3. CHAPTER 3 METHODOLOGY

3.1. Introduction

This study is part of a joint research programme embarked upon by the University of Pretoria and funded by the National Research Foundation. The aim of this study is to investigate leadership behaviour styles in South African organisations. This is an investigation into contemporary turbulent organisational environments where change is at the order of the day. The relationships between the four constructs chosen for this study have as far as could be established never been studied in South Africa and represent, in most cases, novel concepts. Participants completed questionnaires on their leaders' behaviours on two scales, the leadership behaviour CPE scale and an EI scale for their leaders. Participants completed two questionnaires on their own behaviour, that is, Visioning Ability and Organisational Citizenship Behaviour (OCB).

3.2. Research Design

The research design is the structure in terms of which the study is carried out. The current study firstly explores the existence of the CPE leadership behaviour construct in a South African context. Relationships with other constructs related to leadership behaviour are also investigated, such as leader EI, subordinate visioning ability and subordinate OCB.

In accordance with the objectives of the study, a sample of leaders and individuals in managerial or supervisory roles, were drawn from a large organisation, operating in a variety of diverse industry sectors. This organisation is represented in a variety of industrial sectors within the South African economy. It

is divided into separate companies that are active in mining, engineering, research and development, fuel and energy production and marketing, chemical manufacturing and marketing, oil and gas exploration and other industrial sectors. The participants were drawn from subordinates of the leaders in the top 4 leadership layers of the organisation hierarchy. The sample contained both genders and members of all ethnic and race groups. A survey research design was used.

Demographic variables on which information was obtained for both the participants (the subordinates completing the questionnaire) as well as for the participant's superior who is being assessed by the sub-ordinate, were as follows:

- Age
- Gender
- Race
- Hierarchical level in the organisation
- Level of qualifications
- Number of people directly reporting to him/her
- Number of people he/ she is responsible for
- Functional area within which he/she works

3.3. Participants

The biographical characteristics of the sample of participants are presented in order to get a clear portrayal of the survey group. Demographic information of the assessed leader and the self-assessed subordinate is given in tabular form.

The age distribution of the respondents' leaders is shown in Table 3.1.

Table 3.1 Age distribution of leaders

Age	Frequency	Percentage of total Sample	Cumulative Frequency	Cumulative Percent
27	1	0.11	1	0.11
28	4	0.46	5	0.57
30	11	1.25	16	1.82
31	6	0.68	22	2.50
32	8	0.91	30	3.41
33	7	0.80	37	4.21
34	4	0.46	41	4.66
35	31	3.53	72	8.19
36	24	2.73	96	10.92
37	16	1.82	112	12.74
38	42	4.78	154	17.52
39	15	1.71	169	19.23
40	72	8.19	241	27.42
41	27	3.07	268	30.49
42	25	2.84	293	33.33
43	35	3.98	328	37.32
44	30	3.41	358	40.73
45	73	8.30	431	49.03
46	34	3.87	465	52.90
47	21	2.39	486	55.29
48	43	4.89	529	60.18
49	22	2.50	551	62.68
50	77	8.76	628	71.44
51	16	1.82	644	73.27
52	37	4.21	681	77.47
53	41	4.66	722	82.14
54	28	3.19	750	85.32
55	39	4.44	789	89.76

56	17	1.93	806	91.70
57	17	1.93	823	93.63
58	12	1.37	835	94.99
59	5	0.57	840	95.56
60	11	1.25	851	96.81
61	2	0.23	853	97.04
62	1	0.11	854	97.16
63	1	0.11	855	97.27
69	1	0.11	856	97.38
Unknown	23	2.62	879	100.00
TOTAL	879	100.00		

The leaders' age varies between a minimum of 27 and a maximum of 69 years. The mean age is 45.7 years with a standard deviation of 7.2 years.

The gender distribution of the leaders is shown in Table 3.2.

Table 3.2 Leaders' gender

Gender	Frequency	Percentage	Cumulative Frequency	Cumulative Percent
Male	848	96.47	848	96.47
Female	31	3.53	879	100.00

The majority of the leaders are male (n= 848) representing 96.47 % of the sample.

The leaders' race distribution is shown in Table 3.3.

Table 3.3 Leaders' Race

Race	Frequency	Percentage	Cumulative Frequency	Cumulative Percent
Black	26	2.96	26	2.96
White	831	94.54	857	97.50
Asian	15	1.71	872	99.20
Coloured	2	0.23	874	99.43
Other	4	0.46	878	99.89
Unknown	1	0.11	879	100.00
Total	879	100.00		

The majority (n = 831) of the leaders are from the white group, representing 94.95% of the total sample. The second largest group are the black group (n = 26) representing only 2.96 % of the total sample.

The hierarchical level on which the leaders function is shown in Table 3.4.

Table 3.4 Leaders' hierarchical level

Level in Organisation	Frequency	Percentage	Cumulative Frequency	Cumulative Percent
Level 1	28	3.19	28	3.19
Level 2	148	16.84	176	20.02
Level 3	264	30.03	440	50.06
Level 4	384	43.69	824	93.74
Level 5	54	6.14	878	99.89
Unknown	1	0.11	879	100.00
Total	879	100.00		

The organisational hierarchical levels vary from level 1, which is the highest in the organisation to level 13, which is the lowest. The top five levels are

considered to represent all leadership positions within this organisation. The largest single group of the leaders in this sample are on Level 4 (n = 384) and Level 3 (n = 264), representing 43.69% and 30.03% of the sample respectively. The top two hierarchical levels represent 20.02% of the total sample.

The leader's level of qualifications is shown in Table 3.5.

Table 3.5 Leaders' level of qualifications

Highest Qualification	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Secondary school	3	0.34	3	0.34
Std 10 or equivalent	9	1.02	12	1.37
Post-school certificate / diploma	106	12.06	118	13.42
Bachelor's degree or equivalent	294	33.45	412	46.87
Honours degree or equivalent	156	17.75	568	64.62
Masters degree or equivalent	227	25.82	795	90.44
Doctoral degree or equivalent	73	8.30	868	98.75
Unknown	11	1.25	879	100.00
Total	879	100.00		

From Table 3.5, it is evident that this sample of leaders is a highly educated group. More than 98% have post-school qualifications. The largest single group of the leaders (n = 294) have a Bachelor's degree or equivalent qualification, followed by leaders with a masters degree or equivalent (n = 227). These two categories represent 33.45% and 25.82% respectively of the total sample.

The number of people who are reporting to the respondents' leaders are shown in Table 3.6.

Table 3.6 Number of subordinates reporting directly to the leader

Number of subordinates	Frequency	Percent	Cumulative Frequency	Cumulative Percent
1 – 5	259	29.47	259	29.47
6 – 10	415	47.21	674	76.68
11 – 15	102	11.60	776	88.28
16 – 20	51	5.80	827	94.08
21 – 30	21	2.39	848	96.47
31 – 50	13	1.48	861	97.95
51 – 100	11	1.25	872	99.20
Unknown	7	0.80	879	100.00
Total	879	100.00		

The number of subordinates directly reporting to the leaders, ranged between 1 and 99, with a mean number of 9.8 and a standard deviation of 10.1. The largest single group of leaders (n = 415) have between 6 and 10 individuals reporting to him/her. The second largest group of leaders have 1 to 5 direct subordinates (n = 259). These two leader groupings represent 47.50% and 29.60% respectively of the sample.

In addition to direct reports the leaders may also be indirectly responsible for other people such as the subordinates' underlings farther down the hierarchy of the organisation or department he or she is leading. The number of people the leader is responsible for in a direct or indirect way is shown in Table 3.7.

Table 3.7 Number of people the leader is responsible for

Number people responsible for	Frequency	Percent	Cumulative Frequency	Cumulative Percent
1 – 5	70	7.96	70	7.96
6 – 10	108	12.29	178	20.25
11 – 20	124	14.11	302	34.36
21 – 30	70	7.96	372	42.32
31 – 50	76	8.65	448	50.97
51 – 80	77	8.76	525	59.73
81 – 110	43	4.89	568	64.62
111 – 160	62	7.05	630	71.67
161 – 210	47	5.35	677	77.02
211 – 300	47	5.35	724	82.37
301 – 400	33	3.75	757	86.12
401 – 600	37	4.21	794	90.33
601 – 1000	36	4.10	830	94.43
1001 – 2000	21	2.39	851	96.81
2001 – 5000	8	0.91	859	97.72
5001 – 10000	14	1.59	873	99.32
Unknown	6	0.68	879	100.00
Total	879	100.00		

The number of people leaders are directly and indirectly responsible for, ranged from 1 to 10 000, with a mean number of 314,2 and a standard deviation of 1016. The highest frequency (n = 124) was reported for leaders responsible for the number of people ranging between 11 and 20, with a corresponding percentage of 14.11%.

The functional area within which the leader is active is shown in Table 3.8.

Table 3.8 Leaders' functional area

Functional area	Frequency	Percentage	Cumulative Frequency	Cumulative Percent
General Management	224	25.48	224	25.48
Human Resources	28	3.19	252	28.67
Production	88	10.01	340	38.68
Financial and Commercial	103	11.72	443	50.40
Marketing	63	7.17	506	57.57
Corporate Services	26	2.96	532	60.52
Engineering, Design or Project Management	170	19.34	702	79.86
Information Technology	27	3.07	729	82.94
Maintenance Services	55	6.26	784	89.19
Research and Development	57	6.48	841	95.68
Other	38	4.32	879	100.00
Total	879	100.00		

The two largest single groups of leaders are in General Management (n = 224) and in Engineering, Design or Project Management (n = 170) positions. Individuals in these functions make up 25.48% and 19.34% respectively of the total sample.

The following tables show the demographic characteristics of the respondents themselves (subordinates to the leaders being assessed). Table 3.9 shows the age distribution of the respondents.

Table 3.9 Age distribution of respondents

Age	Frequency	Percentage of total Sample	Cumulative Frequency	Cumulative Percent
26	2	0.23	2	0.23
27	8	0.91	10	1.14
28	13	1.48	23	2.62
29	26	2.96	49	5.57
30	37	4.21	86	9.78
31	34	3.87	120	13.65
32	35	3.98	155	17.63
33	22	2.50	177	20.14
34	28	3.19	205	23.32
35	25	2.84	230	26.17
36	26	2.96	256	29.12
37	26	2.96	282	32.08
38	33	3.75	315	35.84
39	23	2.62	338	38.45
40	35	3.98	373	42.43
41	20	2.28	393	44.71
42	36	4.10	429	48.81
43	35	3.98	464	52.79
44	33	3.75	497	56.54
45	56	6.37	553	62.91
46	39	4.44	592	67.35
47	28	3.19	620	70.53
48	33	3.75	653	74.29
49	29	3.30	682	77.59
50	32	3.64	714	81.23
51	17	1.93	731	83.16
52	29	3.30	760	86.46
53	16	1.82	776	88.28

54	21	2.39	797	90.67
55	17	1.93	814	92.61
56	18	2.05	832	94.65
57	14	1.59	846	96.25
58	8	0.91	854	97.16
59	4	0.46	858	97.61
60	4	0.46	862	98.07
61	4	0.46	866	98.52
62	5	0.57	871	99.09
64	1	0.11	872	99.20
65	1	0.11	873	99.32
Unknown	6	0.68	879	100.00
TOTAL	879	100.00		

The respondents' ages range from 26 to 65 years. Their mean age was 42.3 (SD = 8.55 years).

The respondents' gender distribution is shown in Table 3.10.

Table 3.10 Respondents' gender

Gender	Frequency	Percentage	Cumulative Frequency	Cumulative Percent
Male	813	92.49	813	92.49
Female	64	7.28	877	99.77
Unknown	2	0.23	879	100.00
Total	879	100.00		

The vast majority of respondents were males (n = 813), representing 92.7% of the total sample.

The respondents' race distribution is shown in Table 3.11.

Table 3.11 Subordinates' race

Race	Frequency	Percentage	Cumulative Frequency	Cumulative Percent
Black	40	4.55	40	4.55
White	805	91.58	845	96.13
Asian	24	2.73	869	98.86
Coloured	7	0.80	876	99.66
Other	2	0.23	878	99.89
Unknown	1	0.11	879	100.00
Total	879	100.00		

The majority of subordinates are from the white racial group (n = 805), followed by the black group (n = 24), representing 91.58% and 2.73% of the sample respectively.

The hierarchical level in which the subordinates function is shown in Table 3.12.

Table 3.12 Respondents' hierarchical level.

Level in Organisation	Frequency	Percentage	Cumulative Frequency	Cumulative Percent
Level 2	13	1.48	13	1.48
Level 3	79	8.99	92	10.47
Level 4	247	28.10	339	38.57
Level 5	512	58.25	851	96.81
Level 6	21	2.39	872	99.20
Unknown	7	0.80	879	100.00
Total	879	100.00		

The majority of the subordinates in this sample are on Level 5 (n = 512) and Level 4 (n = 247) respectively, representing 58.25% and 28.10% of the

sample respectively. The top two subordinate hierarchical levels represented 10.47% of the total sample.

The subordinates' level of qualifications is shown in Table 3.13.

Table 3.13 Respondents' level of qualifications

Level of Qualification	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Secondary school	1	0.11	1	0.11
Std 10 or equivalent	24	2.73	25	2.84
Post-school certificate / diploma	187	21.27	212	24.12
Bachelor's degree or equivalent	250	28.44	462	52.56
Honours degree or equivalent	164	18.66	626	71.22
Masters degree or equivalent	214	24.35	840	95.56
Doctoral degree or equivalent	39	4.44	879	100.00

The largest single group of the subordinates (n = 250) have a Bachelor's degree or equivalent qualification, followed by subordinates with a masters degree or equivalent (n = 214). These two categories represent 28.44% and 24.35% respectively of the total sample.

The number of people who are directly reporting to the respondents is shown in Table 3.14.

Table 3.14 Number of people reporting directly to the respondent

Number of subordinates	Frequency	Percent	Cumulative Frequency	Cumulative Percent
0	248	28.21	248	28.21
1 - 5	386	43.92	634	72.13
6 - 10	179	20.36	813	92.49
11 - 15	39	4.44	852	96.93
16 - 20	11	1.25	863	98.18
21 - 30	8	0.91	871	99.09
31 - 100	8	0.91	879	100.0

The largest single group of respondents (n = 386) have between 1 and 5 individuals reporting directly to them, followed by respondents who have no direct subordinates (n = 248). These two respondent groupings represent 43.92% and 28.21% respectively of the whole sample. The number of subordinates range between 0 and 99, with a mean of 4.60 and a standard deviation of 7.80.

In addition to direct subordinates, the respondents may also be responsible for other people such as the direct subordinates' underlings as well as individuals farther down the hierarchy of the organisation or department he or she is responsible for. The number of people the respondent is responsible for in this way is shown in Table 3.15.

Table 3.15 Number of people the respondent is responsible for

Number of people responsible for	Frequency	Percent	Cumulative Frequency	Cumulative Percent
1 – 5	433	49.26	433	49.26
6 - 10	87	9.90	520	59.16
11 - 20	100	11.37	620	70.53
21 - 30	57	6.49	677	77.02
31 - 50	46	5.23	723	82.25
51 - 80	50	5.69	773	87.94
81 - 110	19	2.16	792	90.10
111 - 160	23	2.62	815	92.72
161 - 210	10	1.14	825	93.86
211 - 300	11	1.25	836	95.11
301 - 400	11	1.25	847	96.36
401 - 600	14	1.59	861	97.95
601 - 1000	10	1.14	871	99.09
1001 - 2000	5	0.57	876	99.6
2001 – 5000	0	0.00	876	99.6
5001 - 10000	3	0.34	879	100.00

The number of people the respondents were responsible for, ranged from 0 to 10 000, with a mean of 81.4 and a standard deviation of 512.50. For the range between 1 and 5, the highest frequency of respondents were reported (n = 433) (49.26% of the sample).

The number of people reporting directly to the respondent for the 6 - 10 category in Table 3.13 is given as 179, while the number of subordinates the respondent is responsible for, again for the 6 – 10 category, is given as 87. This

may seem contradictory. However the explanation lies in the way work is structured in this organisation. Many task and project teams are used continuously. It is therefore not uncommon for a leader to have more people reporting directly to him/her, but to have fewer subordinates he/she is responsible for.

The functional area within which the respondent is active is shown in Table 3.16.

Table 3.16 Respondent's current functional area

Functional area	Frequency	Percentage	Cumulative Frequency	Cumulative Percent
General Management	40	4.55	40	4.55
Human Resources	41	4.66	81	9.22
Production	104	11.83	185	21.05
Financial and Commercial	111	12.63	296	33.67
Marketing	83	9.44	379	43.12
Corporate Services	41	4.66	420	47.78
Engineering, Design or Project Management	210	23.89	630	71.67
Information Technology	41	4.66	671	76.34
Maintenance Services	82	9.33	753	85.67
Research and Development	69	7.85	822	93.52
Other	53	6.03	875	99.54
Unknown	4	0.46	879	100.00
Total	879	100.00		

The largest single groups of respondents are reported to be in Engineering, Design or Project Management (n = 210) and Financial and Commercial (n = 111) positions. These functions made up 23.89% and 12.63% respectively of the total sample.

3.4. Measuring Instruments

3.4.1. Three-dimensional CPE leadership behaviour scale

The 36-item CPE scale of Ekvall (1991) was used in this study. Ekvall and Arvonen (1991) reported the Cronbach Alphas of the three behaviour dimension structures as follows:

Factor 1: Change-centred behaviour, 0.94

Factor 2: Employee-centred behaviour, 0.93

Factor 3: Production-centred behaviour, 0.93.

Thirty six items describe the manager's behaviour. Each dimension is measured with 12 items. The answer is registered on a four-point Likert-type scale, ranging between 1 and 4, indicating how often the behaviour occurs e.g., 'not at all' to 'very often'. The instruction reads, "Give an objective description of your immediate superior (the person to whom you directly report), using the statements found in the questionnaire".

3.4.2. Visioning ability scale

The visioning ability scale (Thoms & Blasko, 1999) consisting of 12 items describing one factor was used in this study. The visioning ability scale was designed to measure the ability of an individual to create a positive and vivid vision of an organisation's future. Thoms and Blasko (1999) obtained Cronbach Alpha's of 0.87, 0.86, and 0.86, respectively on three different samples.

The measure of visioning ability is a self-rating scale (Thoms & Blasko, 1999). The scale's directions ask subjects to create a positive image in their minds of the organisation to which they belong, as it would appear six months in the future. The subjects are asked to rate their agreement with 12 statements that

relates to the image they created. A 5-point Likert-type scale anchored between strongly disagree (1) to strongly agree (5) is used (Thoms & Blasko, 1999).

3.4.3. OCB scale

The five-factor, 34 item OCB scale of Van Dyne, Graham and Dienesch (1994) was used in this study. A summary of the important psychometric variables is given in Table 3.17.

Table 3.17 Summary factor statistics for the OCB scale

Factor	Number of Items	Eigenvalue	Percentage of Variance Explained	Cronbach's Alpha
1 - Loyalty	7	8.77	16.2	.79
2 - Obedience	10	4.25	7.9	.83
3 – Social participation	5	2.70	5.0	.68
4 – Advocacy participation	7	2.15	4.0	.84
5 – Functional participation	5	1.64	3.0	.75

Note: From "Organisational citizenship behaviour: construct redefinition, measurement, and validation" by L. Van Dyne, W. S Graham & R. M. Dienesch, 1994, Academy of Management Journal, 37, (4), p 765.

Factor 1 contains 7 ***'loyalty'*** items, representing allegiance to an organisation and promotion of its interests.

Factor 2 contains 10 ***'obedience'*** items, representing respect for the rules and policies of an organisation and willingness to expend appropriate effort on its behalf.

Factors 3, 4, and 5 all reflect ***participation***, though in three different forms. Factor 3 – '***social participation***' - includes examples of behaviour such as attending meetings, engaging in positive communications with others, and involvement in other affiliative group activities. These items describe participation in the form of interpersonal and social contact (Van Dyne et al., 1994).

Van Dyne et al. (1994) labelled factor 4 ***'advocacy participation'***. The 7 items of factor 4 describe innovation, maintaining high standards, challenging others, and making suggestions for change-behaviours targeted at other members of an organisation and reflecting a willingness to be controversial.

Factor 5 Van Dyne et al. (1994) labelled ***'functional participation.'*** Each of the 5 items describes a form of participatory contribution in which individuals focus on themselves rather than others in their organisations but yet contribute to organisational effectiveness (Van Dyne et al., 1994). These personally focused behaviours include participation through performing additional work activities, self-development, and volunteering for special assignments.

3.4.4. Emotional intelligence scale

The scale used to measure leaders' emotional intelligence was developed by Rahim and Minors (personal communication, April 2001). Statistical and psychometric properties of this scale were not available at the time of writing. The authors of the instrument gave assurance that the scale is valid and reliable (Rahim & Minors, personal communication, April 2001).

The scale consists of five dimensions and forty items. The five dimensions are as follows:

1. Self-awareness (Items 1-8)
2. Self-regulation (Items 9-16)

3. Self-motivation (Items 17-24)
4. Empathy (Items 25-32)
5. Social skills (Items 33-40)

3.5. Procedures for Data Gathering

3.5.1. Sampling

The study sample was drawn from the top five supervisory and managerial layers in the organisation described above. The Group Human Resources department of the organisation provided an alphabetical list of the names, position levels and companies within which the people are working. In total there were 2155 people in the top hierarchical levels of this group of companies. Another research study occurred simultaneously with this study in this organisation. A random sample from the same 2155 people was drawn for the other study. The researcher in that study drew each third name from the alphabetical list of names to make up his study sample. This author took the remaining 1473 people as a study sample. It was decided not to include any participants from the other sample in this study to prevent response set, boredom, and resentment in participants. A sample of this magnitude was specifically chosen in order to make it possible to divide the total sample into smaller units.

3.5.2. Data Gathering

A questionnaire as posted to respondents through the internal mail of the organisation, consisting of an English cover letter (see Appendix A), and the four psychometric scales as described in 3.4. The questionnaire also requested biographical information of both the respondent and his/her leader (see Appendix B). A pre-addressed envelope was included for the return of the questionnaire. It was decided a-priori that a second reminder letter, pre-addressed envelope and a

copy of the same questionnaire would be send to the entire sample after two weeks, regardless of the response rate after two weeks. This was done to improve the response rate. A copy of the second reminder letter is included in Appendix C. Another three weeks were allowed for responses to be received after the second reminder was sent out. The participants completed the questionnaire anonymously and took part voluntarily. Participants could also request feedback of the research results (see Appendix B).

In total, 879 of these questionnaires were returned, representing a response rate of 61.25%.

The author and the study leaders planned and directed the analysis and the Research Support department of the University of Pretoria carried out the statistical analysis.

3.6. Procedures for Data Analysis

The distribution of the responses to the different measuring instruments were inspected by means of Proc Frequency and Proc Univariate in SAS and it seemed as if the distributions tend to deviate from normality. A conservative approach to the data analysis was therefore followed, that is, non-parametric statistics were used where appropriate. It should however be remembered that the multivariate parametric methods are seen as relatively robust against non-normality of distributions (Kerlinger & Lee, 2000).. For this reason it was regarded as safe to use parametric multi-variable approaches where appropriate

3.6.1. Research question 1

In order to analyse the data to answer research question 1, the structure and internal reliability of the three-dimensional leadership behaviour instrument was revalidated by means of Exploratory and Confirmatory Factor Analysis.

Exploratory Factor Analysis is used when one has obtained measures on a number of variables, and wants to identify the number and nature of the underlying factors. Exploratory Factor Analysis is therefore used to determine the underlying factor structure of a set of data or a construct.

The following steps were executed during the Exploratory Factor Analysis for the CPE construct. Eigenvalues > 1.00 were identified. "clear" breaks between the eigenvalues > 1.00 were identified by means of a Scree test. These identified breaks were taken as indications of the number of possible factors. A Principal Factor Analysis Direct with Direct Quartimin rotation was done according to the number of determined factors. For example, if the Scree test identifies that potentially three, four and five factors are present, then a Principal Factor Analysis is done on all the items specifying three, four and five factor solutions. The results of the Principal Factor Analysis is usually evaluated by taking the following into account: (a) items are identified which do not load ≥ 0.25 on any factor in any solution, as well as (b) those items loading ≥ 0.25 on more than one factor in any of the solutions. These identified items are left out of the following round of Principal Factor Analysis again carried out for the three, four and five factor solutions. With the results of this subsequent round of Principal Factor Analysis, the same decision rules are followed as in the previous round. Should an item not load ≥ 0.25 on any factor in any solution or load ≥ 0.25 on more than one factor in any solution, these factors are removed from further analysis. The process is repeated until no "problematic" items remain on any factor according to the described evaluative procedure.

These conventional rules were not followed in all the cases. This was due to the necessity to align the current approaches to those used by the authors of the original instruments. This is discussed further in 4.1.

For the visioning ability, EI and OCB scales, the structures were identified and validated by means of Exploratory Factor Analysis. The same decision rules as above were followed except that Confirmatory Factor analysis was not carried out on them. These analyses lead to a revalidation of the scales on the responses from this study sample.

Confirmatory Factor Analysis was subsequently applied to the three-dimensional leadership behaviour structure to determine the fit between the data and the factor structure obtained through Exploratory Factor Analysis. Once the underlying structure of a set of data has been obtained, Confirmatory Factor Analysis is used to determine how well the obtained structure fits the data.

Following this analysis, the structural fit indices of the Confirmatory Factor Analysis for this study is compared to the structural fit indexes of Confirmatory Factor Analyses done on the structures obtained by the founding authors of the CPE scale (Ekvall & Arvonen, 1991, 1994). In the latter cases the item loadings obtained by Ekvall and Arvonen (1991, 1994) are used on the responses obtained in the present study. If there are close comparisons between the Confirmatory Factor Analysis fit indices, one can deduce that the structure obtained for this study closely resembles those obtained in previous studies.

3.6.1.1. Proposition 1.1

In order to analyses the data to test proposition 1.1, whether the CPE scale of Ekvall (1991) is portable to a South African cultural setting, the results of the above Confirmatory Factor Analysis fit indices are interpreted. In addition,

coefficients of congruence were calculated. This method was developed to relate factors when only factor loadings are available (Gorsuch, 1983, p285). The formula is as follows:

$$C_{12} = \sum p_{v1}\, p_{v2} / (\sum p_{v1}^{2})^{½} (\sum p_{v2}^{2})^{½}$$

Where C_{12} is the coefficient of congruence between factor 1 (e.g. the employee-orientation factor of this study) and factor 2 (e.g. the employee-orientation factor of the Ekvall and Arvonen (1991) study). p_{v1} are the factor loadings for the first factor in the fist study, and p_{v2} are the factor loadings for the same factor in the second study. Coefficients of congruence are calculated between the three-factor leadership behaviour structure for this study and those of Ekvall and Arvonen (1991, 1994) and also between their structures. If high coefficients of congruence are obtained one can deduct that the structures are similar.

3.6.1.2. Proposition 1.2

In order to analyse the data to test proposition 1.2, cluster analysis using the SAS Fastclus procedure was carried out on the data obtained from the CPE measurements. This method is used to replicate the work Ekvall and Arvonen (1994) and Arvonen (1995) did to identify leadership behaviour clusters. Cluster analysis is a multivariate technique which primary purpose is to group respondents based on the characteristics they posses. It classifies objects so that each object is very similar to others in the cluster with respect to some predetermined selection criterion. In this study, the classifying criteria are similar strengths on each of the three CPE dimensions. The selection criteria are based on the mean values of

each cluster in the three leadership behaviour dimensions and related to the means and standard deviations of the total sample in the following way:

- More than 1 SD above the mean
- Between 1/2 and 1 SD above the mean
- Up to 1/2 SD above or below the mean
- Between 1/2 and 1 SD below the mean
- More than 1 SD below the mean

3.6.2. Research question 2

To analyse the data in order to answer research question 2, the Spearman rho correlation analysis technique and Step-wise Multiple Regression analyses were applied to analyse the relationships between the various dimensions of the constructs as depicted in the model of relationships between constructs studied (figure 2.1). The objective was to determine which of the behavioural dimensions in a construct have strong relations with behaviours in other constructs. Where strong positive correlation coefficients are identified between different construct dimensions, there would be strong predictive power between these behaviours.

3.6.3. Research question 3

Finally, to analyse the data in order to answer research question 3, N-Par One-way Analysis-of-variance was applied and the differences within specific demographic groupings were determined using the Kruskal Wallis test.

The results of the statistical analysis of the different instruments used for measuring the variables included in the study are presented in the following chapter.