SECTION D

EMPIRICAL RESEARCH

CHAPTER 5

RESEARCH METHODOLOGY

5.1 INTRODUCTION

Having dealt with the types, forms, costs and design of a sexual harassment policy, the researcher designed a proposed model to manage and prevent sexual harassment in the workplace. The proposed model was discussed in chapter 4 (page 4-13).

This chapter discusses the research methodology of the study, including the design, layout and administration of the questionnaire, data collection, the population, the sampling method, the response rate, correlations, factor analysis and the level of statistical significance.

5.2 RESEARCH METHODS

Various methods are available for collecting data, such as surveys, experiments or observations (Diamantopoulos & Schlegelmilch, 1997:5). Selecting the most appropriate method of data collection depends on whether the research is qualitative or quantitative or a combination of both.

Creswell (1994:4) states that quantitative research is empirical and relies solely on experiments to prove or disprove a hypothesis, while qualitative research is constructivist and interpretive. A comparison of qualitative and quantitative research is presented in table 5.1 (page 5-3).

TABLE 5.1 QUALITATIVE AND QUANTITATIVE RESEARCH ASSUMPTIONS

QUALITATIVE RESEARCH	QUANTITATIVE RESEARCH
Primarily concerned with processes	Concerned with outcomes
Interested in the meaning such as how people make sense of a particular situation	Interested in responses how do individuals respond to a particular stimulus
Data collected by observing and interacting with people in their natural settings	Data gathered through inventories, questionnaires or machines
Is descriptive in that the interest is in process, meaning and understanding gained through words	Non-descriptive as interested in frequency of various outcomes
Qualitative research is indicative in that the researcher builds abstractions, concepts and hypothesis from details	Quantitative research is deductive in that based on responses and data, the researcher draws a logical conclusion, which proves or disapproves a previously constructed theory

Source: Adapted from Creswell (1994:145)

Babbie, Mouton, Vorster and Prozesky (2001:230) state that the most appropriate method for collecting data is by means of a questionnaire. Welman and Kruger (1999:151) concur, stating that questionnaires are best suited to situations where the objective of the research is aimed at obtaining the following information from respondents:

- biographical data
- typical behavioural traits
- opinions and beliefs
- attitudes

A further reason for electing to use a questionnaire is that respondents are able to accurately measure their attitudes and beliefs through a process of self-reporting, by independently completing a series of questions (Marshall & Rossman, 1995:95).

5.3 THE QUESTIONNAIRE

A questionnaire comprises a set of questions, and is sent to a number of respondents to obtain their input and opinions on the research subject.

Questionnaires may be structured or unstructured. A structured questionnaire provides different options as answers for each question, and respondents are required to select and mark the applicable answer (Babbie, 1998:257). Unstructured questionnaires require more cooperation from respondents since they are required to answer the questions in their own words. The use of unstructured questionnaires in a mail survey significantly reduces cooperation without providing much helpful information (Sudman & Blair, 1998:289). Mail surveys tend to have the lowest response rate of all survey methods and it is not uncommon to have a non-response rate of 90 percent therefore researchers should choose questionnaires carefully (Welman et al, 1999:152; Aaker, Kumar & Day, 1995:378). Table 5.2 below, outlines the advantages and disadvantages of the questionnaire as a data-collection method.

TABLE 5.2 THE ADVANTAGES AND DISADVANTAGES OF QUESTIONNAIRES

ADVANTAGES	DISADVANTAGES
• Relatively cheap method of conducting research • Saves time since a large amount of information can be collected within a relatively short period of time • Greater possibility of anonymity exists • Standardised questions simplify the process of coding data • The answering of questions can be kept impersonal	• Possibility of a low response rate • Researcher has limited/no control over the condition under which the respondents complete the questionnaire • It is not possible for the researcher to explain and clarify concepts to respondents • Anonymity complicates the possibility for the researcher to initiate follow-ups on the questionnaires • It can only be used for short surveys with mainly closed questions

Source: Adapted from Welman and Kruger (1999:151)

The researcher chose the questionnaire as data-collection method because

- It was a relatively cheap method of collecting a lot of data.
- It was easy to distribute the questionnaires by post.
- Most of the respondents had administrative or desk-bound jobs and therefore could complete the questionnaire during office hours.

5.3.1 Requirements of a good questionnaire

A good questionnaire has to meet certain requirements. According to Leedy (1996:143), a good questionnaire

- has clear, unambiguous instructions for respondents
- has a covering letter (page 8-13), that states clearly the purpose(s) for which the information is needed
- must be as short a possible
- contains clear, understandable and objective questions
- has a logical sequence (flow) of sections and questions
- is directly related to the research problem.

Sudman and Blair (1998:292-299) describe the prerequisites for a good questionnaire in more detail (see diagram 5.1 on page 5-6).

DIAGRAM 5.1 REQUIREMENTS FOR A GOOD QUESTIONNAIRE

- **USE A BOOKLET FORMAT**
  A booklet format is desirable because: (1) it prevents pages being lost
  (2) it makes it easier to handle
  (3) a double-page format can be used
  (4) it looks more professional.

- **IDENTIFY THE QUESTIONNAIRE**
  Questionnaires need a date, the title of the study and the name of the person conducting the survey.

- **DO NOT CROWD THE QUESTIONS**
  Self-administered questionnaires should not be crowded as this makes the questionnaire appear more difficult.

- **USE A LARGE, CLEAR PRINT**
  Questionnaires can be made user-friendly by making use of large and clear print. Too small print makes the questionnaire appear difficult thereby discouraging respondents from completing it.

- **PROVIDE INSTRUCTIONS FOR THE COMPLETION OF THE QUESTIONNAIRE**
  The ease with which a questionnaire can be completed plays a big role in a respondent's decision to complete the questionnaire. Specific instructions should appear on the questionnaire and be placed in the most useful location possible. Instructions should be easy to distinguish and therefore bold print, capital letters or italics can be used.

- **DO NOT SPLIT QUESTIONS ACROSS PAGES**
  Respondents find it confusing if a question is split over two pages, especially in respect of response categories for a closed question.

- **PRE-CODE ALL CLOSED QUESTIONS**
  Pre-coding allows the respondent to simply circle the right answer. The questionnaire should also make provision for a pre-column (column for data-coding purposes), identifying the column in the data file where each response will be entered. This column must clearly indicate that it is for office use only.

- **END THE QUESTIONNAIRE IN A PROPER WAY**
  Respondents should be thanked for their anticipation.

Source: Adapted from Sudman and Blair (1998:293)

5.3.2 Questionnaire design

The questionnaire design is crucial to the success of the research. Saunders, Lewis and Thornhill (1997:250) list the following steps in designing a questionnaire:

- Determine information goals and identify the population.

- Decide which questions need to be asked.

- Identify the respondents' frame of reference.
- Formulate the questions.
- Pre-test the questionnaire.
- Revise the questionnaire, if necessary.
- Compile the final questionnaire.

Marshall and Rossman (1995:96) state that questionnaires typically entail several questions that have structured response categories and may include open-ended questions. In designing a questionnaire, cognisance should be taken of qualitative random variables and quantitative variables (Berenson & Levine, 1989:9). Qualitative random variables yield finite or categorical responses and quantitative random variables yield numerical responses.

The first step in designing a questionnaire is to translate the research objectives into information goals in order to formulate specific questions. The objective is to ensure that the final questions cover all the information goals and research objectives.

Besides asking the right questions, researchers need to consider whether to use open-ended or closed questions or both, the level of difficulty, the scaling and the order of the questions. The reason for this is to achieve the correct or best format to obtain the required data.

5.3.2.1 Open-ended or closed questions?

Closed questions provide respondents with specific response categories requiring them to select one or more specific responses. Open-ended questions require respondents to formulate their own responses. Various factors, such as the purpose and method of the survey and the profile of the respondents, will determine the most

appropriate type of questions. According to Sudman et al (1998:267), closed questions are mainly used for the following reasons:

- They encourage response by making the completion of the questionnaire easy.
- They enable respondents to complete the questionnaire in a short time.
- They simplify coding for data analysis purposes.
- They reduce the amount of probing needed.

Welman et al (1999:172) advocate the use of open-ended questions when it is difficult to anticipate all possible responses or when there are too many possible responses to list. Respondents may feel frustrated with closed questions because the response categories restrict their responses and do not allow them the freedom of expression to describe their unique situation, in which case it is preferable to make use of open-ended questions. Open-ended questions also have disadvantages (Welman et al 1999:173):

- Open-ended questions require a better ability to express oneself.
- Open-ended questions require a higher level of education on the part of respondents in order to ensure detailed responses.
- With the greater freedom of choice afforded by open-ended questions, it becomes more difficult to score.
- More time is required to complete an open-ended question than a Likert-scale or semantic differential-scale question.
- It is more difficult to compare different responses to open-ended questions.

Although closed questions require more pre-testing, limit the richness of data, and may become boring for respondents, they work better in situations where there is a

preference for inexpensive, structured information. Welman and Kruger (2001:147) recommend that even if a questionnaire is made up exclusively of closed questions, it should conclude with an open-ended question in case anything of importance to the respondent has been omitted.

5.3.2.2 Difficulty of questions

Since questionnaires provide limited opportunities for the researcher to probe issues, it is important to pay careful attention to the different ways in which people could interpret questions. According to Sudman and Blair (1998:268), the formulation of questions should aim specifically at three issues, namely

- Do the respondents understand the question?
- Do all the respondents interpret the question in the same way?
- Do the respondents interpret the question in the way it is intended?

Sudman and Blair (1998:271) and, Welman and Kruger (1999:157) propose the following principles to minimise problems in understanding questions:

- The questions must be specific.
- Simple language should be used.
- Use words with only one meaning and avoid ambiguity.
- Use numbers when measuring magnitudes.
- Questions should be asked one at a time.

5.3.2.3 Scaling of questions

Scaling is the process of creating a continuum on which objects are located according to the amount of the measured characteristic they possess (Aaker et al, 1995:255). The Likert-scale is the most popular scale used. This scale consists of a collection of statements on a particular subject in respect of which respondents are required to express the degree to which they agree or disagree with the content of the statement (Welman et al, 1999:155). The Likert-scale is designed to establish the respondent's attitudinal disposition towards a particular statement and should contain approximately an equal number of positive and negative statements. This is to counteract the acquiescent response of marking the "agree" column for example, irrespective of the content of the statements. In the Likert-scale, all positive statements are regarded as equal in attitudinal intensity, and the same applies to the negative statements. Accordingly, a score of 5 on a positive/negative statement is just as positive/negative as a score of 5 on another positive/negative statement. The number of response categories that can be used for closed questions depend on the method of administration. By making use of an even number of response categories, the central tendency effect can be eliminated.

5.3.2.4 Order of the questions

Sudman and Blair (1998:279) state that the order, logical sequence and rapport should be taken into account in the layout of the questionnaire.

- **Or*der.*** The effect of the particular order or sequence of questions should be borne in mind because preceding items may affect the response to subsequent items.

- **L*ogical sequence.*** The logical sequence of the questions in the questionnaire is important since it sets the respondent at ease. Accordingly, the questionnaire should begin with a few easy and non-threatening items and follow later with more in-depth questions. Questions that relate to each other should preferably be grouped together so that respondents do not repeatedly

have to switch their focus. The transition from one topic to the next should be clearly identified while remaining connected to the stated aim of the research.

- **R*apport.*** The questions must be laid out in a way to develop a trusting relationship (rapport) with the respondent, otherwise, the data might not accurately reflect the respondent's correct attitudes.

The researcher kept all the above in mind in compiling the questionnaire for this study.

5.4 DESIGN AND LAYOUT OF THE QUESTIONNAIRE FOR THIS STUDY

For the purposes of this study, the researcher elected to use a structured questionnaire as the data-collection instruments. An example of the covering letter and the questionnaire can be found in appendix D. For financial reasons, the covering letter and the questionnaire were drawn up in English only.

5.4.1 Type of questionnaire used

A structured questionnaire provides the respondents with choices for each question, and the respondent is required to select and mark the applicable choice. The questionnaire did, however, conclude with an open-ended question in order to afford the respondents the opportunity to make additional comments or suggestions if they so wished (see end of the questionnaire, page B-22).

5.4.2 Design of questions

The questionnaire consisted mainly of closed questions since such questions are usually self-explanatory and could be answered with relative ease in a short period.

Section A (pages B-14 – B-16), consisted of questions related to the background of the company and required the respondents to mark the appropriate block with an "X". The questions in Section B (pages B-16 – B-17), were related to the industry's assessment of sexual harassment. Here the respondents were required to express their opinion using a five-point Likert-scale ranging from "rarely/almost never" to "almost always". In Section C (pages B-18 – B-19), the respondents were required to rate their particular company's position in respect of various statements relating to the development of formal sexual harassment policies and procedures. This had to be done on a seven-point Likert-scale ranging from "completely true" to "completely untrue". The same applied to Section D (pages B-19 – B-20), where the respondents had to indicate their company's education and training initiatives relating to sexual harassment in the workplace. Section E (pages B-20 – B-21), focused on sexual harassment investigation and complaints procedures in companies, and respondents had to rate their own company's procedures against various statements provided on a seven-point Likert-scale ranging from "completely true" to "completely untrue". Section F (page B-22), was designed to establish which communication channels were used by the company to communicate issues relating to sexual harassment to their employees. The respondents were required to indicate their company's practices using a five-point Likert-scale ranging from "rarely/almost never" to "almost always". The questionnaire concluded with an open-ended question.

5.4.3 Rating the questions

Since closed questions which merely require a "yes" or "no" answer, do not always provide satisfactory information, the researcher decided to include Likert-scale questions. Possible answers were coded with numerical values and represented indefinite quantities, such as the extent to which respondents agreed with the statements: for example, the respondents' level of agreement with various statements on the development of formal policies and procedures related to sexual harassment, educating and training employees about sexual harassment and sexual harassment investigation and complaints procedures.

Welman and Kruger (1999:161) state that the error of central tendency may further be eliminated by avoiding statements in the questionnaire which reflect extreme

positions; for example, “a strongly worded sexual harassment policy will **never** prevent the occurrence of this form of workplace behaviour.” In rating the questions, the following scales were used:

COMPLETELY AGREE	MAINLY TRUE	SLIGHTLY TRUE	50% TRUE 50% UNTRUE	SLIGHTLY UNTRUE	MAINLY UNTRUE	COMPLETELY UNTRUE
1	2	3	4	5	6	7

RARELY / ALMOST NEVER	TO A SMALL EXTENT / INFREQUENTLY	TO A MODERATE EXTENT	TO A LARGE EXTENT / FREQUENTLY	ALMOST ALWAYS
1	2	3	4	5

5.5 BIOGRAPHICAL VARIABLES

In Section A (pages B-14 – B-16), the respondents had to provide information on the history of the company, among other things.

The researcher had two reasons for commencing with these questions. Firstly, asking easy questions at the outset of the questionnaire would set the respondents at ease. Secondly, and more importantly, the information was crucial in determining the relationship between the company’s diversity factors and perceptions of sexual harassment.

5.6 LAYOUT OF THE QUESTIONNAIRE

The questionnaire consisted of six sections (see appendix D), namely

SECTION A: Background information relating to the company

SECTION B: Industry assessment regarding sexual harassment

SECTION C: Development of formal policies and procedures related to sexual harassment

SECTION D: Educating and training employees about sexual harassment

SECTION E: Sexual harassment investigation /complaints procedures

SECTION F: Communication methods used.

The final part of the questionnaire consisted of a blank space to enable the respondents to make any additional comments that they may have deemed appropriate concerning sexual harassment in the workplace.

5.7 APPEARANCE OF THE QUESTIONNAIRE

The physical appearance of the questionnaire plays a vital role in a respondent's decision whether or not to complete it. Aaker et al (1995:306) maintain that the quality of the paper, clarity of production and appearance of crowding are important considerations in the layout of questionnaires.

For the study, the questionnaire was printed on good quality white paper and bound in booklet format. Ample space was allowed between the questions as well as sections. Clear instructions were given on how to complete the questionnaire. Time constraints also have a direct influence on respondents' willingness to complete the questionnaire. As soon as the questions become too difficult or too time-consuming to complete, respondents will refrain from completing the questionnaire. Approximately 10 to 15 minutes was needed to complete the questionnaire.

5.8 PRE-TEST OF THE QUESTIONNAIRE

The purpose of a pre-test is to assess whether the questionnaire meets the researcher's expectations in terms of the information obtained. Questionnaire pre-testing is used as a means of identifying and eliminating questions that could pose problems. Only once all the deficiencies that have been identified during the pre-testing phase have been corrected, can the final questionnaire be compiled and distributed. The appropriate method of testing a questionnaire is to have as many people as possible to look at it. A pre-test constitutes a pilot run and the respondents selected to study the questionnaire should be reasonably representative of but not members of the sample population to be used (Aaker et al, 1995:308).

In this study, a formal pre-test was not done, but the questionnaire was submitted to various members of the Human Resource Departments of Philips South Africa, Siemens and Altech for their views and comments. The statistician responsible for the final data analysis was also approached. Once their inputs had been received, the final questionnaire was compiled and distributed.

5.9 CODING THE DATA

Prior to the data analysis, the raw data underwent a preliminary process of preparation. The objective was to form and code categories of information. Creswell (1994:154) refers to this as segmenting the information. Aaker et al (1995:443) state that the process of data preparation consists of data editing, data coding and statistical adjustment.

Each questionnaire returned was edited for any omissions, ambiguities and/or errors in the actual responses. Accordingly, any responses found illegible or missing were coded as "missing". This simplified the data analysis without distorting the data interpretation.

Once the questionnaires were edited, the information was coded. As the questionnaire was not pre-coded, the data was first coded and then transferred to

code sheets. The code sheets were then used for keying the data into computer files. A statistical software programme (SPSS) was used to generate diagnostic information.

5.10 POPULATION AND SAMPLING

The researcher decided to conduct the study amongst companies making up the Steel and Engineering Industries Federation of South Africa (SEIFSA). SEIFSA has been the national employer federation for the metal and engineering industry since 1943 and is the umbrella body for 42 independent employer associations (see table 5.3 below) in the metal, engineering, electrical, electronics, plastics and allied industries (**http://www.seifsa.co.za**). Four of these are regional associations based in Cape Town, Durban, Port Elizabeth and East London.

The Federation represents more than 2,400 companies, employing over 248,000 employees – over two-thirds of the industry's workforce. This makes SEIFSA one of the biggest and most influential employer federations in South Africa. Member companies range from large corporations employing more than 5,000 workers to small enterprises with a few employees. More than half the member companies employ fewer than 25 employees.

The researcher arbitrarily decided to draw the sample (n) for this study from the total population (N) that is 2,440 companies and further to exclude all companies with fewer than 40 employees.

Thus the SEIFSA statistical department was asked to print a mailing list of all the companies with more than 40 employees (approximately 1,450 companies). The list set out the SEIFSA code (association number) as well as the company number and name that falls under the specific association and the SEIFSA representative of the company. An analysis of companies per staff complement, per employer association in SEIFSA, is depicted in table 5.3 on page 5-17.

TABLE 5.3 ANALYSIS OF COMPANIES PER STAFF COMPLEMENT PER EMPLOYER ASSOCIATION WITHIN SEIFSA

EMPLOYERS' ASSOCIATION	SEIFSA Code	Total No. ER's	Total No. EE's	NUMBER OF EMPLOYEES						
				< 50	51-100	101-200	201-400	401-600	601-1,000	1,OOO +
Assoc. of Electrical Cable Manuf. of SA	7	7	3,204	1	2	1	0	1	1	1
Assoc. of Metal Service Centres of SA	23	18	2,285	10	2	2	2	2	0	0
Babelegi Metal Industries Assoc.	68	11	893	4	4	2	1	0	0	0
Border Industrial Employees' Assoc.	0	54	2,062	45	5	1	3	0	0	0
Bright Bar Assoc.	0	5	563	1	1	3	0	0	0	0
Cape Engineers' & Founders' Assoc.	64	167	10,361	109	32	16	8	1	1	0
Constructional Engineering Assoc. (SA)	27	185	14,868	126	26	13	12	4	3	1
Covered Conductor Manuf. Assoc.	31	2	345	0	0	1	1	0	0	0
Electrical Eng. & Allied Industries Assoc.	6	165	11,575	108	31	12	7	5	2	0
Electrical Manuf. Assoc. of SA	2	16	4,336	1	1	8	2	3	0	1
Electronics & Telecomm. Industry Assoc.	39	12	3,865	0	0	0	4	3	0	5
Ferro-Alloy Producers' Assoc.	34	12	12,743	0	0	0	4	3	0	5
Gate & Fence Assoc.	8	13	285	13	0	0	0	0	0	0
Hand Tool Manuf. Assoc.	4	9	1,429	4	1	2	0	2	0	0
Hot-Dip Galvanizers' Assoc. of SA	38	24	24,688	11	7	4	1	0	0	1
Iron & Steel Producers' Assoc. of SA	24	8	19,664	0	0	0	1	1	2	4
Land mobile Radio Assoc.	54	104	1,426	100	2	1	0	0	0	1
Lift Engineering Assoc. of SA	9	267	14,346	191	41	19	12	3	0	1
Light Engineering Industry Assoc. of SA	10	13	1,194	10	0	1	0	2	0	0
Machine Engravers' Assoc.	42	4	86	4	0	0	0	0	0	0
Materials Handling Assoc.	3	33	1,514	24	6	3	0	0	0	0
Natal Engineering Industry Assoc.	66	128	19,126	52	33	29	5	4	1	4
Non-Ferrous Metal Industry Assoc. of SA	11	15	1,704	5	1	4	5	0	0	0
Plastic Converters' Association	13	104	8,344	58	18	17	9	1	1	0
Plumbers & Engineering Brassware Manuf. Assoc.	43	3	864	1	1	1	0	0	0	0
Port Elizabeth Engineers' Assoc.	67	62	6,183	40	9	4	5	2	1	1
Pressure Vessel Manuf. Assoc. of SA	49	16	1,685	9	0	5	1	0	1	0
Radio, Appliance & TV Assoc. of SA	14	16	705	14	0	1	1	0	0	0
Refrigeration, Air-Con Manuf. & Suppliers' Assoc.	44	25	1,561	15	6	3	1	0	0	0
SA Electroplating Industry Assoc.	20	14	648	9	2	3	0	0	0	0
SA Engineers' & Founders' Assoc.	55	586	30,546	459	61	35	23	3	4	1
SA Fabric Reinforcement Assoc.	50	4	512	1	0	3	0	0	0	0
SA Fasteners Manufacturers' Assoc.	35	27	1,688	13	9	3	2	0	0	0
SA Lighting Assoc.	41	17	1,471	8	6	3	0	0	0	0
SA Post Tensioning Assoc.	36	6	211	4	1	1	0	0	0	0
SA Pump Manuf. Assoc.	28	23	958	15	4	4	0	0	0	0
SA Reinforced Concrete Eng. Assoc.	22	31	1,180	23	5	3	0	0	0	0
SA Tube Makers' Assoc.	18	9	26,425	3	2	2	1	0	0	1
SA Valve & Actuators Manuf. Assoc.	59	27	1,053	22	3	2	0	0	0	0
SA Wire & Wire Rope Manuf. Assoc.	17	6	2,622	4	0	0	0	0	1	1
Sheet Metal Industry Assoc. of SA	19	70	4,113	53	8	5	2	2	0	0
SA Refrigeration & Air-Con. Contr. Assoc.	30	69	2,005	58	7	3	1	0	0	0
SEIFSA ASSOCIATED MEMBERS	53	53	3,286	40	8	2	1	1	1	0
TOTAL:		**2,440**	**248,757**	**1,668**	**345**	**222**	**115**	**43**	**19**	**28**

ER's = EMPLOYERS **EE's = EMPLOYEES**

Thereafter a stratified random sample was drawn by using a table of random numbers. This was made possible by the population being composed of clearly

recognisable, non-overlapping sub-populations, such as associations. As each company was drawn, the specific association code and the company number were placed at the top of the questionnaire. This was done to help with the identification of the companies in the follow-up process. The questionnaire was then sent to the SEIFSA representative of the company indicated on the list.

5.11 QUESTIONNAIRES SENT OUT AND RETURNED

A total of 875 questionnaires were sent out on 15 November 2000. As per the covering letter (see appendix D), the respondents were requested to return the questionnaire by no later than 15 December 2000. The responses received by the closing date were marked off against the SEIFSA list. Postcards were sent to companies who had failed to return their questionnaires, requesting their co-operation in returning the questionnaire (see appendix E). The due date for this was extended to 28 February 2001. Companies who again failed to comply were contacted telephonically. If necessary, a second questionnaire was faxed to the company. This process took place during March/April 2001. The response rate to the questionnaires is illustrated in Table 5.4 below.

TABLE 5.4 RESPONSES RECEIVED BASED ON QUESTIONNAIRES POSTED, FOLLOW-UP POSTCARDS SENT AND TELEPHONE CONTACTS

ACTIVITIES	NUMBER	% RESPONSE
Total number of questionnaires posted (15 November 2000)	875	-
• Total received by closing date (15 December 2000)	101	11.5 (Initial)
Number of postcards sent out	700	-
• Number of questionnaires returned (28 February 2001)	38	-
Companies contacted telephonically (March/April 2001)	43	-
• Questionnaires faxed and returned	11	-
Number of questionnaires received (TOTAL)	**151**	**17.2 (FINAL)**

5.12 DATA INTERPRETATION AND ANALYSIS

The primary objective of data analysis is to arrange (rank), structure and interpret the data collected (Marshall et al, 1995:111). In this study, univariate data analysis, factor analysis, the Cronbach Alpha coefficient and Pearson product moment correlation were used as statistical analysis techniques.

5.12.1 Statistical analysis techniques

Various techniques are available for statistical analysis of the data, including parametric and non-parametric tests. According to Kerlinger (1988:266), a parametric statistical test depends on assumptions about the population from which the sample is drawn, such as that the population scores are normally distributed. A non-parametric or distribution-free statistical test depends on no assumptions on the sample population or the values of the population parameters. Gardner (1975:43-57) supports the use of parametric statistical analysis, while Bradley (1972) advocates non-parametric methods. The researcher decided to use parametric and univariate data analysis.

5.12.2 Univariate data analysis

Univariate data analysis involves a single variable and is the starting point in descriptive analysis. This type of data analysis leads to the construction of a frequency distribution for each variable of interest. A frequency distribution shows in absolute or relative (percentage) terms how often (popular) the different values of a variable occur or are found among the units of analysis. Biographic and organisational questions (see section A of the questionnaire, pages B-14 – B-16) are categorical therefore it is usual to give frequency distributions of the responses to such questions. In the case of cross-tabulating such variables, the chi-square statistic is also calculated as a test of the null hypothesis of independence between the two variables (Kerlinger 1988:569).

5.12.3 Factor analysis as a data reduction technique

Factor analysis is a statistical analysis technique that is especially useful for uncovering various dimensions in a questionnaire. (Kerlinger, 1988:569; Diamantopoulos & Schlegelmilch, 1997:216). Items that refer to the same dimension or share the same characteristics should statistically correlate highly with one another and factor analysis then uncovers the factors or dimensions. According to Kerlinger (1988:569),

> *Factor analysis serves the cause of scientific parsimony. It reduces the multiplicity of tests or measures to greater simplicity. It tells us, in effect, what tests belong together – in other words, which ones virtually measure the same thing, and how much they do so. It thus reduces the number of variables with which the scientist must cope. It also helps the scientist locate and identify unities or fundamental properties underlying tests and measures.*

Accordingly, based upon the above, factor analysis is the process of grouping together questions that seem to be measuring the same underlying factor.

The main part of the questionnaire consisted of Likert-type items generated to elicit responses to indicate the company's position on issues such as the degree of sexual harassment that took place, whether training and development was done, and whether formal policies on sexual harassment existed. The items were broadly organised according to the following themes:

- industry assessment of sexual harassment (section B)
- development of formal policies and procedures related to sexual harassment (section C)
- educating and training employees about sexual harassment (section D)
- sexual harassment investigations/complaints procedure (section E)

A principle component factor analysis of the items of each section of the questionnaire was performed. Kerlinger (1988:576) refers to this as the "principal

factors method". The factor analysis program of the statistical software package SPSS (Statistical Packages for the Social Sciences) was used for this purpose.

The first step in the factor analysis was to compute a matrix of intercorrelations between the items. Once this had been done, the second step was to decide on the number of factors (dimensions) to be extracted. To do so, the eigenvalues of underlying factors were plotted against the factor numbers and the slope of the plotted eigenvalues studied using Catell's "scree test" (Catell, 1978:60; Stevens, 1992:378). The eigenvalue of a factor indicates the amount of variance that factor explains of the data. The bigger the eigenvalue of a factor relative to the size of the eigenvalues of the other factors, the more variance the factor explains. Catell (1978:62) states that factors that account for most of the variability in the original data should be extracted. The initial drop in the eigenvalues of the first one or two consecutive factors is large but grows less and less as more factors are considered. At a particular stage, the drop becomes small and constant so that the shape of the graph is a straight line with a gradual downward slope. This straight-line segment is referred to as a "scree" and there can be more than one. According to Catell (1978:77), the number of the factor at which the first "scree" begins should be noted. This number indicates the number of factors to be extracted. In the present study this approach was used to decide on the number of factors to use. The researcher decided to obtain factor solutions for fewer and even more factors when the "scree" test was not clear and to select those factor solutions which made theoretical sense.

The third and final step of the factor analysis was to rotate the factor solutions obliquely, using the promax rotations to obtain interpretable solutions (Cureton & Mulai, 1975). The promax oblique rotation results in several factor solution matrices, of which the "factor pattern" solution matrix is important (Catell, 1978:230). The values in these factor pattern solution matrices are called factor loadings and give the regression of the items on the factors. The regression coefficients are also referred to as factor loadings. Studying all items that have high loadings on a particular factor and identifying the common nature of these items can indicate the nature of the factor. In the present study all factor loadings higher or equal to 0,25 were considered significant. The cut-off point of 0,25 was to a large extent, arbitrary and possibly too lenient as 0,30 is most commonly used as the cut-off.

Next it was decided to compute a score for each respondent on each of the derived factors by taking the mean of the items that make up the scale and scaling the scores so that each scale measured from 0 (small extent) to 100 (large extent). This meant that some of the scales first had to be reversed so that all scales would logically correlate positively with each other and a high score on any particular scale would indicate a "high level" of whatever the scale measured. Then all scales had to be transformed to a new scale, ranging from 0 (least) to 100 (most). The latter transformation was accomplished by means of the following formula:

*Transformed score = (old score – 1) / (range of scale) *100.*

The following examples serve to explain the process to arrive at the transformed scores. As the first step, a respondent's score on a factor or dimension was calculated as the mean of all the items that made up that factor. If the scale on which the items were measured ranged from 1 to 5, then the range would be 5 – 1 = 4. Therefore, if an employee obtained a score of 3,5 on the original scale, then his or her transformed score would be calculated as

Transformed score = (3,5 – 1) / (4) 100 = 62,5.*

5.12.4 Reliability analysis of questionnaires

The factor analysis of the items in Sections B to E of the questionnaire resulted in a number of factors/dimensions. Then the Cronbach Alpha coefficient was calculated as a measure of the internal reliability of each of the factors/dimensions (Lemke & Wiersma, 1976). Reliability was further determined by means of the Pearson product moment correlation, analysis of variance, post-hoc Scheffé test and control of nuisance variables.

- ***Pearson product moment correlation***

When two or more variables were measured on an interval scale, the Pearson product moment correlation coefficient was calculated as a measure of the linear relation between the two variables, such as when the variables from the factor analysis were correlated with each other (Hays, 1963:499). The correlation coefficient (r) indicates the estimated extent to which the changes in one variable are associated with changes in the other variable on a range of *+1.00 to –1.00*. A correlation of +1.00 indicates a perfect positive relationship and a correlation of 0.0 indicates no relationship and a correlation of: -1.00 indicates a perfect negative relationship (Diamantopoulos et al, 1997:198). In the case of a positive correlation between two variables, the higher the scores on one variable, the higher the scores on the other variable. If the correlation is negative, then the higher the score on the one variable, the lower the scores on the other variable.

- ***Comparison of means using the analysis of variance approach***

  Dimensions of the sexual harassment questionnaire were uncovered and six factors were constructed. These factors were all found to show a high internal reliability. The study included a number of categorical variables that formed the basis for dividing the total sample into categories or sub-groups. Examples of such variables are “size of company” in terms of male employees (small, medium and large) and development stage (three development stages). To compare the categories of a variable, the various sexual harassment questionnaire factors, the analysis of variance approach was used (Kerlinger, 1988:211). The categorical variables were the independent variables, while the various sexual harassment questionnaire factors (the six factors) were the dependent variables. In essence, the sub-groups were compared with respect to their mean-score on a dependent variable scale. In practice, the researcher inspected the mean-score of a scale (e.g. degree of sexual harassment) for each of the sub-groups being compared. There were differences between these sub-groups in their mean-scores on the dependent variable (e.g. degree of sexual harassment) but it was not clear whether these differences were real or were due to chance. The one-way analysis of variance F-test with its associated p-value was performed to establish whether the differences between the means of the various sub-groups were statistically different.

- ***Post-hoc Scheffé test***

  When the F-test in the one-way analysis of variance proves significant at, say the 5% level, there are statistically significant differences between the groups as far as the dependent variable is concerned. However, this could simply mean that some groups are different with respect to their mean-scores. This still would not indicate which pair of groups (of the possible pairings of groups) was different with regard to their mean-scores. Accordingly, where the overall F-test of the analysis of variance was significant, a post-hoc test procedure, namely the Scheffé test, was applied in order to determine which "pair-wise" group differences were significant (Glass & Stanley, 1970:388).

- ***Control of nuisance variables: partial correlations and analysis of variance with covariates***

  The relationship between two variables has been known to be caused by another variable. For example, the correlation between the various sexual harassment factors will certainly to some extent, be caused by the fact that these factors are each related to the size of the company. In this study, two indicators of the size of a company were used, namely the size of the company in terms of the number of male employees, and in terms of the number of female employees. In each case, the number of employees was used to classify a company as small, medium or large. Then the correlation between the sexual harassment factors was computed with the zero-order (the usual correlation when no nuisance variables are controlled) and the partial correlation (controlling for the effect of company size in terms of the number of females and of males) between these factors was examined (Hays, 1963:574-576).

  In some cases, a one-way analysis of variance F-test was performed to establish whether certain groupings (e.g. companies at various stages of maturity: "stage of development") differed in their mean-levels for the sexual harassment factors. Companies at different stages of maturity could differ in size, for instance, which could cause them to differ in mean-levels because company size had been found to relate to the various factors. Hence the focus

here was to evaluate the relationship between “stage of development” and the sexual harassment factors after removing the effect of company size. This was done by specifying the two variables “size of company–females” and “size of company–males” as well as their possible interaction as “covariates” in the one-way analysis of variance F-tests (Kerlinger, 1988:211).

First the one-way F-test was performed without specifying covariates. Then the analysis was repeated but with the size of the company, in terms of male and female employees, specified as a covariate. The latter f-values with their associated p-values could be considered to indicate the existence (or not) of a relationship between the dependent variable (e.g. the sexual harassment factors) and the independent variable (e.g. “stage of development”) with the effect of the covariates held constant.

5.12.5 Level of statistical significance

The levels 0,05 and 0,01 are conventionally used as levels of significance for statistical tests. These levels of significance are rather severe and are used to limit the risk of incorrectly rejecting the null hypothesis, or concluding a significant result erroneously. Such errors are referred to as type-I errors. Often, however, for example in the human sciences, the consequences of a type-I error are not serious and researchers are just as concerned with missing a significant result, known as a type-II error. Aaker et al (1995:471-474) point out that when both types of errors (type-I and type-II errors) are equally important, levels such as 0,20 (and possibly 0,30) are more appropriate than the conventional 0,05 and 0,01 levels.

Another important consideration in the choice of the level of significance is the total number of statistical tests to be performed by the researcher. As the total number of statistical tests increases, so does the probability of a type-I error. To counter this accumulating effect, the level of significance could be set smaller for the individual statistical tests. According to the Bonferonni method, the chosen level of significance (say, 0,30) is divided by the number of tests to be performed. Thus, if the total number of tests to be performed is 60, then the level of significance for any individual

statistical test is 0,30 ÷ 60 = 0,005. This could give a very conservative or strict level of significance in practice, however. In this study, the researcher decided to use the following levels of significance:

- the level of 0,01 for all statistical tests involving factors or dimensions
- the level of 0,05 for all results involving individual items.

5.13 CONCLUSION

This chapter described the research methodology used in the study, including the questionnaire design and layout, pre-testing of the questionnaire, the population, method of sampling, correlations and factor analysis. Chapter 6 covers the data analysis and interpretations. The details pertaining to the descriptive statistics of the items and derived factors in respect of the specific questions contained in the questionnaire that was distributed, is set out in Appendix F.