CHAPTER 6
RESEARCH DESIGN AND PROCEDURE

"A research project is a specific research investigation; a study that completes or is planned to follow stages in the research process" (Zikmund, 2000: 59).

6.1 INTRODUCTION

Chapter five was devoted to a description of the problem statement and the various research propositions. This chapter presents the research process and approach planned for the empirical study. The research methodology will be discussed with special reference to data collection, questionnaire design and statistical procedures to be used.

6.2 THE DATA SOURCES

There are two types of data sources, primary and secondary data (Cooper and Schindler, 1998: 256). Primary data is original data collected specifically for the purpose of the research in question. Researchers gather secondary data for their own purposes, which can be used for the purposes of the research in question. Secondary data may be obtained from internal organisation sources or from external sources. This study will rely on both primary research and secondary data as sources.

6.3 DATA COLLECTION METHODS

The nature of research can be either qualitative or quantitative. Qualitative research is an unstructured, exploratory research method based on small samples intended to provide insight and understanding of the problem setting (Malhotra, 1996: 164). 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).

The primary research data required for this research is firstly of a qualitative nature in order to derive issues to be included in the questionnaire. Qualitative research will be followed by quantitative research.

The qualitative research will be executed by means of personal interviews with selected manufacturers and retailers with the main aim to identify important aspects to be included in the questionnaire (measurement instrument).

Various methods of collecting primary research data exist namely: mail based self-administered questionnaires, telephone interviews, personal interviews (face-to-face) and focus groups.

Dillon et al (1993: 158-164) provide the factors that the researcher can consider during the selection of the best survey method. These factors are depicted in Table 6.1.

Table 6.1: A summary of the data collection methods

Criteria	Mail	Telephone	Face - to face
Versatility	Not much	Substantial but complex or lengthy scales are difficult to use	Highly flexible
Quantity of data	Substantial	Short, lasting typically between 15 and 30 minutes	Greatest quantity
Sample control	Little	Good, but non-listed households can be a problem	In theory, provides greatest control
Quality of data	Better for sensitive or embarrassing questions; no interviewer present to clarify what is being asked	Positive side: interviewer can clear up any ambiguities. Negative side: may lead to socially accepted answers	There is the possibility of cheating
Response rate	In general, low; as low as 10%	60 - 80%	Greater than 80%
Speed	Several weeks	Large studies can be completed in 3 to 4 weeks	Faster than mail but typically slower than telephone surveys
Cost	Inexpensive	Not as low as mail; depends on incidence rate and length of questionnaire	Can be relatively expensive, but considerable variability
Uses	Executive, industrial, medical and readership studies	Particularly effective in studies that require national samples	Still prevalent in product testing and other studies that require visual cues or product prototypes

Adapted from: Dillon, Madden, and Firtle (1993: 173)

The criteria will be discussed in the next section.

- **Versatility**

Versatility refers to the extent to which the survey method can handle different

question formats and scenarios.

- **Quantity of data**

Quantity refers to the amount of information that can be collected.

- **Sample control**

Sample control refers to the ease or difficulty of ensuring that desired respondents are contacted.

- **Quality of data**

Quality of data refers to the accuracy of the data collected using a particular data-collection method.

- **Response rate**

The response rate is calculated by the number of responses divided by the sample size.

- **Speed**

Speed refers to the total time it takes to complete the study by using a particular data-collection method.

- **Cost**

Cost refers to the cost per completed interview.

- **Uses**

Uses refer to the how the collected data will be used.

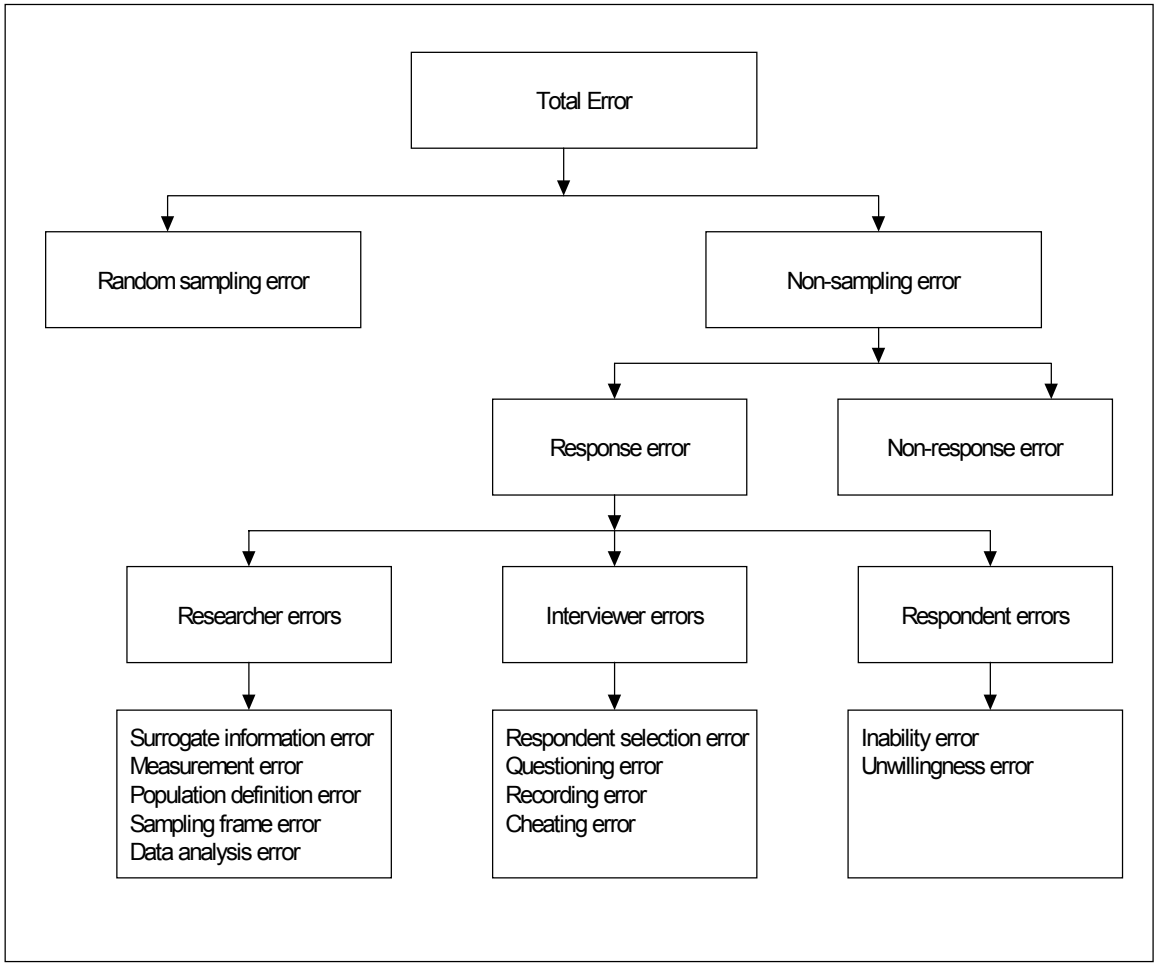
The researcher has chosen the face-to-face or personal interviewing method after carefully considering the above-mentioned criteria. The most important criteria that led to the choice of personal face-to-face interviewing is the quality of the data required. A comprehensive discussion on personal face-to-face interviewing will be done in paragraph 6.6.

6.4 POTENTIAL SOURCES OF ERRORS IN RESEARCH DESIGN

The usefulness of the collected data and the data analysis for this study will depend on the overall quality of the research design. Errors may occur in the research design and will have an influence on the various stages in the research process. Figure 6.1 identifies the types of errors that can affect

research design. A total error, a random sampling error and a non-sampling error will be discussed in paragraph 6.4.1.

Figure 6.1: Errors in research design



Adapted from: Malhotra (1996: 100)

The different errors will be discusses in the next section.

6.4.1 Total error

Malhotra (1996: 100) defines a total error as the total variation between the true mean value in the population of the variable of interest and the observed mean value obtained in a marketing research project. A total error can be divided into a random sampling error and a non-sampling error.

(a) Random sampling error

A random sampling error occurs when a particular selected sample is an

imperfect representation of the population of interest. A random sampling error may be defined as the variation between the true mean value for the sample and the true mean value of the population (Malhotra, 1996: 102)

(b) Non-sampling errors

Malhotra (1996: 102) described a non-sampling error as one that can be attributed to sources other than sampling and it can be random or non-random. Non-sampling errors consist of response errors and non-response errors

(i) Response errors

Malhotra (1996: 102) defines a response error as the variation between the true value mean of the variable in the net sample and the observed mean value obtained in a marketing research project. A response error is a non-sampling error arising from respondents who do respond but give inaccurate answers or whose answers are misrecorded or misanalysed. Researchers, interviewers or respondents can make response errors.

(ii) Non-response errors

Malhotra (1996: 102) defines a non-response error as the variation between the true value mean of the variable in the original sample and the true mean value in the net sample. A non-response error occurs when some respondents included in the sample do not respond. Non-responses will cause the obtained sample to be different in size or composition from the original sample.

6.4.2 Dealing with non-responses

According to Sudman and Blair (1999: 275) there has been a disturbing trend of a steady decline in sample co-operation in the past quarter of the century. There is a broad range of reasons most of which are not under the control of the researcher. The question arises whether careful probability design methods are valid and useful if co-operation rates continue to drop. Sudman et al (1999: 27) believe that reasonably high-quality samples will continue to be possible but they will only be achieved with greater effort and cost. New

methods are needed but will probably be more expensive than existing methods. The new methods will be justified if they significantly improve the quality of information obtained.

On the basis of the above trend Sudman et al (1999) suggest the following possibilities:

- More contact attempts to locate respondents.
- Greater use of mixed modes to obtain co-operation
- Higher compensation to interviewers and respondents.
- As co-operation declines, it will become increasingly important that intensive efforts be made to get a sample of previous non-respondents so that better post-survey adjustments of data are possible.
- Current statistical efforts to adjust for non-co-operation as well as for imputation of missing data will be intensified and improved as problems grow worse, as seen in Groves (1989) and Rubin (1986).

To reduce any possible non-response errors in this research it will be necessary that all the selected individual elements be contacted.

6.5 SAMPLING

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). The population in question is all small organisations in South Africa and the sample is a subset of this particular population as mentioned in chapter one.

Sampling, whether consumer or business, is thus appropriate when the population size is large and if the cost and time associated with obtaining information from the population is high. Sudman and Blair (1999: 273) identified several issues that distinguish business samples from consumer samples:

- The most significant distinguishable issue is the enormous variability in the

size of business organisations. The most commonly used method to sample businesses according to size is to use annual sales.

- The second sampling issue is deciding what is the appropriate unit within the organisation to study.
- The third issue is determining who within the organisation are the appropriate respondents or informants.

The researcher considered the three aspects above and has chosen small organisations based on the number of employees (11 – 50). Manufacturers and dealers were chosen based on their contribution to the percentage of people employed per province and the contribution to GDP to be discussed later in this chapter. Finally the researcher decided that the person in the organisation responsible for marketing decision-making would complete the questionnaire.

There has been a substantial increase in research volume, especially in the areas of customer satisfaction and new product evaluation during the past 20 years. The procedural developments include disk-by-mail and e-mail surveys. There was however, no change in sampling issues and sampling procedures.

Before the steps in the sampling process are discussed it is essential to describe the population and to define terminology that will be used:

- **Population (universe)**

A population or universe is the aggregate of all elements. According to Martins et al (1996: 251) the population must be defined in terms of the element, sample units, time and size. The population selected in this study is all large, medium and small organisations in South Africa across all the Standard Industrial Classification (SIC) of all economic activities. See Table 6.2 in the next section for a detailed description of the population used in this study.

- **Survey population**

The survey population is described by Martins et al (1996: 252) as the aggregate of elements from which the sample is drawn. In practice one seldom finds complete lists or records of all the elements. The sample has to be drawn from lists that do not always contain all of the elements.

There will be a difference between the survey population and the population or universe. The survey population selected for this study is all small organisations in South Africa. Small organisations were selected based on their contribution of nearly 57% of the people employed in the private sector in South Africa and a 42% contribution to the Gross Domestic Product (Ntsika, 1999: 49-51).

- **Sample frame**

A sample frame is a record of all the sample units available for selection at a given stage in the sampling process. A frame may be a register of industries or merchants, a telephone directory or even a map (Martins et al, 1996: 252). Each phase in the sampling process requires its own frame.

According to Martins et al (1996: 252) a reliable sample frame meets several requirements:

- It represents all the elements of the population.
- There is no duplication of elements.
- It is free from foreign elements.

The sample frame selected for this study is the small manufacturers and dealers (wholesalers and retailers) in Gauteng. See paragraph 6.5.2 for a description of the selection of the sample frame.

- **Element**

An element is the unit about which information is needed (Martins et al, 1996: 251). The sample element selected is all manufacturers and dealers (wholesalers and retailers) on a national basis, employing 11 – 50 people.

- **Sample unit**

Martins et al (1996: 251) describe a sample unit as the unit for selection at some stage of the sampling process. The sample unit selected is all small manufactures and dealers (wholesalers and retailers) in Gauteng, with 11 – 50 employees.

There are six distinctive steps in sampling (Martins et al, 1996: 252):

Step 1: Defining the population
Step 2: Identifying the sample frame
Step 3: Selecting the sampling method
Step 4: Determining the sample size
Step 5: Selecting the sample elements

The six steps will now be discussed in the context of the research scope:

6.5.1 Defining the population

The population comprises of all large, small and medium organisations in South Africa. Statistics South Africa, Ntsika (1999) and The Bureau of Market Research (BMR) were contacted to obtain relevant information on the population.

The Standard Industrial Classification (SIC) published in the form of 12 BMR registers was chosen based on the recency of the information. See Table 6.2 for the national breakdown according to the BMR registers.

Table 6.2: National distribution of large, medium and small organisations in South Africa based on employment size

BMR Registers	Micro	Small	Medium	Large	Head offices	Total
Agricultural	-	-	-	-	-	13 574
Mining	339	189	87	48	27	690
Manufacturing	4293	5323	2761	1445	668	14490
Construction	4519	2266	682	253	11	7731
Dealers (wholesalers and Retailers)	21 236	7219	553	304	89	29 701
Financing	-	-	-	-	289	289
Hotel and guest houses	878	976	401	84	0	2339
Business Services	2005	1459	80	30	0	4839
Public sectors	-	-	-	-	-	1141
Importers	-	-	-	-	-	6445
Exporters	-	-	-	-	-	3805
Associations and trade unions	-	-	-	-	-	3839
* Incompletes	-	-	-	-	-	8115
TOTAL						**96 998**

Source: BMR – Report –245

- **Special note**: * Incompletes are organisations not assigned to SIC classifications based on criterion purposes.

Small, micro and medium size organisations represent 56.97% (55 266/96 998) of the national distribution depicted in Table 6.2.

The national distribution as depicted in Table 6.2 was based on employment size as illustrated in Table 6.3 below.

Table 6.3: BMR Register and employment size

BMR Registers	Numberof employees			
	Micro	Small	Medium	Large
Mining	1 - 50	51 - 500	501 - 3000	3000+
Manufacturing	1 - 10	11 - 50	51 - 200	200+
Construction	1 - 10	11 - 50	51 - 200	200+
Dealers (wholesalers and Retailers)	1 - 10	11 - 50	51 - 100	100+
Hotel and guest houses	1 - 10	11 - 50	51 - 250	251+
Business Services	1 - 8	9 - 70	71 - 150	151+
Agricultural, Financing, Public sectors, Associations, Importers, Exporters, Trade unions and Incompletes	No employee classification criteria exists			

Source: BMR – Report –245

It is evident from Table 6.3 that various Registers can not be classified according to the number of employees. For example, the Import and Export registers are classified according to the Rand value of imports and exports annually.

The Registers depicted in Table 6.3 list the names and addresses of institutions and establishments in the major sectors of the economy in South Africa. Each listing includes size indicators such as number of employees and electricity consumption, SIC code and district code (Martins et al, 1996: 112).

6.5.2 Identification of the sample frame

The quantitative criteria as described in Table 6.3 seek to distinguish between the following size classes: micro, small, medium and large organisations.

The sample units are the small manufacturers and dealers in Gauteng with between 11 and 50 employees. This criterion of the number of employees is based on the classification by the State of Small Businesses in South Africa (Ntsika, 1999: 41) as depicted in Table 6.4. The quantitative criteria in Table 6.4 however, seek to distinguish between the following size classes: micro, very small, small and medium organisations based on the criteria related to employment, turnover and asset value.

It is evident from Table 6.4 that there is no uniform classification of small and medium organisation according to employment number across the SIC sectors. The upper limited for medium organisations is 100 employees except for Mining and Quarrying, Manufacturing and Construction. For all the other SIC sectors medium organisations employ up to 100 employees. Small organisations employ 50 and less employees across all the SIC sectors. The upper limited for very small organisations is 10 employees except for Mining and Quarrying, Manufacturing and Construction. For all the other SIC sectors medium organisations employ up to 10 employees. The classification of micro organisations are uniform based on an upper limit of 5 employed employees.

Table 6.4: National Small Business Act classification of organisations

Column 1 Sector or Sub-sectors in accordance with the SIC	Column 2 Size-Class	Column 3 Total full-time equivalent of employees (Less than)	Column 4 Total annual turnover (Less than)	Column 5 Total gross asset value (fixed property excluded) (Less than)
Agriculture	Medium Small Very small Micro	100 50 10 5	R 2.80m R 1.25m R 0.25m R 0.15m	R 2.80m R 1.25m R 0.25m R 0.10m
Mining and Quarrying	Medium Small Very small Micro	200 50 20 5	R 40.00m R 10.00m R 4.00m R 0.15m	R 30.00m R 7.50m R 3.00m R 0.10m
Manufacturing	Medium Small Very small Micro	200 50 20 5	R 25.00m R 6.00m R 2.00m R 0.15m	R 7.50m R 1.75m R 0.60m R 0.10m
Construction	Medium Small Very small Micro	200 50 20 5	R 18.00m R 4.00m R 0.50m R 0.15m	R 3.50m R 0.80m R 0.20m R 0.10m
Retail and Motor Trade and Repair Services	Medium Small Very small Micro	100 50 10 5	R 25.00m R 12.50m R 2.50m R 0.15m	R 3.00m R 1.50m R 0.25m R 0.10m
Wholesale Trade, Commercial Agents and Allied Services	Medium Small Very small Micro	100 50 10 5	R 70.00m R 35.00m R 6.00m R 0.15m	R 12.00m R 6.00m R 1.00m R 0.10m
Catering, Accommodation and Other Trade	Medium Small Very small Micro	100 50 10 5	R 8.00m R 5.00m R 1.00m R 0.15m	R 1.50m R 0.60m R 0.15m R 0.10m
Transport, Storage and Communications	Medium Small Very small Micro	100 50 10 5	R 12.00m R 6.00m R 1.20m R 0.15m	R 3.00m R 1.20m R 0.25m R 0.10m
Finance and Business Services	Medium Small Very small Micro	100 50 10 5	R 10.00m R 3.00m R 0.50m R .015m	R 2.00m R 0.60m R 0.20m R 0.10m
Community, Social and Personal Services	Medium Small Very small Micro	100 50 10 5	R 9.00m R 4.50m R 0.45m R 0.15m	R 4.50m R 2.25m R 0.40m R 0.10m

Source: Ntsika (1999: 41)

For this research employment size has been selected because it is the most stringent criterion and it is used most often to distinguish between small and large organisations (Ntsika: 1999: 41).

According to Ntsika (1999: 53) Gauteng alone accounts for 47% of all large organisations, 46% of medium organisations and 44% of small organisations. According to the BMR (Report 245) Gauteng accounts for 28.25% (27403/96998) of all organisations in South Africa as depicted in Table 6.5 below. Based on these contributions, **Gauteng** was selected as the sample frame. Also see Table 6.5 in this regard.

Table 6.5 provides the provincial breakdown of large, medium and small organisations per SIC code.

Table 6.5: Provincial allocation – Large, medium and small organisations in SA including the incomplete organisations

BMR – registers	Provinces										TOTAL
	Western Cape	Eastern Cape	Northern Cape	Free State	Kwazulu Natal	North West	Gauteng	Mpumalanga	Northern Province	Othar	
Agricultural	-	-	-	-	-	-	-	-	-	-	13 574
Mining	97	40	93	61	46	69	115	113	56	-	690
Manufacturing	2251	1039	258	808	2106	406	6234	928	192	268	14 490
Construction	2636	1152	160	142	688	61	2672	144	45	31	7731
Wholesale and Retail	4909	2652	843	1828	4869	1501	10 061	1743	1245	50	29701
Financing	27	5	0	1	15	1	240	0	0	-	289
Hotel and guest houses	709	207	90	132	355	99	490	165	92	-	2339
Business Services	1212	333	98	233	641	142	1861	219	100	-	4839
Public sectors	194	143	86	129	100	61	222	107	76	23	1141
Importers	1254	371	23	92	872	83	3421	73	46	210	6445
Exporters	644	172	21	39	565	43	2087	154	46	34	3805
Associations and trade unions	-	-	-	-	-	-	-	-	-	-	3839
Total before incompletes	**13 933**	**6114**	**1672**	**3465**	**10 257**	**2466**	**27 403**	**3646**	**1898**	**616**	**88 883**
Incompletes	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**8 115**
TOTAL	**13 933**	**6114**	**1672**	**3465**	**10 257**	**2466**	**27 403**	**3646**	**1898**	**616**	**96 998**

Source: BMR – Report 245

It is important to note from literature discussed in chapters two and three that mainly large organisations were used to study the application of the product life cycle theory abroad. The researcher has chosen ***small organisations*** in South Africa based on statistics that the SMME sector absorbed nearly 57% of the people employed in the private sector and contributed 42% of formal total GDP according to Ntsika (1999: 11).

Table 6.6 provides the provincial breakdown in total numbers and percentages of large, medium and small organisations per SIC code.

Table 6.6: Distribution of small organisations in Gauteng with 11 – 50 employees

BMR – SIC classification	Total distribution	Percentage of total distribution
Manufacturing	2289	**19%**
Construction	793	7%
Dealers (Wholesalers and Retailers)	2461	**20%**
Financing	240	2%
Hotels and guest houses	204	2%
Business Services	562	5%
Other	5958	28%
TOTAL	**12507**	**100%**

Source: BMR – Report 245

Manufactures and dealers (wholesalers and retailers) with 11 – 50 employees were selected based on their 39% contribution as displayed in Table 6.6.

6.5.3 Sample size determination and the selection of the sampling method

A sampling method can be based on a probability or non-probability method. The preferred approach however, is to use probability sampling in which case all the members of the population have a known probability of being selected for the sample. Non-probability sampling relies on the judgement of the researcher and is only as representative as the researcher's luck and skills permit (Martins et al, 1996: 253).

(a) Sample size determination

A sample size can be determined through the use of statistical procedures or through ad hoc methods. Ad hoc methods are used when a researcher knows from experience what sample size to select or when there are known constraints. The constraints may be issues such as time and available funding.

Four factors can influence the determination of a sample size:

- The value of the information in the study in general and the degree of

reliability that is to be placed on the results.

- The number of groups or subgroups to be analysed within the sample.
- The cost of the sample.
- The variability of the population - as variability increases, so does the required sample size.

According to Dillon et al (1993: 251) a sample size can be determined for means and proportions. If the statistic of interest is a proportion rather than mean, the approach of determination is similar for means and proportions. The sample size can furthermore be determined for an ending and a non-ending population.

The sample size determined by the researcher in this study is based on a sample proportion for an ending population of 12507 small organisations in Gauteng, shown in Table 6.6.

The following formula was applied to determine the sample size (Dillon et al: 1993: 253) for small dealer and manufacturing organisations in Gauteng:

$$n = \frac{\hat{P}\,\hat{Q}}{\frac{H^2}{Z^2_{CI}} + \frac{\hat{P}\,\hat{Q}}{N}}$$

Where:		
n	=	Sample size
$\hat{P}$	=	Initial approximation of the population of interest
$\hat{Q}$	=	1 - $\hat{P}$
Z^2_{CI}	=	Required confidence level
N	=	Frequency
H^2	=	Required precision

As the $\hat{P}$ value in the sample size formula represents the initial approximation of the population of interest, the researcher conducted a preliminary telephonic study to determine what percentage of the selected

population knows about the product life cycle concept and applies the concept during marketing strategy formulation and marketing decision-making. Eighty randomly selected organisations - 20 manufacturers and 20 dealers from Pretoria, 20 manufacturers and 20 dealers from Johannesburg, from the BMR list were contacted telephonically. The telephonic interviewer asked to speak to the person in the organisation responsible for making marketing decisions. In 40% of the cases the person responsible for making marketing decisions indicated that he/she knows about the existence of the product life cycle concept and that his/her organisation applies the concept during strategic marketing planning and marketing decision-making.

The calculation of the sample size used was adjusted according to the above finding as follows:

$$n = \frac{\hat{P}\,\hat{Q}}{\frac{H^2}{Z_{CI}^2} + \frac{\hat{P}\,\hat{Q}}{N}}$$

$$n = \frac{(0.4)(0.6)}{\frac{(0.05)^2}{(1.96)^2} + \frac{(0.4)(0.6)}{12507}}$$

$$= \underline{\mathbf{358}}$$

(b) Stratified sampling

Stratified sampling is defined as a probability sampling technique that uses a two-step process to partition the population into sub-populations or strata. Elements are selected from each stratum by a random procedure (Malhotra: 1996: 372).

A stratified sample is a probability sample that differs in two respects from the simple random or systematic sample (Martins et al, 1996: 259). First the population is divided into strata and then the selection is done in every

stratum exactly as in simple random or systematic sampling. The requirements for a probability sample, namely that all elements must have a known chance of being included are adhered to.

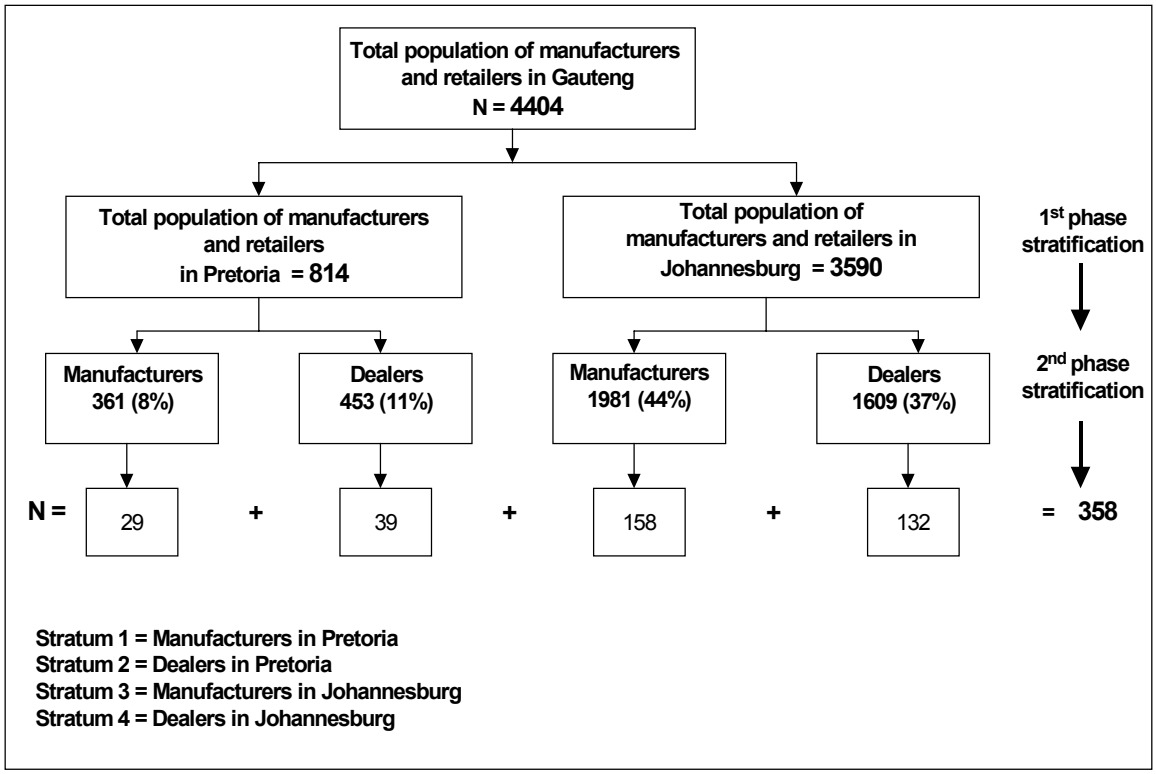
Stratified random sampling is used when a population is heterogeneous in the qualities being investigated, and can be divided into more homogeneous groups (strata) with reference to these qualities. The division of the sample into more homogeneous strata enhances the precision or reduces sample errors in two ways (Martins et al, 1996: 372). First, it ensures that the various elements are included in the sample in their correct proportions. Second, variability of the qualities being investigated decreases within the various strata. If a researcher can succeed in dividing the population into strata whose elements are exactly the same there will be no sample error.

According to Martins et al (1996: 260) stratification is worthless unless the researcher succeeds in classifying the population into strata that are more homogeneous in the quality being investigated than the population as a whole. Figure 6.2 illustrates the process followed by the researcher in drawing a two-phase stratified sample.

- The total population of manufacturers and retailers in Gauteng is 4404 as obtained from a BMR list containing physical street addresses and telephone numbers.
- Gauteng consists mainly of two main cities with telephone codes of 011 and 012 for Johannesburg and Pretoria respectively. The number of numbers per code was counted.
- Of 814 small manufacturing organisations and small dealer organisations were counted for Pretoria and 3590 for Johannesburg – ***1st stratification phase***.
- During the **2nd stratification** phase the number of numbers obtained from the first stratification phase for small manufacturing organisations and small dealer organisations were divided into the total of 4404. For example, small manufacturing organisations in Pretoria 361 divided by 4404 = 8%. This procedure was followed for all strata.

- The percentage figure obtained during the second phase of stratification was then multiplied by the number of small organisations in each stratum. For example, 361 small manufacturing organisations multiplied by 8% = 29. This procedure was followed for all strata.
- The above-mentioned procedure resulted in a stratified sample size of 358 as calculated in paragraph 6.5.3(a).

Figure 6.2: A two-phased stratified sampling



6.5.4 Selection of the sample elements

To enable the fieldworkers to systematically select the sample elements from the BMR list, the sample elements in each stratum was calculated as follows:

- **Stratum 1**: Every ***13th*** (29/361) element will be drawn systematically from the BMR list.

- **Stratum 2**: Every ***12th*** (39/453) element will be drawn systematically from the BMR list.

- **Stratum 3**: Every *13th* (158/1981) element will be drawn systematically from the BMR list.

- **Stratum 4**: Every *12th* (132/1609) element will be drawn systematically from the BMR list.

The sample can be summarised as follows:

Region				Total
Manufacturers		Dealers		
Pretoria	Johannesburg	Pretoria	Johannesburg	
29	158	39	132	
187		+ 171		= 358

6.6 PERSONAL INTERVIEWING

As mentioned in paragraph 6.3.1 the following section will be devoted to a discussion on face-to-face or personal interviewing to be used as the data collection method during the empirical part of this study.

Table 6.1 summarised the various data collection methods at the disposal of the researcher. The researcher has chosen personal interviews based on the high unfamiliarity rate of the sample with the product life cycle concept as discussed in paragraph 6.5.3(a). Flash cards were used for the illustration of the product life cycle curve and the explanation of key concepts used.
Based on the above mentioned the telephone and mail methods of data collection was as possible data collection methods to be employed during the empirical execution of this study.

6.6.1 Definition of a personal interview

A personal interview is a two-way conversation initiated by an interviewer to obtain information from a respondent (Cooper and Schindler, 1988: 291).

6.6.2 Evaluation of a personal interview

There are clear advantages and limitations associated with the use of a personal interview when compared to the other survey methods available to a researcher (Cooper and Schindler, 1988: 291) and summarised in Table 6.1. The following value description will highlight the choice of the researcher to use a personal interviewing method:

(a) Advantages of a personal interview

- Depth of information and detail that can be secured when compared with a telephone, mail, self-administered and mall intercept surveys.
- The interviewer has more flexibility to improve the quality of the information received than with any of the other survey methods.
- Interviewers have more control over the interview and any disturbances that may occur.
- Interviewers can probe for additional questions and gather supplemental information through observation.
- Interviewers can pre-screen to ensure that the correct respondent is participating in the interview.

(b) Limitations linked to the use of a personal interview

Cost and time are limitations linked to a personal interview (Cooper and Schindler, 1988: 291).

An interview may cost from a few to several hundreds of rand and the cost is particularly high if the study covers a wide geographical area or if the sample has stringent criteria. It can take time to fill a sample if some of the respondents to be included in a sample are hard-to-reach people.

6.6.3 Requirements for a successful personal interview

According to Cooper and Schindler (1988: 292) there are three broad conditions to be met to have a successful personal interview. These conditions are:

- Availability of the needed information from the respondent.

- An understanding of the respondent of his or her role.
- Adequate motivation by the respondent to co-operate.

It is the task of the interviewer to ensure that the personal interview is successful. The interviewer can influence the respondent in many ways and it is the responsibility of the interviewer to motivate the respondent to take part in the interview. There are a few techniques namely:

6.6.4 Personal interviewing techniques

The following techniques are available to interviewers for personal face-to-face interviews (Cooper and Schindler, 1988: 293-296):

(a) Introduction

Interviewer appearance and conduct of behaviour are critical in making a good impression on the potential respondent in order to convince the respondent to participate. The interviewer's introduction and explanations should be no more detailed than necessary.

(b) If the respondent is busy

If it is obvious that the respondent is busy, it may be a good idea to give a general introduction and try to stimulate enough interest to arrange an interview at another time.

(c) Establishing a good relationship

The successful interview is based on rapport – meaning a relationship of confidence and understanding between the interviewer and the respondent as interviews are often new to respondents and they need help in defining their roles.

(d) Gathering the data

After the completion of the introduction and the establishment of initial rapport, the interviewer turns to the technical task of gathering information. A difficult task in interviewing is to make certain the answers adequately satisfy the

questions' objectives. The interviewer should follow the exact wording of the questions, ask them in the order presented, and ask every question that is specified.

(e) Probing

The technique of stimulating respondents to answer more fully and relevantly is called probing. A probe should be neutral not to cause bias and should appear as a neutral part of the conversation. According to Cooper and Schindler (1988: 295) there are several probing styles:

- A brief assertion of understanding and interest.
- An expectant pause
- Repeating the question
- Repeating the respondent's reply
- A neutral question or comment
- Question clarification

(f) Recording the interview

While the methods used in recording varies, the interviewer usually writes down the answer of the respondent. Some guidelines can make this task easier:

- Record the responses as they occur
- If there is a time constraint the interviewer should use a shorthand system.
- Abbreviating words and using of key words are good ways of recording.

6.6.5 Interview problems

Cooper and Schindler (1988: 297) indicate that during personal interviewing the researcher deals with the two interrelated aspects of bias and cost. Bias results from three types of error – sampling error, non-response error and response error as discussed in paragraph 6.4 and illustrated in Figure 6.1.

The most reliable solution to non-response problems is to make call-backs. If enough attempts are made, it is usually possible to contact most target respondents, although unlimited call-backs are expensive. One way to

improve the productivity of call-backs is to vary them by time of day and day of week.

When data reported differ from the actual data, response errors occur. Errors can be made in the process of tabulating the data or when the respondent fails to report fully and accurately. Consistent control or elimination of response errors is a problem that has yet to be solved (Cooper and Schindler, 1988: 298).

As professional interviewers' salaries are typically high, Cooper and Schindler (1988: 299) reiterates that interviewing is costly and these costs continue to rise. Much of the cost results from the substantial interviewer time due to administrative tasks and travelling. To counter the problem of research costs, organisations can:

- Pay interviewers an hourly rate.
- Use the telephone to schedule personal interviews.
- Use self-administered questionnaires.

The researcher will discuss the interviewing procedure employed during the fielding of the study in paragraph 6.8.

6.7 MEASUREMENT AND MEASUREMENT SCALES

Before the process of questionnaire design can be explained it is necessary to provide information on the possible measurement scales to the disposal of the researcher.

6.7.1 Measurement

Measurement is a process of assigning numbers to objects to represent quantities of attributes (Dillon et al, 1993: 302). Measurement relates to the procedure used to assign numbers that reflect the amount of an attribute possessed. Many characteristics that are investigated in marketing research studies can be measured in a variety of ways. Particular attention must be

given to the objectives of the study and the precise definition of the characteristics to be measured.

6.7.2 Level of measurement

Measurement can be undertaken at different levels. The levels reflect the correspondence of numbers assigned to the characteristics in question and the meaningfulness of performing mathematical operations on the numbers assigned.

The different levels of measurement will be discussed in the next section.

(a) Nominal measurement

Nominal measurement is measurement where the numbers assigned allow the researcher to place an object in one and only one of a set of mutually exclusive and collectively exhaustive classes with no implied ordering (Dillon et al, 1993: 273).

(b) Ordinal measurement

Ordinal measurement is a measurement in which the response alternatives define an ordered sequence so that the choice listed first, is less (greater) than the second, the second less (greater) than the third, and so forth (Dillon et al, 1993: 274). The number assigned does not reflect the magnitude of an attribute possessed by an object.

(c) Interval measurement

Interval measurement allows the researcher to indicate how far apart two or more objects are with respect to the attribute and consequently to compare the differences between the numbers assigned (Dillon et al, 1993: 275). Because the interval lacks natural or absolute origin, the absolute magnitude of the numbers cannot be compared.

(d) Ratio measurement

Ratio measurement has the same properties as interval scales, but also has a natural and absolute origin (Dillon et al, 1993: 277).

The different appropriate statistical options available to the researcher are illustrated in Table 6.7.

Table 6.7: Appropriate statistics for nominal, ordinal interval and ratio data

Scale	Range	Central tendency	Dispersion
Nominal	Number of categories	Mode	Frequency in each category
Ordinal	Number of scalar positions	Median	Percentage or interquartile range
Interval and ratio	Top scores minus bottom score plus 1	Mean	Standard deviation

Adapted from: Dillon, Madden, and Firtle (1993: 275)

The different scale types depicted in Table 6.7 will be discussed in the next section.

6.7.3 Scale types

Measurement scales fall into two broad categories of comparative and non-comparative scales (Dillon et al, 1993: 277).

(a) Non-comparative scaling

According to Dillon et al (1993: 277) non-comparative scaling is a method whereby the respondent is asked to evaluate each object on a scale independently of the other objects being investigated.

According to Dillon et al (1993: 277 - 281) there are various types of non-comparative scaling:

(i) Line marking/Continuous rating scales

This is a procedure that instructs the respondent to assign a rating by placing a marker at the appropriate position on a line that best describes the object under study. There is no explicit standard for comparison.

(ii) Itemised rating scales

The respondent is provided with a scale having numbers and/or brief descriptions associated with each category and asked to select one of the limited number of categories, ordered in terms of scale position, that best describes the object under study.

When using itemised rating scales the researcher must make the following decisions:

- The number of categories

  When making a decision on the number of categories the researcher can decide to include any number of response categories provided that the respondents have to discriminate among alternatives. The researcher can include between 5 - 9 response categories.
- The number of favourable and unfavourable categories

  When using a balanced scale, the scale has an equal number of favourable and unfavourable categories. When using an unbalanced scale the scale has unequal numbers of favourable and unfavourable scale categories.
- The nature and degree of verbal description

  Verbal category descriptors help to ensure that each respondent is operating from the same base. Pictures and other types of graphic illustrations can also be used, especially if the respondents are children or do not have a high literacy rate.
- The presence of a neutral position

  Odd number versus even number of scale items. In odd numbers of scale the middle scale becomes the neutral point.
- Forced and unforced itemised rating scales

  With forced itemised rating scales the respondent must indicate answers even though he/she has no opinion or knowledge about the subject. It is better to use subjects about which the respondents have knowledge and opinion.

(b) Comparative scaling

Comparative scaling is a scaling process in which the subject is asked to compare a set of stimulus objects directly against one another (Dillon et al, 1993: 281).

According to Dillon et al (1993: 281-288) the following types of comparative scaling are available:

(i) Paired comparisons scale

This is a scale whereby the respondents are provided with two objects at a time and the respondents are asked to select one of the two according to some criterion.

(ii) Geared paired comparisons

This scale type is an extension of the paired comparison method, by asking respondents to indicate for instance which brand is preferred and how much they are willing to pay to acquire their preferred brand.

(iii) Rank-order scales

These are scales where respondents are presented with several objects simultaneously and requested to “order” or “rank” them. Conditional rank-order scale is a procedure whereby respondents consider each object in turn as a standard for comparisons. Respondents assign ranks to other objects according to this standard.

(iv) Constant sum scales

This is a procedure whereby respondents are instructed to allocate a number of points among alternatives according to the same criterion, for example, preference, importance.

(v) Line marking/Continuous rating comparative scale

A procedure whereby respondents are presented with object pairs and the respondents are asked to judge their similarity by placing a mark on a continuous line.

6.7.4 Single-item versus multiple-item scales

After a researcher has decided on a scaling type or a combination thereof, he/she should decide whether to use a single-item or a multiple item scale or a combination thereof.

A multiple-scale usually consists of a number of statements that the respondent must react to. For example, the respondent can be asked to indicate how favourable or unfavourable each statement is. According to Dillon et al (1993: 288) multiple item scales are usually used in attitude measurement. There are three different multiple item scales available to the researcher:

(a) Semantic differential scale

A semantic differential scale is a scaling technique where a measure of the person's attitude is obtained by rating the object or behaviour in question on a set of bipolar adjective scales, Dillon et al (1993: 289). According to Cooper and Schindler (1988: 189) the semantic differential scale measures the psychological meanings of an attitude object.

(b) Stapel scale

According to Dillon et al (1993: 290) a staple scale is a procedure using a single criterion or key words and instructing the respondent to rate the object on a scale. A stapel scale is used as an alternative to the semantic differential scale, especially when it is difficult to find bipolar adjectives that match the investigation question (Cooper and Schindler, 1988: 190).

- **Likert scale**

The Likert scale is a measurement scale consisting of a number of evaluative statements (Dillon et al, 1993: 292). The Likert scale is the most frequently used variation of the summated rating scale (Cooper and Schindler, 1988: 189). Summated scales consist of statements that express either a favourable or unfavourable attitude toward the object of interest. The respondent is asked to agree or disagree with each statement. 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. Likert scales help researchers to compare one person's score with the distribution of scores from a well-defined group.

6.8 QUESTIONNAIRE DESIGN AND TESTING

The research problem together with the research objectives and propositions have been formulated in chapter one and further discussed in chapter five. The process of designing the measurement instrument should be in accordance with the research problem, propositions, primary and secondary research objectives and the different measurement aspects.

All the measurement aspects as discussed in paragraph 6.7 – the levels of measurement and the different measurement scale types - will be considered during the process of designing the questionnaire to be used during the empirical execution of this study. Questionnaire design will be explained in terms of four interrelated activities – preliminary considerations, asking of questions, construction of the questionnaire and the pre-testing of the questionnaire (Dillon et al, 1993: 302).

6.8.1 Preliminary considerations

According to (Dillon et al, 1993: 302) a researcher should translate the research problem into a set of research questions before he/she starts with the formulation of the questions. The research questions should identify:

- What information is required?
- Who the appropriate target respondents are?
- What data collection method to use?

The researcher addressed the three aspects above in chapter one, explained the appropriate target respondents in chapters four and provided substance for the use of the personal interviewing to be used as the data collection method in paragraph 6.6.

6.8.2 Asking questions

Dillon et al (1993: 303) provide three general guidelines to help in devising an effective questionnaire:

- A researcher should write specific questions only after he/she has thoroughly thought through the research objectives and research propositions.
- When a researcher is designing a questionnaire, he/she should constantly refer to the research objectives and research propositions.
- For each question a researcher writes down, he/she should consider how the information obtained from the responses would help in answering the research propositions.

There are a number of specific considerations to keep in mind in developing questions. Dillon et al (1993: 304) provide the following basic principles:

- Principle 1: Be clear and concise
- Principle 2: Response choices should not overlap
- Principle 3: Use natural and familiar language
- Principle 4: Do not use words or phrases that show a bias
- Principle 5: Avoid double-barrelled questions
- Principle 6: State explicit alternatives
- Principle 7: Questions should meet the criteria of validity and reliability

The issue is whether or not a researcher is truly measuring what he/she was attempting to measure and whether or not the researcher can replicate these responses at a later point in time. The researcher can not assume that the same questioning approach will work equally well for all product/service categories and all interviewing methods.

When the researcher constructed the questionnaire to be used as the measurement instrument for this research he adhered strictly to the above-mentioned principles.

6.8.3 Open-ended and closed-ended questions

A researcher can make use of open-ended and close-ended question formats.

(a) Open-ended question format

With open-ended questions the respondent is allowed to choose any response deemed appropriate, within the limits implied by the question.

According to Dillon et al (1993: 310) there are several good reasons for asking open-ended questions.

- Open-ended questions are useful to check and/or corroborate the results of quantitative or closed-ended questions.
- Open-ended questions may be used to obtain direct comparisons and to specify particular causes for preference or rejection when two or more stimuli are involved in a test.
- Open-ended questions are useful in determining whether a particular communication vehicle (e.g. commercial or concept) conveys its intended objectives.
- Open-ended questions elicit of a respodent's general reactions to or feelings on exposure to specific ads or packages involved in a test.

Open-ended questions are not well suited for self-administered questionnaires and answers to open-ended questions may be more of an indication of the respondents' knowledge about or interest in the issue being investigated. Interview bias can be a serious problem with the use of open-ended questions and open-ended questions must be coded or categorised for analysis, which can be a tedious task laden with ambiguities.

(b) Closed-ended question format

With closed-ended questions the respondent is provided with numbers and/or predetermined descriptions and is asked to select the one that best describes his or her feelings.

There are several issues related to itemised question formats (Dillon et al,

1993: 310):

- The number of response alternatives.
- The nature and degree of verbal description.
- The number of favourable and unfavourable categories.
- The statement of a neutral position.
- The forced or unforced nature of scale.

According to Dillon et al (1993: 310) the obvious advantages of the closed-ended question format relate to:

- Their ease of use in the field.
- Their ability to reduce interview bias.
- Their ability to reduce bias based on differences in how articulate respondents are.

6.8.4 Constructing the questionnaire

The questionnaire was divided into five distinct sections as can be observed in the final questionnaire on pages 1 – 13 in Appendix 2:

- **Introduction, qualification and screening questions**
- **Section A:** Classification questions
- **Section B:** Specific product life cycle questions.
- **Section C:** PLC related to strategic marketing, strategic planning, and marketing mix variables.
- **Section D:** The importance of the marketing mix variables, PLC characteristics and strategies linked to the different phases of the product life cycle

The questionnaire was compiled based the level of expected marketing expertise derived from the sample size in paragraph 6.5.3(a) and on the theoretical discussion in paragraphs 6.7 and 6.8 concerning:

- The different measurement scales.
- Preliminary considerations associated with questionnaire design.
- General guidelines for asking questions in a questionnaire.

6.8.5 Pre-testing of the questionnaire

According to Cooper and Schindler (1988: 349) pre-testing is the final step toward ultimately improving survey results. Pre-testing is not only an established practice for discovering errors but is also useful for training the research team. Pre-testing was done by the researcher and not by the interviewers because all seven were marketing graduates familiar with the concepts used and well trained with previous research survey experience.

The value and the necessity for pre-testing proved necessary because important changes were made to the questionnaire before it was finally accepted as the final questionnaire. See pages 1 to 9 in Appendix 1 for the pre-testing questionnaire and pages 1 to 13 in Appendix 2 for the final questionnaire. The pre-testing was done in an unconventional manner. It was executed among respondents similar to those eligible to be incorporated in the study (dealers, manufacturers and entrepreneurs) and larger organisations such as South African Breweries and Nedcor where respondents were familiar with marketing research. During each pre-testing interview all questions were tested. Apart form the pre-testing of each question the following components were also evaluated:

- Interviewer instructions.
- Question formats – refer to paragraphs 6.8.3.(a) and 6.8.3.(b) where open-ended and closed-ended question formats was discussed.
- Questionnaire layout – refer to 6.8.1 and 6.8.2 where preliminary considerations, specific considerations and the principles for questionnaire design is explained.
- Terminology – refer to the principles for questionnaire design as illustrated in 6.8.2

Only minor changes were made to the layout, but the following two important changes were made:

- Clear interviewer instructions were developed to serve as a guide for the interviewer in conducting the personal face-to-face interviews.

- The importance of aspects regarding generic marketing variable aspects in each phase of the product life cycle was divided into two questions in the final questionnaire as apposed to the single question in the pre-testing questionnaire. It was split into two questions (15 and 19) because it was too lengthy if asked in one question due to the unfamiliarity of the respondents with the different aspects tested.

It was very clear from the pre-testing that flash cards should be developed to clarify and explain the meaning of concepts used in this study. See pages 1 and 2 in Appendix 3 for the flash cards used to illustrate the product life cycle concept and to explain the key concepts used in the questionnaire.

6.8.6 Questions in the questionnaire

Each question will now be discussed with reference to the theoretical discussion of questionnaire design in paragraph 6.8.

Page 1 of the final questionnaire, as shown in Appendix 2, indicates procedure for the interviewer on:

- How to approach and select the respondent that qualifies to participate in this study.
- How to make an appointment with an eligible respondent.

The first part of page two provided two paragraphs that the interviewers used when they met the respondent for the interview.

Before the questions will be explained on a question-by –question basis Table 6.8 will indicate the linkage between the questions, research objectives and research propositions.

Table 6.8: The linkage between the questions in the questionnaire, secondary research objectives and research propositions

Questions linked to secondary objectives	
Objectives	**Questions**
(a) To **determine** whether marketing decision-makers in small organisations in South Africa can identify in what phase of the product life cycle an individual product or a product range is.	8, 9 & 10
(b) To **identify** the application of marketing decision-making variables in the various phases of the product life cycle concept by small organisations.	15 & 19
(c) To **determine** whether there are differences between small manufacturing and small dealer organisations with regard to the application of marketing decision-making variables in the various phases of the product life cycle concept.	2, 15 & 19
(d) To **identify** the importance of elements of the marketing mix variables by small manufacturing and small dealer organisations in the different product life cycle phases.	2, 15 & 19
(e) To **investigate** the **ability** of small organisations to **describe** the **marketing objectives** within the various product life cycle phases as indicated in the theory.	16
(f) To **establish** the **ability** of small organisations to **identify** product life cycle **characteristics** as depicted in marketing literature.	18
(g) To **investigate** the **ability** of small organisations to **link marketing strategies** with phases of the product life cycle theory according to the theory classification.	20
(h) To **identify** the different **marketing objectives** that small organisations formulate for their products in each phase of the product life cycle.	10.3
(i) To **establish** whether there are differences in the application of the product life cycle theory between small manufacturing and small dealer organisations.	2, 16, 18 & 20
(j) To **identify** the factors influencing a product through the various phases of the product life cycle among small organisations in South Africa.	10.2
(k) To **determine** the potential of the product life cycle concept for decision-making among small manufacturing and small dealer organisations in South Africa.	2 & 13
(i) To **determine** who is responsible for marketing decision-making in small manufacturing and small dealer organisations	2 & 14
Questions linked to propositions	
Propositions	**Questions**
Proposition 1 - There is a difference in the application of the product life cycle concept theory assumptions of small organisations in South Africa compared to Kotler's theory**.**	16, 18 & 20
Proposition 2 - Marketing managers of small organisations in Gauteng, South Africa use the product life cycle concept to plan and manage their products through the various phases of the product life cycle.	2, 11, 13 & 17
Proposition 3 - Small manufacturing organisations in Gauteng apply and use the product life cycle concept for marketing decision-making purposes.	2 & 17
Proposition 4 - Small dealer organisations in Gauteng apply and use the product life cycle concept for marketing decision-making purposes.	2 & 17
Proposition 5 - There is a significant difference between small manufacturing and small dealer organisations when applying and using the PLC concept for marketing decision-making purposes.	2, 6 & 17
Proposition 6 - Small manufacturing organisations and small dealer organisations in Gauteng, South Africa don't have a marketing function responsible for applying the product life cycle concept when marketing strategy is developed and marketing decisions are taken.	4

The primary objective as set in the introductory chapter one is not depicted in Table 6.8, but it can be related to questions 1 to 5 plus 6, 7, 8, 9, 11, 12, 13 &

14.

Table 6.9 illustrates the linkage between the different sections, different questions, question formats and the different scale types used in the questionnaire.

Table 6.9: The linkage between the different sections, questions, question formats and the different scale types.

Section	Question	Question format	Scale type
Section A	1	Closed-ended	-
	2	Closed-ended	-
	3	Open-ended	-
	4	Closed-ended	-
	5	Closed-ended	-
Section B	6	Closed-ended	5-point Likert scale plus a "don't know"
	7	Open-ended	-
	8	Closed-ended	-
	9	Closed-ended	Dichotomous
	10	Open-ended and closed-ended	-
Section C	11	Closed-ended	Dichotomous
	12	Closed-ended	-
	13	Closed-ended	5-point Likert scale
	14	Closed-ended	5-point Likert scale
	15	Closed-ended	5-point Likert scale
	16	Open-ended	-
	17	Closed-ended	5-point Likert scale
Section D	18	Closed-ended	-
	19	Closed-ended	5-point Likert scale
	20	Closed-ended	-

It is eminent from Table 6.9 that an unbalanced 5-point Likert scale was used based on the expectation that the distribution of responses might be skewed and that most of the respondents could have been favourable or unfavourable towards the various issues at hand. Respondents, who did not have a favourable or unfavourable inclination, were provided with a neutral position and the researcher could therefore determine the top box scores. The top box score refers to the percentage of respondents rating a brand, product, or concept in the most favourable category on the rating scale and is continuously used as a criterion of performance in marketing research (Dillon et al 1993: 278). Please refer to paragraph 6.7.3 where comparative and non-comparative scaling were discussed.

(a) Questions in Section A

Questions 1 to 5 are classification questions formulated to gather profile information on the different manufacturers and dealers as seen on pages 1 to 3 in Appendix 2. **Questions 1 – 5** will be cross-tabulated and used to partly answer propositions 1, 3, 4, 5 and 6. Questions 1, 2, 4 and 5 were closed ended question formats and question 3 was an open-ended question format to classify manufactures and dealers at a micro level for possible linkage to the SIC classification discussed in chapter 4.

(b) Questions in Section B

Questions 6 to 10 were formulated to determine the importance of the product life cycle concept in the execution of certain functions and aspects within small manufacturers and dealers as seen on pages 4 to 6 in Appendix 2.

A closed-ended question format was used for **question 6** because all the possible application areas were derived from the literature study discussed in chapter three. A 5-point Likert scale was used and the scale values were labelled from not important at all, indicated by a scale value of 1, to extremely important, indicated by a scale value of 5. A “don’t know” option was included to make provision for the probability that respondents might not be familiar with the application of the product life cycle concept on all the aspects in his/her organisation.

The reason for the inclusion of **Question 7** was to determine the aspects that provide a competitive advantage to small manufacturers and dealers. In particular this question can provide direction to the importance of the service component. This question can provide further justification to the view of Rafiq and Ahmed (1995: 4 – 15) that a generic marketing mix should be applicable irrespective of the type of marketing – whether consumer, industrial or services marketing. An open-ended question format was used, as the researcher could not anticipate all possible aspects, which may provide a competitive advantage to small manufacturers and dealers.

Questions 8 and 9 were included as they indicated the nature of the product assortment. A closed-ended questions format was used as the researcher derived the different types of product assortments from the literature study. A dichotomous format was used for question 9, as the answer to this question could either have been yes or no.

Questions 10, 10.1, 10.2 and 10.3 were formulated to determine in what PLC phase the primary product or product range is and for the respondents to provide a short description, reasons and a marketing objective for the primary product in that product life cycle phase. Answers to these questions can be compared to the marketing objectives provided by Kotler (2000: 316) as discussed in chapter three. Question 10 was an open-ended question directly related to the different phases of the product life cycle concept derived from the literature study. Questions 10.1 – 10.3 were all open-ended questions based on the possible diverse descriptions, reasons and marketing objectives that could not be anticipated beforehand.

(c) Questions in Section C

Questions 11 to 17, where respondents were asked to determine the role of the product life cycle concept in strategic marketing and strategic marketing planning, can be seen on pages 7 to 11 in Appendix 2. Questions 11, 12 and 13 will provide answers to the way in which small organisations use the product life cycle concept as an instrument for decision-making as stated in the title of this thesis. Questions 14 to 17 furthermore tested the control that small manufacturers and dealers have over the different marketing mix variables, especially the importance of the people, processes and physical evidence and marketing objectives within each phase of the product life cycle

Question 11 was formulated to determine whether small manufacturers and dealers use the product life cycle concept for strategic marketing planning and development purposes. A dichotomous format was used, because the answers to this question could be yes or no.

Question 12 assessed the time frame manufacturers and dealers used to do strategic marketing planning and development. This question is closely related to question 11 to provide a time frame.

Question 13 was formulated to determine the extent to which the product life cycle concept influences the process of marketing strategy planning and development. A 5-point Likert scale was used and the scale values were labelled from a very low influence indicated by a scale value of 1 to an extremely high influence indicated by a scale value of 5.

Question 14 tests the degree of control that manufacturers and dealers have over its marketing mix variables. A 5-point Likert scale was used and the scale values were labelled from no control at all indicated by a scale value of 1 to full control indicated by a scale value of 5.

Question 15 tests the importance that manufacturers and dealers attach to marketing mix variable aspects associated with people, processes and physical evidence. The marketing mix variables were developed from the literature to be generic for the marketing of physical products and services. The remainder of the marketing mix elements will be covered in question 19. A 5-point Likert scale was used and the scale values were labelled from not important at all, indicated by a scale value of 1, to extremely important indicated by a scale value of 5. This is an effort by the researcher to compare it to the strategies provided by Kotler (2000: 316), illustrated in Table 3.5 in chapter three and formulated as secondary objective (d) in the introductory chapter.

Question 16 differs from question 10.3 as this question intends to determine the **marketing objectives** that marketing decision-makers in small manufacturing and dealer organisations link to each phase of the product life cycle. This can be regarded as a generic type of question as the results on this question will be compared to the marketing objectives provided by Kotler (2000: 316), illustrated in Table 3.5. It will be used to achieve secondary objective (e) set in the introductory chapter.

Question 17 was formulated to establish the likelihood that current manufacturers and dealers using the product life cycle concept will continue to do so in future. The likelihood was tested for both general decision-making and marketing decision-making.

(d) Questions in Section D

Question 18 was formulated to evaluate the ability of marketing decision-makers in small manufacturers and dealers to link the ***characteristics*** provided by Kotler (2000: 316) and illustrated in Table 3.5 to each phase of the product life cycle. The results on this question will be compared to the marketing characteristics provided by Kotler (2000: 316) as depicted in Table 3.5.

Question 19 was formulated to determine the importance that manufacturers and dealers attach to marketing mix variable aspects associated with product, price, place and promotion. This question is closely related to question 15 that addresses people, processes and physical evidence. A 5-point Likert scale was used and the scale values were labelled from not important, indicated by a scale value of 1, to extremely important, indicated by a scale value of 5. This is an effort by the researcher to compare it to the ***strategies*** provided by Kotler (2000: 316) and illustrated in Table 3.5.

Question 20 was formulated to evaluate the ability of marketing decision-makers in small manufacturers and dealers to link the ***strategies*** provided by Kotler (2000: 316) to each phase of the product life cycle concept. The results on this question will be compared to the marketing strategies provided by Kotler (2000: 316) as depicted in Table 3.5.

6.9 INTERVIEWING PROCEDURE

The interviewers were trained during a training session by the researcher to ensure that they:

- Were familiar with the selection procedure of a sample element from the BMR list provided.

- Understood the procedure of making appointments with respondents adhering to the two qualifying or screening questions as seen on page 1 in Appendix 2.
- Were familiar with all the interviewer instructions as indicated in the dark highlighted areas in the questionnaire as seen on pages 1, 3, 6, 7, 8, 10, 11 and 13 (Appendix 2).
- Understood the concepts used in the questionnaire.
- Were familiar with the use of the different flash cards as can be seen on pages 1 to 4 in Appendix 3.

The interviewers should follow the interviewing procedure indicated by the interviewer instructions and this was reiterated during the training session. After an interview was finalised the interviewers followed the interviewer instructions as indicated in the dark highlighted areas in the questionnaire. No incentives were given to the respondents, but the interviewers were instructed to inform each respondent that the researcher would arrange a workshop and that the results obtained from this study would be shared during that occasion.

6.10 CODING AND EDITING

All questionnaires were numbered for the ease of possible future reference.

6.10.1 Coding

Coding is the assignment of a numerical value (code) or alphanumerical symbol to represent a specific response to a specific question along with the column position that the designated code or symbol will occupy on the data record (Dillon et al, 1993: 37). Numerical values were assigned to the closed-ended questions during questionnaire design, while responses to open-ended questions were written down and grouped together according to categories. Both the closed-ended and open-ended questions will be pre-coded, checked, edited and subjected to a content analysis process.

6.10.2 Editing

Editing involves the review of the questionnaires for accuracy and precision (Dillon et al, 1993: 37). During the editing process of this study all the usable questionnaires had been checked for maximum accuracy and precision. For accuracy purposes, attention was given to signs of interviewing bias or cheating.

6.10.3 Transferring of data

Data was captured on an internal database at the University of Pretoria and subjected to a verification process in order to eliminate non-response and data capturing mistakes. A data cleaning process was executed and the missing responses were identified. The various approaches dealing with missing responses will be discussed in the paragraph 6.11.1.

6.11 STATISTICAL PROCEDURES AND STATISTICAL TREATMENT USED IN THE ANALYSIS

The SAS computer statistical software package was used for data processing and the results and research findings will be discussed in chapter seven. The following statistical procedures can be applied:

6.11.1 Missing responses

There are various approaches dealing with missing responses by either preserving missing or blank spaces or by assigning values to missing data through mean response or imputed response.

Preserving missing or blank responses is an acceptable practice for different types of analysis. Missing or blank responses can be entertained by applying casewise deletion or by means of pairwise deletion.

- ***Casewise deletion*** is a strategy for missing responses by any respondent (case). The respondent (case) is removed if any of his or her answers are identified as missing (Dillon et al, 1993: 348).

- ***Pairwise deletion*** is a strategy for missing responses that involves using all of the available non-missing data for each calculation (Dillon et al, 1993: 348).

If 75% or more of a questionnaire is not completed the researcher will employ casewise deletion where all the answers provided by the respondent will be discarded.

The assignment of values to the missing data is also an acceptable way of handling missing responses. The researcher has a choice between a mean response strategy and an imputed response strategy.

- A ***mean response*** is an approach to missing responses that involves replacing the missing response with a constant mean, median or mode response to the question depending on the measurement scale used (Dillon et al, 1993: 348). The missing response items in this data transferring process were treated in a way that used a mean substitution approach. If applicable, each missing response item was replaced by the mean score of the answers by all the other respondents to those specific questions.

- An ***imputed response*** is an approach to missing responses where the respondent's answer to other questions used to impute or deduce an appropriate response to the missing question. The researcher did not employ this method.

6.11.2 Descriptive statistics

Descriptive statistics is a single number used by the researcher to summarise data. The researcher can use measures of central tendency and variability to routinely report when tabulating a study (Dillon et al, 1993: 372).

(a) Measures of central tendency, dispersion and distribution

A measure of central tendency is used to provide data on elevation – how

high or how low the scores on a question tend to be. A researcher can use the mean, mode and median to indicate central tendency, dispersion and distribution of data.

(i) The mean

The mean is the arithmetic average of a variable (Sudman and Blair, 1998: 456) and a measure of central tendency for interval and ratio scaled data (Dillon et al, 1993: 374).

(ii) The mode

The mode is the most frequently occurring value used as a measure of central tendency for data assuming a limited number of values (Dillon et al, 1993: 374).

(iii) The median

The median is the value that is halfway between the highest and the lowest value in a data set (Dillon et al, 1993: 375).

The researcher envisaged to make use of the mean values on scaled questions in order to determine the means score for the total sample and to make comparisons between small manufacturing organisations and small dealer organisations based on their mean value scores.

(b) Measures of variability

A researcher can use the range and the variance to indicate variability of data. Measures of variability indicate the degree of dispersion to the researcher – how spread out are the responses to a question (Dillon et al, 1993: 372).

(i) The range

The range is the difference between the largest and the smallest observation in a data set (Dillon et al, 1993: 375).

(ii) The variance

The variance is the average squared distance between the values of

individual observations on some variable and the mean of that variable (Sudman and Blair, 1998: 459).

(iii) The standard deviation

The standard deviation is the positive square root of the variance (Malhotra, 1996: 508).

Variances and standard deviations will be used by the researcher to determine whether mean differences between small manufacturing organisations and small dealer organisations can be regarded as significant differences or not.

6.11.3 Statistical techniques and procedures to be adopted in this research

The following are the main statistical procedures for possible inclusion in this research:

(a) Cross tabulation

Cross tabulation is a statistical technique that describes two or more variables simultaneously and results in tables that reflect the joint distribution of two or more variables that have a limited number of categories or distinct values.

(b) Validity

Validity according to Malhotra (1996: 240) is the extent to which differences in observed scale scores reflect true differences among objects on the characteristic being measured, rather than systematic or random errors. Malhotra (1996: 240) distinguishes between internal validity and external validity. Internal validity is the measure of accuracy of an experiment and external validity is a determination of whether the cause-and-effect relationships found in the experiment can be generalised.

For validity purposes of this study a decision was taken to have strict control over item non-responses.

According to Diamantopoulos and Sclegelmilch (1997: 35 - 36) there are three validity assessment approaches:

(i) **Content validity** – the extent to which a measure appears to measure the characteristic it is supposed to measure. Content validity can be determined by means of face validity and sampling validity. Face validity is the extent to which one measure seems to capture the characteristic of interest. Sampling validity is the extent to which a "content population" of situations/behaviours relating to the characteristic of interest is adequately represented by the measure concerned.

(ii) **Criterion validity** – the extent to which a measure can be used to predict an individual's score on some other characteristics (the criterion). Content validity can be determined by means of concurrent and predictive validity. Concurrent validity is the extent to which a measure is related to another measure when both are measured at the same point in time. Predictive validity is the extent to which current scores on a given measure can predict future scores of another measure.

(iii) **Construct validity** – the extent to which a measure behaves in a theoretically sound manner. Construct validity can be determined by means of convergent validity, discriminant validity and nomological validity. *Convergent validity* is the extent to which a measure is positively related to other measures of the same concept obtained by independent methods. *Discriminant validity* is the extent to which a measure is not related to measures of different concepts with which no theoretical relationships are expected. *Nomological validity* is the extent to which a measure is related to measures of other concepts in a manner consistent with theoretical expectations.

To report the validity of the results for this study the researcher will make use of content validity. The use of content validity is based on the uniqueness of

the questionnaire (use of open-ended questions) and the exploratory nature of the study.

6.11.4 Statistical treatment

The researcher will treat the statistical analysis as follows:

(a) As far as the analysis permits, the researcher will use mean substitution on scaled question where the scale values will be replaced by the mean score of all the other respondents on the same question especially to treat the “don’t know” options in question 6.

(b) The researcher will employ the mean response strategy to report tendencies, dispersions and distribution in the data for the total realised sample and per organisational type – small manufacturers and dealers in Gauteng.

(c) The researcher will use standard deviations to report variability in the data for the total realised sample and per organisational type – small manufacturers and dealers in Gauteng.

(d) The researcher will make use of cross tabulations on variables and organisational type to compare results achieved on the total realised sample and per organisational type – small manufacturers and small dealers in Gauteng.

(e) The researcher will employ t-tests to determine whether differences identified between groups and or variables can be regarded as significant differences or not.

(f) The researcher intends to utilise content validity to indicate that the measurements used, captured the characteristics of interest.

6.12 CONCLUSION

This chapter provided a description of the various data collection methods and the personal face-to-face interviewing technique to be used as data collection method. Special reference was made to the two phased stratified sampling procedure, the determination of the sample size, the compilation of the final questionnaire and the pre-testing procedure followed during the empirical execution of the research.

The next chapter (chapter seven) will provide a discussion on the results and interpretation thereof along with the outcomes of the different research propositions as formulated in the introductory chapter and substantiated in chapter five.