

CHAPTER 6

6 RESEARCH METHODOLOGY

6.1 Introduction

According to the *Concise Oxford Dictionary* (1999:688), the term “methodology” refers to the body of methods used in a particular branch of activity. Methodology is concerned with how we come to know and is practically focused on the specific ways (methods) that we use to understand our world better. This chapter aims to provide an insight into the practical ways that were used in gathering information for the empirical part of this study.

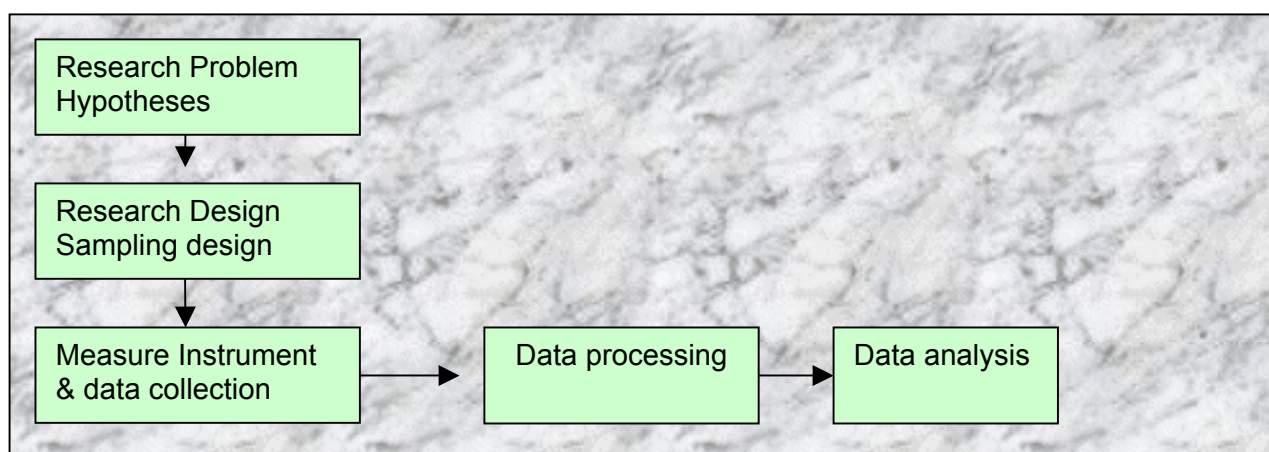


Figure 6.1: Chapter Layout

6.2 Research Problem and Hypotheses

A research objective gives a broad indication of what a researcher wishes to achieve in his/her research. The definition of the research problem is of great importance since it guides all subsequent actions. The problem of this study is the unique application of creativity in the entrepreneurship domain against the background of entrepreneurial development. The research question can be stated as follows: “What are the perceptions among South African small business owners of their own creativity and their businesses’ innovativeness?”

The aims of this study were set out in the chapter 1, but in short may be summarised again as being:

- To establish how the constructs of creativity and innovation are uniquely applied in the entrepreneurship domain (already reported in the literature study)
- To measure the perceptions of small business owners on their own creativity and their implementation of innovative behaviour, and
- Identify the implications of the abovementioned for entrepreneurship education.

6.2.1 Concepts and Constructs

The literature study aimed to identify the various key concepts and constructs of the entrepreneurship domain linked to the application of creativity and innovation, through, inter alia, content analysis of definitions.

6.2.1.1 Entrepreneurship

Through an in depth perusal of the subject literature on entrepreneurship theory and a content analysis of various definitions of entrepreneurship it was deduced that the subject domain rests upon “business creation”, “opportunity finding and exploitation”, and “business growth maximisation”.

Innovation is the critical factor distinguishing entrepreneurs from non-entrepreneurial managers and or small business owners. The entrepreneur is characterised by a preference for creating activity, manifested by some innovative combination of resources for profit.

It was also established that venture performance is a function of the entrepreneur, the industry structure, business strategy, resources and organisational structure, processes and systems (Chrisman, Bauerschmidt & Hofer 1998:8).

Gbadamosi (2002:97) identified the following variables of entrepreneurial behaviour and performance:

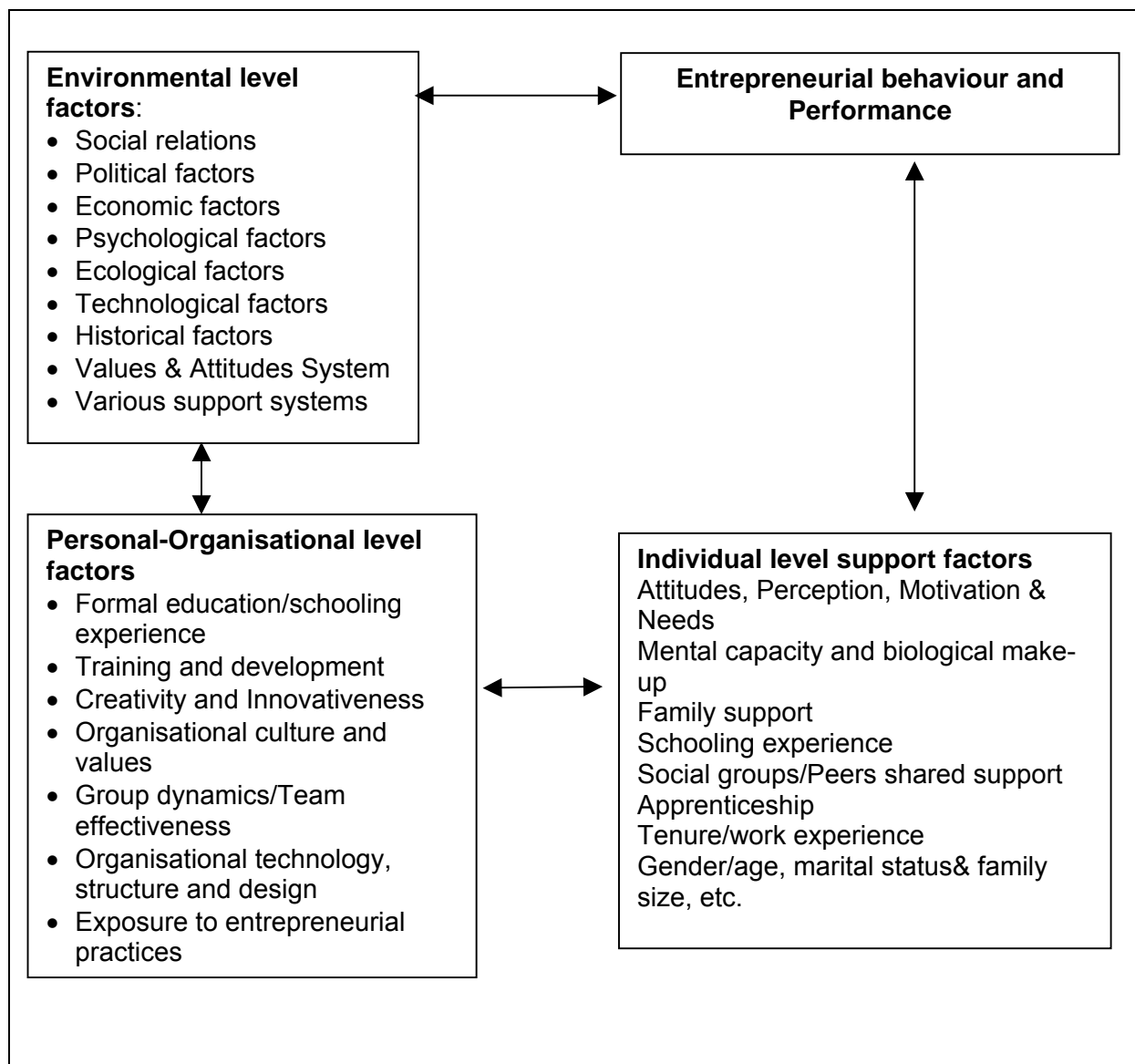


Figure 6.2: Variables of entrepreneurial behaviour and performance adapted from Gbadamosi (2002:97)

In view of this large number of variables that possibly can influence entrepreneurial performance, the questionnaire was developed to measure the relationship between business owners' perception of their own creativity and their perception of their businesses' innovative posture.

6.2.1.2 Creativity

Feldman *et al.* (1994:135), came to the conclusion that in order to understand creativity one must enlarge the conception of what the process is, taking the parameters

of the cultural symbol system (or domain) in which the creative activity takes place into account, as well as the social roles and norms (or field) that regulate the given creative activity. Entrepreneurial creativity is the process through which invention occurs, which means that creativity is the enabling process by which something new comes into existence. Entrepreneurship is enabled by the current or potential existence of something new (an innovation):

- Which may have been developed by new ways of looking at old problems (creativity)
- The lessened capability of prior processes or solutions to respond effectively to new problem parameters brought on by new or emerging external conditions (environmental change)
- Which can supplant or be complementary to existing processes or solutions (a change)
- When championed by one or more invested individuals (the innovator) (Brazeal & Herbert 1999:35).

6.2.1.3 Activities of the Creative Entrepreneurial Process

The literature study and content analysis of various definitions of creativity led to the conclusion that the locus of creativity in the entrepreneurship domain evolves around opportunity recognition, which is enhanced by the following activities:

- Creation (of opportunities)
Creation is the act of pure invention i.e., making something out of nothing. Creation is often preceded by “creative destruction”.
- Synthesising (in order to create and exploit opportunities)
The creative act of joining together two previously unrelated things, e.g. bringing together the telephone and the computer to create the internet is called synthesis. The ability to make the connection between specific knowledge and a commercial opportunity requires a set of skills, aptitudes, insights and circumstances that are neither uniformly nor widely distributed (Ucbasaran *et al.* 2001:63).
- Modification (in order to create and exploit opportunities)

Modification occurs when a thing or process is improved or gains a new application.

6.2.1.4 Innovation

It was established that purposeful innovativeness with growth maximization in mind, is the specific function of entrepreneurship. Creativity is considered a subset of innovation, which is in turn a subset of change (Brazeal & Herbert 1999:39).

A critical question for purposes of this study is: “Which creative activities support/encourage the innovativeness of an entrepreneur?”

- From a macro perspective, the entrepreneurs’ innovativeness is the willingness and the capability of entrepreneurs to create a paradigm shift in the science and technology and/or market structure in an industry.
- From a micro prospective, the innovativeness is the willingness and the capability of entrepreneurs to move the firm’s existing marketing resources, technological resources, skills, knowledge, capabilities, or strategy (Jun & Deschoolmeester 2003:4).

The innovation capacity can be categorised into different groups: product innovation capability, process innovation capacity, organisation innovation, and the capability to acquire, to diffuse the technology transferred from outside sources. However, though there are so many different groups of innovation capacity, it is a fact that innovation capacity will never be completely summed up and represented by one single or several capabilities. Innovation capability actually is the integration and colligation of multi-capabilities (Jun & Deschoolmeester 2003:15).

The literature study identified the following key activities of innovation:

- Imagining – having the initial insight about market opportunity for a particular technical development
- Incubating – nurturing the technology sufficiently to gauge whether it can be commercialised
- Creation capability – the capability of invention

- Demonstrating – building prototypes and getting feedback from potential investors and customers
- Promoting – persuading the market to adopt the innovation, and
- Sustaining - ensuring that the product or process has long a life as possible in the market.

6.2.2 Relationships between the concepts

Two or more variables are related, regardless of their type, if the values of those variables are distributed in a consistent manner in a sample of observations. In other words, variables are related if their values systematically correspond to each other for these observations. Gender and perception of creativity would for example, be considered to be related if most males had a positive perception and most females a negative perception, or vice versa.

If the introduction of *new* services/products and change of operational processes are seen as indicators of innovativeness in the entrepreneurship domain, then it could be hypothesised that there will be a positive relationship between each of the constructs and purposeful innovation. Creativity can involve the adjustment or refinement of existing procedures or products, the identification of opportunities and the identification of solutions to problems. Basically it involves *new* ideas. It can then be further reasoned that there will be implementation of creativity through innovation.

Some entrepreneurs realise the importance of continuous innovation, but regard the rewards linked to the effort and accompanying risk of self-initiated product innovations as insufficient, they often adapt existing products, services, methods or techniques in an innovative manner (Nieuwenhuizen *et al.* 2003:4). Thus their creativity, i.e., visualisation skills, problem definition skills, idea generation skills, creative problem solving skills, skills to overcome mental barriers, creative evaluation skills, critical thinking skills, judgment skills and solution implementation skills, finds expression on the continuum of innovation and adaptation.

These relationships will be tested by way of factor- and variance analysis of the constructs measured by the questionnaire.

6.2.3 Hypotheses

The South African Innovation Survey, which was done during 2001/2002, confirmed that South African entrepreneurs followed the route of modification to an even larger extent than their peers internationally (Oerlemans 2003:5). This observation in the context of Bandura's (1978:238) self-efficacy theory, namely that personal assessment of capability to accomplish certain outcomes, provided a formula for successful action, placed the creativity of South African small business persons in doubt. The following hypotheses were set to guide the thinking:

- Hypothesis H₁ South African small business persons do not perceive themselves to act creatively.
- Hypothesis H_{1a} South African small business persons perceive themselves to act creatively.
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- Hypothesis H₂ South African small business persons do not perceive their businesses as innovative.
- Hypothesis H_{2a} South African small business persons perceive their businesses as innovative.
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- Hypothesis H₃ South African small business persons do not report a high implementation orientation with regard to creativity and innovation.
- Hypothesis H_{3a} South African business owners/managers report a high implementation orientation with regard to creativity and innovation.

6.3 Research design

This study is a cross-sectional formal study, using the survey method to attempt to establish a relationship between small business owners'/managers' perception of their creative behaviour and their perception of their businesses' innovativeness through the introduction of new products/services, changing of strategic goals and expansion of markets.

6.3.1 Sampling design

A population is the total collection of elements about which inferences are to be made. The basic idea of sampling is that by selecting some of the elements in a population, conclusions about the entire population can be drawn. The ultimate test of a sample design is how well it represents the characteristics of the population it purports to represent (Cooper & Schindler 2001:164).

The reasons for sampling in this case include:

- Lower cost
- Greater speed of data collection, and
- Availability of population elements.

When each sample element is drawn individually from the population at large it is an unrestricted sample. The following decisions have been made in securing the simple random sample:

6.3.1.1 The Relevant Population and Sampling frame

The concept “population” refers to all possible cases, which are of interest for a study, and specifies four elements: content, units, extent, and time. For purposes of this study the population is defined as:

Small, Medium and Micro enterprises in South Africa

It is possible to construct a so-called sampling frame, having defined the population. A sampling frame is a listing of all the elements in a population and the actual sample is then drawn from this listing. It is possible that biases could exist between the opinions of members of the sample frame and population. Therefore, the adequacy of the sampling frame is crucial in determining the quality of the sample drawn from it.

Sample frames may differ from the population in the following ways:

- The frame may contain ineligible or elements that are not part of the population
- The frame may contain duplicate listings, and the frame may omit units of the population, which is by far the most serious problem.

Due to the fact that no complete list exists of all small, medium and micro enterprises (SMME's) in South Africa, Gaffney's Business Contacts (2002) was used to draw a sample. Gaffney's Business Contacts (2002) lists more than 15 000 businesses in South Africa. It must be acknowledged though, that Gaffney's list, as also other lists of businesses, would include more of the formalised businesses i.e., licensed businesses registered for VAT. This possible shortcoming was addressed by distributing a mail questionnaire to businesses drawn from the above list but supplementing the sample with questionnaires distributed ad hoc at the Cenbis Business centres in the Tshwane Metropolitan Municipality.

6.3.1.2 Sampling techniques

Techniques that make use of probability theory can both greatly reduce the chances of getting a non-representative sample and, permit precise estimation of the likelihood that a sample differs from the population by a given amount. One of the main characteristics of the stratified sampling technique that will be used is that it tends to reduce sampling error and decreases the required sample size. Since the aim of the study is to make probability based confidence estimates of certain parameters, a probability sampling technique, namely systematic random sampling will be utilised.

6.3.1.3 Sample Size

The following principles influenced the estimation of the sample size:

- Research Hypotheses
One concern in establishing desired sampling size is that there are a sufficient number of cases to examine research hypotheses properly. Generally the literature considers 100 cases in a sample the bare minimum (Monette, Sullivan & DeJong 1990:146).

- The variance within the population

The variance within the population to be sampled influences the sample size. As a rule of thumb a large sample is more essential for a heterogeneous population than for a homogeneous one. Unfortunately, most of the time researchers know little about the homogeneity of the target population. Probability theory solves this problem by assuming maximum variability in the population (i.e., 50% variability). Of course, such estimates are conservative and will result in sample sizes larger than strictly needed for a given level of precision.

In this regard it is important to note that South Africa's historical course shows that there is a developmental gap between Previously Disadvantaged Individuals (PDI's) and the rest, which needs specific attention. The informal sector currently "employs" more than three million small business owners. This sector is also the primary location of black entrepreneurs. The entrepreneurs located here are faced with circumstances that greatly hamper growth (Antonites 2003:9).

- Sampling Technique

The level of precision, or in other words the level of sampling error one is willing to accept in a research also influences sample size (Steyn, Smit, du Toit & Strasheim 1994:394). Suppose the average Research and Development effort of firms in a country is 5.5%. A sample is drawn and the average Research and Development effort is calculated as 5.8%. As one can see the sample statistic is close to the population statistic, but there is an error of 0.3% points (the sampling error).

In reality, the sample statistic is known but the population statistic is unknown. So, the question is how the difference between the sample and the population value can be assessed. The answer to this question is that this assessment can be done in terms of the likelihood that a sample value differs by a certain value from the population value.

Establishing a confidence interval, i.e., a range in which it is fairly certain that the population value lies does this. Moreover, precision is directly related to sample size. Larger samples are more precise than smaller ones. Probability theory enables to calculate the sample size that would be required to achieve a given level of precision.

It was decided to accept a 5% confidence interval.

- Determining the sample size

Taking the above factors into account it was decided to distribute 750 questionnaires. The mail survey was enhanced by telephonic communication before, and during the survey.

In order to partially address the informal sector the various business information centres of the City of Tshwane Metropolitan Municipality (CENBIS) was utilised to distribute a 100 of the 750 questionnaires to business owners that utilised their services on a random basis.

6.4 The Measurement Instrument/Questionnaire

There is no simple answer to which of the available methods of data collection the researcher should use when collecting data. There are however, three major criteria for evaluating a measurement tool (Cooper & Schindler 2001:210):

- Validity refers to the extent to which the test measures what we actually wish to measure
- Reliability has to do with the accuracy and precision of a measurement procedure, and
- Practicality is concerned with a wide range of factors of economy, convenience and interpretability.

The survey was done via mail and a telephone survey was done as a follow-up to non-respondents. For the more informal business sector, questionnaires were handed out at business centres.

A structured questionnaire (Annexure A) with thirty questions (items) was compiled for purposes of this study to measure the application of creativity skills by business owners/managers and comparing the frequency of the applications with entrepreneurial behaviour, i.e., the introduction of new services/products, new marketing concepts and changing strategies.

Variables differ in "how well" they can be measured, i.e., in how much measurable information their measurement scale can provide. There is obviously some measurement error involved in every measurement, which determines the "amount of information" that we can obtain. Another factor that determines the amount of information that can be provided by a variable is its "type of measurement scale."

It was decided to use a five-point Likert scale taking into account the study objectives, the response form, data properties and especially the number of dimensions. The Likert scale is a frequently used variation of the summated rating scale and assists in the comparison of one person's score with a distribution of scores from a well-defined sample group. A nominal scale was used for the questions on demographics, which were in the form of multiple-choice questions with single answers.

There is always a chance that some questions can cause problems and questionnaire testing is needed to identify and eliminate these problems. The questionnaire was tested by distributing a copy of the questionnaire to a few respondents in different fields ranging from academics to entrepreneurs. Interviews were personally conducted afterwards with the respondents to determine the underlying weaknesses of the questioning and how to go about correcting them. The questionnaire was adapted afterwards and some statements that proved to be unclear were rephrased.

6.4.1 Demographic information

A variable can be defined as a symbol that stands for any one of a set of two or more mutually exclusive values and in practice is used as a synonym for "construct" or the property being studied. (Cooper & Schindler 2001:44). The following variables were selected for purposes of this study:

- Gender

- Number of years' business management experience (reasoning that previous entrepreneurial experience may provide a framework or mental schema for processing information. In addition, it allows informed and experienced entrepreneurs to identify and take advantage of disequilibrium profit opportunities. This entrepreneurial learning goes beyond acquiring new information by connecting and making inferences from various pieces of information that have not previously been connected. These inferences build from individual history and experience and often represent "out-of-the box" thinking).
- Business size (micro, very small, small, medium and large). It was hypothesised that the larger the size of the business the more resources would be available to support creativity and innovativeness.
- Life cycle phase of the business (because it is hypothesised that a business in its growth/mature phases will be more creative than those in start-up/declining stages).

6.4.2 Concepts measured

6.4.2.1 Perception of creativity

The concept of creative skills was divided into creation, synthesising and modification encompassing the following activities:

- Problem/challenge/opportunity recognition / definition
- Idea generation
- Creative idea analysis and evaluation
- Idea judgement/critical thinking
- Solution implementation

Nine questions test the perceptions of personal creativity, the development of new ideas and the application thereof when looking for solutions to problems. A number of questions focus specifically on the application of "creative skills" such as considering more than one solution and connecting (synthesising) environment and business.

6.4.2.2 Measuring "innovative behaviour"

The concept "innovative behaviour" was measured where innovativeness refers to a willingness to support creativity and experimentation when introducing new prod-

ucts/services. For purposes of this research, the concept “innovative behaviour” was divided into:

- Purposeful growth strategies
- Opportunity finding (new services, marketing concepts, ways of production)
- Opportunity exploitation, changing of strategic goals, constantly seeking different markets/market segments)
- Purposeful innovation (changed operational processes)

Jun and Deschoolmeester (2003:21) see the innovation achievements as the convincing evidence illustrating the innovation strength in the enterprise innovation capability, which can be evaluated by means of seven different indicators that reveal aspects of these capabilities, namely:

- The incidence of major product innovation, or completed improvement of an existing product
- The incidence of major process innovations
- The incidence of major improvements in production organisation
- The occurrence of substantial ‘incremental’ innovation
- An ‘innovativeness index’ which combines the information about the above four indicators, and which also takes account of the complexity and originality of the innovations
- The number of patent(s) held, if any
- An indicator measuring the firm’s ISO (quality standard) accreditation status.

Taking Lundvall’s (1988:352) ideas on the complexity of innovative activities as a point of departure, the items listed below were developed to operationalise the complexity of innovative activities.

- Characteristics of product/service innovation
Firms were asked to characterise their innovative activities aimed at the realisation of product or service innovations. Questions were asked on risks taken, new products and different ways to produce products.

- Internal consequences of product/service innovations
A question was asked on the influence of product/service innovations on operational processes.
- Internal consequences of process innovations
Firms were asked whether they agreed or not that process innovations caused changes of other products, services and processes within the firm. Possibilities to answer range from 1 (strongly disagree) to 5 (strongly agree). This item measures another aspect of the complexity of innovative activities.

6.4.2.3 Measuring an implementation orientation

Part of establishing business owners' perceptions on their businesses' innovative orientation was building in a number of control questions on proactiveness where proactiveness is regarded as an opportunity-seeking, forward-looking perspective involving introducing new products or services ahead of the competition and acting in anticipation of future demand to change the environment.

According to the motivational model discussed by Naffziger *et al.* (1994:35) the entrepreneur must believe that the actions that he/she initiates will lead to specific outcomes achieved by the firm, such as increased sales, profit or market share. The entrepreneur will try to understand what actions lead to what outcomes as he/she attempts to guide the firm through the marketplace. When expectations are met the owner is motivated to continue to pursue entrepreneurial (creative /innovative) behaviour. This belief is termed "perceived implementation-outcome relationship". Firms were asked whether they were of the opinion that costs, a lack of information, own risk aversion and their competitors impeded on their innovativeness and creativity.

6.5 Data collection

The questionnaires were mailed to the 750 respondents during November 2003. A return envelope was included with the questionnaire. After four weeks a number of

non-respondents were phoned and after 8 weeks the final number of questionnaires, returned, was 222 (29.6%).

6.6 Data processing

The questionnaires were checked for completeness and questionnaires with incomplete data discarded. The responses were captured from the questionnaire in the BMDP statistical software programme. Some basic calculations were made to test the reliability of the data.

6.6.1 Descriptive Statistics

An important aspect of the "description" of a variable is the shape of its distribution, which tells the frequency of values from different ranges of the variable. It is of interest to establish how well the distribution can be approximated by the normal distribution, since this assumption forms key to the use of inferential statistics. Simple descriptive statistics can provide some information relevant to this issue. For example, if the skewness, which measures the deviation of the distribution from symmetry, is clearly different from 0, then that distribution is asymmetrical, while normal distributions are perfectly symmetrical. If the kurtosis (which measures "peakedness" of the distribution) is clearly different from 0, then the distribution is either flatter or more peaked than normal, the kurtosis of the normal distribution is 0.

The characteristics of location, spread, shape and shape are helpful tools for cleaning up data and discovering problems. The frequencies for all questions will be established. Together with the frequency the observations form a distribution of values. The responses will be checked for distribution, location, spread and shape.

6.6.2 Factor Analysis

Factor analysis evaluates all variables simultaneously with the objective to group variables that belong together and have overlapping measurement characteristics together. The main applications of factor analytic techniques are:

- to reduce the number of variables, and

- to detect structure in the relationships between variables, that is to classify variables.

Factor analysis was conducted to determine whether the dimensions of creativity, innovativeness and the implementation-outcome perceptions represented distinct constructs.

The Z- test was utilised to test the structure in the relationship between the variables. A Z-score is a standard score, that can be calculated once the mean and the standard deviation are available and is obtained by subtracting the mean from a value and dividing the result by the standard deviation: $z = (\text{value} - \text{mean}) / \text{standard deviation}$ (Zady 1999:4). The calculated score describes where a value is located in the distribution.

6.6.3 Variance Analysis

The statistical method for testing the null hypothesis that the means of several populations are equal is analysis of variance (ANOVA). This data analysis technique examines the significance of the factors (= independent variables) in a multi-factor model. The one factor model can be thought of as a generalisation of the two sample t-test. That is, the two sample t-test is a test of the hypothesis that two population means are equal. The one factor ANOVA tests the hypothesis that k population means are equal. To use ANOVA certain conditions must be met:

- The samples must be randomly selected from normal populations.
If the kurtosis is greater than 0, then the F tends to be too small and we cannot reject the null hypothesis even though it is incorrect, and
- The populations should have equal variances (Cooper & Schindler 2001:509).
If the variances in the two groups are different from each other, then adding the two together is not appropriate, and will not yield an estimate of the common within-group variance (since no common variance exists).

In this study some of the constructs (see chapter 7) did not comply with the requirements for the ANOVA and non parametric analyses (Kruskal-Wallis as described in 7.2.3) were consequently applied.

6.7 Validity

Research should be valid, where 'validity' refers to the problem of establishing whether the data collected presents a true picture of what is being studied. Validity in research therefore deals with accurate interpretability of the results (internal validity) and the generalisability of the results (external validity). The reliability of research concerns the replicability and consistency of the methods used, conditions prevailing and results obtained. Internal reliability refers to the extent to which the data collection, analysis and interpretation are consistent, given the same conditions. External reliability deals with the probability of replication in the same or similar settings and the obtaining of similar results (Du Plooy 1995:31).

The statistical significance of a result is the probability that the observed relationship (e.g., between variables) or a difference (e.g., between means) in a sample occurred by pure chance ("luck of the draw"), and that in the population from which the sample was drawn, no such relationship or differences exist. Using less technical terms it could be said that the statistical significance of a result tells something about the degree to which the result is "true" (in the sense of being "representative of the population"). More technically, the value of the p-value represents a decreasing index of the reliability of a result (Statsoft 2004). The higher the p-value, the less it can be believed that the observed relation between variables in the sample is a reliable indicator of the relation between the respective variables in the population. Specifically, the p-value represents the probability of error that is involved in accepting our observed result as valid, that is, as "representative of the population." For example, a p-value of .05 (i.e., 1/20) indicates that there is a 5% probability that the relation between the variables found in the sample is a "fluke."

6.7.1 Content validity

Content validity refers to the first impression the user has of the instrument and should show a reasonable, logical, clear connection between the instrument and what is measured. It concerns the degree to which an instrument assesses all relevant aspects of the conceptual or behavioural domain that the instrument is intended to measure (Grimm & Yarnold 2002:104).

6.7.2 Criterion validity

Criterion validity concerns how accurately an instrument predicts a well-accepted indicator of a given concept, or a criterion.

6.7.3 Concurrent validity

Concurrent validity is established by showing that there is a relationship with a present criterion, i.e., the measure is shown to relate statistically to an independently determined, concrete measure obtained simultaneously (Grimm & Yarnold 2002:110). According to Bandura's theory of self-efficacy, there will be positive relationship between an entrepreneur's perception of his self-efficacy and his implementation orientation. Various factors may however intensify the entrepreneur's perception of his self-efficacy at a given stage, inter alia, the number of years' management experience that he/she has, the specific life cycle phase of the business and/or the industry the business is operating in. Concurrent validity of these independent variables was tested making use of the so-called Z-stat.

6.7.4 Construct validity

The concern of construct validity is whether a questionnaire that is intended to assess participants' perception of their own creativity truly captures that, or does it provide information about another concept (Cooper & Schindler 2001:214).

6.7.5 Convergent validity

If an instrument is measuring what it is supposed to measure, it should relate positively to other measures of the same thing (i.e., they all should be "converging" on the same trait. An instrument is said to have convergent validity if, in numerous cases, it is statistically shown that there is agreement on the rating (Statsoft 2004).

6.8 Chapter Conclusion

Scientific inquiry is grounded in the inference process, which is used to develop and test propositions through the double movement of reflective thinking (Cooper & Schindler 201:53).

According to Cooper and Schindler (2001:40) the success of research hinges on how clearly we conceptualise. The findings are discussed in the next chapter.