

# CHAPTER 9

## METHOD OF INVESTIGATION

### 9.1 Data Gathering Method

The accidental or incidental method of sampling was used for students studying human resources management and industrial engineering.

The incidental sampling method is defined by Plug et al (1997:382) as a sample that is available e.g. a class of students.

### 9.2 Participants

All first-year, second-year and third-year students studying Personnel Management and Industrial Engineering were included in the sample which contained 286 students.

### 9.3 Instruments

The following instruments were used to analyse the sample:

- DISCUSS – personality behavioural questionnaire;
- Nowicki-Strickland Lefcourt I/E questionnaire – internal vs external locus of control; and
- Myers-Briggs Type Indicator questionnaire – temperament indication.

The following information was gathered for each subject:

- Senior certificate results; and
- Examination results of major subjects.

The data was gathered from the information system of Technikon Pretoria.

## 9.4 Statistic Analysis

The SPSS for windows was used for statistical analysis.

### 9.4.1 Descriptive Statistics

Descriptive statistics provide a description or summary of the information or data gathered from individuals as reported by Howell (1992:4). The average, mean, degree of skewness and kurtosis are calculated and presented in this chapter.

The mean and average according to Huysamen (1997:25) are measurements of central tendency which assume a single value to represent all the values within a distribution.

Steyn et al (1996:101) refer to the arithmetic average as the most popular and widely used measurement of location, and the mean as the point that corresponds to the score that lies in the middle of the distribution. The mean instead of the arithmetic average is used to accommodate ordinal and interval scales.

Skewness can be described as the shape of the distribution of observations. A positive value indicates that the majority of the sample obtained a high score (negatively skewed) while on the other hand a negative value indicates positively skewness. A normal distribution is zero (Wegner, 1998:94).

The measure of kurtosis indicates the measure of peakedness of a distribution. The coefficient of kurtosis is defined by Steyn et al (1996:148) as follows:

$B_2 = 0$ : normal kurtosis

$B_2 < 0$ : negative kurtosis

$B_2 > 0$ : positive kurtosis

The standard deviation is defined by McBurney (1994:419) as the square root of the variance or a measure of variability in the same units as the scores being described.

## 9.4.2 Correlations

The SPSS program for Windows was used to calculate correlations between the variables. A correlation analysis examines the strength of a linear association between two variables (Wegner, 1998:303).

## 9.4.3 Predictions

Multiple regression attempts to predict a dependent variable from a set of independent variables, and the regression equation according to Bless and Kathuria (1993:277):

$$y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \dots + \beta_k X_k$$

and  $\beta_0, \beta_1, \dots, \beta_k$  indicates the effect of its respective independent variable on the dependent variable and is called the partial regression. In order to determine the regression models for prediction, regression analysis for every measurement was done.

To determine whether the association, as postulated by multiple regression equation is significant, the size of the test statistics  $F$  are compared with the critical values of the  $F$ -distribution.  $F$  indicates the association of the variance as a result of regression and the variance as a result of error (ratio of between-variance to within-variance). High values indicate that the effect is responsible for a significant proportion of the variance of the response, in other words that it has a significant effect. When the  $F$ -value is more than the critical value of the  $F$ -distribution, the zero hypothesis can be rejected, which indicates that a significant association exists between the dependent and at least one of the independent variables (Underhill and Bradfield, 1994:307).

## 9.4.4 Reliability

Smit (1993:37) reports that the reliability of a measure is simply its consistency. Generally reliability of a measuring instrument can be determined through three methods viz test-retest, alternate or parallel and internal consistency. In this study the method of internal consistency will be used to determine the reliability of a single test opportunity.

Cronbach's alpha also called the alpha coefficient, according to Rosnow and Rosenthal (1996:404), is a measurement of reliability and the inter-association of every item is examined. This indicates in essence the average of all possible split-half coefficients, which is the result of different distributions of the measuring instruments. The more highly the scores correlated, and the more items there are, the higher the reliability is. The alpha value of an item indicates the value of the item if the item is excluded from the scale.

Item analysis is a statistical method to determine which items from a multiple item scale must be excluded in order to increase the reliability of the instrument. The item with the highest alpha value (higher than Cronbach's alpha) is excluded from the model and the analysis is repeated until the alpha value of none of the exceeds Cronbach's alpha value (Julyan, 1996:8). A mathematical representation of alpha:

$$\alpha = \left( \frac{k}{k-1} \right) \left( 1 - \frac{\sum_{i=1}^k \sigma_i^2}{\sigma_r^2} \right)$$



The reliability coefficient for the Nowicki-Strickland Lecourt I/E Scales (Rotter) was calculated according to Cronbach's alpha:

$$r = 0.9098$$

This is a very high reliability coefficient according to Bless and Higson-Smith (1995:135).

Research conducted by Roodt and Roberts (1996) concludes the Discuss's reliability of 0.728 (dominance), 0.645 (influence), 0.730 (steadiness) and 0.550 (compliance).

The reliability coefficient of the Myers-Briggs is reported by Myers et al (1998:163) as 0.79 (E/I), 0.83 (S/N), 0.62 (T/F) and 0.82 (J/P) which indicate consistency over time.

The reliability coefficient for the Myers-Briggs was calculated according to Cronbach's alpha:

$$r = 0.6914$$

This is a high reliability coefficient according to Bless and Higson-Smith (1995:135).

## 9.5 Summary

In this chapter the method of investigation and the descriptive statistics, correlational statistics and multiple regression used in the research are discussed.

The results of the reliability coefficient of the various instruments used are reported.