regarding organisational culture.
- Section B: Biographical questions.

The standard instrument consists of 89 items. However, only 56 items are included in this study, because they are the only ones common to all the organisations in the study. A further 20 questions were added that relate to the transport organisation.



The CAI can be administered in companies to gain insight into the following areas of the organisational functioning:

- Is the business being managed effectively?
- Do the employees understand the mission and its implementation?
- What are the employees' expectations and perceptions of the company?
- Do all job levels, departments and language groups enhance the required organisational culture or are they in conflict with it?

### **3.4.1 The Questionnaire Dimensions**

The following dimensions and sub-dimensions are measured with the CAI:

#### **3.4.1.1 Mission/Vision**

This dimension measures employees' understanding of the vision and mission of the organisation and also includes Sub-dimensions such as goals and core values.

Typical questions related to this dimension are:

- I understand the overall objectives of the organisation.
- I believe that our management has the vision and knowledge to lead the organisation successfully through the new millennium.

#### **3.4.1.2 Management Processes**

This dimension measures the effectiveness of the different management processes as observed by the employees. Sub-dimensions include:

- (i) Control; (ii) Communication; (iii) Decision Making; (iv) Innovation Process; and (v) Formulate Objectives.

Typical questions related to this dimension are:

- Written objective contracts for at least the next 12 months are given to employees.
- When management make decisions that affect employees, the persons involved are consulted.

### **3.4.1.3 Employee Needs and Objectives**

This dimension measures the perceptions of employees regarding the integration of their needs and objectives with those of the organisation. Sub-dimensions are:

(i) Personnel versus Organisation Needs; and (ii) Personnel Satisfaction versus Organisation Objectives.

Typical questions related to this dimension are:

- Performance is evaluated objectively according to actual results.
- Employees are continuously encouraged to develop better work procedures and methods.



### **3.4.1.4 External Environment**

This dimension measures the extent to which the focus is on customers as well as the perceptions of employees of the effectiveness of community involvement. Sub-dimensions are:

(i) Client Focus; and (ii) Community Involvement.

Typical questions related to this dimension are:

- I know precisely who our target market and clients are.
- We listen actively in order to understand the current and future needs of our customers.

### **3.4.1.5 Means to Achieve Objectives**

This dimension measures the contribution of supportive structures and services to organisational effectiveness. Sub-dimensions are:

(i) Technology; (ii) Physical Appearance; (iii) Training; (iv) Personnel Services; (v) Change and Management of Change; (vi) Organisational Structure; and (vii) Support (*New Sub-Dimension*).

Typical questions related to this dimension are:

- We are satisfied with the technology, equipment, job tools and other physical things we need to do our work.
- We are all clear on our roles in the organisation.

### **3.4.1.6 Interpersonal Relations**



This dimension measures the relationships between managers and workers as well as the management of conflict. Sub-dimensions are:

(i) Manager versus Worker; (ii) Interdepartmental Relations; and (iii) Management of conflict.

Typical questions related to this dimension are:

- Purposeful action is taken to involve all employees in decision making.
- Conflict is resolved by confronting those involved with the problem and mutually working towards solutions.

### **3.4.2 Biographical Variables**

The following biographical variables are included in the questionnaire:

(i)Years of Service; (ii) Age; (iii) Gender; (iv) Language; and (v) Race.

### 3.4.3 Response Scale

A five point Likert type rating scale is used in the questionnaire. (See Table 3.1). The questionnaire thus lacks equal interval qualities, where all the response categories are anchored. This is an issue, which will be discussed in Chapter 5.

**TABLE 3.1  
RESPONSE SCALE**

<b>Strongly Disagree</b>	<b>Disagree</b>	<b>Uncertain</b>	<b>Agree</b>	<b>Strongly Agree</b>
1	2	3	4	5

### 3.5 Sample

Particulars of organisations that are included in the study are provided in Table 3.2.

  
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**TABLE 3.2  
PARTICIPATING ORGANISATIONS**

<b>Company No.</b>	<b>Organisation</b>	<b>N</b>	
1	Bank	1056	} <b>NORM GROUP</b>
2	Home Loans division	219	
3	Retail chain store	119	
4	IT organisation	213	
5	Services organisation	2459	
<b>Total</b>		4066	
6	Transport organisation	593	

From Table 3.2 it is clear that there are significant differences in sample size between the different organisations ranging from 119 to 2 459. Seeing that sample

size effects levels of significance, due consideration will be given to it during the analysis phase.

Table 3.3 depicts the biographical information included in the questionnaire used to obtain data for the CAI. The research study data was drawn from the technical division of a transport organisation. The Technical division has 13 000 employees and at least 1 500 of them have access to a computer network.

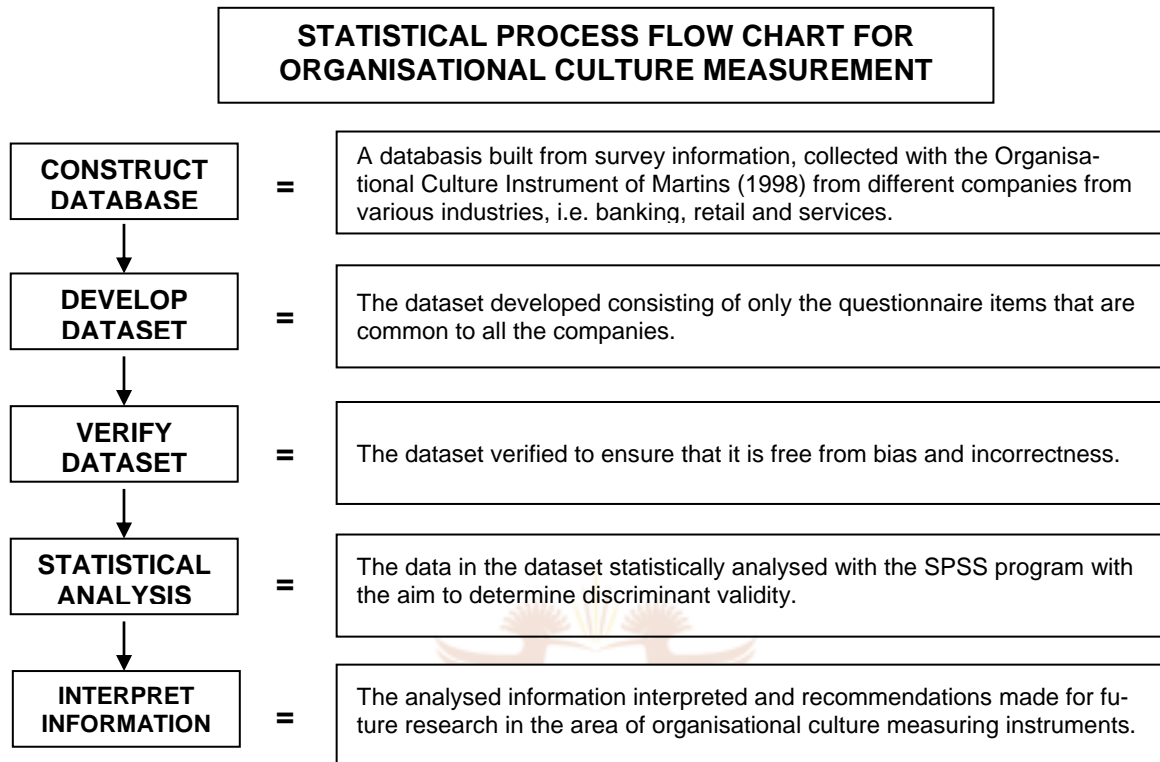
**TABLE 3.3**  
**BIOGRAPHICAL INFORMATION**

<b>NORM GROUP</b>			<b>TRANSPORT ORGANISATION</b>	
<b>Category</b>	<b>Count</b>	<b>%</b>	<b>Count</b>	<b>%</b>
<b>RACE</b>				
White	1086	44.9%	409	69%
Coloured	294	12.2%	19	3.2%
Indian	125	5.2%	21	3.5%
Black	912	37.7%	144	24.3%
Total	4066	100%	593	100%
<b>AGE</b>				
24 and younger	438	11.3%	8	1.3%
25 – 35	1808	46.5%	166	28.0%
36 – 45	1006	25.9%	186	31.4%
46 and more	638	16.4%	233	39.3%
Total	4066	100%	593	100.0%
<b>GENDER</b>				
Male	2034	52.0%	512	86.3%
Female	1876	48.0%	81	13.7%
Total	4066	100%	593	100.0%
<b>LANGUAGE</b>				
Afrikaans	1014	80.5%	*	*
English	225	17.9%	*	*
Other	21	1.7%	*	*
Total	4066	100%	*	*

\* Information not available

### 3.6 Research Design Process

With a view to reaching the objectives of the research the process depicted in the flow chart will be followed (See Figure 3.5).



**Figure 3.4: Statistical Process Flow Chart**

### 3.7 Procedure of Data Collection

#### 3.7.1 Primary Data

The data were collected by means of electronic mail. The CAI was e-mailed to a sample of 1 126 subjects in the division of the transport organisation, who had to complete it on their PC's, linked to a network server. The original e-mail was followed up by two reminders, encouraging the subjects to complete the questionnaire. 593 (52%) responses were received.

### **3.7.2 Secondary Data**

Secondary data consists of a convenience sample of 4 066 participants from five different companies and various industries.

## **3.8 Statistical Analyses Applied in the Research**

This section deals briefly with the statistical analyses employed in the study. It covers the fundamental distinction between descriptive statistics and inferential statistics with a greater focus on the latter category. More specifically the following statistical methods will be employed:

### **3.8.1 Descriptive Statistics**

- Mean, mode and median.
- Standard deviations.
- Minimum and maximum values.
- Skewness and Kurtosis.



### **3.8.2 Multivariate Statistics**

- Factor analysis.
- Anova
- Manova.

The descriptive statistics will be carried out first to gain insight into the distribution of the data. Then factor analysis will be done to identify the underlying structure of the data set. This will be followed by an analysis of variances to determine whether significant differences exist. All analyses will be carried out with the SPSS computer package.

### 3.8.2.1 Factor Analysis

According to Hair et al. (1998) factor analysis is a generic name given to a class of multivariate statistical methods whose primary purpose is to define the underlying structure in a data matrix.

According to Kurtz and Mayo (1979) when several variables are correlated with each other, the many correlations among them can often be explained in terms of a smaller number of underlying factors. These are found by the technical process factor analysis.

The rationale for using factor analysis according to Kim and Mueller (1978), and Afifi and Clarke (1984) include:

- To identify underlying constructs or “factors” that explain the correlation among a set of variables.
- To test hypotheses about the structure of variables.
- To summarise a large number of variables with a smaller number of derived variables.
- To determine the number of dimensions required to represent a set of variables.

This study employs factor analysis to reduce the large number of variables (56) into fewer underlying and meaningful factors. First order as well as second order factor analysis will be carried out.

#### 3.8.2.1.1 Approach to be followed

The exploratory factor analysis approach will be followed in this study. Exploratory factor analysis seeks to uncover the underlying structure of a large set of variables. The *à priori* assumption is that any variable may be associated with any factor.



### **3.8.2.1.2 Type of Factoring**

There are several different types of factor analysis. Principal Factor Analysis (PFA) is the preferred type for the purposes of this study. Principal Factor Analysis, also called principal axis factoring, is a form of factor analysis that seeks the least number of factors, which can account for the common variance (correlation) of a set of variables.

### **3.8.2.1.3 Factor Analytic Data Mode**

The R-mode factor analysis will be applied. In R-mode, rows are cases, columns are variables, and cell entries are scores of the cases on the variables. In R-mode, the factors are clusters of variables on a set of people or other entities.

### **3.8.2.1.4 Criteria for determining the number of factors**

The following criteria, as described by Dunteman (1989, pp. 22-3) will be used to determine the number of factors:



### **3.8.2.1.5 Kaiser criterion**

The Kaiser rule is to drop all components with eigenvalues under 1.0.

### **3.8.2.1.6 Rotation Method**

According to Hair et al. (1998) rotation serves to make the output more understandable and is done to facilitate the interpretation of factors. Unrotated solutions are hard to interpret because variables tend to load on multiple factors. Rotation of the axes causes the factor loadings of each variable to be more clearly differentiated by factor.

In this study Varimax rotation will be carried out for the first order factor analysis, while oblique rotation will be carried out for the second order factor analysis.

Varimax rotation is an orthogonal rotation of the factor axes to maximize the variance of the squared loadings of a factor (column) on all the variables (rows) in a factor matrix, which has the effect of differentiating the original variables by extracted factor. That is, it minimises the number of variables which have high loadings on any one given factor. Each factor will tend to have either large or small loadings of particular variables on it. A Varimax solution yields results which make it as easy as possible to identify each variable with a single factor.

As mentioned for the second order factor analysis, an oblique rotation will be carried out. This will be done with a view to get a simpler factor structure.

#### **3.8.2.1.7 Number of cases needed to do factor analysis**

From a review of the literature it is clear that there is no scientific answer to the question, "how many cases are needed to do factor analysis?". The following arbitrary "rules of thumb" have been noted:

- STV ratio. The subjects-to-variables ratio should be no lower than 5 (Bryant & Yarnold, 1995)
- Rule of 100: The number of subjects should be the larger of 5 times the number of variables, or 100. Even more subjects are needed when communalities are low and/or few variables load on each factor. (Hatcher, 1994)
- Rule of 150: Hutcheson and Sofroniou (1999) recommends at least 150 - 300 cases, more toward the 150 end when there are a few highly correlated variables, as would be the case when collapsing highly multi co-linear variables.
- Rule of 200. There should be at least 200 cases, regardless of STV (Gorsuch, 1983)

### **3.8.2.1.8 Number of variables needed in factor analysis**

Thurstone recommended at least three variables per factor for exploratory factor analysis (Kim & Mueller, 1978).

### **3.8.2.1.9 Sampling adequacy**

The Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy and the Bartlett's test of sphericity will be carried out to predict if the data are likely to factor well, based on correlation and partial correlation. Kaiser (1974) suggested that a KMO value below 0,5 should be considered as unacceptable.

### **3.8.2.1.10 Item Analysis with Cronbach Alpha**

The internal consistency of the questionnaire (degree of homogeneity among the items) will be assessed using Cronbach's Coefficient Alpha.

### **3.8.2.1.11 Preparing for Multivariate Analyses**

The quality of analyses is a function of the preparation that went in before the actual analyses. Thus, it is crucial for the acceptability of the results that sufficient preparation be done beforehand. Next the steps taken in order to properly prepare for the various analyses will be described.

With a view to more accurate assessment of dimensionality, the data set will be carefully examined. Various techniques will be employed to examine both the individual variables and the relationships among them. Pitfalls and how to overcome them resulting from the research design and data collection will be also considered. Specifically missing data, identification of outliers, and testing of the assumptions

underlying multivariate techniques will be evaluated during four separate phases, as proposed by Hair *et al.* (1998) below:

- A graphical examination will be undertaken of the nature of the variables in the analysis and the relationships that form the basis of multivariate analysis;
- The impact that missing data could have on the analysis, plus alternatives for retaining cases with missing data in the analysis will be evaluated;
- Outliers and their possible impact on the analyses will be considered; and
- The ability of the data to meet the statistical assumptions specific to the multivariate techniques will be assessed.

#### **3.8.2.1.12 Testing the Assumptions of Multivariate Analysis**

According to Hair *et al.* (1998) the need to test the statistical assumptions is increased in multivariate applications because of two characteristics of multivariate analysis. First, the complexity of the relationships, owing to the typical use of a large number of variables, makes the potential distortions and biases more potent when the assumptions are violated. This is particularly true when the violations compound to become even more detrimental than if considered separately. Second, the complexity of the analyses and of the results may mask the signs of assumption violations apparent in the simpler univariate analyses.

Multivariate analysis requires that the assumptions underlying the statistical techniques be tested twice: first for the separate variables, and second for the multivariate model variate, which acts collectively for the variables in the analysis and thus must meet the same assumptions as individual variables.

Hair *et al.* (1998) asserts that the most fundamental assumption in multivariate analysis is normality, referring to the shape of the data distribution for an individual metric variable and its correspondence to the normal distribution. If the variation from the normal distribution is sufficiently large, all resulting statistical tests are invalid, as normality is required to use the F and t statistics. Further assumptions that will be tested are:

- No selection bias/proper specification.
- Interval data.
- Linearity.
- Orthogonality.
- Underlying dimensions.
- Moderate to moderate-high intercorrelations.
- Factor interpretations and labels have face validity and are rooted in theory.

Because the differences in sample size are large an F- test is not conclusive. The effect of the difference in sample size needs to be taken into account. For this reason it is necessary to look at the Partial Eta Squared.

### **3.8.2.2 Analysis of Variance (ANOVA)**

Subsequent to the factor analysis described above, an analysis of variance will be carried out on the data set to determine the significance in difference between means.

Salkind (2000, p.223) describes ANOVA as: “Analysis of variance because the variance due to differences in performance are separated into variance that’s due to differences between individuals within groups and variance due to differences between groups.”

### **3.8.2.3 Multivariate Analysis of Variance (MANOVA)**

Salkind (2000, p.269) also points out that: “that there are many different renditions of analysis of variance (ANOVA), each one designed to fit a particular “more than two groups being compared” situation. One of these, multivariate analysis of (MANOVA), is used when there is more than one dependent variable. So instead of looking just at one outcome, more than one outcome or dependent variable is used. If the dependent or outcome variables are related to one another (which they usually

are), it would be hard to determine clearly the effect of the treatment variable on any one outcome. Hence, MANOVA to the rescue.”

### **3.9 Conclusion**

In this chapter the empirical research part of the study was discussed. This chapter documented the research design, the CAI, the research process and the statistical procedures employed in the study. It was pointed out that the research was designed in such a way that it could adequately answer the research question in order to reach the objectives of the study. In the next chapter the results of the statistical analyses will be discussed.



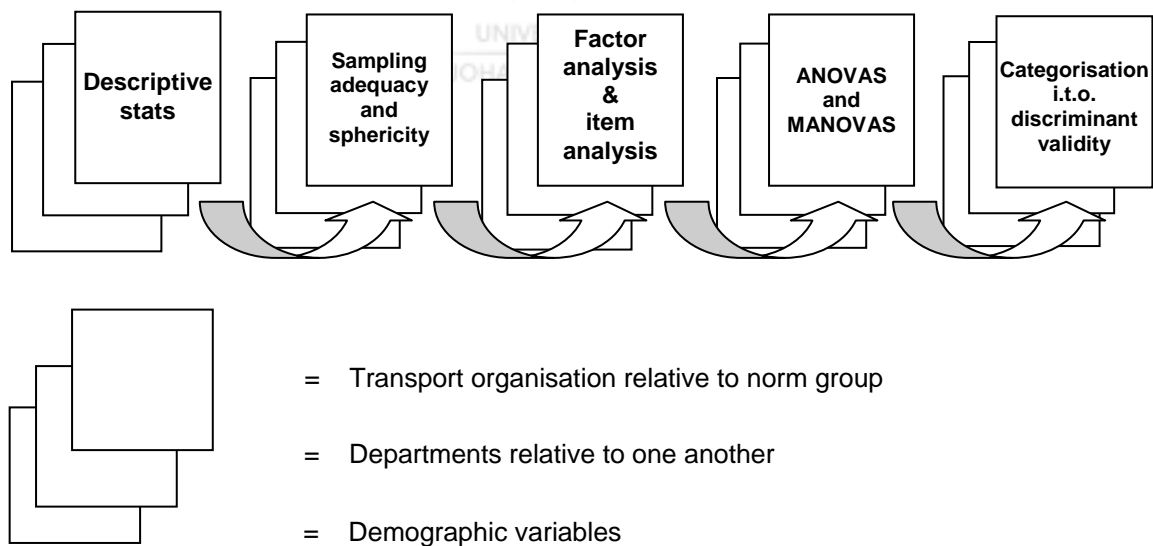
## CHAPTER 4: RESULTS

### 4.1 Introduction

Chapter 3 dealt with the design of the experiment to perform a successful empirical research. It led to the conclusion that the research design reflects:

- the quantitative research paradigm,
- *ex post facto* characteristics, and
- a primary as well as secondary data basis.

In this chapter the results of the various procedures, which include descriptive statistics, factor analysis, and analysis of variance are documented and main observations made. Figure 4.1 portrays the sequence of the procedures that follow in this chapter.



**Figure 4.1: Research Process Sequence**

Firstly, the results of the descriptive statistics for the transport company are reflected. Secondly, the results of the measures of sampling adequacy and Bartlett's test of sphericity are reflected. Thirdly, the results of the measures of factor analyses, carried out at two levels, are reflected. Fourthly, the results of the analyses of variance

are reflected. Multivariate analyses of variance were conducted to do comparisons regarding the demographic variables as well as to compare the departments of the transport organisation with one another. An univariate analysis of variance was carried out to compare the transport organisation with the norm group. These comparisons are aimed at assessing the discriminant validity of the CAI.

Following this, the various statistical procedures to be performed as part of this study are outlined. It is pointed out that the particular statistical procedures were selected for their suitability to test the research hypotheses of the study:

- Hypothesis 1: There are significant differences in mean culture scores between the sub-cultures based on demographic variables of the transport organisation.
- Hypothesis 2: There are significant differences in mean culture scores between sub-cultures based on various functional departments of the transport organisation.
- Hypothesis 3: There are significant differences in mean culture scores between the transport organisation and organisations in the norm group.

Following is an exposition of the descriptive statistics.

## **4.2 Descriptive Statistics**

The frequencies of the data set are depicted in Annexure B. A closer inspection of Annexure B reveals that the item distributions tend towards bimodal curves, where fewer “uncertain” responses were obtained than “agree” or “disagree”. Thus the distribution is slightly asymmetric.

## **4.3 Factor Analysis**

The item scores on the Culture Assessment Instrument were factor analysed in order to determine the underlying factor structure of the Instrument. A procedure developed by Schepers (1992) was followed in order to counter possible effects of differential item skewness resulting in artefactors. This procedure includes first as well as



second level factor analyses. All calculations were done by means of the SPSS- Windows program of SPSS - International. Following are details of the results.

#### 4.3.1 First Level Factor Analysis

In order to determine sampling adequacy and sphericity of the intercorrelation matrix, the Kaiser-Meyer-Olkin Measure of Sampling Adequacy and the Bartlett's Test of Sphericity were respectively conducted on the intercorrelation matrix of the 56 items of the instrument. The results are depicted in Table 4.1. From Table 4.1 it is clear that the data set complies with the requirements of sampling adequacy and sphericity. Thus the data set was fit for subjection to factor analysis.

**TABLE 4.1  
KMO AND BARTLETT'S TEST**

<b>Kaiser-Meyer-Olkin Measure of Sampling Adequacy</b>		0,936
<b>Bartlett's Test of Sphericity</b>	<b>Approx. Chi-Square</b>	15067,459
	<b>df</b>	1540
	<b>P(x<sup>2</sup>)</b>	0,000

The 56 items of the Culture Assessment Instrument were intercorrelated and the eigenvalues of the unreduced intercorrelation matrix were calculated. Owing to limited space, the intercorrelation matrix (56 x 56) is not reproduced here. Twelve factors were postulated according to Kaiser's (1961) criterion (eigenvalues-greater-than-unity) and extracted by means of a principal factor analysis, also called Principal Axis Factoring. The eigenvalues of the unreduced intercorrelation matrix are given in Table 4.2.

**TABLE 4.2  
EIGENVALUES OF THE UNREDUCED INTER-CORRELATION MATRIX**

Root	Initial Eigenvalues			Root	Initial Eigenvalues		
	Eigen-values	% of Variance	Cumulative %		Eigen-values	% of Variance	Cumulative %
<b>1</b>	16,595	29,634	29,634	<b>29</b>	0,562	1,004	82,334
<b>2</b>	2,506	4,476	34,109	<b>30</b>	0,546	0,975	83,309
<b>3</b>	2,062	3,682	37,792	<b>31</b>	0,529	0,945	84,254

Root	Initial Eigenvalues			Root	Initial Eigenvalues		
	Eigen-values	% of Variance	Cumulative %		Eigen-values	% of Variance	Cumulative %
4	1,794	3,203	40,995	32	0,519	0,926	85,180
5	1,581	2,822	43,817	33	0,490	0,874	86,055
6	1,521	2,716	46,534	34	0,485	0,867	86,922
7	1,391	2,483	49,017	35	0,475	0,848	87,769
8	1,286	2,296	51,313	36	0,456	0,814	88,583
9	1,250	2,233	53,546	37	0,442	0,790	89,373
10	1,159	2,070	55,616	38	0,423	0,755	90,127
11	1,150	2,054	57,670	39	0,414	0,738	90,866
12	1,049	1,874	59,543	40	0,401	0,716	91,582
13	0,978	1,746	61,289	41	0,383	0,684	92,266
14	0,967	1,727	63,016	42	0,378	0,676	92,942
15	0,921	1,645	64,661	43	0,369	0,660	93,601
16	0,867	1,548	66,209	44	0,360	0,642	94,243
17	0,847	1,512	67,721	45	0,353	0,630	94,874
18	0,834	1,488	69,209	46	0,325	0,580	95,453
19	0,789	1,409	70,619	47	0,311	0,555	96,008
20	0,784	1,400	72,019	48	0,307	0,548	96,556
21	0,750	1,339	73,358	49	0,280	0,499	97,055
22	0,731	1,305	74,663	50	0,276	0,494	97,549
23	0,665	1,188	75,851	51	0,247	0,441	97,990
24	0,645	1,151	77,002	52	0,244	0,435	98,425
25	0,640	1,143	78,145	53	0,237	0,423	98,848
26	0,610	1,089	79,234	54	0,229	0,408	99,256
27	0,597	1,065	80,299	55	0,212	0,379	99,636
28	0,577	1,030	81,330	56	0,204	0,364	100,000

Trace = 56

The factor matrix obtained was rotated to simple structure by means of Varimax rotation. See Table 4.3. From Table 4.3 it can be seen that twelve factors were extracted. Factor 11 and 12 were poorly determined, since they only had two or less significant findings. The twelve factors explain about 60% of the variance in the factor space.

**TABLE 4.3**  
**SORTED AND ROTATED FACTOR MATRIX**

	Factor											
	1	2	3	4	5	6	7	8	9	10	11	12
Q58	0,600	0,305										
Q73	0,551					0,305						

	Factor											
	1	2	3	4	5	6	7	8	9	10	11	12
Q74	0,472											
Q49	0,467		0,348									
Q71	0,459											
Q67	0,385											
Q70	0,336											
Q37	0,334											
Q6		0,551										
Q5		0,518										
Q4		0,514										
Q3		0,464										
Q56	0,332	0,464										
Q50	0,374	0,452										
Q63		0,359										
Q55		0,257										
Q46			0,745									
Q45		0,303	0,567									
Q47			0,558									
Q44			0,493									
Q53	0,385	0,308	0,419									
Q40	0,345		0,353									
Q72	0,391			0,556								
Q10				0,544								
Q24				0,512			0,361					
Q68				0,409								
Q51				0,401								
Q33				0,399								
Q8				0,385								
Q11				0,354								
Q66				0,297								
Q29				0,289								
Q14					0,689							
Q13					0,653							
Q12		0,346			0,459							
Q69					0,347							
Q15					0,341						0,301	
Q38						0,560						
Q7		0,336				0,539						
Q2						0,530						
Q23							0,709					
Q25							0,685					
Q28							0,305					
Q75								0,580				
Q34								0,555				
Q76	0,308							0,528				
Q64								0,355				

	Factor											
	1	2	3	4	5	6	7	8	9	10	11	12
Q20									0,627			
Q21									0,514			
Q19									0,405			
Q59										0,496	0,329	
Q26										0,471		
Q27										0,466		
Q61											0,549	
Q31		0,385										0,422
Q30				0,319								0,375

### 4.3.2 Second Level Factor Analysis

Sub-scores were calculated on the twelve obtained factors and they were subsequently subjected to a second level factor analysis. The Kaiser-Meyer-Olkin Measure of sampling adequacy and the Bartlett's Test of sphericity on the intercorrelation matrix of the twelve subscores were calculated and the results are depicted in Table 4.4. From Table 4.4 it is clear that this data set, comprising of the twelve subscores, also complies with the requirements of sampling adequacy and sphericity.

**TABLE 4.4**  
**KMO AND BARTLETT'S TEST**

<b>Kaiser-Meyer-Olkin Measure of Sampling Adequacy</b>		0,938
<b>Bartlett's Test of Sphericity</b>	<b>Approx. Chi-Square</b>	3333,746
	<b>df</b>	66
	<b>P(x<sup>2</sup>)</b>	0,000

The inter-correlation matrix of the 12 factors is depicted in Table 4.5.

During second level factor analysis two factors were extracted by means of a principal factor analysis according to Kaiser's (1961) criterion (eigenvalues-greater-than-unity).

**TABLE 4.5**  
**INTER-CORRELATIONS MATRIX OF 12 FACTORS**

	<b>S1</b>	<b>S2</b>	<b>S3</b>	<b>S4</b>	<b>S5</b>	<b>S6</b>	<b>S7</b>	<b>S8</b>	<b>S9</b>	<b>S10</b>	<b>S11</b>	<b>S12</b>
<b>SS1</b>	1.000	0.678(**)	.669(**)	.698(**)	.591(**)	.564(**)	.403(**)	.635(**)	.505(**)	.345(**)	.151(**)	.538(**)
<b>SS2</b>	0.678	1.000	0.651(**)	0.637(**)	0.580(**)	0.586(**)	0.384(**)	0.587(**)	0.486(**)	0.264(**)	0.185(**)	0.547(**)
<b>SS3</b>	0.669	0.651(**)	1.000	0.586(**)	0.497(**)	0.511(**)	0.393(**)	0.652(**)	0.488(**)	0.265(**)	0.084(*)	0.506(**)
<b>SS4</b>	0.698	0.637(**)	0.586(**)	1.000	0.569(**)	0.519(**)	0.469(**)	0.578(**)	0.497(**)	0.421(**)	0.173(**)	0.579(**)
<b>SS5</b>	0.591	0.580(**)	0.497(**)	0.569(**)	1.000	0.500(**)	0.413(**)	0.471(**)	0.455(**)	0.292(**)	0.184(**)	0.355(**)
<b>SS6</b>	0.564	0.586(**)	0.511(**)	0.519(**)	0.500(**)	1.000	0.340(**)	0.469(**)	0.383(**)	0.289(**)	0.142(**)	0.418(**)
<b>SS7</b>	0.403	0.384(**)	0.393(**)	0.469(**)	0.413(**)	0.340(**)	1.000	0.412(**)	0.332(**)	0.438(**)	0.138(**)	0.290(**)
<b>SS8</b>	0.635	0.587(**)	0.652(**)	0.578(**)	0.471(**)	0.469(**)	0.412(**)	1.000	0.420(**)	0.373(**)	0.147(**)	0.452(**)
<b>SS9</b>	0.505	0.486(**)	0.488(**)	0.497(**)	0.455(**)	0.383(**)	0.332(**)	0.420(**)	1.000	0.254(**)	0.102(*)	0.438(**)
<b>SS10</b>	0.345	0.264(**)	0.265(**)	0.421(**)	0.292(**)	0.289(**)	0.438(**)	0.373(**)	0.254(**)	1.000	0.185(**)	0.207(**)
<b>SS11</b>	0.151	0.185(**)	0.084(*)	0.173(**)	0.184(**)	0.142(**)	0.138(**)	0.147(**)	0.102(*)	0.185(**)	1.000	0.072
<b>SS12</b>	0.538	0.547(**)	0.506(**)	0.579(**)	0.355(**)	0.418(**)	0.290(**)	0.452(**)	0.438(**)	0.207(**)	0.072	1.000

\*\* Correlation is significant at the 0.01 level (2-tailed).

\* Correlation is significant at the 0.05 level (2-tailed).

N=593

The eigenvalues appear in Table 4.6. From Table 4.6 it can be seen that the two factors explain 58% of the variance in the factor space.

**TABLE 4.6**  
**EIGENVALUES OF THE UNREDUCED INTER-CORRELATION**  
**MATRIX OF SUBSCORES EXPLAINED**

<b>Initial Eigenvalues</b>			
<b>Root</b>	<b>Eigenvalue</b>	<b>% of Variance</b>	<b>Cumulative %</b>
<b>1</b>	5,858	48,819	48,819
<b>2</b>	1,103	9,191	58,010
<b>3</b>	0,893	7,443	65,453
<b>4</b>	0,659	5,489	70,942
<b>5</b>	0,641	5,338	76,280
<b>6</b>	0,566	4,719	80,999
<b>7</b>	0,550	4,580	85,578
<b>8</b>	0,479	3,988	89,566
<b>9</b>	0,343	2,857	92,424
<b>10</b>	0,333	2,776	95,200
<b>11</b>	0,307	2,555	97,755
<b>12</b>	0,269	2,245	100,000

Trace = 12

The factor matrix appears in Table 4.7. Factor One represents Culture excluding Opportunity and Factor Two is referred to as Opportunity. For convenience Factor One will generally be referred to as “Culture”.

**TABLE 4.7**  
**SORTED AND ROTATED FACTOR MATRIX ON SUBSCORES**

Sub Scores	Factor	
	1	2
SS 2	0,878	
SS 3	0,834	
SS 1	0,830	
SS 12	0,707	
SS 4	0,679	
SS 8	0,645	
SS 6	0,635	
SS 5	0,597	
SS 9	0,591	
SS 10		0,791
SS 7		0,473
SS 11		0,222

Extraction Method: Principal Axis Factoring.  
Rotation Method: Oblimin with Kaiser Normalization.  
a Rotation converged in 4 iterations.

The subscores on the CAI data set were subsequently forced into an one factor solution to enable comparison with a norm group.

The factor matrix for the one factor solution appears in Table 4.8.

**TABLE 4.8**  
**FACTOR MATRIX**

Sub Scores	Factor 1	h2j
SS 1	0,841	0,707
SS 4	0,818	0,670
SS 2	0,807	0,651
SS 3	0,771	0,595
SS 8	0,739	0,547
SS 5	0,690	0,475

<b>Sub Scores</b>	<b>Factor 1</b>	<b>h2j</b>
<b>SS 6</b>	0,667	0,444
<b>SS 12</b>	0,631	0,398
<b>SS 9</b>	0,612	0,374
<b>SS 7</b>	0,541	0,293
<b>SS 10</b>	0,439	0,193
<b>SS 11</b>	0,201	0,040

Extraction Method: Principal Axis Factoring.  
a 1 factors extracted. 4 iterations required.

A reliability analysis was conducted firstly on both obtained scales and secondly on the forced singled score. The results for scale 1, and 2 and the single scale are reported in Tables 4.9, 4.10 and 4.11 respectively.

**TABLE 4.9**  
**RELIABILITY ANALYSIS: SCALE 1**

	<b>Scale Mean if Item Deleted</b>	<b>Scale Variance if Item Deleted</b>	<b>Corrected Item- Total Correlation</b>	<b>Alpha If Item Deleted</b>
Q58	149,804	723,499	0,596	0,952
Q73	149,890	722,328	0,645	0,952
Q74	149,681	722,846	0,627	0,952
Q49	150,066	723,339	0,612	0,952
Q71	149,044	737,917	0,355	0,954
Q67	149,548	726,745	0,599	0,952
Q70	149,742	728,236	0,517	0,953
Q37	150,250	723,958	0,582	0,952
Q6	150,078	724,406	0,485	0,953
Q5	150,096	721,185	0,567	0,953
Q4	149,756	721,965	0,601	0,952
Q3	149,983	722,040	0,601	0,952
Q56	149,312	734,881	0,468	0,953
Q50	149,344	729,409	0,553	0,953
Q63	149,825	726,540	0,543	0,953
Q55	149,282	734,507	0,481	0,953
Q46	150,381	724,804	0,489	0,953
Q45	150,074	722,147	0,574	0,953
Q47	149,816	728,731	0,480	0,953
Q44	150,663	725,302	0,571	0,953

	<b>Scale Mean if Item Deleted</b>	<b>Scale Variance if Item Deleted</b>	<b>Corrected Item- Total Correlation</b>	<b>Alpha If Item Deleted</b>
Q53	150,174	720,836	0,651	0,952
Q40	150,154	716,860	0,707	0,952
Q72	149,958	724,534	0,611	0,952
Q10	149,875	732,660	0,482	0,953
Q24	150,403	728,961	0,497	0,953
Q68	149,718	732,014	0,460	0,953
Q51	150,486	724,966	0,573	0,953
Q33	149,978	730,153	0,510	0,953
Q8	149,953	729,930	0,432	0,953
Q11	149,659	732,110	0,576	0,953
Q66	149,546	736,438	0,468	0,953
Q29	149,858	727,889	0,499	0,953
Q14	149,777	725,400	0,521	0,953
Q13	149,651	734,332	0,391	0,953
Q12	149,685	726,774	0,540	0,953
Q69	149,887	725,232	0,535	0,953
Q15	149,560	726,220	0,471	0,953
Q38	149,762	721,158	0,623	0,952
Q7	149,449	727,353	0,510	0,953
Q2	149,347	737,322	0,432	0,953
Q75	149,590	726,165	0,600	0,952
Q34	149,833	725,045	0,638	0,952
Q76	149,752	724,055	0,644	0,952
Q64	150,649	732,063	0,391	0,954
Q20	150,272	725,519	0,442	0,953
Q21	149,747	731,608	0,424	0,953
Q19	150,229	722,674	0,520	0,953
Q31	150,027	724,256	0,569	0,953
Q30	149,982	725,741	0,528	0,953

Reliability Coefficients

N of Cases = 593,000

N of Items = 49

Cronbach Coefficient Alpha =0,954

#### 4.4 Reliability

The Cronbach Coefficient Alpha of 0,954 indicates that scale 1 (culture excluding opportunity) is highly reliable and can consistently measure the dimension.



**TABLE 4.10**  
**RELIABILITY ANALYSIS: SCALE 2**

	<b>Scale Mean if Item Deleted</b>	<b>Scale Variance if Item Deleted</b>	<b>Corrected Item-Total Correlation</b>	<b>Alpha if Item Deleted</b>
Q23	18,398	14,237	0,464	0,663
Q25	18,643	13,994	0,580	0,626
Q28	18,941	16,241	0,452	0,667
Q59	17,118	16,614	0,449	0,669
Q26	17,508	15,524	0,348	0,697
Q27	17,906	15,555	0,452	0,665
Q61	16,374	19,208	0,188	0,717

Reliability Coefficients

N of Cases = 593,000

N of Items = 7

Cronbach Coefficient Alpha = 0,707

The Cronbach Coefficient Alpha of 0,707 indicates that scale 2 (opportunity) is moderately reliable and can fairly consistently measure the dimension.

The internal consistency of the single scale was also assessed using Cronbach Coefficient Alpha. Table 4.11 provides the item statistics for the single scale.

**TABLE 4.11**  
**RELIABILITY ANALYSIS - SCALE (ALPHA)**

	<b>Scale Mean if Item Deleted</b>	<b>Scale Variance if Item Deleted</b>	<b>Corrected Item-Total Correlation</b>	<b>Alpha if Item Deleted</b>
Q2	170,162	891,011	0,436	0,953
Q3	170,798	875,121	0,589	0,952
Q4	170,570	874,874	0,592	0,952
Q5	170,911	874,007	0,559	0,952
Q6	170,892	878,174	0,469	0,953
Q7	170,263	880,367	0,509	0,953
Q8	170,767	884,368	0,413	0,953
Q10	170,690	886,444	0,475	0,953
Q11	170,474	885,344	0,579	0,953
Q12	170,499	879,933	0,534	0,953
Q13	170,465	888,378	0,384	0,953

	<b>Scale Mean if Item Deleted</b>	<b>Scale Variance if Item Deleted</b>	<b>Corrected Item- Total Correlation</b>	<b>Alpha if Item Deleted</b>
Q14	170,592	877,793	0,526	0,953
Q15	170,374	878,164	0,484	0,953
Q19	171,044	875,738	0,511	0,953
Q20	171,086	877,555	0,452	0,953
Q21	170,562	885,328	0,419	0,953
Q23	171,390	878,647	0,409	0,953
Q24	171,218	880,116	0,530	0,953
Q25	171,634	881,756	0,413	0,953
Q26	170,499	895,521	0,203	0,954
Q27	170,897	884,873	0,409	0,953
Q28	171,933	883,678	0,492	0,953
Q29	170,673	879,619	0,519	0,953
Q30	170,796	878,933	0,521	0,953
Q31	170,842	877,725	0,555	0,953
Q33	170,793	883,188	0,513	0,953
Q34	170,648	877,323	0,645	0,952
Q37	171,064	876,378	0,584	0,952
Q38	170,577	873,785	0,617	0,952
Q40	170,968	868,453	0,711	0,952
Q44	171,477	878,355	0,565	0,952
Q45	170,889	875,910	0,552	0,953
Q46	171,196	877,354	0,491	0,953
Q47	170,631	882,993	0,460	0,953
Q49	170,880	875,808	0,613	0,952
Q50	170,159	883,282	0,539	0,953
Q51	171,300	877,342	0,578	0,952
Q53	170,988	873,606	0,642	0,952
Q55	170,096	888,253	0,478	0,953
Q56	170,127	889,351	0,451	0,953
Q58	170,619	877,108	0,578	0,952
Q59	170,110	890,936	0,395	0,953
Q61	169,366	904,790	0,196	0,954
Q63	170,639	878,718	0,554	0,953
Q64	171,464	884,357	0,408	0,953
Q66	170,361	890,525	0,462	0,953
Q67	170,363	880,123	0,588	0,952
Q68	170,533	884,638	0,473	0,953
Q69	170,702	877,700	0,539	0,953
Q70	170,557	881,234	0,517	0,953
Q71	169,858	891,774	0,357	0,953
Q72	170,772	876,798	0,617	0,952
Q73	170,705	875,073	0,639	0,952

	<b>Scale Mean if Item Deleted</b>	<b>Scale Variance if Item Deleted</b>	<b>Corrected Item- Total Correlation</b>	<b>Alpha if Item Deleted</b>
Q74	170,496	875,896	0,617	0,952
Q75	170,405	878,819	0,602	0,952
Q76	170,567	877,189	0,633	0,952

Reliability Coefficients  
N of Cases = 593  
N of Items = 56  
Alpha = 0,953

The Cronbach Coefficient Alpha of 0,953 indicates that the scale is highly reliable and can consistently measure the particular dimensions of the magnitude of organisational culture it is designed to measure.

In other words, the measuring instrument is capable of consistently reflecting the same underlying constructs. Furthermore, it indicates a high degree of homogeneity amongst the questionnaire items.

Thus far the data set has been reduced to two factors that will be used for internal comparisons and subsequently forced into a single factor that will be used for comparison with the norm group. It has further been established that the two obtained scales were highly reliable. The forced single scale also yielded a high reliability coefficient. The next phase of the statistical process comprises analysis of variance. The results thereof are reported in the next section.

#### **4.5 Multivariate Analyses of Variance (MANOVA's) : Comparison of internal Sub-Cultures**

In order to test Hypothesis 1, which states that there are significant differences in mean culture scores between the sub-cultures based on demographic variables of the transport organisation, and Hypothesis 2, which states that there are significant differences in mean culture scores between sub-cultures based on various functional

departments of the transport organisation, a multivariate analysis of variance was conducted on the two scales.

In the following section the analysis of variance in respect of the demographic variables and the two scales i.e. “culture” and “opportunity” are discussed.

#### 4.5.1 Variables

The following demographic variables were subjected to multivariate analyses of variance: years of service, age, gender, race, grade, and department.

##### 4.5.1.1 Tenure

The descriptive statistics for tenure categories are depicted in Table 4.12. From Table 4.12 it is clear that the majority of respondents have more than 10 years service, while only 134 (23%) have 10 years or less service.

**TABLE 4.12**  
**DESCRIPTIVE STATISTICS ON TENURE GROUPS**

<b>Scale</b>	<b>Years service</b>	<b>Mean</b>	<b>Std. Dev</b>	<b>N</b>
<b>Scale 1</b>	<b>Less than 10 years</b>	3,140	0,586	134
	<b>Longer than 10 years</b>	3,117	0,555	459
	<b>Total</b>	3,122	0,561	593
<b>Scale 2</b>	<b>Less than 10 years</b>	3,316	0,550	134
	<b>Longer than 10 years</b>	2,873	0,642	459
	<b>Total</b>	2,973	0,649	593

The results of the Hotelling’s Trace test are depicted in Table 4.13. From Table 4.13 it can be seen that there are significant differences in mean overall culture scores between the two length of service groups.

**TABLE 4.13**  
**MANOVA: COMPARISON OF OVERALL MEAN CULTURE SCORES**  
**BETWEEN TENURE GROUPS**

Effect	Value	F-ratio	df	Error df	P(F)	Partial Eta Squared	
<b>QB 1</b>	<b>Hotelling's Trace</b>	0,121	35,841(a)	2,000	590,000	0,000	0,108

a Exact statistic

b Design: Intercept+QB1

The results of the Levene's test for equality of error variances are depicted in Table 4.14. From Table 4.14 it is clear that the error variance of the dependent variables is equal across groups, since the p-values are  $> 0,05$ .

**TABLE 4.14**  
**LEVENE'S TEST OF EQUALITY OF ERROR VARIANCES**

Scale	F-ratio	df1	df2	P(F)
<b>Scale 1</b>	1,365	1	591	0,243
<b>Scale 2</b>	3,719	1	591	0,054

Tests the null hypothesis that the error variance of the dependent variable is equal across groups.

a Design: Intercept+QB1

The results of the tests of between-subjects effects are depicted in Table 4.15. From Table 4.15 it can be seen that in respect of Scale 2 there are significant differences in the mean culture scores between the two tenure categories.

Thus respondents with less than 10 years service are more positive than respondents with more than 10 years service about opportunities in the company (see Table 4.12). Only 8,2% of the variance explained, can be attributed to differences in culture scores, based on the partial Eta squared.

**TABLE 4.15**  
**ANOVA: COMPARISONS OF LENGTH OF SERVICE GROUPS**  
**IN RESPECT OF SCALE 1 & 2**

Source	Dependent Variable	Type III Sum of Squares	df	Mean Square	F-ratio	P(F)	Partial Eta Squared
<b>Corrected Model</b>	<b>Scale 1</b>	0,05509(a)	1	0,05,509	0,175	0,676	0,000
	<b>Scale 2</b>	20,383(b)	1	20,383	52,586	0,000	0,082
<b>Intercept</b>	<b>Scale 1</b>	4060,886	1	4060,886	12864,172	0,000	0,956
	<b>Scale 2</b>	3974,095	1	3974,095	10252,786	0,000	0,945
<b>QB1</b>	<b>Scale 1</b>	0,055	1	0,05,509	0,175	0,676	0,000
	<b>Scale 2</b>	20,383	1	20,383	52,586	0,000	0,082
<b>Error</b>	<b>Scale 1</b>	186,563	591	0,316			
	<b>Scale 2</b>	229,078	591	0,388			
<b>Total</b>	<b>Scale 1</b>	5967,546	593				
	<b>Scale 2</b>	5492,592	593				
<b>Corrected Total</b>	<b>Scale 1</b>	186,618	592				
	<b>Scale 2</b>	249,461	592				

a R Squared = 0,000 (Adjusted R Squared = -0,001)

b R Squared = 0,082 (Adjusted R Squared = 0,080)



#### 4.5.1.2 Age

The descriptive statistics for age groups are depicted in Table 4.16. From Table 4.16 it is clear that all the age categories are of equal size with the exception of the category 55 years or older, which is much smaller than the others. Only 61 respondents fall in this category.

**TABLE 4.16**  
**DESCRIPTIVE STATISTICS ON AGE GROUPS**

Scale	Age	Mean	Std. Dev.	N
<b>Scale 1</b>	<b>Younger than 35 years</b>	3,129	0,560	174
	<b>36 – 45 years</b>	3,214	0,613	186
	<b>46 – 54 years</b>	3,006	0,508	172
	<b>55 years or older</b>	3,152	0,495	61
	<b>Total</b>	3,122	0,561	593
<b>Scale 2</b>	<b>Younger than 35 years</b>	3,154	0,671	174
	<b>36 – 45 years</b>	3,061	0,647	186
	<b>46 – 54 years</b>	2,763	0,558	172
	<b>55 years or older</b>	2,787	0,633	61
	<b>Total</b>	2,974	0,649	593

The results of the Wilks' Lambda test are depicted in Table 4.17. From Table 4.17 it is clear that there are significant differences in mean culture scores between the different age groups.

**TABLE 4.17**  
**MANOVA: COMPARISON OF OVERALL MEAN CULTURE SCORES**  
**BETWEEN FOUR AGE GROUPS**

Effect	Value	F-ratio	Hypothesis df	Error df	P(F)	Partial Eta Squared
<b>QB2</b> Wilks' Lambda	0,915	8,885(a)	6,000	1176,000	0,000	0,043

The statistic is an upper bound on F that yields a lower bound on the significance level.  
Design: Intercept+QB2

The results of the Levene's test of equality of error variances are depicted in Table 4.18. From Table 4.18 it is clear that the error variance for Scale 1 is unequal across groups ( $p < 0,05$ ), while the error variance for Scale 2 is equal across groups ( $p > 0,05$ ). Hence in the case of Scale 1 the Dunnett test and in the case of Scale 2 the Scheffe test are used to compare variances.

**TABLE 4.18**  
**LEVENE'S TEST OF EQUALITY OF ERROR VARIANCES**

Scale	F-ratio	df1	df2	P(F)
<b>Scale 1</b>	3,027	3	589	0,029
<b>Scale 2</b>	0,898	3	589	0,442

Tests the null hypothesis that the error variance of the dependent variable is equal across groups.  
Design: Intercept+QB2

The results of the tests of between-subjects effects are depicted in Table 4.19. From Table 4.19 it is clear that there are significant differences in mean culture scores between age groups regarding both Scale 1 and Scale 2. Only a small amount of the variance explained, with regard to Scale 1 (2,1%) and Scale 2 (6,8%) can be attributed to differences in culture scores, based on the partial Eta squared.

**TABLE 4.19**  
**MANOVA: COMPARISONS OF AGE GROUPS**  
**IN RESPECT OF SCALE 1 & 2**

Source	Dependent Variable	Type III Sum of Squares	df	Mean Square	F-ratio	P(F)	Partial Eta Squared
<b>Corrected Model</b>	<b>Scale 1</b>	3,947(a)	3	1,316	4,243	0,006	0,021
	<b>Scale 2</b>	16,890(b)	3	5,630	14,258	0,000	0,068
<b>Intercept</b>	<b>Scale 1</b>	4688,372	1	4688,372	15117,065	0,000	0,962
	<b>Scale 2</b>	4152,320	1	4152,320	10515,973	0,000	0,947
<b>QB2</b>	<b>Scale 1</b>	3,947	3	1,316	4,243	0,006	0,021
	<b>Scale 2</b>	16,890	3	5,630	14,258	0,000	0,068
<b>Error</b>	<b>Scale 1</b>	182,671	589	0,310			
	<b>Scale 2</b>	232,572	589	0,395			
<b>Total</b>	<b>Scale 1</b>	5967,546	593				
	<b>Scale 2</b>	5492,592	593				
<b>Corrected Total</b>	<b>Scale 1</b>	186,618	592				
	<b>Scale 2</b>	249,461	592				

R Squared = 0,021 (Adjusted R Squared = 0,016)

R Squared = 0,068 (Adjusted R Squared = 0,063)

The results of the Dunnett and the Scheffe post hoc tests for Scales 1 and 2 respectively are depicted in Table 4.20. From Table 4.16 it is clear that respondents in the age group 46 – 54 are least positive, whilst the respondents in age group 36 – 45 are most positive about the culture of the division (Scale 1). It will further be noted from Table 4.16 that respondents in the age groups 46 years and older feel more negative about opportunity (Scale 2), while respondents in the age categories 45 years and younger feel more positive about opportunity.

**TABLE 4.20**  
**POST HOC TESTS: MULTIPLE COMPARISONS ON AGE GROUPS**

Dependent Variable	(I) Age	(J) Age	Mean Difference (I-J)	Std. Error	P(F)	95% Confidence Interval		
						Lower Bound	Upper Bound	
<b>Scale 1</b>	<b>Dunnett T3</b>	<b>Younger than 35 years</b>	<b>36 - 45 years</b>	-0,084	0,062	0,680	-0,248	0,079
			<b>46 - 54 years</b>	0,124	0,057	0,178	-0,029	0,276
			<b>55 years or older</b>	-0,023	0,076	1,000	-0,227	0,182



Dependent Variable	(I) Age	(J) Age	Mean Difference (I-J)	Std. Error	P(F)	95% Confidence Interval	
						Lower Bound	Upper Bound
Scale 2 Scheffe	36 - 45 years	Younger than 35 years	0,084	0,062	0,680	-0,079	0,248
		46 - 54 years	0,208(*)	0,059	0,003	0,051	0,365
		55 years or older	0,062	0,078	0,964	-0,146	0,269
	46 - 54 years	Younger than 35 years	-0,124	0,057	0,178	-0,276	0,029
		36 - 45 years	-0,208(*)	0,059	0,003	-0,365	-0,051
		55 years or older	-0,146	0,074	0,270	-0,345	0,053
	55 years or older	Younger than 35 years	0,023	0,076	1,000	-0,182	0,227
		36 - 45 years	-0,062	0,078	0,964	-0,269	0,146
		46 - 54 years	0,146	0,074	0,270	-0,053	0,345
	Younger than 35 years	36 - 45 years	0,094	0,066	0,573	-0,092	0,280
		46 - 54 years	0,392(*)	0,068	0,000	0,203	0,581
		55 years or older	0,367(*)	0,094	0,002	0,105	0,630
	36 - 45 years	Younger than 35 years	-0,094	0,066	0,573	-0,280	0,092
		46 - 54 years	0,298(*)	0,066	0,000	0,112	0,485
		55 years or older	0,274(*)	0,093	0,034	0,014	0,534
	46 - 54 years	Younger than 35 years	-0,392(*)	0,068	0,000	-0,581	-0,203
		36 - 45 years	-0,298(*)	0,066	0,000	-0,485	-0,112
		55 years or older	-0,024	0,094	0,995	-0,287	0,238
	55 years or older	Younger than 35 years	-0,367(*)	0,094	0,002	-0,630	-0,105
		36 - 45 years	-0,274(*)	0,093	0,034	-0,534	-0,014
		46 - 54 years	0,024	0,094	0,995	-0,238	0,287

Based on observed means.

\* The mean difference is significant at the 0,05 level.

#### 4.5.1.3 Gender

The descriptive statistics for gender groups are depicted in Table 4.21. From Table 4.21 it is clear that only 81 (14%) respondents are female.

**TABLE 4.21**  
**DESCRIPTIVE STATISTICS ON GENDER GROUPS**

	<b>Gender</b>	<b>Mean</b>	<b>Std. Deviation</b>	<b>N</b>
<b>Scale 1</b>	<b>Male</b>	3,083	0,548	512
	<b>Female</b>	3,374	0,581	81
	<b>Total</b>	3,122	0,561	593
<b>Scale 2</b>	<b>Male</b>	2,931	0,652	512
	<b>Female</b>	3,242	0,565	81
	<b>Total</b>	2,974	0,649	593

The results of the Hotelling's Trace test for the variable "gender" are depicted in Table 4.22. From Table 4.22 it is clear that there are significant differences in mean culture scores between the two gender groups.

**TABLE 4.22**  
**MANOVA: COMPARISON OF OVERALL MEAN CULTURE SCORES**  
**BETWEEN TWO GENDER GROUPS**

<b>Effect</b>	<b>Value</b>	<b>F-ratio</b>	<b>Hypothesis df</b>	<b>Error df</b>	<b>P(F)</b>	<b>Partial Eta Squared</b>
<b>QB3 Hotelling's Trace</b>	0,040	11,768(a)	2,000	590,000	0,000	0,038

a Exact statistic

b Design: Intercept+QB3

The results of the Levene's test for equality of error variances are depicted in Table 4.23. From Table 4.23 it is clear that the error variance for both Scale 1 and Scale 2 is equal across groups ( $p > 0,05$ ). Hence in the case of Scale 1 as well as Scale 2 the Scheffe test is used to compare variances.

**TABLE 4.23**  
**LEVENE'S TEST OF EQUALITY OF ERROR VARIANCES**

	<b>F-ratio</b>	<b>df1</b>	<b>df2</b>	<b>P(F)</b>
<b>Scale 1</b>	0,133	1	591	0,715
<b>Scale 2</b>	3,603	1	591	0,058

Tests the null hypothesis that the error variance of the dependent variable is equal across groups.

a Design: Intercept+QB3

The results of the multivariate analysis of variance are depicted in Table 4.24. From Table 4.24 it is clear that in the case of both Scales 1 and 2 there are significant differences in mean between the two groups. From Table 4.21 it is clear that females are significantly more positive than males in respect of culture (Scale 1). From Table 4.21 it is also clear that females are significantly more positive about opportunity (Scale 2) than males. Based on partial Eta squared only 3,2% and 2,7% of the variance on Scale 1 & 2 respectively, can be attributed to differences in culture scores.

**TABLE 4.24**  
**ANOVA: COMPARISONS OF GENDER GROUPS IN RESPECT OF SCALE 1 & 2**

<b>Source</b>	<b>Dependent Variable</b>	<b>Type III Sum of Squares</b>	<b>df</b>	<b>Mean Square</b>	<b>F-ratio</b>	<b>P(F)</b>	<b>Partial Eta Squared</b>
<b>Corrected Model</b>	<b>Scale 1</b>	5,940(a)	1	5,940	19,429	0,000	0,032
	<b>Scale 2</b>	6,744(b)	1	6,744	16,422	0,000	0,027
<b>Intercept</b>	<b>Scale 1</b>	2915,256	1	2915,256	9535,798	0,000	0,942
	<b>Scale 2</b>	2664,719	1	2664,719	6488,419	0,000	0,917
<b>QB3</b>	<b>Scale 1</b>	5,940	1	5,940	19,429	0,000	0,032
	<b>Scale 2</b>	6,744	1	6,744	16,422	0,000	0,027
<b>Error</b>	<b>Scale 1</b>	180,679	591	0,306			
	<b>Scale 2</b>	242,717	591	0,411			
<b>Total</b>	<b>Scale 1</b>	5967,546	593				
	<b>Scale 2</b>	5492,592	593				
<b>Corrected Total</b>	<b>Scale 1</b>	186,618	592				
	<b>Scale 2</b>	249,461	592				

a R Squared = 0,032 (Adjusted R Squared = 0,030)

b R Squared = 0,027 (Adjusted R Squared = 0,025)

#### 4.5.1.4 Race

The descriptive statistics for racial groups are depicted in Table 4.25. From Table 4.25 it is clear that the majority of respondents are white. Only 86 respondents (15%) are Black which include all non-white groups, for the purposes of these analyses.

**TABLE 4.25**  
**DESCRIPTIVE STATISTICS ON RACIAL GROUPS**

Scale	Race	Mean	Std. Deviation	N
Scale 1	Black	3,192	0,665	86
	White	3,112	0,520	409
	Total	3,126	0,548	495
Scale 2	Black	3,538	0,532	86
	White	2,842	0,591	409
	Total	2,963	0,638	495

The results of the Hotelling's Trace test for the variable "race" are depicted in Table 4.26. From Table 4.26 it is clear that there are significant differences in the mean culture scores between the two racial groups.

**TABLE 4.26**  
**MANOVA: COMPARISON OF OVERALL MEAN CULTURE SCORES**  
**BETWEEN TWO RACIAL GROUPS**

Effect	Value	F-ratio	Hypothesis df	Error df	P(F)	Partial Eta Squared
Hotelling's Trace	0,261	64,294(a)	2,000	492,000	0,000	0,207

a Exact statistic

b Design: Intercept+QB4

The results of the Levene's test for equality of error variances are depicted in Table 4.27. From Table 4.27 it is clear that the error variance for Scale 1 is unequal across groups ( $p < 0,05$ ), while the error variance for Scale 2, is equal across groups ( $p > 0,05$ ).

**TABLE 4.27**  
**LEVENE'S TEST OF EQUALITY OF ERROR VARIANCES**

Scale	F-ratio	df1	df2	P(F)
<b>Scale 1</b>	13,492	1	493	0,000
<b>Scale 2</b>	1,272	1	493	0,260

Tests the null hypothesis that the error variance of the dependent variable is equal across groups.

The results of the tests of between-subjects effects are depicted in Table 4.28. From Table 4.28 it is clear that in respect of Scale 2 there are significant differences in mean between the two groups. From Table 4.25 it can be seen that blacks are more positive about opportunity, than whites. In this case 17% of the variance can be attributed to differences in culture scores.

**TABLE 4.28**  
**ANOVA: COMPARISONS OF RACIAL GROUPS IN RESPECT OF SCALE 1 & 2**

Source	Dependent Variable	Type III Sum of Squares	Df	Mean Square	F-ratio	P(F)	Partial Eta Squared
<b>Corrected Model</b>	<b>Scale 1</b>	0,458(a)	1	0,458	1,527	0,217	0,003
	<b>Scale 2</b>	34,465(b)	1	34,465	101,922	0,000	0,171
<b>Intercept</b>	<b>Scale 1</b>	2824,065	1	2824,065	9423,656	0,000	0,950
	<b>Scale 2</b>	2892,379	1	2892,379	8553,617	0,000	0,946
<b>QB4</b>	<b>Scale 1</b>	0,458	1	0,458	1,527	0,217	0,003
	<b>Scale 2</b>	34,465	1	34,465	101,922	0,000	0,171
<b>Error</b>	<b>Scale 1</b>	147,741	493	0,300	-	-	-
	<b>Scale 2</b>	166,706	493	0,338	-	-	-
<b>Total</b>	<b>Scale 1</b>	4985,006	495				
	<b>Scale 2</b>	4546,286	495				
<b>Corrected Total</b>	<b>Scale 1</b>	148,199	494				
	<b>Scale 2</b>	201,171	494				

a R Squared = 0,003 (Adjusted R Squared = 0,001)

b R Squared = 0,171 (Adjusted R Squared = 0,170)

#### 4.5.1.5 Grade

The descriptive statistics for the variable grade are depicted in Table 4.29. From Table 4.29 it is clear that the majority of respondents are junior officials, whilst the management category is the smallest.

**TABLE 4.29**  
**DESCRIPTIVE STATISTICS ON GRADE LEVELS**

Scale	Grade	Mean	Std. Deviation	N
Scale 1	Management (+Senior)	3,095	0,505	87
	Junior Management	3,060	0,550	174
	Junior Official	3,162	0,580	332
	Total	3,122	0,561	593
Scale 2	Management (+Senior)	2,860	0,538	87
	Junior Management	2,885	0,595	174
	Junior Official	3,050	0,693	332
	Total	2,974	0,649	593

The results of the Wilks' Lambda test for grade are depicted in Table 4.30. From Table 4.30 it is clear that there are significant differences in mean culture scores between the various grade levels.

**TABLE 4.30**  
**MANOVA: COMPARISON OF OVERALL MEAN CULTURE SCORES**  
**BETWEEN THREE GRADE LEVELS**

Effect	Value	F-ratio	Hypothesis df	Error df	P(F)	Partial Eta Squared
<b>QB5 Wilks' Lambda</b>	0,981	2,784(a)	4,000	1178,000	0,026	0,009

a Exact statistic

b The statistic is an upper bound on F that yields a lower bound on the significance level.

c Design: Intercept+QB5

The results of the Levene's test for equality of error variances are depicted in Table 4.31. From Table 4.31 it is clear that the error variance for Scale 1 is equal across

groups ( $p > 0,05$ ), while the error variance for Scale 2, is unequal across groups ( $p < 0,05$ ). Hence in the case of Scale 1 the Scheffe test and in the case of Scale 2 the Dunnett test are used to compare variances.

**TABLE 4.31**  
**LEVENE'S TEST OF EQUALITY OF ERROR VARIANCES**

Scale	F-ratio	df1	df2	P(F)
<b>Scale 1</b>	1,692	2	590	0,185
<b>Scale 2</b>	4,986	2	590	0,007

Tests the null hypothesis that the error variance of the dependent variable is equal across groups.  
a Design: Intercept+QB5

The results of the tests of between-subjects effects are depicted in Table 4.32. From Table 4.32 it is clear that in respect of Scale 2 there are significant differences in mean culture scores between the two groups. Only 1,8% of the variance can be attributed to culture score differences.



**TABLE 4.32**  
**ANOVA: COMPARISON OF GRADE LEVELS IN RESPECT OF SCALE 1 & 2**

Source	Dependent Variable	Type III Sum of Squares	df	Mean Square	F-ratio	P(F)	Partial Eta Squared
<b>Corrected Model</b>	<b>Scale 1</b>	1,274(a)	2	0,637	2,028	0,132	0,007
	<b>Scale 2</b>	4,390(b)	2	2,195	5,285	0,005	0,018
<b>Intercept</b>	<b>Scale 1</b>	4285,837	1	4285,837	13642,965	0,000	0,959
	<b>Scale 2</b>	3819,179	1	3819,179	9194,544	0,000	0,940
<b>QB5</b>	<b>Scale 1</b>	1,274	2	0,637	2,028	0,132	0,007
	<b>Scale 2</b>	4,390	2	2,195	5,285	0,005	0,018
<b>Error</b>	<b>Scale 1</b>	185,344	590	0,314			
	<b>Scale 2</b>	245,071	590	0,415			
<b>Total</b>	<b>Scale 1</b>	5967,546	593				
	<b>Scale 2</b>	5492,592	593				
<b>Corrected Total</b>	<b>Scale 1</b>	186,618	592				
	<b>Scale 2</b>	249,461	592				

a R Squared = 0,007 (Adjusted R Squared = 0,003)

b R Squared = 0,018 (Adjusted R Squared = 0,014)

The results of the *post hoc* tests on grade in respect of Scale 2 are depicted in Table 4.33. From Table 4.33 it is clear that there are significant differences in mean between the groups Senior Management, Junior Management and Junior Official. From Table 4.29 it can be seen that the groups Senior Management and Junior Management are more negative about opportunity than junior officials, although junior officials are not extremely positive about opportunity.

**TABLE 4.33**  
**POST HOC TESTS: MULTIPLE COMPARISONS BETWEEN GRADE LEVELS**

Dependent Variable	(I) Grade	(J) Grade	Mean Difference (I-J)	Std. Error	P(F)	95% Confidence Interval	
						Lower Bound	Upper Bound
Scale 2 Dunnett T3	Management (+Senior)	Junior Management	-0,025	0,073	0,982	-0,201	0,152
		Junior Official	-0,189(*)	0,069	0,021	-0,356	-0,022
	Junior Management	Management (+Senior)	0,025	0,073	0,982	-0,152	0,201
		Junior Official	-0,164(*)	0,059	0,017	-0,306	-0,023
	Junior Official	Management (+Senior)	0,189(*)	0,069	0,021	0,022	0,356
		Junior Management	0,164(*)	0,059	0,017	0,023	0,306

Based on observed means.

\* The mean difference is significant at the 0,050 level.

**4.5.1.6 Department**

In order to test Hypothesis 2, which states that there are significant differences in mean culture scores between sub-cultures based on various functional departments of the transport organisation a multivariate analysis of variance was carried out on the data set.

The descriptive statistics for department are depicted in Table 4.34. From Table 4.34 it is clear that the majority of respondents (188)(32%) are from the Infrastructure



Maintenance department, whilst the departments with the fewest responses are Governance (16)(3%) and Evaluation, Acquisition and Review (32)(5%).

**TABLE 4.34**  
**DESCRIPTIVE STATISTICS ON DEPARTMENTS**

	<b>Department</b>	<b>Mean</b>	<b>Std. Deviation</b>	<b>N</b>
<b>Scale 1</b>	<b>Asset Life Cycle Management</b>	3,152	0,481	99
	<b>Railway Engineering</b>	3,161	0,514	100
	<b>Evaluation, Acquisition and Review</b>	3,082	0,481	32
	<b>Traction</b>	2,971	0,522	88
	<b>Wagons</b>	3,160	0,760	70
	<b>Governance</b>	3,625	0,530	16
	<b>Infrastructure Maintenance</b>	3,107	0,549	188
	<b>Total</b>	3,122	0,561	593
<b>Scale 2</b>	<b>Asset Life Cycle Management</b>	2,818	0,597	99
	<b>Railway Engineering</b>	2,881	0,555	100
	<b>Evaluation, Acquisition and Review</b>	2,906	0,557	32
	<b>Traction</b>	2,950	0,647	88
	<b>Wagons</b>	3,102	0,773	70
	<b>Governance</b>	3,348	0,592	16
	<b>Infrastructure Maintenance</b>	3,047	0,669	188
	<b>Total</b>	2,974	0,649	593

The results of the Wilks' Lambda test for the variable grade are depicted in Table 4.35. From Table 4.35 it is clear that there are significant differences in mean culture scores between the various departments.

**TABLE 4.35**  
**MANOVA: COMPARISONS ON OVERALL MEAN**  
**CULTURE SCORES BETWEEN SEVEN DEPARTMENTS**

<b>Effect</b>	<b>Value</b>	<b>F-ratio</b>	<b>Hypothesis df</b>	<b>Error df</b>	<b>P(F)</b>	<b>Partial Eta Squared</b>
<b>Wilks' Lambda</b>	0,927	3,757(a)	12,000	1170,000	0,000	0,037

The statistic is an upper bound on F that yields a lower bound on the significance level.  
Design: Intercept+QB6

The results of the Levene's test for equality of error variances are depicted in Table 4.36. From Table 4.36 it is clear that the error variance for both Scale 1 and Scale 2 is unequal across groups ( $p < 0,05$ ). Hence the Dunnett test is used to compare variances in respect of both Scales.

**TABLE 4.36**  
**LEVENE'S TEST OF EQUALITY OF ERROR VARIANCES**

	F-ratio	df1	df2	P(F)
<b>Scale 1</b>	6,505	6	586	0,000
<b>Scale 2</b>	2,370	6	586	0,029

Tests the null hypothesis that the error variance of the dependent variable is equal across groups.  
a Design: Intercept+QB6

The results of the tests of between-subjects effects are depicted in Table 4.37. From Table 4.37 it is clear that in respect of both Scales there are significant differences in mean culture scores between the various departments. However only 3,5% and 3,1% of the variance for Scales 1 and 2 respectively, can be attributed to culture score differences.

**TABLE 4.37**  
**ANOVA: COMPARISON BETWEEN DEPARTMENTS**  
**IN RESPECT OF SCALE 1 & 2**

Source	Dependent Variable	Type III Sum of Squares	df	Mean Square	F-ratio	P(F)	Partial Eta Squared
<b>Corrected Model</b>	<b>Scale 1</b>	6,484(a)	6	1,081	3,515	0,002	0,035
	<b>Scale 2</b>	7,853(b)	6	1,309	3,174	0,005	0,031
<b>Intercept</b>	<b>Scale 1</b>	3420,843	1	3420,843	11128,413	0,000	0,950
	<b>Scale 2</b>	3060,532	1	3060,532	7423,046	0,000	0,927
<b>QB6</b>	<b>Scale 1</b>	6,484	6	1,081	3,515	0,002	0,035
	<b>Scale 2</b>	7,853	6	1,309	3,174	0,005	0,031
<b>Error</b>	<b>Scale 1</b>	180,135	586	0,307			
	<b>Scale 2</b>	241,609	586	0,412			
<b>Total</b>	<b>Scale 1</b>	5967,546	593				
	<b>Scale 2</b>	5492,592	593				
<b>Corrected Total</b>	<b>Scale 1</b>	186,618	592				
	<b>Scale 2</b>	249,461	592				

a R Squared = 0,035 (Adjusted R Squared = 0,025)

b R Squared = 0,031 (Adjusted R Squared = 0,022)

The results of the *post hoc* tests on both Scales are depicted in Table 4.38. From Table 4.38 it is clear that regarding Scale 1 there are significant differences in mean between Governance and Evaluation, Acquisition and Review, Traction and Infrastructure Maintenance. From Table 4.34 it is clear that Governance is significantly more positive about culture than these departments.

**TABLE 4.38**  
**POST HOC TESTS: MULTIPLE COMPARISONS BETWEEN DEPARTMENTS**

Dependent Variable	(I) Department	(J) Department	Mean Difference (I-J)	Std. Error	P(F)	95% Confidence Interval		
						Lower Bound	Upper Bound	
Scale 1	Dunnett T3	Governance	Asset Life Cycle Management	0,473	0,141	0,059	-0,012	0,958
			Railway Engineering	0,464	0,142	0,070	-0,022	0,951
			Evaluation, Acquisition and Review	0,543(*)	0,157	0,035	0,023	1,064
			Traction	0,654(*)	0,144	0,004	0,164	1,143
			Wagons	0,465	0,161	0,125	-0,062	0,991
			Infrastructure Maintenance	0,518(*)	0,138	0,028	0,038	0,998
			Asset Life Cycle Management	0,530	0,160	0,062	-0,016	1,076
Scale 2	Dunnett T3	Governance	Railway Engineering	0,467	0,158	0,135	-0,076	1,009
			Evaluation, Acquisition and Review	0,442	0,178	0,297	-0,145	1,029
			Traction	0,399	0,163	0,336	-0,154	0,951
			Wagons	0,246	0,175	0,957	-0,331	0,823
			Infrastructure Maintenance	0,301	0,156	0,680	-0,238	0,840
			Asset Life Cycle Management	0,530	0,160	0,062	-0,016	1,076
			Railway Engineering	0,467	0,158	0,135	-0,076	1,009

#### 4.6 Univariate Analysis of Variance (ANOVA): Comparison with the Norm Group Culture

In order to test hypothesis 3, which states that there are significant differences in mean culture scores between the transport organisation and organisations in the norm group, an univariate analysis of variance was carried out on scores of the single scale. The results of these analyses are depicted in Tables 4.39 – 4.40. In Table 4.39 the average mean for the transport company and the norm group is depicted. From Table 4.39 it is clear that the norm group has a higher mean culture score (3,3) than the transport company (3,1). However, there is not a huge gap between the two means.

**TABLE 4.39**  
**DESCRIPTIVE STATISTICS ON THE COMPANY AND NORM GROUP**

Group	Mean	Std. Deviation	N
Transport Company	3,104	0,539	593
Norm Group	3,326	0,603	4066
<b>Total</b>	<b>3,297</b>	<b>0,600</b>	<b>4659</b>

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The differences in variance between the companies are depicted in Table 4.40. At first glance it would appear that there are significant differences in mean between the different companies.

**TABLE 4.40**  
**ANOVA : COMPARISON OF CULTURE SCORES BETWEEN**  
**TRANSPORT COMPANY AND NORM GROUP**

Source	Type III Sum of Squares	df	Mean Square	F-ratio	P(F)	Partial Eta Squared
<b>Corrected Model</b>	25,500(a)	1	25,500	72,027	0,000	0,015
<b>Intercept</b>	21392,485	1	21392,485	60425,835	0,000	0,928
<b>QB6</b>	25,500	1	25,500	72,027	0,000	0,015
<b>Error</b>	1648,712	4657	0,354			
<b>Total</b>	52330,822	4659				
<b>Corrected Total</b>	1674,212	4658				

a R Squared = 0,015 (Adjusted R Squared = 0,015)

However, it must be kept in mind that the sample sizes differ considerably. Thus, In order to make accurate inferences, it is necessary to make provision for the differences in sample size. For this purpose the Partial Eta Squared was calculated. Partial Eta Squared reveals that only 1,5% of the variance can be attributed to differences in culture, which is a very small portion and of no practical consequence.

Hence, Hypothesis 3, which states that there are significant differences in mean culture scores between the transport organisation and organisations in the norm group, is rejected. It can thus be concluded that the instrument does not possess external discriminant validity, i.e. the capability to distinguish culture between a single company and a norm group.

#### **4.7 Summary of Main Findings**

The main findings, based on the results of the statistical analyses are:

- Respondents with less than 10 year's service are more positive than respondents with more than 10 years service about opportunities in the company.
- Respondents in the age group 46 – 54 are least positive, whilst respondents in the age group 36 – 45 are most positive about the culture of the division.
- Respondents in the age groups 46 years and older feel more negative about opportunity, while respondents in the age category 45 years and younger feel more positive about opportunity.
- Females are significantly more positive than males in respect of both culture and opportunity.
- Blacks are more positive than whites about opportunity.

- Senior Management and Junior Management are negative about opportunity, while junior officials are positive, although not highly positive about opportunity.
- Governance is significantly more positive about culture than the rest of the departments.
- Governance is significantly more positive about culture than Evaluation, Acquisition and Review, Traction and Infrastructure Maintenance.

It must be kept in mind that where above findings are based on the significance of differences in variance between groups, the percentage of variance attributable to differences in culture scores are in most cases very low and of no practical consequence. The percentage of variance explained in all these findings varies between 2% and 8% with one exception, i.e. the variable “race” on Scale 2, in which case 17% of the variance is explained.

With regard to Hypothesis 1, which states that there are significant differences in mean culture scores between the sub-cultures based on demographic variables of the transport organisation, significant differences were found between sub-cultures based on demographic variables, but the proportion of variance explained was of no practical consequence. Likewise with regard to Hypothesis 2, which states that there are significant differences in mean culture scores between sub-cultures based on various functional departments of the transport organisation, significant differences were found between sub-cultures in functional departments but the proportions of variance explained was also of no practical consequence. Both Hypothesis 1 and Hypothesis 2 were rejected on these grounds.

Further analyses were carried out to compare the culture of the transport company with the norm group, representative of various industries. The statistical procedures carried out for this purpose, are the Chi-square and the Partial Eta Squared. The results of these statistics revealed that there are significant differences in mean scores, but only 1,5% of the variance could be explained after provision was made for difference in sample size. Based on the small proportion of variance explained Hypothesis 3, which states that there are significant differences in mean culture scores be-

tween the transport organisation and organisations in the norm group, is also rejected.

#### **4.8 Conclusion**

In this chapter the results of the various statistical procedures were documented and observations made. The results of descriptive statistics, Scale analysis and analysis of variance were portrayed.

The results of the descriptive statistics revealed that the distribution is moderately asymmetric. It is negatively skewed, closely bimodal and slightly peaked. The results for the sampling adequacy and sphericity tests revealed that the intercorrelation matrices complied with the prerequisites for Scale analysis. The results of Scale analysis at two levels were reflected. First level Scale analysis resulted in twelve Scales which explain 60% of the variance in the factor space, whilst second level Scale analysis resulted in two Scales which explained 58% of the variance in the factor space. The two factors were also forced into one Scale, which explained 48% of the variance in the factor space.

The results of the multivariate analyses of variance between the demographic variables and the various departments of the transport company revealed that there are significant differences in mean culture scores. However, only a very small percentage of the variance, which has no practical consequence, can be explained after provision was made for differences in sample size. Hence Hypotheses 1 and 2 are rejected.

The results of the analysis of variance between the transport company and the norm group revealed that there are significant differences in mean, but only 1.5% of the variance can be explained after provision was made for difference in sample size. Hence Hypothesis 3 is also rejected.

In the next chapter the results will be interpreted and discussed. Also in the next chapter the study will be reviewed and recommendations made for further research.

## **CHAPTER 5: CONCLUSION AND RELATED RECOMMENDATIONS**

### **5.1 Introduction**

This chapter not only integrates all the various aspects of the study as envisaged in chapter one but it also seeks to draw specific conclusions based on the finding of the study. Specific recommendations are made about the limitations of the CAI based on the new model of organisational culture proposed in Chapter 2.

In Chapter 1 the background, the motivation for the study as well as the objectives of the study were discussed. The research was contextualised from a South African perspective. It was indicated that the study of organisational culture is truly multi-disciplinary, drawing from different fields of study.

Chapter 2 reviews an extensive literature study, which encapsulated the current knowledge on organisational culture. Special reference was made to the study and assessment of organisational culture. Definitions, main themes, perspectives, approaches as well as different models of organisational culture were examined. Following this the advantages and disadvantages of both qualitative and quantitative research methods were reviewed. Also in this chapter a new model of organisational culture was proposed. This model serves as an integrating framework for the study.

In Chapter 3 the empirical research was discussed. This chapter documented the research design, the CAI, the research process and the statistical procedures employed in the study. The research was designed in such a way that it could adequately address the research question in order to reach the objectives of the study.

In Chapter 4 the results of the statistical procedures were documented and main observations, based on the statistical analyses, made. The results of descriptive statistics, factor analyses and analyses of variance were portrayed. In terms of the hypotheses that were formulated in chapter one, two sets of data, primary and secondary were analysed. The primary data set relates to the hypotheses that focussed



on an internal perspective, namely the phenomenon of sub-cultures within a transport organisation. The secondary data set relates to the comparison of the culture of the transport company with the culture of the companies in the norm group.

The results of analyses of variance revealed that there are significant differences amongst the mean culture scores of the various sub groups (departments and demographic variables) within the transport organisation. However, only an insignificant portion of the variance could be attributed to culture differences.

The current chapter indicates how the theoretical as well as empirical objectives of the study, were reached. The findings of the study are discussed. Conclusions are drawn from both the literature review and the empirical research. Recommendations are made, based on the findings of the study. The value, as well as the limitations of the study are pointed out and proposals for future research are made. A discussion on the findings of the study is preceded by a summary of the methodology employed.

## **5.2 The Methodology in Summary**

A summary of the methodology of the study includes the basic characteristics of the sample, the measuring instrument, the research procedure and the statistical analyses.

### **5.2.1 The Research Participants**

The sample, from which the primary data was generated, consists of 593 employees from a transport organisation. The majority of the participants were white, males and were in the age group 36 years and older.

The norm group, from which the secondary data was obtained, consists of 4066 participants from five companies representing various industries. The majority of respondents were white, males and were in the age group 25 to 35.

## **5.2.2 The Measuring Instrument**

The CAI was used in the data gathering process. The instrument consists of six dimensions, which cover internal and external elements. Although the latest version of the instrument consists of 89 items, only the 56 items that are common to all the companies in the norm group were included in the study. These 56 items are proportionally representative of the six dimensions.

## **5.2.3 The Research Procedure**

The primary data was also collected by using Martin's (1989) CAI, by posing the 56 questions that were common to all the companies in the norm group. The primary data was collected electronically by means of convenience sampling. It yielded a very good response, which was in excess of 50%.

The norm data set was developed from data gathered over about 3 years. The data were collected to identify the culture of the individual companies in the sample. The main aim in gathering the information was basically the same in all the cases - to improve the performance of the companies.

## **5.2.4 Statistical Analysis**

The primary and secondary data sets were factor analysed in order to determine the underlying factor structure of the Instrument. A procedure developed by Schepers (1992) was followed in this regard. This procedure counters for effects of differential item skewness, resulting in the creation of artefactors. This procedure includes first as well as second levels factor analyses. The Statistical Consultation Service of the Rand Afrikaans University conducted the analyses. All calculations were done by means of the SPSS- Windows program of SPSS - International.

### **5.3 A Summary of Key Findings**

This section discusses the key findings in respect of the objectives of the study, both the literature objectives and the empirical objectives.

#### **5.3.1 Findings Regarding the Literature Research Objectives**

Following is a summary on the key findings of the study in respect of the primary and secondary objectives of the literature research.

##### **5.3.1.1 Findings Regarding the Primary Objective of the Literature Research**

The primary objective of the literature research was to determine the various acceptable ways in which organisational culture is reliably and validly measured and compared across and within companies.

A review of the literature revealed that although the concept of organisational culture has been prominent in organisational and management literature for quite some time, scholars still disagree on the best way to measure it. Some authors have suggested the use of multiple methods (e.g., Martin, 1992; Rousseau, 1990), but these methods are often complex, expensive, and time-consuming (Ashkanasy, Broadfoot & Falkus, 2000).

##### **5.3.1.2 Findings regarding the Secondary Objectives of the Literature Research**

The secondary objectives of the literature review yielded the following:

###### **5.3.1.2.1 To Define the Construct “Organisational Culture”**

It would appear that there is no definitive conclusion or a common language to define such a complex concept as culture. There are as many definitions of organisational

culture as there are authors on the subject. For the purposes of this study the definition of one of the more prominent authors on the subject organisation culture was selected. The most commonly accepted definition of organisational culture appears to be the one touted by Edgar Schein (1985, p. 9):

“A pattern of basic assumptions – invented, discovered, or developed by a group as it learns to cope with its problems of external adaptation and internal integration – that has worked well enough to be considered valid and, therefore, to be taught to new members as the correct way to perceive, think and feel in relation to those problems.”

The most salient point from the above definition with relevance to this study is that culture is deeply rooted (“*A pattern of basic assumptions*”). The fact that culture is deeply rooted implies a hierarchy of levels.

#### **5.3.1.2.2 To Identify the Levels of Organisational Culture**

The literature review revealed that organisational culture consists of several levels (Schein, 1985) of which some are implicit and others are explicit. Most often these levels are explained by terms such as behaviour, values, and basic assumptions.

Comprehensive insight into the culture of a company can only be claimed when there is understanding of the different elements of culture on all three levels. Thus measurement has to be on all three levels.

#### **5.3.1.2.3 To Examine the Diverse Perspectives of Organisational Culture**

To fully understand the complexity of the literature on organisational culture, it is necessary to explore the various perspectives of culture that have been adopted in this field (Wilson, 2001). Martin and Meyerson (1988) identified the following three major perspectives in organisational culture research:

- The integration perspective

- The differentiation perspective
- The fragmentation perspective

This study was done from the integration perspective (cf. Par. 2.5.1). The integration perspective portrays organisation-wide consensus and consistency. Cultural members share the same values, promoting a shared sense of loyalty and commitment.

#### **5.3.1.2.4 To Distinguish the Various Organisational Culture Research Themes**

Research into the nature of organisational culture, tends to follow four main themes (cf. Par. 2.4). Researchers are interested in the difference because the way a person views culture will determine how he/she studies it (Allaire & Firsirotu, 1984). The four main themes are:

- Tangible vs Intangible
- Metaphor vs Variable
- The Effect of Culture
- Creation and Transmittance



This study recognises the intangible elements of organisational culture but is carried out on the tangible level of culture. The CAI assesses observable behaviour, practices and artefacts at surface level rather than the invisible values and beliefs at the deeper unconscious levels.

Although metaphors such as personality and the layers of an onion are used to make the construct organisational culture more understandable the construct is treated as a variable in this study.

The effect of culture falls beyond the scope of this study. Yet, the author's viewpoint is that culture has a major effect on organisational performance, especially over the long term.

In respect of creation and transmittance of culture the issue is whether behaviour leads to shared feelings or shared feelings to behaviour (Sathe, 1985). Although creation and transmittance of culture fall beyond the scope of this study, the author is of the opinion that the relationship between shared feelings and behaviour is intertwined and reciprocal, i.e. behaviour leads to shared feelings and shared feelings in turn lead to behaviour.

#### **5.3.1.2.5 To Review the Different Models of Organisational Culture and Develop an Appropriate One for this Research**

Various models of organisational culture were reviewed and the “Theoretical Model: How Culture Works” proposed by Cooke and Szumal (2000) was selected as a basis for the development of a new model.

#### **5.3.1.2.6 To Identify the Different Approaches to Measuring Organisational Culture**

Although the concept of organisational culture has been prominent in organisational and management literature for quite some time, scholars still disagree on the best way to measure it. Some authors have suggested the use of multiple methods (e.g., Martin, 1992; Rousseau, 1990), but these methods are often complex, expensive, and time-consuming (Ashkanasy, Broadfoot & Falkus, 2000).

What is borne out by the literature, is that questionnaires can play an important role in the quantitative analysis of organisational culture (Reichers & Schneider, 1990; Rousseau, 1990). As the elements of culture become more conscious and observable to participants in a study, they become more accessible to standardised assessment. According to Ashkanasy *et al.* (2000) it is generally agreed that surveys represent an efficient and standardised means of tapping the shallower levels of Schein’s (1985) typology. The deepest level of culture, on the other hand, can be investigated only through more intensive observation, focused interviews, and the involvement of organisational members in self-analysis. The thrust of this argument is

that there is a clear and continuing role for quantitative measures as a means of assessing the less abstract levels of organisational culture.

#### **5.3.1.2.7 To Review the Discriminant Validity of the Various Measures of Organisational Culture**

A review of the literature revealed that studies normally report validity in terms of face, content, construct, criterion and predictive validity (See Annexure A). However, discriminant validity is seldom reported. Yet discriminant validity is an important kind of validity. It indicates the ability of an instrument to distinguish between variables. In the case of this study the ability of the instrument to distinguish differences in sub-cultures of a transport organisation on the one hand as well as the transport organisation Culture in relation to a norm group of organisations, are the entities being examined.

An instrument that possesses discriminant validity will be able to identify these differences in culture. It is important to be able to identify these differences. It is in the uniqueness of a company where its competitive advantage or disadvantage lies. Knowing its unique characteristics can help a company to improve its “way of doing” business.

*A priori* differences between the sub-cultures of a transport organisation as well as between cultures of different organisations including the transport organisation were postulated in Chapter 1 on the grounds of the theory of communities of practice. According to this theory “groups emerge around a discipline or problem” (Stewart, 2001). An industry is regarded as a distinctive group. Hence, it is assumed that the companies in the sample would respond differently to the CAI.

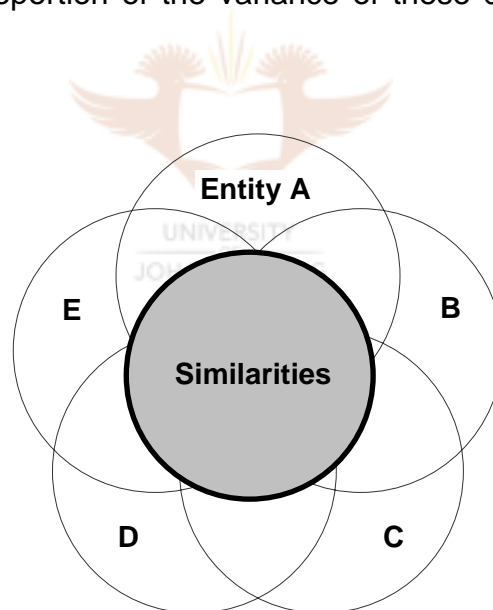
### **5.3.2 Findings Regarding the Empirical Research Objectives**

Following is a discussion on the findings in respect of the primary and secondary objectives of the empirical research.

### 5.3.2.1 Findings regarding the Primary Objective of the Empirical Research

The primary objective of the empirical research is to determine the ability of the CAI to validly and reliably assess and distinguish organisational sub-cultures within an organisation as well as to compare the overall culture of the organisation with that of other organisations in a norm group. In other words to determine the discriminant validity of the CAI.

The empirical findings do not support the expectations of the study. It was expected that the instrument would identify significant differences in sub-cultures based on functional departments and on the demography of the organisation. The results of the empirical research suggested that there are differences in sub-cultures of the transport organisation and between the transport organisation and the norm group. However, only a small proportion of the variance of these differences could be explained.



**Figure 5.1: Similarities between Entities**

From the results in Chapter 4 it is further clear that the CAI reliably assessed commonalities in sub-cultures in the transport organisation as well as between the transport organisation and companies in the norm group. This is the strength of the instrument. It is able to detect communalities between entities. See Figure 5.1 for a graphic representation of what the findings suggest. In Figure 5.1 each circle repre-



sents a different entity within a single organisation or different organisation and the shaded area represents the similarities as identified by the instrument. The areas not shaded represent the unique differences not identified by the instrument.

### **5.3.2.2 Findings regarding the Secondary Objectives of the Empirical Research**

The findings in respect of the secondary objectives of the research are:

#### **5.3.2.2.1 To analyse and interpret the differences in sub-cultures based on demographic variables and on the various functional departments of the transport organisation**

The results of the analyses of variance indicated that there are differences in mean culture scores the in sub-cultures based on demographic variables and on the various functional departments. However a small proportion, 2% - 8%, with one outlier, i.e. 17%, of these differences can be explained. Hence both Hypotheses 1 and 2 are rejected. Hypothesis 1 states that there are significant differences in mean culture scores between the sub-cultures based on demographic variables of the transport organisation. Hypothesis 2 states that there are significant differences in mean culture scores between the sub-cultures based on various functional departments of the transport organisation.

#### **5.3.2.2.2 To analyse and interpret the differences in culture between the transport organisation and the norm group**

As is the case with the empirical findings on the sub-cultures, the study suggests that there are significant differences between the cultures of the transport company and the companies in the norm group, but only a small portion of the variance could be explained after provision was made for difference in sample size. Hence Hypothesis 3, which states that there are significant differences in mean culture scores between the transport organisation and organisations in the norm group is rejected.

### 5.3.2.2.3 To identify the underlying factor structure of the CAI

Two levels of factor analyses were conducted. First level factor analysis resulted in twelve factors being postulated. These twelve factors explain about 60% of the variance in the factor space. Second level factor analysis resulted in two factors, which explain about 58% of the variance in the factor space.

### 5.3.2.2.4 To compare the CAI with the newly developed culture model

A comparison of the Martin's (1989) model, underpinning the CAI, with the author's model reveals both similarities and differences (See Table 5.1). In Table 5.1 major differences between the two models are shaded. From Table 5.1 it is clear that both models recognise the importance of viewing the organisation as a system, consisting of various subsystems, e.g. structure, technical subsystems, etc.

  
**TABLE 5.1:**  
**THE MARTINS MODEL COMPARED WITH THE NEWLY DEVELOPED MODEL**

<b>Attribute</b>	<b>Martins Model</b> (Cf. Par 2.6.6)	<b>New Model</b> (Cf. Par 2.6.7)
<b>Organisational Systems</b>	<i>Five internal subsystems</i>	<i>Four subsystems</i>
	Structure	Structure
	Management	Management
	Technical	Technology
	Psycho-social	Competencies
	Goals	
<b>Levels recognised</b>	<i>Three levels</i>	<i>Three levels</i>
	Artefacts & creations	Artefacts & creations
	Values	Values
	Basic assumptions	Basic assumptions
<b>Dimensions (breadth of measurement)</b>	<i>Six Dimensions</i>	<i>Five Dimensions</i>
	Mission/Vision	Structure
	Management Processes	Management
	Employee Needs and Objectives	Technology
	External Environment	Competencies
	Means to Achieve Objectives	Environment

<b>Attribute</b>	<b>Martins Model</b> (Cf. Par 2.6.6)	<b>New Model</b> (Cf. Par 2.6.7)
	Interpersonal Relations	
<b>Depth of measurement</b>	<i>One level</i>	<i>Three levels</i>
	Artefacts & creations	Artefacts & creations
		Values
		Basic assumptions

In respect of a systems view of organisations there are only two minor differences between the two models. Firstly, Martins (1989) shows the goals system as a separate subsystem, while the author regards the goal system as part of the management subsystem. Secondly, different terms are used for essentially the same subsystem. Martins (1989) uses the term Psycho-social, whilst the author uses the term Skills/Qualities. In both cases it entails the competencies of people, including interpersonal and leadership skills.

Both models recognise the impact of the organisational systems on the behaviour and performance of the organisation. A further similarity is that both models are based on Schein's (1985) three level typology, i.e. artefacts and creations, values, and basic assumptions. Another similarity is that both models deliver a profiling rather than a typing instrument.

The difference in number of dimensions (6 versus 4) is insignificant. Seeing that the dimensions are focused on the subsystems, differences are a function of classification rather than conceptual differences. Martins refers to the external environment as a subsystem, which is then the sixth subsystem. The six dimensions are linked to the six subsystems. In the new model the dimensions are also linked to the organisational systems, which explains why there are four dimensions in the author's model. It was pointed out above that although the number of dimensions differs between the two models they in essence cover the same elements. The six dimensions of the Martin's model cover the same elements (or breadth) as the four dimensions of the author's model.

It is in the depth of measurement where the fundamental differences between the two models lie. A closer look at Martins' questionnaire reveals that the questionnaire focuses on the surface - the level of artefacts and creations. This is in the author's opinion also the level where companies easily and continuously adapt to latest trends and practices. Most companies nowadays are acutely aware that the new globalised economy requires quick adaptation to continuous changes in the business environment. Hence, companies quickly and continuously adapt to these changes and pressures. However, these adaptations are at surface level, where it is easy to embrace and implement new practices such as new performance management, incentive systems or new communication initiatives.

Although Martins' model recognises the deeper levels of values and basic assumptions, the CAI does not assess culture at these levels. It is at the deeper levels where the fundamental differences between entities lie. When companies implement new management practices, neither their basic assumptions nor their belief systems are always automatically affected. Thus they may have implemented world class practices, but in their underlying fibre they have not changed at all. They still believe the same things as in the past.

In summary thus, at surface level companies may appear to be the same and do things in the same way. However, at a deeper level they may differ fundamentally. A company can for example adopt participative practices, but in essence stay autocratic. This is where a disconnect can exist between a company's beliefs and practices.

The instrument identifies similarities at surface level but not differences at the deeper levels. The scale was designed for the tangible, espoused level (the level of practice if you will) but not for the deeper (unconscious) level of tacit values and basic assumptions. Inferences can be made about the deeper levels, but the items in the instrument do not purposefully and systematically expose the deeper levels of organisational culture.

With this finding Postulate 1, which states that a proper fit exists between the Martins' model of organisational culture and the proposed model is only partly accepted.

The following section purports to assess the CAI in its current form based on the criteria for instrument design, proposed by Swart, Roodt, and Schepers (1999).

### 5.3.3 Criteria for Instrument Design

Following, is a review of the CAI based on criteria for the design of a new questionnaire:

Firstly, the construct must be theoretically founded as clearly as possible. The aim of the first criterion is to examine and describe the abstract construct, i.e. “culture”. According to Martins (1989) culture falls in the ambit of the anthropology, which is the contemplation of the *anthropos*, the scientific statements in a systems perspective in respect of all visible facts regarding humans.

Secondly, there must be no doubt about the domain to which the construct belongs. The domain in this case is “organisational culture”. According to Martins (1989) organisational culture is regarded as branching from the social anthropology. From this follows studying of the community, the organisation, groups, norms and roles.

Martins (1989, p. 45) defined organisational culture as follows: “Organisational culture is an integrated pattern of human behaviour, which is unique to a particular organisation and which originated as a result of the organisation’s survival processes and interaction with its environment. Culture directs the organisation to goal attainment. Newly appointed employees must be taught what is regarded as the correct way of behaving.”

The above definition implies that employees behave in the same way within a company, which is unique to that particular company. In other words each company has its own culture (behaviour) and culture differs between companies. By implication, companies can be differentiated in terms of culture. This further implies that a CAI should be able to detect these differences in culture between internal entities of a company or between companies.

Thirdly, sub domains must be identified. Sub domains in the case of the CAI are the dimensions: Mission/Vision; Management Processes; Employee Needs and Objectives; External Environment; Means to Achieve Objectives; and Interpersonal Relations.

Fourthly, behavioural indicators of the sub domains must be identified. This step aims at operationalising the abstract construct “organisational culture” by describing it in observable behaviour. Behavioural indicators are used to link the theoretical concepts with the empirical variables. In this case behavioural indicators were identified for each of the several dimensions. These indicators, ranged from three in the case of the dimensions “Employee Needs and Objectives” and “External Environment” to seventeen in the case of “Means to Achieve Objectives.” It must be remembered that these figures are for the shortened, 56-item version of the instrument. For the complete instrument the figures range from five to thirty. Nevertheless, in the case of both the shortened version as well as the complete version, the spread of behavioural indicators is uneven. This means that certain dimensions are under-represented, whilst others are over-represented.

Based on above review it would appear that the instrument has both face validity and content validity. Up to this point the researcher complied with the criteria of instrument design.

Fifthly, the item format is important to ensure that the questions support the behavioural indicators. Item format covers aspects such as the correct use of language, questions versus statements, the type of response scale and the instructions of the instrument. The correct use of these elements influences the validity of the questionnaire. In the construction of the CAI these guidelines were not strictly applied.

According to Swart *et al.* (1999) it is also essential that each measuring instrument possess adequate construct validity. At face value the CAI complies with this requirement, especially with a Cronbach Coefficient Alpha of 0,945.

As far as the questionnaire response scale is concerned (cf. Par. 3.3.4) Schepers (1992) recommends that it is better to use an intensity response scale where only the two extreme categories are labelled as depicted in Figure 5.2.

1	2	3	4	5
<b>Strongly disagree</b>			<b>Strongly agree</b>	

**Figure 5.2: Proposed Intensity Response Scale**

From above review it is clear that ensuring that the design of the instrument complies with the criteria for questionnaire design can enhance the instrument.

#### **5.4 Value of Study**

This study has theoretical, practical, and methodological value. This study contributes to the better understanding of culture in companies by assessing the validity and reliability of the organisational CAI. Insight into a company's culture enables the effective management thereof, which in turn contributes to the success of the company. Insights into the various aspects of culture will contribute to theory building, while the new model will help practitioners to assess organisational culture more accurately, amongst others by using complimentary methods. This in turn will help practitioners to design and implement quality change programs for enhancing organisational performance. Specific contributions of the research include:

##### **5.4.1 Theoretical Value**

- The research throws light on the issue of cultural differences between entities (within a company as well as between companies) and in effect on the discriminant validity of the CAI;
- The research provides a systems perspective on organisational culture;
- The research emphasises the central roles of Schein's (1985) three level typology and the three perspectives in culture research;

- The research serves as a building block for future research in organisational culture.

#### **5.4.2 Practical Value**

- The research contributes to a very important area “burning people issue” of organisational life in South Africa;
- The research lends support to the important role organisational culture plays in organisational performance;
- The research provides a framework and criteria for assessing organisational culture in companies;
- The research enables a company to better understand and manage its culture;
- The research provides a model of organisational culture that can facilitate organisational change programmes;

#### **5.4.3 Methodological Value**

- The research provides guidelines for the development of organisational culture scales;
- The research supports the value of quantitative methods in assessing organisational culture;
- The research reinforces the principles of multi-method, multi-level and linking research.

#### **5.5 Limitations of Study**

Although this study has provided relevant insights into the discriminant validity and reliability of the CAI within the South African context, it is important to recognise limitations associated with this study:

- A combination of primary and secondary data were used to test the third hypothesis; the results, therefore, should not be interpreted as proof that the instrument



does not possess discriminant validity, but rather as not lending support for the a priori assumptions.

- It must be borne in mind that the study suffers from the usual limitations of survey research.
- A limited sample of organisations was used; therefore, caution is necessary in making generalisations to other industries without additional empirical tests.
- The sizes of the organisations in the study differ, which have an influence on both the statistical analyses as well as the findings based on the analyses, despite statistical measures to counter for these effects.

## **5.6 Recommendations for Further Research**

It is clear from the above that simplistic models of organisational culture have to be seriously reconsidered from a theoretical as well as a practical perspective. A more complex model of organisations, that portrays them as being constructed from different systems and subsystems, which interact on different levels, is perhaps a bit closer to reality. Following are recommendations made regarding the theoretical, practical and methodological areas:

### **5.6.1 Recommendations from a Theoretical Perspective**

From a theoretical perspective it is recommended that further research be carried out in order to:

- Reflect all theoretical dimensions of the construct organisational culture.
- Operationalise the construct organisational culture at the levels of values and basic assumptions, so that these constructs can be properly assessed with an organisational culture-measuring instrument.
- Link organisational culture to the position of a company's life cycle.

### **5.6.2 Recommendations from a Practical Perspective**

From a practical perspective the following are recommendations should enhance both the effectiveness and efficiency of the instrument:

- In order to enhance the effectiveness of the instrument is recommended that items be included that will expose the deeper levels of organisational culture i.e. the underlying values and the basic assumptions.

In order to enhance the efficiency of the instrument it is recommended that only items that comply with the criteria for questionnaire design be included in the instrument.

With a view to relevancy and value-adding only Items that can distinguish between cultures based on the success of a company should be included in the instrument (linking research).

### **5.6.3 Recommendations from a Methodological Perspective**

The following suggestions are made with regard to improving the methodology:

- Key stakeholder groups, such as suppliers and customers should also be surveyed in order to form a holistic and balanced picture of the culture of the organisation.
- Qualitative approaches and methods, including interviews and focus groups should be employed to supplement questionnaire surveys.

## **5.7 Conclusion**

The study of organisational culture is a relatively new field of study and many gaps still exist in the body of knowledge. Organisational culture is an all-encompassing, multifaceted construct, characterised by myriad dimensions and perspectives. It

permeates all aspects of corporate life and has become a popular field of study because of the promises it holds for improving organisational performance.

This study assessed the CAI and found it to be a highly reliable instrument from a particular perspective. It has the ability to measure the communalities between companies very well. However, it does not have the ability to measure the differences in culture between companies. Thus the instrument in its current form, does not possess discriminant validity.

The instrument can be improved by including behavioural indicators aimed at the deeper levels of culture i.e. the levels of values and basic assumptions. It is recommended that those items that distinguish fairly well between companies be retained in an improved version of the instrument. However, by including items that directly focus on underlying values and basic assumptions, the instrument's value can be enhanced.

The findings of this study do not only provide valuable insights into the theory of organisational culture, thereby contributing to the body of knowledge, but also serve as guide to practitioners in developing more effective and efficient culture assessment instruments. Valid and reliable culture assessment instruments are urgently required in addressing culture as a burning people issue in South Africa today.

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## ANNEXURE A

### Attributes of Organisational Culture Instruments

Author	Year	Level	Dimensions	Type	Format	Reliability	Consensual Validity	Construct Validity	Criterion Validity
Allen & Dyer	1980	1	7	Behaviour	Likert			X	X
Kilmann & Saxton	1983	1	4	Behaviour	paired	X		X	X
Cooke & Lafferty	1986	1	12	Behaviour	Likert	X	X	X	X
Harrison	1975	1/2	15	Typing	rank				
Handy	1979	2	9	Typing	rank				
Margerison	1979	2	24	Typing	Likert				
Organisation Technology International	1979	2	5	Descriptive	Likert				
Glaser	1983	2	4	Typing	Likert				
Harris & Moran	1984	2	7	Effectiveness	Likert				
Sashkin & Fulmer	1985	2	10	Effectiveness	Likert		X		
Enz	1986	2	22	Fit	Likert	X		X	X
Reynolds	1986	2	14	Descriptive	Likert	X			X
O'Reilly <i>et al.</i>	1991	2	24	Fit	Q-sort	X	X	X	X
Woodcock	1989	2	12	Effectiveness	Likert				
Hofstede <i>et al.</i>	1990	2	NA	Descriptive	Likert				
Lessem	1990	2	7	Typing	rank				
PA Consulting Group	1991	2	NA	Descriptive	Likert				
Migliore <i>et al.</i>	1992	2	20	Descriptive	Likert		X		

SOURCE: Adapted from Ashkanasy *et al.* (2000, p.136).

## ANNEXURE B

### ITEM SCORE DISTRIBUTIONS (F & %) (N=593)

		Strongly disagree	Disagree	Uncertain	Agree	Strongly agree
New technology is sufficiently applied in Spoornet.	Count	25	189	98	264	17
	%	4,2%	31,9%	16,5%	44,5%	2,9%
I understand the overall objectives of Technical.	Count	5	55	140	339	54
	%	,8%	9,3%	23,6%	57,2%	9,1%
Each department in Technical as well as every employee is in possession of measurable standards which specify the results to be achieved.	Count	35	185	144	198	31
	%	5,9%	31,2%	24,3%	33,4%	5,2%
Employees are given the opportunity to make a contribution in identifying the outputs for their own group.	Count	27	156	94	282	34
	%	4,6%	26,3%	15,9%	47,6%	5,7%
Written plans for our work group are available for at least the next 12 months.	Count	69	178	119	200	27
	%	11,6%	30,0%	20,1%	33,7%	4,6%
Performance feedback sessions are held with employees three times a year to evaluate their performance against predetermined objectives/standards.	Count	65	208	77	199	44
	%	11,0%	35,1%	13,0%	33,6%	7,4%
I know precisely who our target market and customers are.	Count	22	94	100	294	83
	%	3,7%	15,9%	16,9%	49,6%	14,0%
We really spare no effort in understanding the needs of our internal and external customers.	Count	40	180	138	187	48
	%	6,7%	30,4%	23,3%	31,5%	8,1%
The planners in the technical environment normally consider all relevant factors during the planning phase.	Count	29	157	185	195	27
	%	4,9%	26,5%	31,2%	32,9%	4,6%
We are actively researching the needs of our existing and potential customers.	Count	18	130	234	187	24
	%	3,0%	21,9%	39,5%	31,5%	4,0%
Technical takes purposeful action to integrate its core values with all activities and results.	Count	4	87	223	266	13
	%	,7%	14,7%	37,6%	44,9%	2,2%
Our employees display a professional image in their contact with the public, their relationship with colleagues and their general behaviour at work.	Count	21	139	101	301	31
	%	3,5%	23,4%	17,0%	50,8%	5,2%
Employees in Technical respect the property and other possessions of Spoornet ... they protect them and do not take anything belonging to Spoornet.	Count	23	113	152	249	56
	%	3,9%	19,1%	25,6%	42,0%	9,4%
Employees display an attitude of doing things right the first time.	Count	30	159	105	252	47
	%	5,1%	26,8%	17,7%	42,5%	7,9%
We provide our products/services totally free from any discrimination (race or gender).	Count	50	88	95	276	84
	%	8,4%	14,8%	16,0%	46,5%	14,2%
Only technologies that will not lead to employee redundancy should be considered.	Count	59	198	80	158	98
	%	9,9%	33,4%	13,5%	26,6%	16,5%

		<b>Strongly disagree</b>	<b>Disagree</b>	<b>Uncertain</b>	<b>Agree</b>	<b>Strongly agree</b>
Sufficient time and effort is spent on forecasting the technology environment in order to ensure that investment risk is minimised.	Count	16	140	245	169	23
	%	2,7%	23,6%	41,3%	28,5%	3,9%
Sufficient opportunities exist for participation in national and international technology events/forums/projects.	Count	77	192	167	145	12
	%	13,0%	32,4%	28,2%	24,5%	2,0%
We are satisfied with the technology, equipment, job tools and other physical things we need to do our work.	Count	85	217	68	200	23
	%	14,3%	36,6%	11,5%	33,7%	3,9%
The physical appearance of the buildings, offices, equipment, furniture and reception areas support the organisation's image.	Count	121	177	72	193	30
	%	20,4%	29,8%	12,1%	32,5%	5,1%
The way we dress supports the organisation's image.	Count	34	136	109	279	35
	%	5,7%	22,9%	18,4%	47,0%	5,9%
Technology is a key resource of profound importance for the profitability and growth of Spooronet.	Count	7	19	16	267	284
	%	1,2%	3,2%	2,7%	45,0%	47,9%
Equal opportunities for all people in Technical have become a reality.	Count	209	134	79	136	35
	%	35,2%	22,6%	13,3%	22,9%	5,9%
The needs of human resources are determined scientifically (accurately).	Count	91	187	200	105	10
	%	15,3%	31,5%	33,7%	17,7%	1,7%
Recruitment takes place without discrimination in terms of gender, race or language.	Count	225	175	85	82	26
	%	37,9%	29,5%	14,3%	13,8%	4,4%
In order to adjust to the rapidly changing political situation in South Africa it is desirable to appoint people of colour at all levels of authority in Technical.	Count	64	122	80	222	105
	%	10,8%	20,6%	13,5%	37,4%	17,7%
Spoornet is a sought after employer in the employment market.	Count	71	138	190	162	32
	%	12,0%	23,3%	32,0%	27,3%	5,4%
We retain our best workers.	Count	250	226	65	46	6
	%	42,2%	38,1%	11,0%	7,8%	1,0%
Internal training is competency based (i.e. employees are able to perform the tasks successfully after training).	Count	34	156	126	251	26
	%	5,7%	26,3%	21,2%	42,3%	4,4%
Action is taken to develop supervisors and managers as both leaders and managers.	Count	45	166	146	210	26
	%	7,6%	28,0%	24,6%	35,4%	4,4%
Performance evaluation is succeeded with development interviews during which training and development actions are jointly planned with employees.	Count	50	160	159	209	15
	%	8,4%	27,0%	26,8%	35,2%	2,5%
The work environment complies with safety and health standards.	Count	20	70	65	383	55
	%	3,4%	11,8%	11,0%	64,6%	9,3%
Technical responds quickly to changes in the internal and external environment.	Count	31	150	205	194	13
	%	5,2%	25,3%	34,6%	32,7%	2,2%
Technical is managed effectively.	Count	20	125	206	225	17
	%	3,4%	21,1%	34,7%	37,9%	2,9%

		<b>Strongly disagree</b>	<b>Disagree</b>	<b>Uncertain</b>	<b>Agree</b>	<b>Strongly agree</b>
Technology is sufficiently applied in order to eliminate human error.	Count	14	188	197	191	3
	%	2,4%	31,7%	33,2%	32,2%	,5%
The work environment is conducive to experimenting with new technologies.	Count	20	157	135	263	18
	%	3,4%	26,5%	22,8%	44,4%	3,0%
The minimum duplication of work occurs.	Count	52	238	123	171	9
	%	8,8%	40,1%	20,7%	28,8%	1,5%
We are all clear on our roles in Technical.	Count	33	133	125	269	33
	%	5,6%	22,4%	21,1%	45,4%	5,6%
Employees in the technical environment are known for their ingenuity and creativity.	Count	6	71	148	325	43
	%	1,0%	12,0%	25,0%	54,8%	7,3%
A visible trust relationship exists between employees and management.	Count	48	206	152	168	19
	%	8,1%	34,7%	25,6%	28,3%	3,2%
In-house technical research is on a sound footing.	Count	15	121	252	191	14
	%	2,5%	20,4%	42,5%	32,2%	2,4%
Core rail assets (locomotives, wagons and infrastructure) are well maintained over their full life cycle.	Count	83	213	131	145	21
	%	14,0%	35,9%	22,1%	24,5%	3,5%
Heavy Haul technologies are successfully applied to the general freight lines.	Count	13	95	278	202	5
	%	2,2%	16,0%	46,9%	34,1%	,8%
Employees are adequately informed about what other departments are doing.	Count	105	298	92	86	12
	%	17,7%	50,3%	15,5%	14,5%	2,0%
There are sufficient personal discussions (“eyeball sessions”) on matters of significance between managers and their employees.	Count	54	192	119	205	23
	%	9,1%	32,4%	20,1%	34,6%	3,9%
Higher level management takes purposeful action to make contact with employees on lower levels.	Count	110	212	92	157	22
	%	18,5%	35,8%	15,5%	26,5%	3,7%
Subordinates have an open channel of communication to higher levels of the hierarchy.	Count	49	109	148	263	24
	%	8,3%	18,4%	25,0%	44,4%	4,0%
Spoornet is investing in the right technologies and resources.	Count	12	76	266	216	23
	%	2,0%	12,8%	44,9%	36,4%	3,9%
Purposeful action is taken to delegate decision-making to the appropriate lower levels.	Count	38	182	176	180	17
	%	6,4%	30,7%	29,7%	30,4%	2,9%
My work environment could be described as participative.	Count	13	76	71	380	53
	%	2,2%	12,8%	12,0%	64,1%	8,9%
When decisions are made at higher levels, those affected most by these decisions are consulted.	Count	77	273	121	110	12
	%	13,0%	46,0%	20,4%	18,5%	2,0%
The technical capability of Spoornet is continuously improving.	Count	35	121	145	282	10
	%	5,9%	20,4%	24,5%	47,6%	1,7%

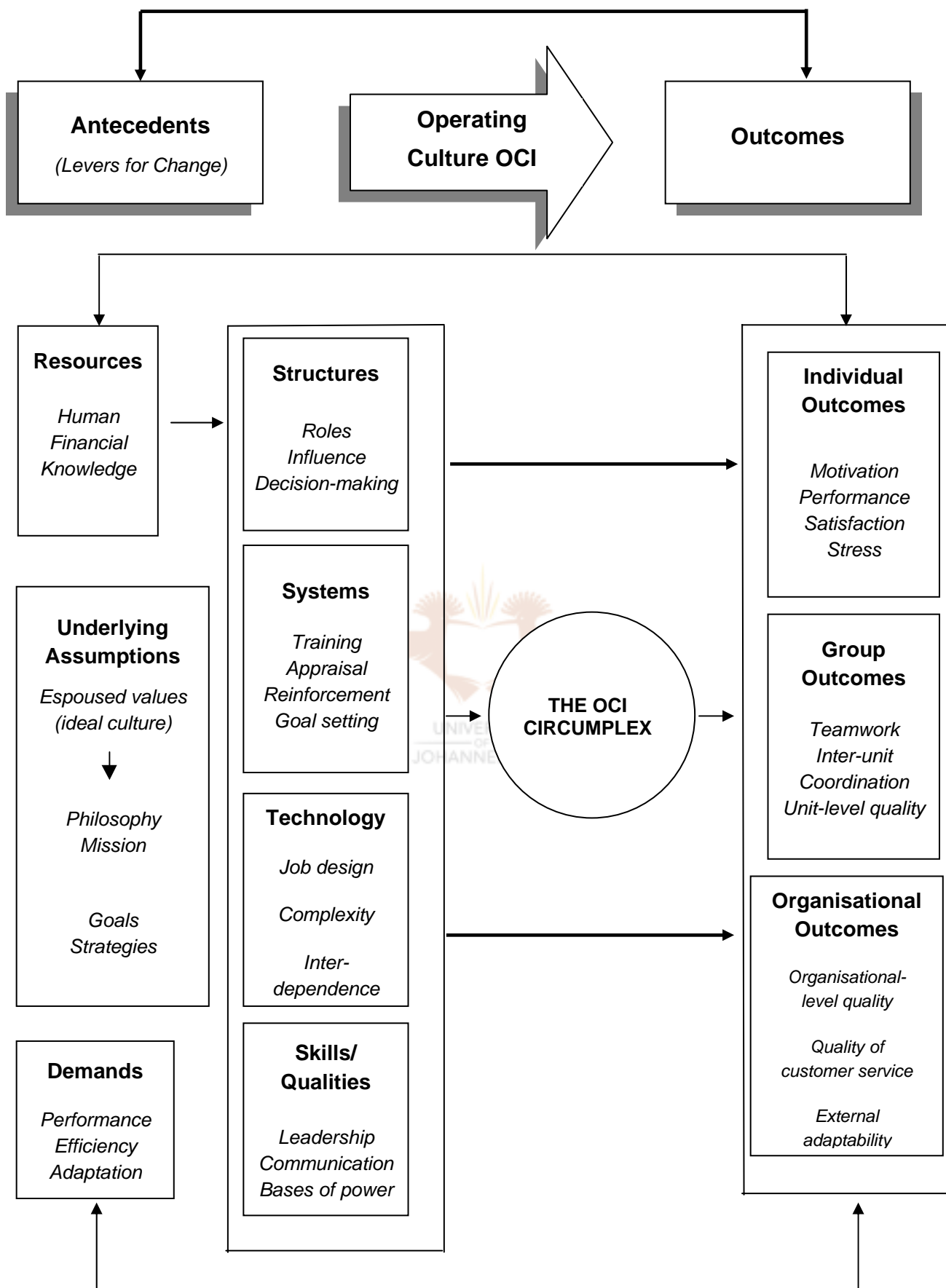
		<b>Strongly disagree</b>	<b>Disagree</b>	<b>Uncertain</b>	<b>Agree</b>	<b>Strongly agree</b>
Employees and managers collectively formulate objectives.	Count	47	216	132	194	4
	%	7,9%	36,4%	22,3%	32,7%	,7%
Employees in Technical have the know-how to solve any technical problem quickly and effectively.	Count	7	101	133	308	44
	%	1,2%	17,0%	22,4%	51,9%	7,4%
My work results can be determined accurately.	Count	5	74	64	395	55
	%	,8%	12,5%	10,8%	66,6%	9,3%
Control of own work is promoted.	Count	8	69	79	386	51
	%	1,3%	11,6%	13,3%	65,1%	8,6%
The technical capability of Spoornet is focussed on the right issues.	Count	8	86	224	262	13
	%	1,3%	14,5%	37,8%	44,2%	2,2%
In Technical those persons in positions of authority delegate as much power as is required to complete tasks successfully.	Count	28	146	132	261	26
	%	4,7%	24,6%	22,3%	44,0%	4,4%
I believe that my own personal objectives can be satisfied, through the achievement of organisational objectives.	Count	16	61	71	384	61
	%	2,7%	10,3%	12,0%	64,8%	10,3%
The man – machine relationship is well understood in the technical environment.	Count	5	93	147	322	26
	%	,8%	15,7%	24,8%	54,3%	4,4%
I don't mind "walking the extra mile" when necessary.	Count	1	8	15	274	295
	%	,2%	1,3%	2,5%	46,2%	49,7%
Technical is needs driven and aligned with the strategic direction of Spoornet.	Count	4	26	157	357	49
	%	,7%	4,4%	26,5%	60,2%	8,3%
Performance/Achievement is evaluated objectively according to actual results.	Count	32	131	165	236	29
	%	5,4%	22,1%	27,8%	39,8%	4,9%
Our remuneration system (salary, fringe benefits, etc) is fair.	Count	163	198	102	126	4
	%	27,5%	33,4%	17,2%	21,2%	,7%
Technology is perceived as a competitive factor within Spoornet.	Count	7	66	153	327	40
	%	1,2%	11,1%	25,8%	55,1%	6,7%
Technical is known for its innovative products and/or services.	Count	5	71	193	303	21
	%	,8%	12,0%	32,5%	51,1%	3,5%
Employees are continuously encouraged to develop better work procedures and methods.	Count	15	102	105	347	24
	%	2,5%	17,2%	17,7%	58,5%	4,0%
Rules and regulations are continuously reviewed and upgraded to cope with change.	Count	14	145	127	279	28
	%	2,4%	24,5%	21,4%	47,0%	4,7%
In our organisation employees are self-motivated and have the ability to control their own work.	Count	38	164	115	250	26
	%	6,4%	27,7%	19,4%	42,2%	4,4%
Management believes subordinates are self-motivated and have the ability to control their own work.	Count	19	143	137	259	35
	%	3,2%	24,1%	23,1%	43,7%	5,9%



		<b>Strongly disagree</b>	<b>Disagree</b>	<b>Uncertain</b>	<b>Agree</b>	<b>Strongly agree</b>
Teamwork is an important characteristic in Technical.	Count	4	67	51	305	166
	%	,7%	11,3%	8,6%	51,4%	28,0%
The activities of the various sections within Technical are co-ordinated and aligned.	Count	24	170	180	200	19
	%	4,0%	28,7%	30,4%	33,7%	3,2%
We solve our differences ... we get down to the root of our differences.	Count	26	156	160	234	17
	%	4,4%	26,3%	27,0%	39,5%	2,9%
Conflict is resolved by confronting those involved with the problem and mutually working towards solutions.	Count	22	128	114	302	27
	%	3,7%	21,6%	19,2%	50,9%	4,6%
I believe that our management has the vision and knowledge to lead Technical successfully through the new millennium.	Count	19	78	188	262	46
	%	3,2%	13,2%	31,7%	44,2%	7,8%
Managers in Technical have the necessary leadership skills.	Count	15	125	184	241	28
	%	2,5%	21,1%	31,0%	40,6%	4,7%



## ANNEXURE C



**Theoretical Model: How Culture Works (Cook & Szumal, 2000, p.151)**