

CHAPTER 6

RESEARCH DESIGN AND METHODOLOGY

6.1 INTRODUCTION

Chapter 5 was devoted to a description of the problem statement and research hypotheses. This chapter presents the approach to the planned research process. The research methodology is discussed with special reference to the sample, data collection, questionnaire design and statistical procedures used. A detailed discussion on the construction of the questions for the measurement instrument is also presented.

6.2 DATA SOURCES

There are two types of data sources, namely primary and secondary data (Malhotra, 1996:116). Secondary data are data that have already been collected for purposes other than the problem at hand. Chapters 2 to 4 summarised the secondary data on information privacy found in a wide range of relevant scientific journals, research publications and media articles. Primary data is original data collected specifically for the purpose of the research in question (Cooper & Schindler, 2001:260). Chapters 6 to 8 focus on the collection and analysis of the primary data needed to address the lack of knowledge and understanding regarding information privacy concerns by South African consumers. The empirical investigation is of a quantitative nature. Quantitative research involves the collection of primary data from a large number of individuals, frequently with the intention of projecting the results to the larger population (Martins, Loubser & Van Wyk, 1996:125). Once the research problem has been defined and clearly specified, the research effort can turn to data collection, as is discussed in the next section.

6.3 DATA COLLECTION

There are various methods of collecting primary research data, for example, mail-based self-administered questionnaires, telephonic interviews, personal interviews (face-to-face) and focus groups. For the purposes of this study, data were gathered by means of telephonic interviews using a questionnaire as the measurement instrument. The telephone interviews involved phoning a sample of respondents and asking them a series of questions. The interviewer used a paper questionnaire and recorded the responses, in line with suggestions by Malhotra, 1996:198).

Telephonic interviews were chosen as the data collection method because the method offers the following advantages (Dillon, Madden & Firtle, 1993:173; Churchill & Iacobucci, 2002:282):

- The telephone can be used to complete large studies in a short time (two to three weeks) and is especially effective for national samples.
- A substantial amount of information can be collected within 15 to 30 minutes.
- Like face-to-face interviews, telephonic interviews offer very good sample control. Although non-listed households can be a problem, the desired respondents can be contacted with relative ease.
- Telephone interviewers can clear up any ambiguities, increasing the quality of the data.
- The telephone as a data collection medium offers a high response rate compared to mail.

It is important to note that in most studies, the realised sample can sometimes differ from the drawn sample, because certain types of errors can occur during data collection. One such source of bias is non-response error, which represents a failure to obtain information from some elements of the population that were selected and designated for the sample. The two main sources of non-response bias are 'not-at-homes' and refusals to answer (Churchill & Iacobucci, 2002:532). Replies may not be secured from some designated sampling units because the respondent is not at home

when the interviewer calls. In almost every study, some respondents refuse to participate. The rate of refusals depends, amongst other things, on the nature of the respondent, the circumstances surrounding the contact, the nature of the subject and the interviewer. Field errors can also arise after the individual has agreed to participate in the study. Instead of co-operating fully, the individual may refuse to answer particular questions or provide a response that differs somehow from what is actually true or correct.

Before the primary data can be collected, a sample needs to be drawn and a measurement instrument needs to be designed. The sampling procedure and the design of the questionnaire are discussed in the following sections.

6.4 SAMPLING

Sampling is one component of a research design. Churchill and Iacobucci (2002:449) have identified several basic steps to follow when drawing a sample from a population. Five of their steps are briefly described and discussed below as they apply to this study.

6.4.1 Define the target population

The first step is to define the target population, in other words, the totality of cases that conform to some designated specifications. The specifications define the elements that belong to the target group and those that are to be excluded. The target population selected for this study was all adults above the age of 18 years residing in South Africa who had a telephone number listed in a telephone directory. Since the size of the target population was large and the cost and time associated with obtaining information from the population is high, a sample was drawn. A sample is a selection of a subset of elements from a larger group of objects (Churchill & Iacobucci, 2002:981). The basic principle of sampling is that by selecting some of the elements in a population, a researcher may draw conclusions about the entire population (Malhotra, 1996:359).

6.4.2 Identify the sampling frame

The second step in the sample selection process is the identification of the sampling frame, which is the listing of the elements from which the actual sample will be drawn. The sampling frame for this study was all South African households with a listed telephone number, as contained in Telkom's electronic CyberTrade Telephone Directory Service. CyberTrade is an electronic telephone directory service that provides a basic electronic search facility to subscribers (Telkom, 2002). According to the latest statistics, the sampling frame represents 2.9 million households in South Africa. This is 30.4 per cent of the total number of households (9.5 million) with fixed telephone lines at home (SAARF, 2001). Even though the target population was all households with listed telephone numbers, the researcher had to take cognisance of the fact that the CyberTrade Telephone Directory Service does not provide a complete and accurate listing of all households. Reality dictates that there is seldom a perfect correspondence between the sampling frame and the target population of interest.

Certain errors can occur in the sampling frame. One such error is the possibility of a certain degree of non-coverage error, which occurs mainly because the telephone directories do not provide a complete sampling frame. Not every family has a phone, and not all people who have telephones have them listed in the directory. Furthermore, there is some variation between those who have and those who do not have telephones in terms of certain important demographic characteristics. Over-coverage error can also be a source of bias (Churchill & Iacobucci, 2002:527). It can arise because of duplication in the list of sampling units. Units with multiple entries in the sampling frame (for example, families with several phone listings) have a higher probability of being included in the sample than sampling units with one listing. For most surveys, however, non-coverage is much more common and troublesome.

6.4.3 Select a sampling procedure

The third step of selecting a sample procedure is linked to the identification of the sampling frame, because the choice of sampling method depends largely on what the researcher can develop as a sampling frame. Sampling techniques can be divided into two broad categories, namely probability and non-probability samples. Probability samples are distinguished by the fact that each population element has a known, non-zero chance of being included in the sample. Non-probability samples rely on personal judgment somewhere in the element-selection process and therefore prohibit estimating the probability that any given population element will be included in the sample (Churchill & Iacobucci, 2002:978). The sample for this study was drawn by means of systematic sampling. Systematic sampling has many desirable features because such a sample is relatively simple to draw, it is easy to check and it can be done at a moderate cost (Zikmund, 2000:363). With this method, the sample is chosen by selecting a random starting point and then selecting every i -th element in succession from the sampling frame (Malhotra, 1996:370). The sampling interval, i , is determined by dividing the population size N by the sample size n and rounding to the nearest integer. Table 6.1 sets out an outline of the procedure followed to determine the sampling interval for this study. Here the first number was chosen at random, after which the first number on every 11th page in the electronic directory was chosen.

6.4.4 Determine the sample size

Sample size refers to the number of elements to be included in the study (Malhotra, 1996:363). Sample size can be determined through the use of statistical procedures or on the basis of managerial judgement. One judgemental factor involves the determination of sample size by selecting the appropriate item, question or characteristic for the sample size calculations. In most studies several characteristics are involved, and the desired degree of precision may vary for these items. The researcher must exercise judgement to determine which item will be utilised. Often the item that will produce the largest sample size is utilised to determine the ultimate

sample size (Zikmund, 2000:393). Given the fact that factor analysis and structural equation modeling were to be used in the data analyses in this study, the decision on sample size was very important. As a general rule for factor analysis, the sample size should be larger than 100, or have a minimum of at least five times as many observations as there are variables to be analysed. A more acceptable size would have a ten-to-one ratio, and some researchers even propose a minimum of 20 cases for each variable. The researcher should always try to obtain the highest cases-per-variable ratio to minimise the chances of 'over-fitting' the data (Hair, Anderson, Tatham, & Black, 1998:99).

In structural equation modeling, the researcher often requires a much larger sample size to maintain the accuracy of estimates and to ensure representativeness. The need for larger sample sizes is also part of the program requirements and the multiple observed indicator variables used to define latent variables. Many researchers use from 250 to 500 subjects, and the greater the sample size, the better (Schumacker & Lomax, 1996:20). Anderson and Gerbing (1988:416) argue that 150 subjects is sufficient to obtain a converged and proper solution for models with three or more indicators per factor, otherwise a sample size of at least 400 to 500 is needed. If the data violate the assumptions of multivariate normality, the ratio of respondents to parameters needs to increase with a generally accepted ratio of 15 respondents for each parameter (Hair *et al.*, 1998:605).

The above-mentioned guidelines suggest different sample sizes, depending on the number of variables or estimates of the study. Since a number of 45 variables were to be analysed in this study, the researcher decided to draw a random sample of 800 respondents from the sample frame for this study. This decision was based on the 1:15 ratio suggested by Hair *et al.* (1998:605), with a 'built-in' 20 per cent addition for anticipated 'missing responses' (see Section 6.6.1) that could reduce the dataset. Table 6.1 sets out how the sample of 800 was drawn from the sampling frame.

Table 6.1 Systematic sampling procedure

AREA	Total number of pages in directories (sample frame)	Number of pages selected from directory (sample drawn)
Boland and West Coast	482	43
Cape Peninsula	1223	111
Durban and surrounding area	782	71
East London and border	321	29
East Rand	684	62
Free State	478	43
Johannesburg	1008	91
KwaZulu-Natal North Coast	175	15
KwaZulu-Natal South Coast	87	8
Mpumalanga	387	35
North West Province	426	38
Northern Province	244	22
Northern Cape and Namaqualand	194	17
Port Elizabeth and Eastern Cape	496	45
Pietermaritzburg and KwaZulu-Natal	347	31
Pretoria and surrounding area	645	58
Southern Cape and Karoo	212	19
Vaal Triangle	208	18
West Rand	494	44
TOTAL	8893	800

Source: Adapted from <http://cybertel.cybertrade.co.za>

6.4.5 Select the sample elements

A sample element is the unit about which information is needed, usually the respondent (Martins *et al.*, 1996:251). A sampling unit is an element, or a unit containing the element, that is available for selection at some stage of the sampling process (Malhotra, 1996:361). In this study, the sampling units were the different households chosen to be

interviewed, and the sample elements were the household family members with the following characteristics (elements):

- (a) individuals aged 18 years or older;
- (b) individuals who can understand Afrikaans or English; and
- (c) individuals who had most recently celebrated their birthdays.

From the above-mentioned guidelines, it is clear that this study selected individuals in the households using age and the standard 'last birthday' technique as qualifying criteria.

Once the sample was determined, the researcher could focus on the development of the measurement instrument. The next section focuses on the phase of the research design where the questionnaire was designed and pre-tested.

6.5 QUESTIONNAIRE DEVELOPMENT

This section reviews the procedures followed to develop the questionnaire. Attention is paid to the measurement and scaling procedures, the actual questionnaire design, the pre-testing, as well as the coding and editing of the questionnaire.

6.5.1 Level of measurement

Measurement in research consists of assigning numbers to empirical events in compliance with a set of rules. In other words, certain characteristics are measured such as perceptions, attitudes or preferences, instead of the consumer as an object. The levels of measurement reflect the correspondence of numbers assigned to the characteristics in question and the meaningfulness of performing mathematical operations on the numbers assigned. There are four primary scales of measurement, namely nominal, ordinal, interval and ratio (Malhotra, 1996:271-275).

- A **nominal scale** is a figurative labelling scheme in which the numbers serve only as labels or tags for identifying and classifying objects, such as classifying the respondent as a male or female.
- An **ordinal scale** is a ranking scale in which numbers are assigned to objects to indicate the relative extent to which the objects possess certain characteristics.
- In an **interval scale**, numerically equal distances on the scale represent equal values in the characteristic being measured.
- A **ratio scale** possesses all the properties of the nominal, ordinal and interval scales and, in addition, an absolute zero point.

This study used of nominal and interval scales. The nominal scales served to identify and classify respondents, whereas the interval scales represented the values of the attitudes being measured. Scaling is considered an extension of measurement and is discussed below.

6.5.2 Scaling techniques

Scaling involves creating a continuum upon which measured objects are located. The scaling techniques commonly employed in marketing research can be classified into comparative and non-comparative scales (Malhotra, 1996:276).

- **Comparative scales** involve the direct comparison of stimulus objects. Comparative scale data must be interpreted in relative terms and have only ordinal or rank order properties. Several comparative scaling techniques are available, such as paired comparisons scales, geared paired comparisons, rank-order scales, constant sum scales and continuous rating comparative scales.
- In **non-comparative scales**, also referred to as metric scales, each object is scaled independently of the others in the stimulus set. Here the resulting data are generally assumed to be interval- or ratio-scaled. Non-comparative scales are composed of continuous and itemised rating scales. In a continuous rating scale, respondents rate the objects by placing a mark at the appropriate position on a line that runs from one extreme of the criterion variable to the other. In itemised rating scales, respondents

are provided with a scale that has a number of brief descriptions associated with each category. The Likert scale, semantic differential scale and Stapel scales are commonly used itemised scales.

The scaling technique employed in this study was the Likert scale. As a general rule, researchers should use the scaling technique that will yield the highest level of information feasible in a given situation and permit using the greatest variety of statistical analyses. Likert scales are mainly used to measure attitudes, and since this study aimed to measure the attitudes of consumers regarding information privacy, the main part of the questionnaire consisted of Likert scales. The Likert scale is a widely used rating scale that requires the respondents to indicate a degree of agreement or disagreement with each of a series of statements about the stimulus objects (Malhotra, 1996:292). Each scale item has five response categories, ranging from 'strongly disagree' to 'strongly agree'. Each response is given a numerical score to reflect its degree of attitude favourableness, and the scores may be totalled to measure the respondent's attitude. The Likert scale was used here because it has several advantages. Likert scales help researchers to compare one respondent's scores with the distribution of scores from a well-defined group, it is easy to construct and administer, and respondents readily understand how to use the scale, making it suitable for telephone interviews (Cooper & Schindler, 2001:234). The main disadvantage of the Likert scale is that it takes long to complete because respondents have to read each statement or, in the case of telephonic interviews, the interviewer has to read each statement to the respondent.

The measurement levels and scaling techniques discussed above were considered during the process of questionnaire design and had an impact on the question structure and wording.

6.5.3 Questionnaire design

Questionnaire design consists of several stages of development. Some of the main stages are discussed below.

6.5.3.1 *Objectives of the questionnaire*

A questionnaire is a formalised set of questions for obtaining information from respondents. A questionnaire has several objectives (Malhotra, 1996:319; Zikmund, 2000:310). First, it must translate the information needed into a set of specific questions that the respondents can and will answer. Second, the questionnaire has to motivate the respondent to co-operate and complete the interview. Third, the questionnaire should minimise response errors such as inaccurate answers. Finally, the questionnaire should collect only relevant information needed to solve the problem. Special attention was paid to the afore-mentioned objectives when the questions for the questionnaire were developed.

6.5.3.2 *Interview method and question content*

After specifying the basic information that is required, the researcher needs to specify how it will be obtained. As has been mentioned earlier, data was collected by means of telephonic interviews where respondents interacted with the interviewer, but did not see the questionnaire. This limited the type of questions that could be asked to short and simple ones. Telephonic interviews were chosen as the data collection method because this method provides a high response rate, is ideal for completing large studies, and was manageable for the researcher in terms of a limited time-frame.

The researcher's objectives and the chosen interview method had an impact on the questions formulated. When deciding on the question content, a researcher should consider the following (Cooper & Schindler, 2001:337):

- Should this question be asked?

- Is the question of proper scope and coverage?
- Can the respondents answer this question adequately, as asked?
- Will the respondents willingly answer this question, as asked?

Careful attention was paid to these questions, ensuring that the objectives would be met using the telephonic interviews.

6.5.3.3 *Question structure*

The structure of a questionnaire is an important consideration in questionnaire design. A questionnaire can be structured into administrative questions, classification questions and target questions (Cooper & Schindler, 2001:333).

- **Administrative questions** identify the respondent, interviewer and conditions. These questions are rarely asked of the respondent but are necessary to study patterns within the data and to identify possible error sources. The questionnaire used in this study allowed for identification of the respondent using a respondent code, the name of the interviewer, the telephone area-code, as well as qualification criteria such as identifying the person in the household who had most recently celebrated a birthday.
- **Classification questions** are usually socio-demographic variables that allow respondents' answers to be grouped so that patterns are revealed and can be classified. This questionnaire contained questions relating to variables such as age, home language, education, employment, income and gender.
- **Target questions** address the investigative questions of a specific study. Target questions may be structured (known as closed questions) or unstructured (known as open-ended questions). With open-ended questions, respondents are free to reply in their own words rather than being limited to choosing from a set of alternatives (Churchill & Iacobucci, 2002:328). A closed question can be dichotomous or multiple-choice (Malhotra, 1996:330). A dichotomous question has only two response alternatives, such as yes or no. A multiple-choice question requires

respondents to choose the alternative that most closely corresponds to their position on the subject, for example, marking the age category that applies to the respondent. This study did not use any open-ended questions. Dichotomous, multiple-choice and scale questions were formulated in the questionnaire.

6.5.3.4 *Question wording*

Question wording is the translation of the desired question content and structure into words that respondents can clearly and easily understand. Ordinary words should be used in a questionnaire, and they should match the vocabulary level of the respondents. Many questions, particularly those measuring attitudes and lifestyles, are worded as statements to which respondents indicate their degree of agreement or disagreement. Evidence indicates that the response obtained is influenced by the directionality of the statements: whether they are stated positively or negatively. In these cases, it is usually better to use dual statements, some of which are positive and others negative (Malhotra, 1996:335). The attitude statements formulated for this study used dual statements, with 32 statements reflecting a positive attitude and sixteen statements reflecting a negative attitude. Careful attention was also given to the wording of the questions for this study. Several 'marketing-related' terms were changed into everyday terminology to match the vocabulary level of the respondents. The questions were also formulated in a 'conversational' manner, since the data was to be collected by means of telephonic interviews.

6.5.3.5 *Question sequence*

Once the structure and wording of questions have been addressed, a researcher can construct the questionnaire. The introduction to the research needs to convince respondents about the importance of the research and the value of their participation. A typical questionnaire contains two types of information, namely basic information and classification information (Churchill & Iacobucci, 2002:345). Basic information refers to the subject of the study, whereas classification information refers to the other data that

are collected to classify respondents in order to extract more information about the phenomenon of interest. The proper questionnaire sequence is to present questions securing basic information first and those seeking classification information last. Since the basic information is the most critical, the researcher should not risk alienating the respondent by asking a number of personal questions before getting to the heart of the study. Questions should also be asked in a logical order. All questions that deal with a particular topic should be completed before beginning a new topic (Malhotra, 1996:337).

6.5.4 Constructing the questionnaire

The survey included 66 questions, some of which inquired about general demographic information, and others about consumers' beliefs, attitudes and behaviour regarding information privacy. All the questions were formulated based on the theoretical discussion on consumer privacy. Information needed to address the problem, research objectives and hypotheses were integrated into the question bank. The questionnaire (see the example in Appendix 1) was divided into five sections:

- Section 1: Qualification and introduction
- Section 2: 45-item Likert scale measurements containing belief, attitude and behaviour intention statements relating to privacy concerns
- Section 3: Privacy Segmentation Index measurement
- Section 4: Behaviour, experience and knowledge measurement
- Section 5: Classification questions

In the next section there is a discussion of the above-mentioned sections in the questionnaire.

6.5.4.1 *Section 1: Qualification and introduction*

The questionnaire was compiled using the guidelines discussed above. The first page of the questionnaire indicated the procedure for the interviewer. The procedure guided the interviewer through the initial process of introduction and qualification. Thereafter, a

background on the study was provided and certain important information such as the confidentiality of the answers was emphasised. Finally, the respondent was prepared for the first set of questions, by explaining the question formats and procedure to be followed.

The next section focuses on the different questions in the questionnaire.

6.5.4.2 Section 2: 45-item Likert scale measurement

The second section of the questionnaire (Questions 1-45) contained the main constructs or dimensions designed to measure information privacy concerns. As was mentioned in Chapter 5, eight main dimensions had been identified and were measured using a 45-item instrument using 5-point Likert scales. The following questions were formulated to address the issue.

(a) Questions 1 and 2

The first two questions in the questionnaire were adapted from a study by Phelps *et al.* (2000). The purpose of the questions was to measure consumers' concerns regarding **data collection**. The items specifically addressed the issue of collecting an excessive amount of personal information, and were structured to represent a **belief** and an **attitude** of a consumer.

(b) Questions 3 and 4

Questions 3 and 4 were adapted from a field experiment by Stone *et al.* (1983). The purpose of these questions was to address consumers' concerns regarding the practice of **data collection** without prior permission from the consumers. Question 3 was worded to represent a **belief** statement, and Question 4 to represent an **attitude** statement.

(c) *Questions 5 and 6*

Questions 5 and 6 aimed to determine how consumers would feel if organisations **collected** their personal information in return for certain benefits. Question 5 was formulated to represent the consumer's general **belief** regarding the issue, and Question 6 to represent the consumer's own **attitude** to the situation. These questions were adapted from a Privacy Concerns and Consumer Choice survey by Louis Harris & Associates and Westin (1998b).

(d) *Questions 7 and 8*

Questions 7 and 8 were adapted from the Privacy Concerns and Consumer Choice survey by Louis Harris & Associates and Westin (1998b). The purpose of these questions was to measure consumers' concerns regarding **data storage**. Specifically consumers' **beliefs** and **attitudes** pertaining to the access they have to their personal information while in the possession of organisations were measured.

(e) *Questions 9 and 10*

Questions 9 and 10 were adapted from a similar question constructed by Campbell (1997). These questions were designed to measure consumers' concerns regarding the accuracy of their information while it is contained (**stored**) in organisations' records. The two questions were formulated to represent the issue from a **belief** as well as from an individual **attitude** perspective.

(f) *Questions 11 and 12*

The next two questions were formulated to address consumers' concerns regarding **data security**. The items were adapted from two previous studies by Harris Interactive (2000; 2002b) on consumer information privacy. The questions were specifically designed to determine consumers' **beliefs** and **attitudes** regarding the safety of their personal information while it is stored on organisations' databases.

(g) *Questions 13 and 14*

Questions 13 and 14 were constructed with the purpose of measuring consumers' **beliefs** and **attitudes** regarding the control they have over the ways organisations **use** their personal information. These questions were adapted from previous studies by Stone *et al.* (1983) and Phelps *et al.* (2000).

(h) *Questions 15 and 16*

The objective of the next two questions was to address consumers' concerns over organisations' **use** of information for other purposes than those provided when the information was collected. The questions were adapted from several previous studies (Culnan, 1993; Campbell, 1997; Harris Interactive, 2002b) and were formulated to represent consumers' **beliefs** and **attitudes** regarding the purpose of information use.

(i) *Questions 17 and 18*

Questions 17 and 18 were adapted from the IBM-Harris Multi-National Consumer Privacy survey (Harris Interactive & Westin, 2000). The questions were designed to measure consumers' concerns regarding the possible **misuse** of their information by organisations. Question 17 was formulated to measure consumers' **beliefs** regarding misuse and Question 18 to measure consumers' personal **attitudes** toward misuse.

(j) *Questions 19 and 20*

These two questions were formulated to address the issue of **data disclosure**. Question 19 aimed to measure consumers' **beliefs** regarding the practice of information-sharing with other organisations without the permission of the consumer to whom the information belongs. The purpose of Question 20 was to measure consumers' **attitudes** regarding the same practice. This concept has been addressed in several previous studies on consumer information privacy concerns and was adapted from previous studies by Nowak and Phelps (1992), Culnan (1993), Taylor *et al.*, (1995) and Campbell (1997).

(k) Questions 21 and 22

Questions 21 and 22 addressed a similar issue as Questions 19 and 20 did (**data disclosure**). Questions 21 and 22 differed from Questions 19 and 20 in that consumers' **beliefs** and **attitudes** were measured when they receive benefits in return for the sharing of their information with other organisations. The questions were adapted from the Privacy Concerns and Consumer Choice survey by Louis Harris & Associates and Westin (1998b).

(l) Questions 23 and 24

A third set of questions addressed **data disclosure** as an issue of concern to consumers. In Questions 23 and 24, consumers were asked whether they **believed** that name removal opportunities existed and whether they were concerned when they were not offered an opportunity to remove their information from records shared with other organisations (**attitude**). These questions were also adapted from the Privacy Concerns and Consumer Choice survey by Louis Harris & Associates and Westin (1998b).

(m) Questions 25 and 26

The purpose of Questions 25 and 26 was to determine consumers' concerns regarding **solicitation**. The questions were adapted from a study by Culnan (1993) and aimed to measure consumers' **beliefs** and **attitudes** about receiving unrequested advertising material that is of no interest to them.

(n) Questions 27 and 28

Questions 27 and 28 were adapted from several previous studies (Vidmar & Flaherty, 1985; Nowak & Phelps, 1992; Louis Harris & Associates & Westin, 1998b). These studies' aim was to measure consumers' **beliefs** and **attitudes** regarding telemarketing (**solicitation**). Since this has proved to be a medium that is very intrusive to consumers, they were questioned about whether they were interested in receiving such telephone calls.

(o) *Questions 29 and 30*

Questions 29 and 30 contained the final **belief** and **attitude** statements of the questionnaire. These questions were formulated to measure consumers' reaction when they receive information (**solicitation**) from organisations they have not done business with before. These questions were adapted from a study by Sheehan (1999).

(p) *Questions 31, 34, 37, 40 and 43*

Five questions were formulated to measure consumers' **expectations regarding government or legislative protection** during stages of **data collection, data security, data use, data disclosure and solicitation**. Question 31 measured respondents' expectations regarding data disclosure, and the question was adapted from previous ones used in several studies (Nowak & Phelps, 1992; Culnan, 1993; Taylor *et al.*, 1995; Campbell, 1997). The purpose of Question 34 was to measure consumers' expectations as to whether government should restrict organisations only to collect the information needed for a specific transaction. This question was adapted from studies by Nowak and Phelps (1992) and Taylor *et al.* (1995). The objective of Question 37 was to establish whether consumers expected government to do more to protect the safety of personal information. The question was adapted from two previous studies by Harris Interactive (2000; 2002b) on consumer information privacy. Question 40 was constructed to gauge consumers' concerns regarding data use and their expectation that government should limit those uses. The question was adapted from a study by Stone *et al.* (1983). The final question measured consumers' expectations regarding government protection (Question 43). This question was adapted from a study by Culnan (1995) and questioned consumers on possible limitations on unrequested advertising material.

(q) *Questions 32, 35, 38, 41 and 44*

Consumers' **behavioural intentions regarding data collection, data security, data use, data disclosure and solicitation** were measured by means of five questions. The first question (Question 32) was adapted from the IBM-Harris Multi-National Consumer Privacy survey (Harris Interactive & Westin, 2000) and determined consumers'

intentions to request an organisation to remove their personal information if they suspected it was being misused. Question 35 was formulated to measure consumers' intentions to support initiatives that would enable them to stop unrequested advertising material. The question was adapted from a study by Sheehan (1999). The purpose of Question 38 was to measure consumers' intentions to remove their information from organisations' records if the organisation sold the information to others. The question was adapted from the Privacy On and Off the Internet survey by Harris Interactive (2002b). Question 41 was constructed to establish the expectations of consumers regarding their support of an organisation's efforts to ensure that their personal information is kept safely. The question was adapted from a study by Harris Interactive (2002a) measuring Americans' fear on the Internet. Question 44 measured the behavioural intentions of consumers when organisations cannot provide reasons for why they want to collect personal information, and was adapted from studies by Culnan (1993) and Campbell (1997).

(r) Questions 33, 36, 39, 42 and 45

The final set of questions to be discussed as part of the 45-item instrument is Questions 33, 36, 39, 42 and 45. All these questions related to consumers' **expectations regarding privacy protection policies** of organisations during stages of **data collection, data security, data use, data disclosure and solicitation**. Question 33 measured consumers' expectations regarding the provision that privacy policies make for unrequested advertising material. The purpose of Question 36 was to establish consumers' expectations of the extent to which privacy policies should indicate their data disclosure practices. Question 39 was formulated to determine consumers' expectations regarding the protection of privacy policies during data collection. Questions 33, 36 and 39 were all adapted from the Privacy Concerns and Consumer Choice survey by Louis Harris & Associates and Westin (1998b). The purpose of Question 42 was to measure whether consumers expected organisations to use independent auditing firms to verify their privacy policies. Question 45 was included to gauge consumers' expectations regarding protection of their personal information while

it was in the possession of organisations. Both Questions 42 and 45 were adapted from the Privacy On and Off the Internet by Harris Interactive (2002b).

6.5.4.3 *Section 3: Privacy Segmentation Index (Questions 46, 47 and 48)*

Alan Westin and Louis Harris & Associates created a Privacy Segmentation Index in 1995 (Harris Interactive, 2002b:20). The third section in the questionnaire contained the three questions from the Privacy Segmentation Index. This index was in the format of 4-point Likert scales ranging from 'strongly disagree' to 'strongly agree'. Respondents who strongly agreed or slightly agreed with the statement Question 46, and strongly disagreed or slightly disagreed with the statements in Questions 47 and 48, were grouped into one segment. Respondents who strongly disagreed or slightly disagreed with the statement in Question 46, and strongly agreed or slightly agreed with the statements in Questions 47 and 48 were grouped into the second segment. All the remaining options formed the third segment.

6.5.4.4 *Section 4: Behaviour, experience and knowledge measurement (Questions 49 to 60)*

Section Four of the questionnaire contained dichotomous questions asking consumers certain questions to which they had to answer 'yes' or 'no'. Questions 49 to 60 measured consumers' actual protective behaviours, experiences of privacy invasion, knowledge of specific data practices, as well as Internet and direct marketing behaviours. Questions 49 to 53 were constructed to measure consumers' behaviour to protect their personal information during the stages of data collection, data security, data use, data disclosure and solicitation. These questions were adapted from several previous studies that measured concerned consumers' behaviour (Campbell, 1997; Sheehan, 1999; Harris Interactive & Westin, 2000; Harris Interactive, 2002b). Question 54 determined how many consumers had personally been a victim of privacy invasion. This question was addressed in various previous studies (Culnan, 1995; Campbell, 1997; Harris Interactive & Westin, 2000; Louis Harris & Associates & Westin, 1998b).

The purpose of Question 55 was to establish whether consumers were aware of any options to remove their names from records of organisations. This item was adapted from studies by Culnan (1993), and Milne and Boza (1999). Questions 56 and 57 were uniquely formulated for this study and the objective was to determine how many consumers had purchased via the Internet or had made use of Internet banking services. The last three questions of Section Four (Questions 58 to 60) were formulated to measure consumers' involvement with direct marketing, and were adapted from the Privacy Concerns and Consumer Choice survey by Louis Harris & Associates and Westin (1998b) for this study.

6.5.4.5 *Section 5: Classification questions (Questions 61 to 67)*

Section Five was the last section of the questionnaire and contained classification questions. The following socio-demographic characteristics were measured in Questions 61 to 67: age, home language, level of education, employment status, monthly income, gender and ethnic orientation. These questions were used to identify significant differences between respondents' socio-demographic characteristics and their privacy concerns.

The above section discussed the design of the questionnaire and the construction of specific questions. To place the different questions and its purpose into perspective, Table 6.2 provides an overview of the secondary objectives and hypotheses, and how they relate to the different questions in the measurement instrument. Table 6.2 serves to link the questions in the questionnaire with the secondary research objectives and research hypotheses (as discussed in Chapter 5, Sections 5.3 and 5.4).

Table 6.2 Summary of objectives, hypotheses and questions

Questions linked to secondary objectives and hypotheses	
Objectives	Questions
(SO2) To establish differences between consumers' manifest behaviours to protect their privacy and their privacy concerns. <i>H₁: There is a significant difference between consumers in terms of their protective behaviour and their privacy concerns.</i>	1-45 & 49-53
(SO3) To establish differences between consumers in terms of their personal experiences of invasions of privacy and their privacy concerns. <i>H_{2a}: There is a significant difference between consumers who have been victims of invasions of privacy and consumers who have not been victims of invasions of privacy in terms of their privacy concerns.</i>	1-45 & 54
(SO4) To establish the dependency between gender and personal experiences of invasions of privacy. <i>H_{2b}: There is a dependency between being a victim of invasion of privacy and gender.</i>	54 & 66
(SO5) To establish differences between consumers in terms of their knowledge about information protection practices and their privacy concerns. <i>H_{3a}: There is a significant difference between consumers in terms of their level of awareness of name removal procedures and their privacy concerns.</i>	1-45 & 55
(SO6) To establish the dependency between age and knowledge about information protection practices. <i>H_{3b}: There is a dependency between the level of awareness of name removal procedures and age.</i>	55 & 61
(SO7) To establish the dependency between level of education and knowledge about information protection practices. <i>H_{3c}: There is a dependency between the awareness of name removal procedures and levels of education.</i>	55 & 63
(SO8) To establish differences between consumers in terms of their Internet usage and their privacy concerns. <i>H₄: There is a significant difference between Internet users and Internet non-users in terms of their privacy concerns.</i>	1-45 & 56-57

Objectives	Questions
(SO9) To establish differences between consumers in terms of their direct purchasing behaviour and their privacy concerns. <i>H₅: There is a significant difference between direct shoppers and non-direct shoppers in terms of their privacy concerns.</i>	1-45 & 58-60
(SO10) To classify consumers into different privacy sensitive segments based on their general privacy concerns. <i>H₆: The proportion of South African consumers is not equally represented in the different privacy segments.</i>	46-48
(SO11) To identify differences between consumers in terms of their demographic characteristics and their privacy concerns. <i>H_{7a}: There is a significant difference between young and old people in terms of their privacy concerns.</i> <i>H_{7b}: There is a significant difference between the main language groups in terms of their privacy concerns.</i> <i>H_{7c}: There is a significant difference between consumers in terms of their levels of education and their privacy concerns.</i> <i>H_{7d}: There is a significant difference between consumers in terms of their employment status and their privacy concerns.</i> <i>H_{7e}: There is a significant difference between consumers in terms of their income levels and their privacy concerns.</i> <i>H_{7f}: There is a significant difference between males and females in terms of their privacy concerns.</i>	1-45 & 61, 62, 63, 64, 65, 66, 67

6.5.5 Pre-testing the questionnaire

The acid test of a questionnaire is how it performs under real conditions of data collection. For this assessment, the questionnaire pre-test is vital (Churchill & Iacobucci, 2002:351). The pre-test can be used to assess both individual questions and their sequence. An important purpose of pre-testing is to discover the respondents' reactions to questions. Pre-testing should help to discover where repetitiveness or redundancy occurs and is bothersome. In telephonic interviews the sound of the question and its transition must be fluid as well. Most draft questionnaires or interview schedules suffer from lengthiness. By timing each question and section, the researcher is in a better

position to make decisions about modifying or cutting material. Given the fact that the data for this study was to be collected by means of telephonic interviews, consideration was given to the length of the questionnaire, since telephone interviews are labour intensive and an accurate estimate of elapsed time had to be made. A lengthy telephone questionnaire could also contribute to fatigue or boredom by the respondents. The purpose of the pre-testing was thus twofold: first to test the questionnaire, and second to determine the interview time.

The questionnaire was refined after conducting a pilot test across a sample of 20 respondents, drawn from the identified sampling frame. The length of the interview proved to be between 15 minutes and 25 minutes, depending on the respondent. Interviewers alerted respondents to their involvement in a preliminary test of the questionnaire, enlisting the respondents as collaborators in the refinement process. According to Cooper and Schindler (2001:361), detailed probing of the parts of the questionnaire, including phrases and words, is appropriate under pre-testing conditions.

The pre-testing resulted in the following:

- The Likert scale-typed questions were initially worded in a first-person statement format. An example is: 'I do not mind to provide a lot of personal information if I think it is necessary.' Some respondents indicated that they were uncertain to whom the 'I' referred to in these statements. Did the 'I' refer to themselves, or to the interviewer? It was decided to change all the 'I' statements, to 'you' statements. For example: 'You do not mind to provide a lot of personal information if you think it is necessary.' Given the conversational nature of telephone interviews, formulating the statement as a 'you' statement would seem to be clearer to the respondent at the other end.
- Several respondents indicated that there seemed to be repetition in the questions. When measuring attitudes, researchers often ask several similar (but not the same) questions for the purpose of reliability. As a result of these comments, a decision was made to group similar questions together. Grouping questions that dealt with similar topics together eliminated the sense of repetition and seemed to create a more logical sequence for the respondents.

- Overall, the survey questions proved to be understandable and meaningful to the target population.

An example of the questionnaire used for pre-testing is appended in Appendix 2.

6.5.6 Coding and editing

Coding means assigning a code, usually a number, to each possible response to each question. The code includes the indication of the column position and the data record it will occupy. For example, the gender of respondents can be coded as 1 for females, and 2 for males (Malhotra, 1996:475). Assigning numerical symbols permits the transfer of data from the survey to the computer (Zikmund, 2000:421). Since the questionnaire contained only structured questions, it was pre-coded. This means that codes were assigned before the fieldwork was conducted. The respondent code and the record number also appeared on each record in the data.

Editing is the review of questionnaires with the objective of increasing accuracy and precision. It consists of screening questionnaires to identify illegible, incomplete, inconsistent or ambiguous responses. Treatment of unsatisfactory responses is commonly handled by returning to the field to get better data, assigning missing values and discarding unsatisfactory respondents (Malhotra, 1996:473). Questionnaires with unsatisfactory responses may be returned to the field, where the interviewers contact the respondents again. If returning the questionnaires to the field is not feasible, the researcher may assign missing values to unsatisfactory responses. Another approach is to discard the unsatisfactory responses. The treatment of unsatisfactory responses is addressed from a statistical perspective in the next section.

6.6 STATISTICAL PROCEDURES USED

Data was captured on a database and stored in ASCII-format. The data was also subjected to a verification process in order to eliminate non-response and data

capturing mistakes. The ASCII-file was prepared for data processing using the SAS computer statistical software package.

6.6.1 Data cleaning

A researcher may be confronted with various missing responses that need to be addressed before data analysis can commence. Missing responses represent values of a variable that are unknown: either because respondents provided ambiguous answers; or because their answers were not properly recorded (Malhotra, 1996:481). There are various approaches to deal with missing responses by either preserving missing or blank spaces, or by assigning values to missing data.

- **Casewise deletion** is one method of treating missing responses. Here the respondent (case) is removed if any of the answers are identified as missing. If 75 per cent or more of a questionnaire is not completed, a researcher employs casewise deletion (Dillon *et al.*, 1993:349).
- **Pairwise deletion** is a method of handling missing values in which all cases or respondents with any missing values are not automatically discarded, but only the respondents with complete responses are considered (Malhotra, 1996:482).
- A **mean response** is an approach that involves replacing the missing response with a constant mean, median or mode response of all the other respondents to the question (Dillon *et al.*, 1993:372).
- An **imputed response** is an approach where the respondent's answer to other questions is used to impute or deduce an appropriate response to the missing question. This can be done statistically by determining the relationship of the variable in question to other variables based on the available data (Malhotra, 1996:482).

The researcher can decide to use casewise deletion, pairwise deletion or mean response, depending on the statistical technique used and the extent of the missing data.

6.6.2 Descriptive statistics

Descriptive analysis refers to the transformation of the raw data into a form that is easy to understand and interpret (Zikmund, 2000:437). Describing responses or observations is typically the first form of analysis. The calculation of averages, frequency distributions, and percentage distributions is the most common form of summarising data. The following are the main statistical procedures that were considered for use in the data analysis.

6.6.2.1 *Frequency distributions*

In a frequency distribution, one variable is considered at a time. The objective is to obtain a count of the number of responses associated with different values of the variable. A frequency distribution for a variable produces a table of frequency counts, percentages and cumulative percentages for all the values associated with that variable. It also indicates the shape of the empirical distribution of the variable and can be used to construct histograms (Malhotra, 1996:504). The most commonly used statistics associated with frequencies are the mean, mode, median and standard deviation.

(a) The mean

The mean is the arithmetic average of a variable (Sudman & Blair, 1998:456) and a measure of central tendency for interval- and ratio-scaled data (Dillon *et al.*, 1993:374). The researchers can make use of mean values on the Likert scaled questions in order to determine the mean scores for the total sample and to make comparisons between different demographic characteristics.

(b) The variance and standard deviation

The variance is the average squared distance between the values of individual observations and some variable and the mean of that variable (Sudman & Blair, 1998:459). The standard deviation is the positive square root of the variance (Malhotra,

1996:508). Variances and standard deviations can be used to determine whether mean differences between groups can be regarded as significantly different or not.

6.6.2.2 *Cross-tabulation*

Analysing results by groups, categories, or classes is known as the technique of cross-tabulation (Zikmund, 2000:439). The purpose of cross-tabulation is to allow the inspection of differences between groups and to make comparisons. Cross-tabulation was used by in this study to allow for a determination of relationships or associations between variables.

6.6.3 **Multivariate statistics**

Multivariate statistical methods allow the effects of more than one variable to be considered at one time (Zikmund, 2000:533). Multivariate techniques can be classified into two groups, namely dependence and interdependence techniques. Typical dependence techniques include multiple regression analysis, multiple discriminant analysis, multivariate analysis of variance and canonical correlation analysis. These are techniques where criterion or dependent variables and predictor or independent variables are present. Interdependence techniques include factor analysis, cluster analysis, and multidimensional scaling. These are techniques in which the whole set of interdependent relationships is examined (Malhotra, 1996:645).

Factor analysis as an interdependent multivariate technique was used as a data analysis procedure in this study. Factor analysis is a general term for several specific computational techniques. The objective of this technique is to reduce the variables to a manageable number that belong together and have overlapping measurement characteristics (Cooper & Schindler, 2001:591). Mathematically, factor analysis is somewhat similar to multiple regression in that each variable is expressed as a linear combination of underlying factors. The general purpose of factor analysis is to summarise the information contained in a large number of variables into a smaller

number of factors (Zikmund, 2000:544). The following steps were followed to conduct the factor analysis (Malhotra, 1996:648):

- Specify the variables to be included in the factor analysis.
- Construct the correlation matrix.
- Choose the method of factor analysis.
- Determine the number of factors.
- Rotate the factors.
- Interpret the factors.
- Calculate the factor scores.
- Determine the model fit.

One of the research objectives (as identified in Chapter 1) was to measure South African consumers' beliefs, attitudes, behavioural intentions and expectations toward data collection, data storage, data use, data disclosure and solicitation. The purpose for the factor analysis in this study was to uncover the underlying dimensions of consumers' information privacy concerns.

6.6.4 Hypotheses testing

In statistical theory, a hypothesis is an unproven proposition or supposition that tentatively explains certain facts or phenomena. A hypothesis is a statement, an assumption, about the nature of the world (Zikmund, 2000:459). A null hypothesis is a statement about a *status quo*. An alternative hypothesis states that there are differences and it is the opposite of the null hypothesis. The purpose of hypothesis testing is to determine whether the null hypothesis can be rejected, which in turn provides support for the alternative hypothesis. Whenever inferences are drawn about a population, there is a risk that an incorrect conclusion may be reached. Two types of errors can occur (Malhotra, 1996:512). A Type I error occurs when the sample results lead to the rejection of the null hypothesis when it is in fact true. A Type II error occurs when, based on the sample results, the null hypothesis is not rejected when it is in fact false.

Several hypotheses have been identified in Chapter 5 and were tested following the steps below (Malhotra, 1996:511; Cooper & Schindler, 2001:493):

- Formulate the null hypothesis and the alternative hypothesis.
- Select an appropriate statistical technique and the corresponding test statistic.
- Choose the level of significance.
- Calculate the value of the test statistic.
- Interpret the test and make the statistical decision to reject or not reject the null hypothesis.
- Express the statistical decision in terms of the marketing research problem.

There are two general classes of significance tests, namely parametric and non-parametric (Cooper & Schindler, 2001:496). Parametric tests are more powerful because their data are derived from interval and ratio measurements. Non-parametric tests are used to test hypotheses with nominal and ordinal data. Parametric tests were to be the preferred tests of choice for the test of significance for this study, provided that their assumptions are met. The following were typical tests for consideration in this study: chi-square tests, analysis of variance (ANOVA), and multiple analyses of variance (MANOVA). The researcher was responsible for reviewing the assumptions pertinent to the chosen test before conducting the analysis.

Despite specific results from hypothesis testing and factor analysis, a study has to pay attention to the validity and reliability of the measurement instrument. Some of the main validity and reliability techniques are discussed in the following section.

6.6.5 Validity and reliability

Validity and reliability are criteria for evaluating a measurement tool and are briefly discussed below.

6.6.5.1 *Reliability*

Reliability refers to the extent to which a scale produces consistent results if repeated measurements are made (Malhotra, 1996:304). Two dimensions underlie the concept of reliability, namely repeatability and internal consistency (Zikmund, 2000:280). The repeatability of a measure can be assessed using the test-retest method. This involves administering the same scale or measure to the same respondents at two separate times to test for stability. The second dimension of reliability concerns the homogeneity of the measure. An attempt to measure an attitude may require asking several similar questions or presenting a battery of scale items. To measure the internal consistency of a multiple-item measure, scores on subsets of the items within the scale are correlated. One technique measuring internal consistency is Cronbach's coefficient alpha. The final items derived from the factor analysis were tested for their reliability by submitting them to item analysis and a Cronbach alpha assessment. Cronbach's coefficient alpha is a very suitable assessment of the reliability of the construct indicators because it has the most utility for multi-item scales at the interval level of measurement (Cooper & Schindler, 2001:217).

6.6.5.2 *Validity*

The validity of a scale may be defined as the extent to which differences in observed scale scores reflect true differences among objects on the characteristic being measured, rather than the systematic or random error (Malhotra, 1996:306). Researchers may assess content validity, criterion validity, or construct validity.

- **Content validity** consists of a subjective but systematic evaluation of the representativeness of the content of a scale for the measuring task at hand. If the instrument contains a representative sample of the universe of subject matter of interest, then content validity is acceptable. Determination of content validity is judgemental and can be approached in several ways. First, the researcher may determine it through a careful definition of the topic of concern, the items to be scaled and the scales to be used. A second way to determine content validity is to

use a panel of persons to judge how well the instrument meets the standards (Cooper & Schindler, 2001:212).

- **Criterion validity** examines whether the measurement scale performs as expected in relation to other variables selected as meaningful criteria. One source suggests that any criterion measure must be judged in terms of four qualities: relevance, freedom from bias, reliability and availability (Cooper & Schindler, 2001:1996:213).
- **Construct validity** addresses the question of what construct or characteristic the scale is measuring. In attempting to evaluate construct validity, both the theory and the measuring instrument are considered. Construct validity is the most difficult type of validity to establish (Churchill & Iacobucci, 2002:351). As a confirmatory procedure, factor analysis is primarily a method for assessing the construct validity of measures. Construct validity is supported if the factor structure of the scale is consistent with the constructs the instrument purports to measure (Floyd & Widaman, 1995:287).

To report the validity of the results for this study, the researcher assessed the construct validity of the measurement instrument. Confirmatory factor analysis (CFA) was used, since this analysis is, in its purest form, a form of validation. CFA is the predominant method of analysis found in the literature concerning validation studies, particularly when validating the internal factor structure of a newly developed test instrument (Steenkamp & Van Trijp, 1991:283; Hair *et al.*, 1998:114, 247; Burgers, De Ruyter, Keen & Streukens, 2000:154; Ferrara, 2000:102). More specifically, the construct validity was assessed by determining the unidimensionality, reliability, convergent validity, and discriminant validity of the measurement instrument. Unidimensionality can be defined as the existence of one construct underlying a set of items, and has been recognised as one of the critical and basic assumptions of measurement theory (Hattie, 1985:139). Convergent validity is demonstrated when a measure has relatively high correlations with other measures of the same common factor (Hair *et al.*, 1998:118). Another method to assess construct validity is to estimate the reliability (Steenkamp & Van Trijp, 1991:290; Burgers *et al.*, 2000:155) and variance-extracted measures (Hair *et al.*, 1998:611; Smith, Milberg & Burke, 1996:185) for each construct to assess whether

the specified indicators are sufficient in their representation of the constructs. Discriminant validity is determined by demonstrating that a measure does not correlate very highly with another measure from which it should differ (Peter, 1981:136).

6.7 SUMMARY

This chapter has provided a description of the various data sources and data collection methods, focusing on telephonic interviews as the preferred method of data collection. Special attention was paid to the sampling procedure, with systematic sampling as the chosen probability sampling method. Most of the chapter focused on the development of the questionnaire as the measurement instrument relating to objectives and hypotheses. Finally, the statistical procedures that were used for data analyses were briefly discussed.

In the next chapter the results and hypotheses testing of the data were discussed.