CHAPTER 4 THE RESEARCH DESIGN

4.1 INTRODUCTION

To follow-up on the literature study (chapters 2 and 3) an empirical study was undertaken to determine the following:

(a) The typical dimensions of workforce diversity and the resulting diversity-related structure or organization form that it leads to.

(b) Specific factors of workforce diversity (contextual).

(c) A statistical model of workforce diversity that can be used to make causal inferences about the interrelationships between the factors of workforce diversity. The dimensions of workforce diversity will be determined with the use of factor and item analysis of the sections B, C, D, E, F and G.

Theoretically each section represents a dimension. The diversity related structure or organization form will be determined with these of statistical conventions that are applicable to the diversity opinion questionnaire that will be used.

The specific factors of workforce diversity cannot be simply extracted from the relevant sections or dimensions that were determined. Traditional factor analysis can only indicate which factors actually measure the relevant dimension and which belong together. This research require statistical methods that can confirm or dispute the roles of the dimensions and factors in the casual pattern that is suggested by the revised interactional model of cultural diversity (IMCD) (see figure 3.3:150).

In figure 3.3 the revised IMCD is referred to as a change model of workforce diversity and consists of two parts. The first part represents second-order change factors that are dependent variables of the independent variables section F (how much is diversity valued), section C (extent of organizational change) and section D (status quo of the management of diversity). The second part represents first-order change factors that are variables of the independent variables section G (how is diversity managed) and section B (extent of diversity-related problems). Section D

also represents the diversity climate caused by both the second and first order change processes. Finally, the sections or dimensions act in the causal sequence of section F, section C, section D, section G to section B as dependent variables of the independent variable known as the diversity-related organization form. The organization form is reflected by the diversity climate. The sections or dimensions as dependent variables are referred to as latent variables in their relationship to the independent variable (section D – reflecting the organization form).

Thus, to determine the factors of workforce diversity, one has to test the causal pattern in figure 3.3 statistically. Any statistical method to be used must have the capacity to measure the extent to which the statistically determined causal associations fit the theoretical causal associations in figure 3.3. It is however, very difficult to prove equivalence between a theoretical model and a statistical model.
The finding of a "statistically significant" association in a particular study (no matter how well done) does not establish a causal relationship. Kleinbaum et al (1998:36) states: "To evaluate claims of causality, the investigator must consider criteria that are external to the specific characteristics and results of any single study." The research strategy outlines a most appropriate statistical method.

4.2 PURPOSE OF THE EMPIRICAL STUDY

This empirical study has the following objectives:

(i) The study of prior research in South Africa to guide the formalisation of the revised Cox-paradigm of workforce diversity as a change-model for managing workforce diversity, as well as empirical research. This is achieved with South African research perspectives that was discussed in section 3.2.4.

(a) Empirical *identification* and *determination* of the following:

The typical diversity-related organization form. Dimensions of workforce diversity and associations between dimensions.

(b) Specific factors of workforce diversity (contextual). A theoretical model of workforce diversity.

(c) More specific *determination* of the dimensions and contextual factors of workforce diversity in South Africa, based on the theoretical model.

(ii) To construct a model of workforce diversity that can be used in a cultural specific context to determine the dynamics of workforce diversity in South Africa in any practical situation. Exploration of relevant literature (chapter 3) indicated that a valuing diversity paradigm was required for this purpose.

(iii) An interim scale for the determination of variables of workforce diversity in South Africa, based on the assumption that organizations are in a period of transition from monoculturalism to multiculturalism.

4.3 THE RESEARCH STRATEGY

The research strategy chosen is a survey. The reason for choosing the survey method is because managers across South Africa need to provide responses to specific questions on dimensions of workforce diversity. The survey method is the most versatile method to use in analysis of responses that are required to determine the factors of workforce diversity embedded in dimensions.

The design includes (i) a descriptive study to determine the sample statistics and (ii) a causal study to determine the factors that lead to the diversity-related organization structure or form.

The sample statistics will be used according to the conventions of the survey developed by Gardenswartz and Rowe (1993) to determine the relevant dimensions of workforce diversity. These dimensions must be viewed in the context of the

discussion in sub-section 3.2.3.2 (p. 134-136). It will also be used to determine the diversity-related organization structure or form, using the same conventions.

The determination of culture-specific relevant factors of workforce diversity is only meaningful and useful if a statistical pattern of causality can be established amongst the different dimensions. It is then also required that the "fit" of the dimensions is tested in the change-model of workforce diversity that was developed in chapters 2 and 3 (refer to figure 3.3:150).

A unique statistical method integrates the theory (chapters 2 and 3) with the results of the empirical study. Path analysis or structural equations modelling (Bollen, 1989), is a collection of procedures that enables one to make casual inferences. Structural equations modeling are a procedure for covariance analysis of the "structure" of statistical associations.

Covariance is a joint variation between pairs of variables. Covariance analysis of the diversity-related "structure" or "organization form" should reveal likely causal relationships between dimensions through the covariance of dimensions and factors.

The results from the analysis of covariance are then used to construct a casual "path diagramme". For causal relationships to be proved between independent and dependent variables there must be covariance between them. In this study, the dimensions (sets B,C,D,F,G) are the independent variables and the factors (v12 – v114) are the dependent variables.

4.3.1 The measurement instrument

The measurement instrument is a diversity opinion questionnaire developed by Gardenswartz and Rowe (1993). It has already been tested in South Africa prior to the commencement of this study (refer to the pilot-study, p. 138), and is thus appropriate for this study.

4.3.1.1 The Diversity Opinion Survey

The Diversity Opinion Survey is attached as appendix 1.

*A*dapting existing questionnaires of Gardenswartz and Rowe who developed a draft copy of the questionnaire. The draft was circulated among a peer group of five Australian human resource and research methodology specialists to evaluate the format, language and concepts. The same exercise was done in South Africa. For example, the demographic characteristics of the respondents were changed to meet South African conventions.

A definition of diversity suitable for the South African context (that is congruent to the definition of Griggs and Louw) was added to the introduction and headings were changed.

Questionnaire design

The diversity survey includes the *aim* of the survey, *definitions* of concepts, and *demographic* data (represented by section A). It further includes *perceptions* (represented by sections B to G) on: extent of diversity related problems; extent of organizational change; the status quo at your company regarding diversity management; potential organizational barriers to diversity; how much is diversity valued in your company; and how is diversity managed in your company.

Each section (B to G) represents the relevant dimensions of workforce diversity.

(i) In the section *"Symptoms of diversity related problems"* the respondents are requested to indicate whether a specific symptom is applicable or present in their working environment.

Scoring

Companies choosing 15-37 has a negative (monocultural) diversity climate.

Companies choosing 38-52 has a neutral (non-discriminatory) diversity climate,

Companies choosing 53-75 has a positive (multicultural) diversity climate.

(ii) In the section *"Extent of organizational change"*, the scores of respondents measure how open the organization is to change.

Scoring

A score of 50 to 70 – the culture of the organization is open to change and the organization reacts and adapts quickly;

A score of 40 to 49 – the organization understands that change is a reality, is open to change, but has not yet fully embraced it, nor is it harnessing change to make it work for the organization;

A score of 30 to 39 – the organization understands the value of change but needs to be more open to its reality and quicker to the implementation process;

A score of 14 to 29 – if the organization does not get better at adapting, its longevity will be affected negatively.

(iii) In the section *"Status quo in the company regarding diversity management"*, the diversity-related organization structure or form is determined. Jackson and Holvino (in Gardenswartz and Rowe, 1993:274) argue that organizations experience three stages in the evolution towards a diversity sensitive environment:

The monocultural stage: The organization acts as though all the employees are the same. There is an expectation to conform to a standard (for example a white male model) and success is achieved by following the expectations of this model. *Others* are expected to assimilate and adopt the dominant style of the organization,

The non-discriminatory stage: Usually as a result of government regulations or threats of employees' grievances, organizations begin to adhere to affirmative action requirements and equal employment opportunity regulations. Much attention is given to meeting quotas in hiring and

promotions as well as removing roadblocks that inhibit equal advancement opportunities.

For employees of non-mainstream groups, there is a push-pull between the need to assimilate and a desire for the organization to accommodate their need. Compromise is usually the way to deal with conflict.

The multicultural stage: There is recognition that there are clear differences among people, culture, background, preferences and values. Assimilation is not seen as the way to deal with conflict, but rather the creation of new norms which allow scope for employees to do their own thing. Policies and procedures are flexible to be applicable to all and no one is exploited.

Scoring

All the "1" options indicate a monocultural diversity climate (mean = 11-16).

All the "2" options indicate a non-discriminatory diversity climate (mean = 17-26).

All the "3" options indicate a multicultural diversity climate (mean = 27-33).

(iv) In the section *"How much is diversity valued in your company"* a respondent's attitudinal predisposition towards or against diversity is assessed with 20 questions to obtain an indication to what extent diversity is either being valued or resisted. Responses are scored by adding the even and uneven items of their response. The even numbered items score the multicultural view that inter alia values diversity and the uneven numbered items score a monocultural view which inter alia resist diversity The bigger the score the greater the acceptance or resistance of diversity factors with the maximum score being 50. The respondents' scores are integrated and the uneven items are subtracted from the even items [as per prescribed procedure]

(v) Respondents assess *"How is diversity managed in your environment"* by analysing three sub- components that add up to an aggregate score. Respondents are asked to rate statements on their individual attitudes and

beliefs; the organization's values and norms; and management practices and policies.

Scoring

The aggregate score should indicate the prevalent mode in which diversity is managed. For example, if the organization values and norms are prevalent, it is likely that individual differences may not be valued (may be resisted), resulting possibly in the negative effects as portrayed in the diversity climate (refer to figure 3.3:166). The opposite is also true.

4.3.1.2 The measurement scale

The population parameters are effects or dimensions of diversity that impact on organizational effectiveness. The scale used is an interval scale. The responses to the measurement variables in the questionnaire are opinions that reflect the perceptions that manager has on the management of workforce diversity. The measurement variables are the factors of workforce diversity relevant to each section or dimension.

Five point like scales are used for most sections except where the scoring key indicates the choice of a specific format. The form of statistical analysis most suited to the interval scale includes the following:

The arithmetic mean, as the measure of central tendency, and the standard deviation as a measure of dispersion of opinions. The statistical procedures of choice, are analysis of variances, parametric t-tests and F-tests, and product moment correlation. These are the standard procedures used testing significance among more than three samples and the data is measured on an interval ratio scale. In this study significance is tested within and between a criterion and reference group, as embedded in two demographic categories and five organizational diversity categories.

4.3.2 The target population

The relevant population consists of all South African distance learning MBA students enrolled at South African business schools.

The researcher chose this population for the following reasons:

(i) The members of the population are managers with between three and twenty years experience.

(ii) They are physically distributed in organizations across all the provinces of South Africa, which satisfies the requirement of generalizability of the results of the study.

(iii) The data can be collected within a fixed time-period and venue.

4.3.2.1 The sample

The sample is a *convenience sample*, as it is a non-probability sample.

The *sampling frame* consists the list of units from which the sample will be drawn. These units are geographically dispersed throughout the nine provinces of South Africa and include: (i) The Northern region of South Africa, to make up 67 percent of the sample frame, based on the representatives of possible cases, (ii) The Southern region of South Africa, to make up 33 percent of the sample frame, also based on the representatives of cases. The Northern region consists of Gauteng, Northern Province, Mpumalanga, Free State Province and North West Province. The Southern region consists of Kwazulu Natal, the Western, Eastern and Northern Cape.

The *sample units* consist of units from two non-overlapping collections of cases from the population, being institutions, namely the UNISA School of Business Leadership (SBL), and the Post-graduate School of Management of the University of Pretoria (PSM).

The sample units have been chosen to consist of cases that are representative of the composition of the sampling frame, which will serve as a group that confers to the sample the designated specifications. This group will be referred to as the *criterion group*, selected from the SBL. Sampling units will also be selected from cases at the

PSM that confers only the designated specifications of management criteria. This group serves as a "control" group, from which results can be tested for generalizability to the constituency of the region that has the most cases. This group will be referred to as the reference group.

The Sampling distribution: This is the distribution of values of some statistics calculated for each possible distinguishable sample that could be drawn from a population. The *sample means* to estimate the populations mean the *sample standard deviation* to estimate the population standard deviation.

4.3.2 2 Sample size

The approach followed for determining the sample size was based on perceptions of what the population variance of the mean of the non-demographic sections of the survey questionnaire should be. The coefficient of variance for a similar accepted study in Australia ranged from .10 to .20 (Erwee and Innes, 1997). Pre-testing of data collection techniques with a sample of 159 from the criterion group, showed variance estimates of 0.14 – 0.24. It was then decided to obtain a sample that was approximately 30-40% of the sample frame. 500 cases from the SBL and 300 cases from the University of Pretoria.

The sampling frame was estimated to be approximately 1900 cases. The actual resulting sample size was 614 cases, consisting of 245 criterion cases, and 369 reference cases.

Foreign students have been deleted from the data set as contextual factors in other societies may influence the results.

Demographic data on gender, age, race, management level, private or public sector, industry sectors, type of occupation and size of company will be gathered.

4.3.3 Data collection.

The researcher gathered data from the following sources:

(i) The March 1998 study school for first-year MBA students at the SBL

(ii) The April 1998 study schools for second, third and fourth year MBA students at the SBL.

(iii) All 1998 part-time MBA classes at the PSM. Data was collected by the (then) promoter of the author ([1]Professor Ronel Erwee of the Human Resources department of the faculty of Economic and Management Sciences of the University of Pretoria).

4.3.3.1 Pretesting of data-collection techniques

The choice of the target population was in part based on the reduction or elimination of possible error sources that can result in measurement differences that are not attributable to the respondent.

Demographic data on gender, age, race, management level, private or public sector, industry sectors, type of occupation and size of company would be gathered, as outlined in 4.3.1(par 3).

The instrument was assessed as appropriate. Comments were invited on ambiguity of questions or statements, physical defects of the instrument that could compromise results, the relevance and importance of the survey sections and the nature of its variables. All respondents could not fault the sections on diversity, but a significant number felt that they were not happy with sub-section A9 (specification of racial categories), and sub-section A10 (specification of hierarchical level in organization). This incident introduced the risk that opinion differences will come from relatively stable characteristics of the respondent that can affect the scores. Sub-sections A9 and A10 was subsequently omitted from the instrument.

4.3.3.2 Description of the sample population

In the empirical research, the population is studied in the context of

[1] Professor Erwee was the promoter for this research, which was registered during July 1997, when Professor Erwee served as a visiting Associate Professor (from the UP), to the Human Resources department of the business school of the University of South Queensland in Australia. She relinquished the appointment during September 1998, due to UP regulations, as she accepted an appointment at USQ as full professor.

the diversity-related external and internal environment of the organization. The relevant category of the external environment is the demographic, and of the internal environment is the organizational. Below are the frequencies of the demographic and organizational categories, expressed in percentages of the total group. N = 614; Criterion group: Reference group = 41:59

Demographic diversity

Gender and age are the only demographic variables that were studied as elements of section A of the questionnaire. Race was left out, due to discomfort and resistance with its inclusion encountered during pretest of the survey instrument (refer to data collection: 171-172). The racial composition reported below, is the composition of the attendees at the various MBA study schools.

Gender:	Female: 23%	Male: 77%		
Age:	20s: 29%	30s: 46%	40s: 25%	
Race:	White: 60%	Black: 37%	Asian: 8%	Coloured: 5%

Organizational diversity

Tenure (length of current employment):

Tenure: 50% Yuppies: 50%.

(> 10yrs) (< 10yrs)

Economic sector: Private: 64% Public: 15% Other: 21%

Most of the respondents were from the private sector in the criterion group, whilst the reference group consisted of many public-sector respondents.

*Nature of business (*industry that describes employer's main operations).

Corporate commercial: 55% Parastatal: 45%

Most public-sector respondents identified with the corporate commercial sector.

Career type: Human Resource: 39% Quantitative function: 61%

Size of organization: Corporate: 51% Small and med. enterprize: 49%

Based on approx. no. employees: (> 500) (< 500).

4.3.4 Statistical methods for data analysis

Following is a discussion of the statistical methods to be used in the relevant data analysis for preliminary statistical procedures, as well as statistical procedures for the determination of dimensions, organization form and factors.

4.3.4.1 Determination of the diversity-related organization form of organizations in South Africa

Editing the data from initial computer runs to remove errors did preliminary statistical tests. This included frequency analysis followed by factor analysis and item analysis.

The full procedure is outlined in appendix 3(a). Sample statistics could be produced for the determination of the arithmetic mean, the standard deviation, the standard error of the mean, and the coefficient of variance of the mean.

The sample statistics were used to determine the dimensions and diversity-related organization form.The diversity-related organization form is determined with the use of the conventions of the diversity opinion survey that govern its determination. The

organization form is indicated mainly by section D – Status quo regarding the management of diversity in the organization.

The conventions include a score chart of the means determined for the variables of section D, and the mean-values and variances that indicate each organization form. It is further also indicated by sections F1 (multicultural statements on the valuing of diversity), and F2 (mono-cultural statements on the valuing of diversity), and section B (extent of diversity-related problems).

The score-conventions are specified in the section on the questioaire design (4.3.1.1:159-162).

Following below are the hypotheses that are stated on the above sections. The hypotheses about the sample means of sections D, B, F, C and G are based on the findings of the literature study [(2.7.4.1:107-115) and (3.2.4.1:137-142)].

Hypotheses

The F-test is chosen for use in the analysis of variance, because we have k independent samples, accept the assumptions of analysis of variance, and have interval data. C = Criterion group,

R = Reference group.

The null hypotheses are for criterion and reference groups, with respect to VV7, VV8, VV3, VV4, VV5, VV6, VV7, V8, VV10.

The null-hypothesis is tested on the basis of the score conventions for sections in 4.3.1.2

Hypothesis 1

Null hypothesis. $HO: UC = UR = 17$

$HA: UC \neq UR > 17$

The null hypothesis is that for the section status quo at your company re diversity management, the mean is less than 17, i.e., that the results indicate a monocultural diversity climate.

Hypothesis 2

Null hypothesis. HO : UC = UR = 37

HA : UC ≠ UR < 37

The null hypothesis is that for the section "Extent of diversity related problems", the mean is less than 37, i.e., it has in the context of this section, a negative diversity climate.

Hypothesis 3

Null hypothesis. HO : UC = UR = 39

HA : UC ≠ UR < 39

The null hypothesis is that for the section "Extent of organizational change", the mean is less than 39, i.e., that change should be implemented quicker.

Hypothesis 4

Diversity is not valued in South African organizations.

Scoring

Monocultural items (V62;V64) will have a positive correlation with monocultural items on D options "1", and with low scores on section C and options "1" and "2" on section B.

Multicultural items (V63;V65) will have a positive correlation with multicultural items D3, and with high scores on section C and options "4" and "5" on B.

Hypothesis 5

In the section "How is diversity managed in your organization?" aggregate scores will show that organizations emphasize organization values, norms (OVN) and management practices and policies (MPP), and that they de-emphasize individual attitudes and beliefs (IAB).

Multivariate analysis of variance is used to determine if significant differences exist within the criterion and reference groups on the means of the sections on diversity. It employs sums of squares and cross-products (SSCP) matrices. The variance between

groups is determined by partitioning the total SSCP matrix and testing for significance.

Multivariate analysis of variance is used to determine if significant differences exist between groups in biographical and organizational categories of diversity.

4.3.4.2 Determination of the factors of workforce diversity in South Africa

The factors of workforce diversity are determined as follows:

A statistical analysis programme called structural equations modeling (SEM) or path analysis is used. Essentially, SEM consist of a collection of methods that assesses causality indirectly, by eliminating competing causal explanations via data analysis and finally arriving at an acceptable causal model that is not obviously contradicted by the data at hand. The methods cannot be used to establish a particular causal theory directly, but arrive at a final causal model through a process of elimination. Part of this elimination process involves the comparison of various estimated correlation ("path") coefficients by means of data analysis.

The procedure followed is attached as Appendix 3(b).

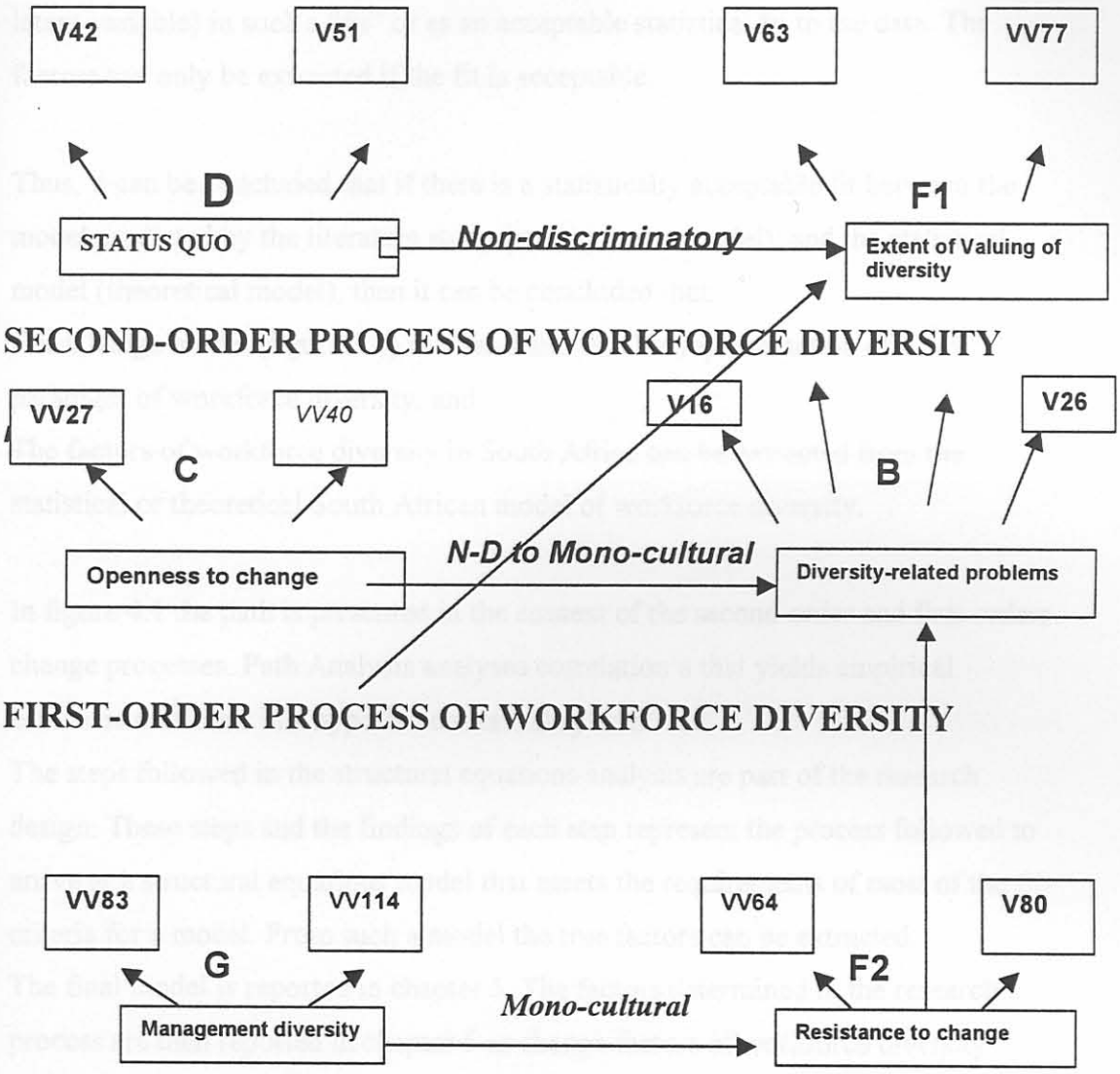
The model in figure 3.3 (p 150) is used to predict the causal relationships among the sections or latent variables. This is done by outlining a "path" of causality referred to as a path diagramme.

The data obtained from the preliminary analysis (Appendix) is processed by a computer programme specifically developed for path analysis of interrelationships between latent variables. It determines the covariance between the dimensions and factors. It is called the SAS System's CALIS procedure (SAS Institute Inc., 1989), and the models tested were covariance structure models with multiple indicators for all latent constructs.

The analysis consisted of a two-step procedure based in part on an approach recommended by Anderson and Gerbing (1988). In the first step, a path diagramme was drawn on the basis of the causal patterns evident in figure 3.3. (p 150).

Confirmatory factor analysis was used to develop a measurement model that demonstrated an *acceptable* fit to the data is possible. In step two, the measurement model was modified so that it came to represent the theoretical (causal) model of interest. This theoretical model was then further revised and tested to find a theoretically meaningful and statistically acceptable model.

Figure 4.1 **Predicted Path diagramme of a theoretical model of workforce diversity in South Africa.**



The purpose of a statistical model of workforce diversity in South Africa, is to firstly compare the congruence or "fit" of such a model to a predicted model derived from figure 3.3, which depicts the model of workforce diversity that was developed on the basis of the literature study covered by chapters 2 and 3; The model predicts that (i) second-order change will be indicated by dimensions of openness to change and the valuing of diversity. (ii) First-order change processes will be indicated by how

diversity is managed and diversity-related problems. (iii) The status quo of the management of diversity will essentially reflect the diversity climate. Secondly, to identify the factors of workforce diversity manifested (as dependent on a specific latent variable) in such a "fit" or as an acceptable statistical fit to the data. The factors can only be extracted if the fit is acceptable.

Thus, it can be concluded that if there is a statistically acceptable fit between the model predicted by the literature study (measurement model), and the statistical model (theoretical model), then it can be concluded that:
The Change model (figure 3.3) is a valid and reliable representation of a new paradigm of workforce diversity, and
The factors of workforce diversity in South Africa can be extracted from the statistical or theoretical South African model of workforce diversity.

In figure 4.1 the path is presented in the context of the second order and first orders change processes. Path Analysis analyses correlation's that yields empirical estimates of effects in a hypothetical causal system.
The steps followed in the structural equations analysis are part of the research design. These steps and the findings of each step represent the process followed to arrive at a structural equations model that meets the requirements of most of the fit-criteria for a model. From such a model the true factors can be extracted.
The final model is reported in chapter 5. The factors determined in the research process are then reported in chapter 5 as change factors of workforce diversity.

Step 1

An SAS Programme (PROC CALIS) was prepared to *estimate the initial theoretical model* as follows:

(i) Patterns and initial values are determined by determining the number of endogenous and exogenous variables, manifest and latent. The programme uses the method of maximum likelihood estimation for:

(a) The maximum likelihood (ML) function, and the estimated covariance matrix of estimators. This matrix has ML estimators appearing on the diagonal (endogenous variables) and estimated covariance's between pairs of estimators appearing off the diagramme (exogenous variables).

(ii) The initial variable equations are set and the variances of the exogenous variables determined.

(iii) The initial covariances of all factors are determined.

(iv) Covariance analysis to determine initial maximum likelihood's and predict.

A model matrix. Goodness of Fit indices are produced for the initial theoretical model.

The data of the results of (i) – (iv) are contained in a computer report of 213 pages and is available on request.

Assessment of theoretical models

Goodness of fit indices for the theoretical model are measures of how good the fit is between the data produced by the statistical estimation and the actual model derived form theory (figure 3.3:156). The model consists of a normal portion and a structural portion. The variables of the normal portion are referred to as exogenous variables. The goodness of fit indices for these variables are direct. The variables of the structural portion of the model are referred to as endogenous variables. The goodness of fit indices for these variables are relative.

When assessing a theoretical model in terms of the acceptability (idealness) of its fit to the measurement model, the following criteria have to be met.

The p value for the model chi-square test should be non-significant (should be greater than 0.05); the closer to 1.00, the better.

(b) A chi-square difference test should reveal no significant difference between the theoretical model and the measurement model (also others). The observed chi-square difference should be less than the critical value, meaning that there is no significant difference in the fit provided by the two models.

(c) The chi-square/df ratio should be less than 2.

(d) The comparative fit index (CFI) and the non-normed fit index (NNFI) should both exceed 0.9; the closer to 1.00, the better.

(e) The absolute value of the t-statistics for each factor loading and path coefficient should exceed 1.96, and the standard factor loading should be non-trivial in size (i.e., absolute values should exceed 0.05).

(f) The Root-squared values for the latent endogenous variables should be relatively large, compared to what typically is obtained in research with these variables.

(g) The distribution of normalized residuals should be symmetrical and centred on zero, and relatively few (or no) normalized residuals should exceed 2.0 in absolute value.

The combined models should demonstrate relatively high levels of parsimony and fit, as evidenced by the parsimony ratio (PR) and the parsimonious normed-fit index (PNFI). Parsimony is the measure of how carefully predictors of the organization form have been chosen. A few predictors will create a small ML model. A small ML model can have relatively high parsimony.

The structural portion of the model should demonstrate relatively high levels of parsimony and fit, as evidenced by the relative normed-fit index (RNFI), the relative parsimony ratio (RPR), and the relative parsimonious-fit index (RPFI).

Findings regarding the estimation of the initial theoretical model

Table 4.1 below presents the goodness of fit indices for the result of step 1 followed by a discussion of the combined and structural portions.

Table 4.1 Goodness of fit indices for the initial theoretical model (measurement model)

Fit Criterion	8.0694
Goodness of fit index (GFI)	0.7914
GFI adjusted for degrees of freedom (AGFI)	0.7776
Root mean square residual (RMR)	01244
Parsimonious GFI (Mulaik, 1989)	0.7649
CHI-SQUARE DF = 2073	4793-2070
NUL MODEL CHI-SQUARE DF = 2145	15818.8790
Probability of close fit	0.9983
ECVI ESTIMATE	8.9545
Bentler's comparative fit index	0.8011
Normal theory reweighted chi-square	5165-3635
Akaike's information criterion	647.2070
Bozdogan's (1987) CAIC	-10523.281
Schwartz's Bayesian criterion	-8450.2808
McDonald's (1989) centrality	0.1017
Bentler & Bonett's (1980) Non-normed index	0.7942
Bentler & Bonett's (1980) NFI	0.6970
James, Mulaik & Brett (1982) Parsimonious NFI	0.6736
Z-test of Wilson & Hilferty (1931)	31.1430
Bollen (1986) Non-Normed index RHOI	0.6865
Bollen (1988) Non-Normed index Delta 2	0.8021

The Combined model:

The comparative fit index = 0,8011; The NNFI = 0,7942; The goodness of fit index = 0,7914The parsimonious GFI = 0,7649The parsimonious norm-fit index = 0,6736

Structural portion of the model

The relative non-normed fit index = 0,6865. In the light of the PNFI it would be seen as though problems with fit may be in the structural part of the model.

Probability of dose fit = 0,9983.

Conclusions

The fit of the data resulting from the confirmatory factor analysis (initial statistical theoretical model) with the predicted theoretical model (fig 3.3:) is not ideal or close. (The probability of close fit = 0,9983). For the purpose of this research, the fit shall be deemed acceptable to good, if the probability to a close fit = 1,000, and the fit and parsimony of the structural part can be improved.

This model is therefore unacceptable. Anderson and Gerbing (1988) provide a decision-tree framework for a series of chi-square difference tests between pairs of these four models. The procedure results in the acceptance of a model that does not significantly differ from the measurement model, while at the same time is as parsimonious as possible. If none of the preceding models meets these criteria, the framework guides one through additional modifications (e.g. relaxing additional constraints) until an acceptable model is found. The authors point out that their approach shifts from being confirmatory to being increasingly exploratory as more modifications are made.

Following is a framework advanced by Anderson and Gerbing for modifying the initial model.

A Decision-Tree Framework for Modifying the initial theoretical Model to produce a measurement model

As complex as the concept of model modification has been so far, it becomes even more complex when the model to be modified is a theoretical model. In many cases, this task can be made easier by following a structured approach to model modification described by Anderson and Gerbing (1988). Some basic concepts are reviewed.

Essentially, the procedure involves performing a series of chi-square difference tests for four casual models:

M_t, the initial theoretical model

M_m, the measurement model

M_c, a constrained model

M_u, an unconstrained model

Three of these models have already been discussed: M_t , or the initial theoretical model, Mc, the constrained model, and Mm, the measurement model.

Mc is a *constrained model.* Mc is a constrained version of Mt, in the sense that one or more of the parameters (e.g., casual paths) in Mt is fixed at zero in Mc. Theoretical considerations determine which parameters should be fixed at zero. The fourth model is Mu, an *unconstrained model.* Mu is an unconstrained version of Mt, in that one or more parameters in Mt are freed to be estimated in Mu. Kleinbaum (1998) warns against the dangers of data-driven model modification when doing path analysis with manifest and latent variable models. He makes 5 recommendations.

Make few modifications.

Make only changes that can be meaningfully interpreted.

Follow a parallel specification search procedure.

Compare alternative a priori models.

Carefully describe the limitations of the study.

The sample is just about adequate (*N = 608)*, and it has been established that data-driven modifications are particularly risky in small samples (MacCallum, Roznowski, & Necowitz, 1992).

Step 2

In this step a PRO CALIS programme was created to estimate the revised constrained model *The procedure is outlined in appendix 8*

Following in table 4.2 below are the results of the modification followed by a discussion on the combined and structural parts of the model

Table 4.2. Goodness of fit indices for the first modified initial theoretical model

Fit Function	6.6683
Goodness of fit index (GFI)	0.7968
GFI adjusted for degrees of freedom (AGFI)	0.7836
Root mean square residual (RMR)	0.0590
Parsimonious GFI (Mulaik, 1989)	0.7740
Chi-Square	3960.9560
Chi-Square DF	1662
Pr > Chi-Square	<.0001
Independence Model Chi-Square	14232
Independence Model Chi-Sqaure DF	1711
RMSEA Estimate	0.0483
RMSEA 90% Lower Confidence Limit	0.0463
RMSEA 90% Upper confidence Limit	0.0502
ECVI Estimate	7.0728
ECVI 90% Lower Confidence Limit	6.7581
ECVI 90% Upper Confidence Limit	7.4019
Probability of Close Fit	0.9308
Bentler's Comparative Fit index	0.8164
Normal Theory Reweighted LS Chi-Square	4467.3167
Akaike's Information Criterion	636.9560
Bozdogan's (1987) CAIC	-8318.8330
Schwarz's Bayesian Criterion	-6656.8330
McDonald's (1989) Centrality	0.1449
Bentler & Bonett's (1980) Non-normed Index	0.8110
Bentler & Bonett's (1980) NFI	0.7217
James, Mulaik, & Brett (1982) Parsimonious NFI	0.7010
Z-Test of Wilson & Hilferty (1931)	29.0470
Bollen (1986) Normed Index Rhol	0.7135
Bollen (1988) Non-normed Index Delta2	0.8171
Hoelter's (1983) Critical N	265

Combined portion

Fit criterion: Not met

Goodness of fit index: 0.7968; Comparative fit index: = 0.8164;Parsimonious GF1: = 0.7740; Parsimonious NF1: = 0.7217

Structural Portion

Normed Index RHOI 0.7135; Probability dose fit = 0.9308

There are improvements in the structural portion of the model as well as the required of parsimony & fit (PNF1). However, the fit criterion is not met, and the probability of a close fit worsened. Thus this model is not acceptable.

Second modification of the initial theoretical model

The procedure is outlined in appendix 8:338.

The findings on the modification is shown in table 4.3 and is followed by a discussion of the combined and structural parts of the model.

Table 4.3. Good of fit indices for second modification of the initial theoretical model

Fit Criterion	7.6458
Goodness of fit index (GFI)	0.7969
GFI adjusted for degrees of freedom (AGFI)	0.7823
Root mean square residual (RMR)	0.0571
Parsimonious GFI (Mulaik, 1989)	0.7661
CHI-SQUARE = 4541.6080 DF = 2062 PROB>CH 2**	0.0001
NUL MODEL CHI-SQUARE: DF = 2145	15818.8790
Probability of close fit	1.0000
ECVI ESTIMATE 8.2113 90%C.I. - 7.8768	8.5605
Bentler's comparative fit index	0.8187
Normal theory reweighted chi-square	5003.5541
Akaike's information criterion	417.5645
Bozdogan's (1987) CAIC	-10693.649
Schwatz's Bayesian criterion	-8631.6491
McDonald's (1989) centrality	0.1245
Bentler & Bonett's (1980) Non-normed index	0.8114
Bentler & Bonett's (1980) NFI	0.7129
James, Mulaik, & Brett (1982) Parsimonious NFI	0.6853
Z-test of Wilson & Hilferty (1931)	29.0135
Bollen (1986) Non-Normed index RHOI	0.7013
Bollen (1988) Non-Normed index Delta 2	0.8198
Hoelter's (1983) Critical N	285

The Combined model

Fit criterion = 7,6458; Goodness of fit index = 0,7969; Comparative fit index = 08187; Parsimonious CF1 = 0,7661; Parsimonious NF1 = 0,6853

Structural portion

Non-normed index RHO1B = 0,7013; Probability of close fit = 1,000

Conclusion

This model can be accepted on the grounds of the goodness of fit indices criteria and the probability of close fit that is = 1.000.This model can now serve as the measurement model, Mm.

4.3.5 Appropriateness of the research strategy in terms of the research project

A descriptive study concerns a univariate question or hypothesis about the size, form, distribution or existence of a variable. The research questions require implicitly (i) The determination of the existence of the dimensions (as identified in the second and first-order processes of workforce diversity) and dimension-variables (factors) of workforce diversity. (ii) The test of a hypothesis on the diversity-related organization form that reflects the coherent dimension (status quo of the management of diversity).

The descriptive study is extended to include measurements of association between sections to determine interrelationships. In addition to the above, is the Path analysis, and structural equations analysis to make causal inferences. The causal inferences are made from a structural equation model obtained from a PROC CALIS that processes the data obtain from the descriptive study.

4.3.6 Strengths and weaknesses of the research design

Strengths

The descriptive survey afforded the researcher the capacity to control the design for the optimum precision and unambiguous measurement of the variables of interest. The choice of the target population was in part based on the reduction or elimination of possible error sources that can result in measurement differences that are not attributable to the respondent.

MBL students are mature or maturing managers for whom a two-weekly study-school at the business school's Midrand campus in Gauteng is compulsory, due to the distance-learning nature of the degree. The sample population is representative of all the geographic provinces of South Africa. Two second-year classes with a total number of 159 students pre-tested the diversity opinion survey during March 1998. The design includes the most appropriate methods of analysis that enhance the internal reliability and validity of results. The capacity to use the output-data of the descriptive part of the study, to infer causal relationships between the sections of the instrument. The use of structural equations analysis to construct a picture of the interrelationships between dimensions and the causal path of the relationships, affords one the ability to estimate the validity of the theoretical model constructed in figure 3.3.

(b) Weaknesses

The design has the capacity for the determination of dimensions as well as dimensions that may be significant. Therefore six dimensions are included in the causal study for the determination of factors. Six latent variables may have a negative impact on goodness of fit data, so that an ideal model is not achieved.