

Entrepreneurial Cognition and the Decision to Exploit a  
New Venture Creation Opportunity

By

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Submitted on partial fulfilment of the requirements for the degree of

**PhD (ENTREPRENEURSHIP)**

In the  
Faculty of Economic and Management Science

**UNIVERSITY OF PRETORIA**

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**March 2005**

## ACKNOWLEDGEMENTS

I am immensely indebted to the following people:

- My promoter and friend, Dr Marius Pretorius (UP) for his guidance and support. I really admire his patience and motivation as well as his ability to stretch across quadrants.
- Rina Owen for her wisdom and exceptional understanding of the statistical process.
- Sollie Millard for his statistical guidance.
- My family Lourens, Gerhard and Heinrich for their support, allowing me to fulfil a dream. I am extremely blessed to have three such men in my life.
- My mother, for believing in me all her life. Her passion for life and devotion to everybody around her makes her a living example of the Biblical woman referred to in Proverbs 31: 10 – 31.
- Last but not least to all my friends for their encouragement and support.

Above all I thank the almighty God for the privilege of good health and energy to complete the task.

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March 2005

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### **ABSTRACT**

This study focuses on entrepreneurial cognition and the decision to start a new venture opportunity. The entrepreneurial process used has four broad phases namely; the intention to start, opportunity identification, taking the decision to exploit (start-up) and taking action to execute the venture. The focus of the study is on the decision to start. The study reports empirically the results from an experimentally designed case analysis.

An attempt is made to clarify if any of the following constructs under discussion namely: risk perception, illusion of control, misconceptions or self-efficacy acts as a heuristic or bias and therefore influences the decision to exploit the opportunity. Entrepreneurs and non-entrepreneurs do not differ in their risk propensity but differ in their cognitive perception of the viability of the venture.

A case study method that deals with the animal feed industry was used to eliminate possible familiarity with the industry. The case study was followed by an eight-page questionnaire, developed with structured questions to be completed by the respondents. The respondents varied over groups of students in entrepreneurship, general business management students, and well as humanities students. Managers and practicing entrepreneurs form the rest of the researched population.

The study concludes that misconceptions, illusion of control and business risk perception, but not self-efficacy, influence the decision to start a business.

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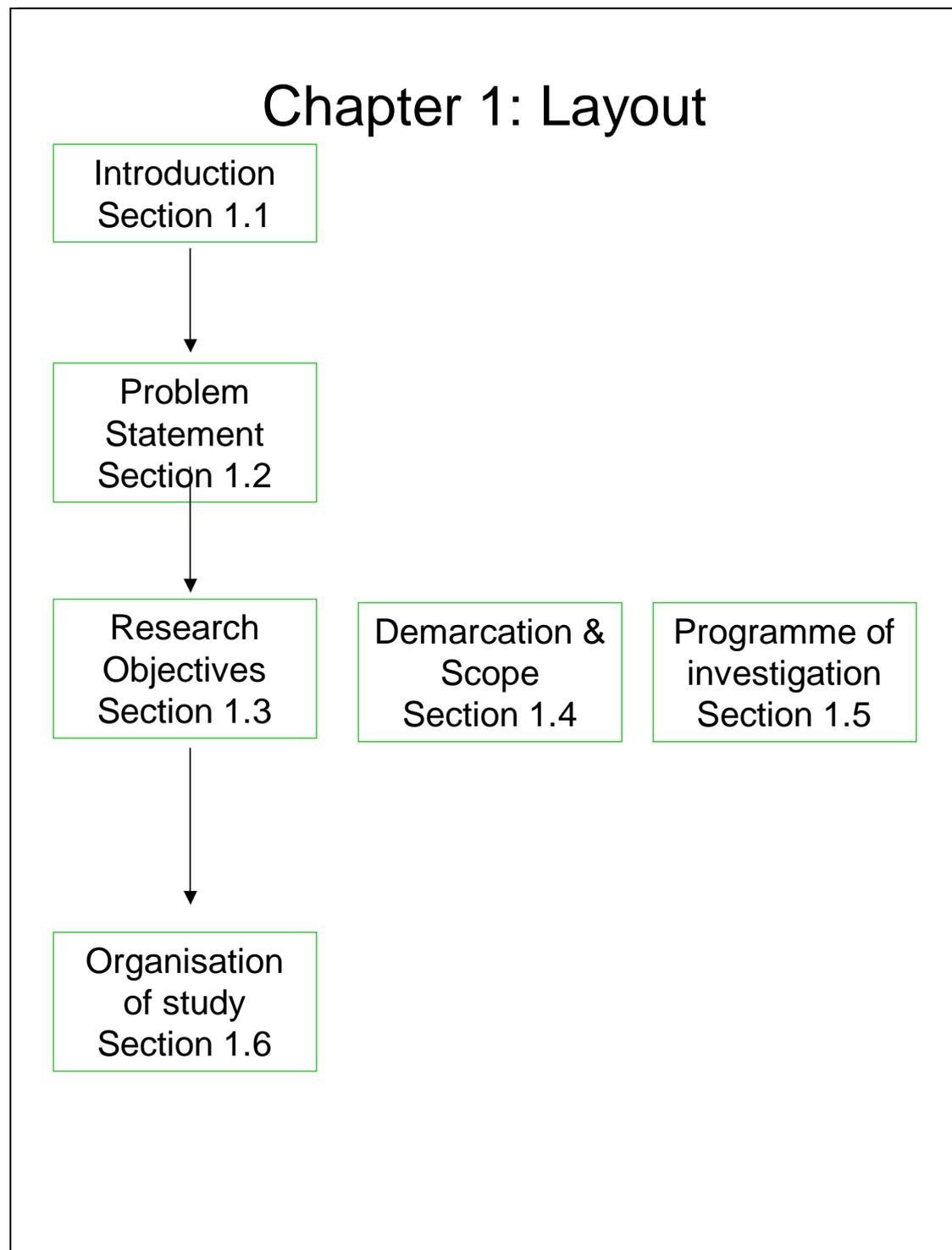
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## Chapter 1: Background and orientation to the problem



## 1.1 Introduction

*Researchers traditionally addressed the question of how one must understand the entrepreneur by examining whether entrepreneurs were more likely than others to have certain personality traits, such as locus of control and need for achievement. This direction, however, has been characterized as a “dead end” by some, based on inconclusive findings of a direct effect of traits on action. Thus with a few notable exceptions (e.g. Johnson, 1990), the research focus moved away from studying individual trait differences to examining entrepreneurial cognitive and decision processes. This approach suggested that an individual’s perception of reality might play an important role in determining entrepreneurial activity.*

(Simon & Houghton, 2002: 106).

Until recently, entrepreneurship theory was based on the fields of economics, personality psychology and strategy (Mitchell, Busenitz, Lant, McDougall, Morse, & Smith, 2002: 94). All these approaches based on the different fields mentioned made a contribution to the understanding of entrepreneurship, but at the same time had some shortcomings, which will later be explored.

In recent years, however, entrepreneurship researchers have made great strides towards explaining why some individuals proceed with entrepreneurial actions when others do not. Much of this research concluded that differences in individual perceptions about a potential entrepreneurial action play a major role in the decision to proceed or not.

Similarly, numerous scholars have suggested that perceptions of feasibility and desirability lead to venture creation and other entrepreneurial activities. For example, Simon, Houghton & Aquino (1999: 113) found that individuals who perceive lower risk associated with a venture are more likely to decide to start the

venture. Therefore the cognitive perspective is of importance for the entrepreneurial process (Chapter 4).

In order to understand entrepreneurial cognition one needs to look at the previous theories that attempted to explain the relationship between the entrepreneur and how a new venture is formed. Until recently, three different fields, namely economics, personality psychology and strategy, were used to explain entrepreneurship theory (Mitchell et al, 2002: 94). Each of these fields made its own contribution, but at the same time had some major shortcomings:

The economists had an outcomes-based approach to understanding new venture formation, in that they viewed the contribution of the entrepreneur to be the creation of a new business venture. Their positive contribution was the fact that they established what entrepreneurship is and when it occurs, but they were unable to explain how and why it occurs (Mitchell et al, 2002: 94).

The second phase of entrepreneurship research, according to Mitchell et al (2002: 94), was that of the behaviourists like Max Weber and David McClelland. Mitchell et al (2002: 94) quote McClelland (1985), who tried to establish the characteristics and traits of the entrepreneur and also tried to describe the entrepreneurial personality as the key component in new venture creation. Unfortunately this research did not succeed because the researchers were unable to establish a set of characteristics that were unique to all entrepreneurs (Mitchell et al, 2002: 95).

The third phase of the research was based on strategic management and how the entrepreneur actually influences the performance of the venture. This research was very useful in linking the performance of ventures to entrepreneurship research relative to research in strategic management. The general shortcomings, however, were the fact that the researchers were unable to link attributes of the entrepreneur to performance of the venture (Mitchell et al, 2002: 95).

Given the shortcomings of the previous fields of research and the inability to establish the entrepreneur as a distinct individual, academics have changed their field of thought to that of the cognitive view of entrepreneurship, in an attempt to try to explain the role of the individual in the entrepreneurial process (Mitchell et al, 2002: 95). Shaver & Scott (1991: 26) had already stated that a psychological approach to new venture creation must involve cognitive processes that occur within the individual.

In more recent studies the focus has thus moved to a cognitive approach of understanding how entrepreneurs think and make strategic decisions (Tversky & Kahneman, 1974; Manimala, 1992; Busenitz & Barney, 1997; Vallaster, 2000; Alvarez & Busenitz, 2001; Selden, Transley & Fletcher, 2004). It has been asserted that two broad categories influence the probability that particular people will discover particular opportunities:

- Firstly, the possession of the information necessary to identify an opportunity
- Secondly, the cognitive properties necessary to exploit it (Mitchell et al, 2002: 94)

According to these criteria, research that contributes to a better understanding of information processing and entrepreneurial cognition has an important role to play in the development of entrepreneurship literature.

According to Mitchell et al (2002: 95), the cognitive viewpoint acts as an effective tool and helps us to explain the previously unexplainable phenomena within the entrepreneurship research domain. It will help people to understand how entrepreneurs think and why they do some of the things that they do. In doing so a theoretical, rigorous and testable argument for such distinctiveness will be provided with.

*Entrepreneurship Theory and Practice* published a special issue (Winter, 2002) on information processing and entrepreneurial cognition because it felt that the

journal had a role to play in developing entrepreneurship literature. Five articles (out of 26) were selected and published, using authors such as Simons, Houghton, Lim, Mitchell, Balkin, Baron, Krueger, Shepherd, Gartner and Gatewood to explore issues regarding decisions to start a venture, heuristics, biases, misconceptions and cognitive processes of entrepreneurs.

*The Journal of Business Venturing*, Volume 19 (2004) published a special issue that focused on concepts and findings in cognitive science that had not yet been successfully “imported” by entrepreneurship researchers. Five articles from authors such as Baron, Brockner, Ward and Sternberg were published on cognition, creativity and entrepreneurship.

*Entrepreneurship Theory and Practice* published another special edition (Winter 2004) on the distinctive and inclusive domain of entrepreneurial cognition research, in an attempt to develop and utilise a “boundaries and exchange” concept. It aimed to provide a lens through which both distinctive and inclusive aspects of the entrepreneurship domain (see Figure 1.1) were employed to frame this special issue (Mitchell, Busenitz, Lant, McDougall, Morse & Smith, 2004: 505).

Mitchell et al (2004: 506) quote Harrison & Leitch (1996), who suggest that entrepreneurial cognition needs to create a distinct position within the context of existing research. The domain of entrepreneurial cognition research cannot simply be a net importer of theory from cognitive psychology and other domains, and expect thereby to establish its legitimacy. Mitchell et al (2004: 506) also quote Davis (1971), who argued that the domain of entrepreneurial cognition must develop its own interesting research questions and make progress in answering those questions by building and extending theory in its own domain, and thereby gradually establish its legitimacy.

Entrepreneurial cognition distinctiveness is therefore most likely to be established when questions, concepts and relationships are proposed that are different from those proposed by scholars in other areas like cognitive

psychology, and which are overlooked by them when using their research lenses (Mitchell et al, 2004: 506). However, it is important to note that both cognitive psychology and entrepreneurial cognition as fields of study have a distinct territory within which they work, but also a region of shared territory, as shown in Figure 1.1 (Mitchell et al, 2004: 507).

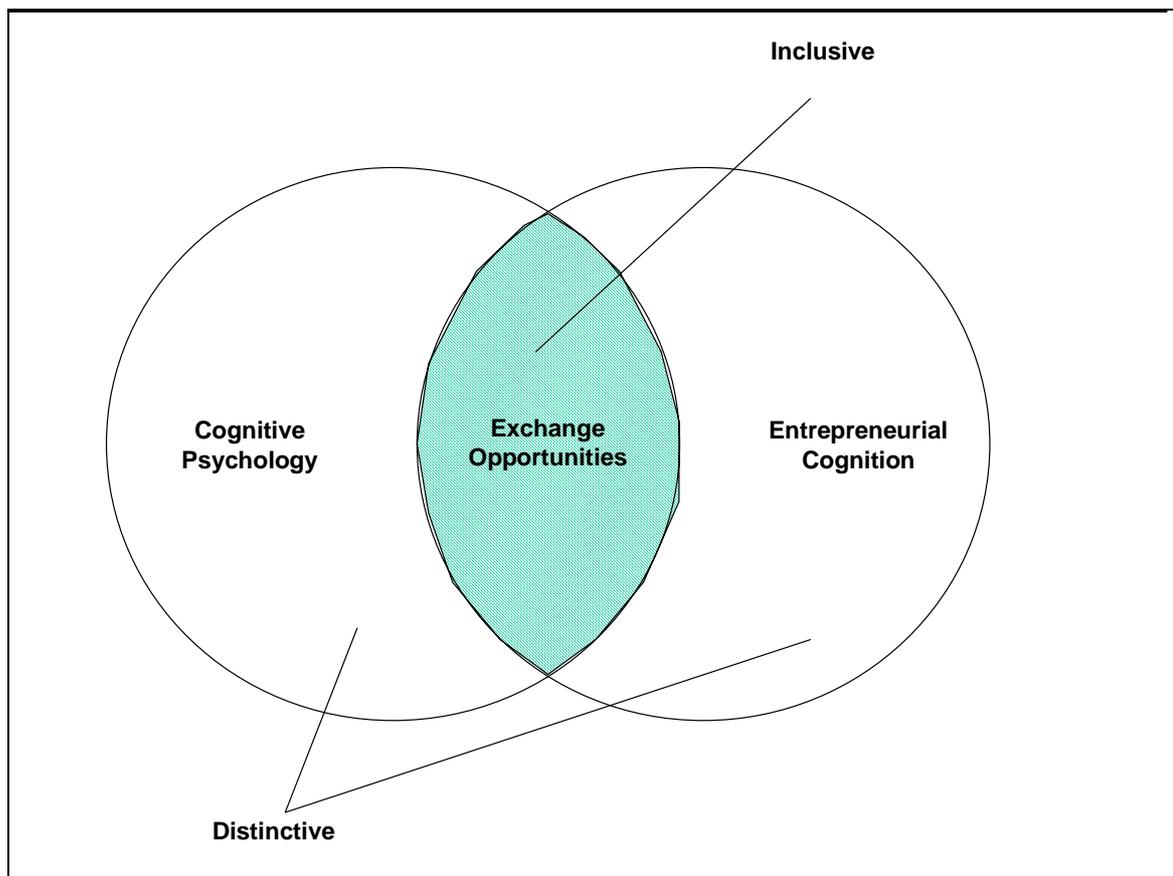


Figure 1.1 Conceptual domain of Cognitive Psychology and Entrepreneurial Cognition (Mitchell et al, 2004: 507)

The types of question that it is important to investigate in the entrepreneurial cognition field are summarised in Table 1.1. An attempt is made to provide examples of research questions relevant to the domains of both cognitive psychology and entrepreneurial cognition.

Table 1.1 Research question for the different domains with quoted references as suggested by Mitchell et al (2004: 508).

Questions specific to the Cognitive Psychology domain	Exchange opportunities with the other domain	Questions specific to the entrepreneurial domain
How do people think? Barsalou (1992)	Fundamental understanding of human cognition	
Does regulatory focus theory explain how people engage in self-regulation? Roese (1997)	Examples of the development of specific cognitive theory. How do entrepreneurs engage in multi-tasking?	
Creative cognition? Balance between novelty and familiarity. (Ward & Sifonis (1997)	An understanding of the basic mental operations of creativity.	
What are the mental processes that lead people to depart from the rational model of decision-making? Kahneman & Lavallo (1994)	The nature of human decision making and potential problem areas.	
What are the mental processes that account for expert performance?	Explanation of new venture formation as use of expert scripts.	
Methodology: Scale development of challenging concepts/theory. Hinkin (1995)	Measurement and scale development.	
	Do cognitive differences lead to meaningful	Why do some people and not others

	differences in choices such as career choices?	choose to become entrepreneurs? Simon, Houghton & Acquina (2002)
	Generalisability issues, Implications of creative people working in complementary careers.	Why do some people and not others recognise opportunities that can be profitably exploited? Gaglio & Katz (2001)
	Provides focus for why the examination of different decision processes is important. Also explains adjustments to theory boundaries.	How do entrepreneurs think and make strategic decisions? How do these differences lead to competitive advantages or disadvantages? Busenitz or Barney (1997); Mitchell et al (2000; 2002); Alvarez & Busenitz (2001)
	Research into alertness, biases, heuristics, transaction cognitions and so forth.	Do entrepreneurs think differently from other business people? Busenitz (1997); Gaglio & Katz (2001); Mitchell et al, (1994); Mitchell (2003)
	Dealing with measurement issues outside laboratory	Measurement of cognitive concepts in

	settings.	non-laboratory settings. Mitchell (1994); Mitchell et al (2000)
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The above research questions are of importance to this study. This study is undertaken to investigate certain aspects of possible research questions mentioned in Table 1.1. An attempt is also made to contribute to the body of knowledge related to the entrepreneurial cognition domain. The study deals with:

- How business risk perception influences the decision to exploit a venture opportunity
- How misconceptions influence the decision to exploit a venture opportunity
- How illusion of control bias influences the decision to exploit a venture opportunity
- How self-efficacy influences the decision to exploit a venture opportunity
- How thinking preferences as determined by HBDI (Herrmann Brain Dominance Instrument) influence the decision to exploit a venture opportunity

Figure 1.2 illustrates the focus of the study.

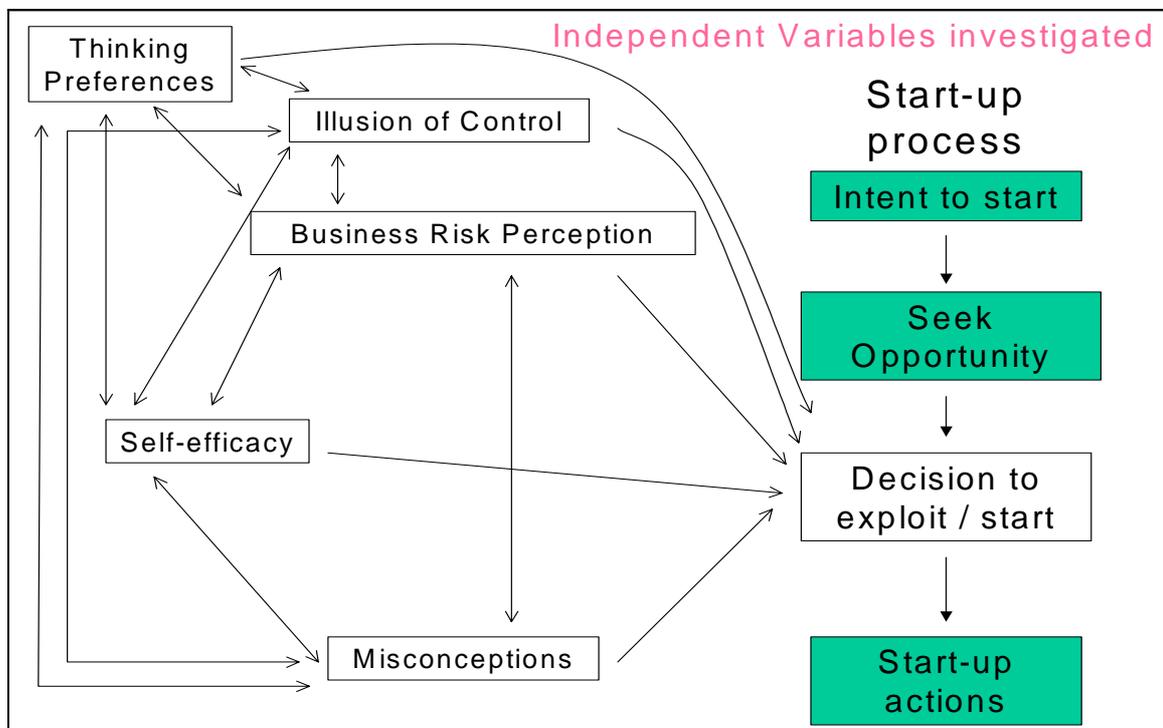


Figure 1.2 The focus of the study: the decision to exploit or start as the dependent variable and the independent variables investigated.

## 1.2 Problem statement

The key problem of the study is to establish which constructs may influence the decision to start a venture opportunity. To better understand the thinking of the entrepreneur, the study looks at elements influencing the decision on whether to start the venture opportunity, such as perceptions (business risk perception, misconceptions and self-efficacy), as well as heuristics and biases (illusion of control bias).

The following constructs and potential influences on the decision are investigated:

- Patterning and thinking preferences (Whole brain thinking / cognitions)
- The illusion of control bias and its influence on the entrepreneur's risk perception
- Self-efficacy
- Misconceptions
- Business risk perception

The relationships between the above factors and how misconceptions contribute to all of the above

## 1.3 Research objectives

The primary objective of the study is to investigate whether and how the decision to pursue a business opportunity is influenced by factors from the entrepreneurial cognition domain. Many authors (including Mitchell, Shepherd, Simon and Houghton, to name only a few) are currently investigating the entrepreneurial cognition domain.

- The major objective leads to the following secondary objectives:
- To contribute to the body of knowledge regarding the entrepreneurial cognition domain

- To investigate factors that influence the decision to start a new venture opportunity
- To develop an understanding of the specific factors that contribute to the decision to start a new venture opportunity

Figure 1.3 shows the layout of the study in order to achieve these objectives.

## 1.4 Demarcation and scope of the study

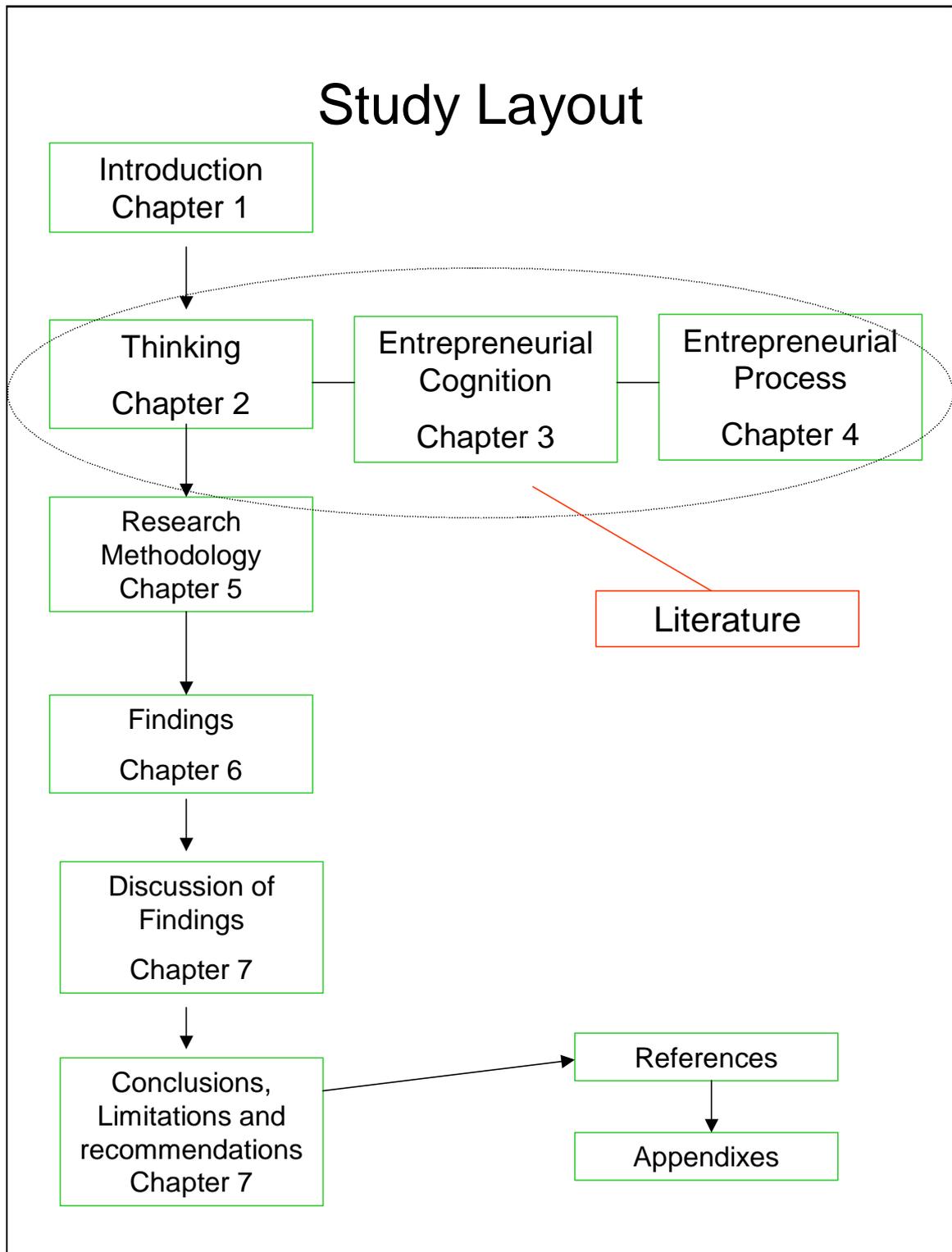


Figure 1.3 Scope of the study

## 1.5 Programme of investigation

- Firstly, the investigation started with a literature review. The literature regarding cognitive styles, patterning (De Bono) and thinking preferences (HBDI) was investigated and is reported on in Chapter 2. This was followed by an investigation into cognition, heuristics and biases, self-efficacy, misconceptions and risk perception, as described in Chapter 3. The last part of the literature review investigated the entrepreneurial process, reported on in Chapter 4.
- Secondly, an empirical analysis of data was executed out. The research and methodology are described in Chapter 5 and the empirical statistics are given in Chapter 6. A factor analysis was performed to determine the factors involved, as well as an item analysis, analysis of variance, a linear discriminant analysis and a logistical regression. A focus group to obtain expert opinion on the viability of the business was also held. The method of data collection included the use of a case study and a questionnaire in a case-study format.
- Thirdly, an interpretation of the data, and the conclusions from the findings, as well as the recommendations and limitations of the study, are reported in Chapter 7.

## 1.6 Organisation of the study

Chapter 1: Background and orientation to the problem

Chapter 1 introduces the entrepreneurial cognition concept and gives an overview of the background and orientation to the concept. References are made to specific journals such as *Entrepreneurship Theory and Practice* and *The Journal of Business Venturing*, which published special editions on entrepreneurial cognition.

The problem statement is then presented, followed by the research objectives and the demarcation of the study. The programme of investigation is mentioned, followed by the organisation of the study according to the different chapters.

#### Chapter 2: Cognitive styles and thinking patterns

Chapter 2 reviews the literature related to mental or cognitive models, patterning and thinking preferences (HBDI). Cognitive or mental models are seen as powerful thinking tools or metaphors. When mental models are understood they can enhance communication, teamwork and decision-making, which in turn can enhance effective problem solving (Lumsdaine, Lumsdaine & Schelnutt, 1999: 49).

Thinking preferences are also investigated. It has long been recognised that people have different styles of knowing and thinking and that the left brain deals with analytical, systematic and logical information and the right brain with creative, artistic and intuitive information (Lumsdaine & Binks, 2003: 47).

#### Chapter 3: Cognition and biases

Chapter 3 reviews the literature related to cognition, heuristic and biases, misconceptions, self-efficacy and business risk perception. According to Baron (2004: 237), the cognitive perspective should be viewed as complementary to, rather than incompatible with, other points of view in entrepreneurship such as personality and characteristic traits. The cognitive perspective may provide additional insight into the complex process of entrepreneurship thinking.

#### Chapter 4: Entrepreneurial process

Chapter 4 reviews the literature related to the entrepreneurial process. Entrepreneurship can be seen as the process whereby entrepreneur creates or takes an opportunity and pursues it, regardless of the resources currently controlled.

The chapter investigates a cognitive model suggested by Forbes (1999) and the window of opportunity metaphor (Wickham, 2001: 209) as a generalised

introduction to understanding the entrepreneurial process. The discussion is then followed by the organising model of Shook, Priem & McGee (2003: 381), who proposed four stages in the entrepreneurial process. The role of the enterprising individual has been studied within each of the four stages.

Cognitive processes in the entrepreneurial process are part and parcel of the entrepreneurs' perception and thinking and form the backbone of entrepreneurial decision-making. The identification of the opportunity, the gathering of resources and the decisions taken regarding the potential of the venture, its viability and long-term sustainability are all important factors to be taken into account.

#### Chapter 5: Research procedures and methodology

Chapter 5 presents the research design and methodology applied in this study. It starts by providing an overview of the research process, research questions, hypotheses and the sampling process. The measuring instruments used and the type of data analysis are specified.

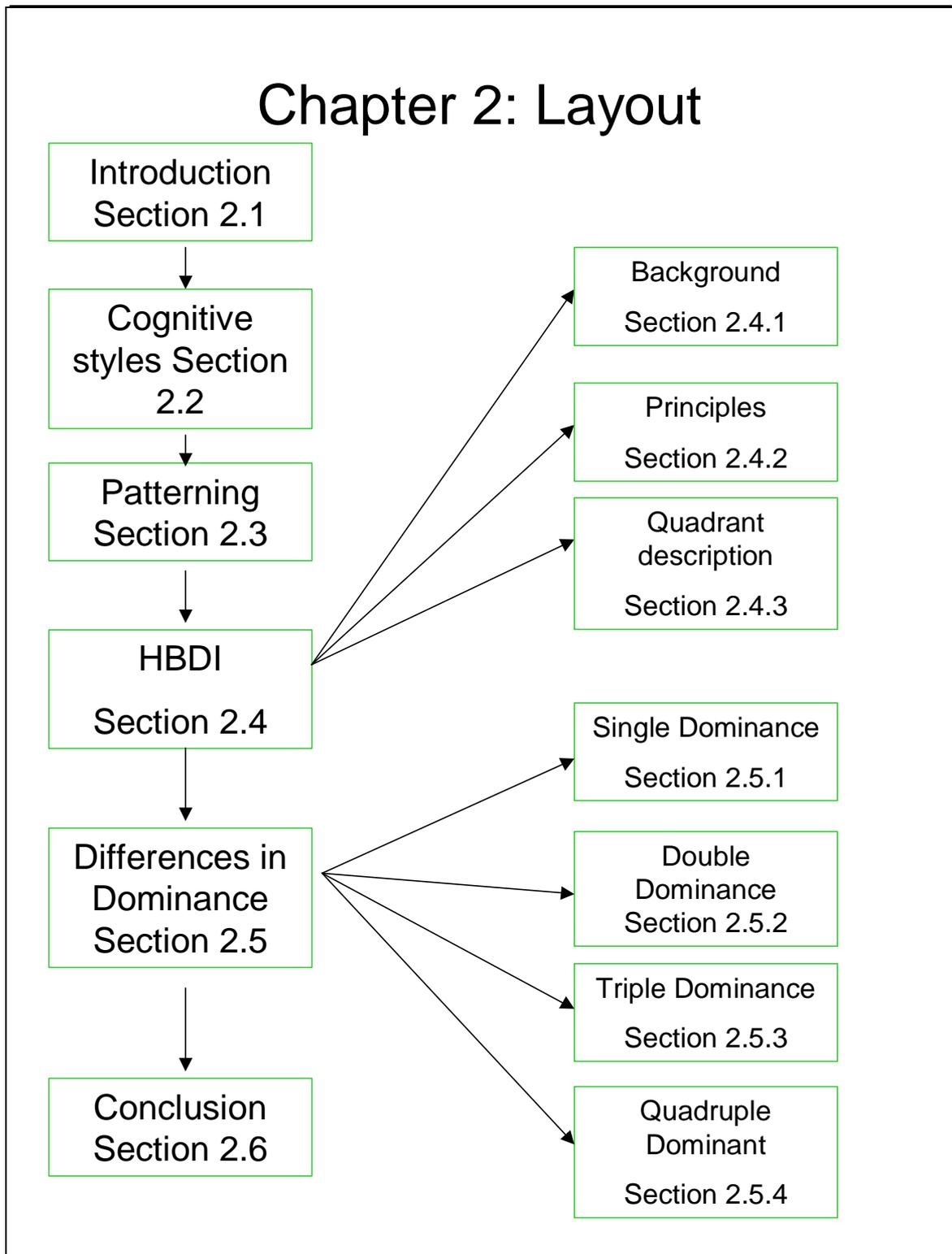
#### Chapter 6: Findings

In Chapter 6 the results of the empirical study are reported. The results of this empirical study are provided in tabular format. The demographic data are presented, followed by the results of the factor analyses (four factors were identified), variance analysis, focus group, discriminant analysis and logistical regression analysis.

#### Chapter 7: Discussion of findings

Chapter 7 discusses the findings and draws final conclusions. It is evident from the empirical data that certain factors influence the decision of whether to start a venture opportunity or not. Recommendations are made for further investigations. Limitations to the study were also perceived and these are reported in this chapter.

## Chapter 2: Cognitive Styles and Thinking Patterns



## 2.1 Introduction

Mental or cognitive models are powerful thinking tools or metaphors. When mental models are understood they can enhance communication, teamwork and decision-making, which can again enhance effective problem solving (Lumsdaine et al, 1999: 49). Flexible, critical and creative problem-solving skills are necessary in a rapidly changing world in order to cope with and find solutions for its many problems (Lumsdaine & Lumsdaine, 1995: 4). Making a decision on whether to start or not to start a venture is an example of such a problem-solving situation faced by the entrepreneur.

According to Ucbasaran & Westhead (2002: 6), habitual entrepreneurs may have a unique mindset that allows them to identify not only more opportunities but also more innovative ones. These cognitive processes include a greater reliance on entrepreneurial heuristics (see Chapter 3), which allow entrepreneurs to have at their disposal greater cognitive resources, which in turn facilitate higher levels of innovative activity.

The following three mental or cognitive styles / models are of specific interest for this study:

- Cognitive style
- Patterning system for understanding thinking
- The Whole Brain thinking model of Ned Herrmann (thinking preferences)

## 2.2 Cognitive style

Brigham & De Castro (2003: 44) attempt to provide an overview of the construct of cognitive style. These authors argue and quote Sadler-Smith & Badger (1998) that the cognitive style construct is widely recognised as an important determinant of individual behaviour. Cognitive style can be defined as an individual's preferred

and habitual approach to organising, representing and processing information (Streufert & Nogani 1998); a built-in and automatic way of responding to information and situations (Riding & Rayner, 1998); individual differences in the way people perceive, think and solve problems, learn and relate to others (Witkin, Moore, Goodenough & Cox, 1977); and individuals' characteristics modes of perceiving, remembering and problem-solving (Messick, 1984) as quoted by Brigham & De Castro (2003: 44).

According to Brigham & De Castro (2003: 44), cognitive style is a higher-order heuristic and can be conceptualised as the way the individual's brain is "hard-wired". It leads to a consistent approach that people employ when they approach, frame and solve problems. They also quote Sadler-Smith & Badger (1998) who postulate that cognitive style has certain common characteristics:

- It is a pervasive dimension that can be assessed using psychometric techniques.
- It is stable over time.
- It is bipolar.
- It describes different, rather than better, thinking processes.

Brigham & De Castro (2003: 47) quote Rayner (2000) who argue that the contemporary field of cognitive style can be traced to basically three areas in psychology: perception, cognitive controls and processing. "Style" refers to various aspects of an individual's performance, cognition, behaviour, motivation, learning, teaching, and organisational behaviour. Table 1.1 acknowledges the previous studies, not only in order to understand the foundations of cognitive style, but also to indicate the wide number of distinct labels and models that exist in the field.

Table 2.1 The key holistic – analytic models of cognitive style (Brigham & De Castro (2003: 47)

Source: Adapted from Rayner (2000: 125).

Dimensions/labels	Description	Author(s)
Field dependency - independency	Individual dependency on a perceptual field when analysing a structure or form that is part of the field	Witkin & Asch (1948); Witkin (1964).
Levelling - Sharpening	A tendency to assimilate detail rapidly and lose or emphasis detail and changes in new formation.	Klein (1954); Gardner, Holzman, Klein, Linton & Spence (1959).
Holist - Serialist	The tendency to work through problem-solving incrementally or globally and assimilate detail.	Pask & Scott (1972); Pask (1976).
Assimilator - Explorer	Individual preference for seeking familiarity or novelty in the process of problem-solving and creativity.	Kaufmann (1989).
Adaptors - Innovators	Adaptors prefer conventional, established procedures; Innovators prefer restructuring or new perspectives in problem-solving.	Kirton (1976, 1987, 1994).
Analytic - Intuitive	Analysts favour a structured approach to problem-solving and systematic methods of investigation; Intuitives prefer an open-ended approach to problem-solving and random methods of exploration.	Allison & Hayes (1996).

Although certain dimensions of an individual's cognitive style will remain stable over time (Allison & Hayes 1996; Kirton 1980), the style demands which a new venture makes on the entrepreneur will vary as the venture grows (Brigham & De Castro 2003: 50).

The term *cognitive style* has become widely used and many models and descriptions fall under the classification of cognitive style. For the purposes of this study, De Bono's patterning system and the Herrmann Brain Dominance Instrument for thinking preferences, both which are cognitive styles, are further explored.

## **2.3 Patterning**

### **2.3.1 Pattern recognition**

Cognitive scientists have developed a method of studying pattern recognition, which means recognition of complex patterns of stimuli against a background of extraneous noise. This may help to provide new insights into the nature of opportunity recognition. To apply this to the entrepreneurial cognition domain, it can be argued that opportunities come into existence in the external world as a result of unrelated changes in technology, markets and government policies or regulations. However, these opportunities remain only a potential until someone "connects the dots" and perceives a pattern among them (Baron & Ward, 2004: 559).

According to Baron & Ward (2004: 559), the above issues regarding patterning should not be seen as exhaustive in any way. According to Krueger (2003), many other issues have not yet been examined in detail by entrepreneurial cognition researchers, for example:

- Do entrepreneurs show different patterns of creative thought from other individuals?

- Do they differ from other individuals with respect to the kind of tacit knowledge they possess in memory?

Recognising opportunities may involve perceiving connections between seemingly unrelated changes in technological, economic, political and social factors – a kind of pattern recognition. In order to perceive such links, however, individuals must possess knowledge structures that permit them to do so (Baron, 2003). In addition, they must access that knowledge in ways that lead to original and practical business ideas (Baron & Ward, 2004: 569).

In order to understand the concept of patterning as referred to above, the next section will explore patterning in more detail, on the basis of the work done by De Bono (1993).

### **2.3.2 De Bono on patterning**

According to De Bono (1993: 49), the human brain works as a self-organising system in which incoming information organises itself into patterns and sequences. The author also postulates that a huge difference exists between “passive” or externally organised information systems, where information is laid out passively and has no activity of its own, and self-organising systems, where information is used and moved around. Our traditional information systems of thinking belong to the active self-organising systems.

In a remarkably simple manner, the nerve networks in the brain operate as a self-organising system that allows information to be organised into sequences. It seems (according to De Bono, 1993: 49) that the brain is designed to make sense of the world around us by forming routine patterns of perception from incoming information, and not to be creative. The result is that 90% of our lives are governed by established routines and patterns, and that 100% of our perceptions are the result thereof.

De Bono (1993: 171) further postulates that, for the first time in human history, we have begun to understand the difference between traditional passive information systems, in which information is moved about by a processor, and self-organising, active information systems, in which information organises itself into sequences and patterns. He points out that there is nothing sinister about this, and it can be linked to very simple ways in which nerve networks act as self-organising systems.

De Bono suggests that once one understands the way in which self-organising systems create asymmetric patterns, we can understand why every valuable creative idea must always be logical hindsight.

Information forms the basis for any decision and can be seen as the oxygen of business. In his work De Bono uses the Four Wheels of Human Thinking metaphor to explain information processing in the brain. Figure 2.1 illustrates a series of funnels representing the patterns already established by the self-organising nature of human perception in our minds, meaning that whatever we see can only be perceived through these patterns. When one perceives a new idea, one has to speculate, imagine or hypothesise it first in order to find the already established pattern (De Bono, 1993: 34).

In a study done by Uchasaran & Westhead (2002) on the differences between novice and expert entrepreneurs, these authors argue that experts are able to manipulate incoming information into recognisable patterns and then match the information more strongly and transform it into appropriate actions. They also quote Hillerbrand (1989), who postulates that this capacity reduces the burden of cognitive processing and may have the advantage that information is more easily encoded in memory (providing further cognitive resources). This may lead to spotting of opportunities far more often, because of the experts' ability to recognise complex information in their environment. Entrepreneurs' greater information-processing capacity, due to increased cognitive resources, may lead

to the identification of more novel and innovative opportunities. De Bono refers to this as cognitive resources patterning.

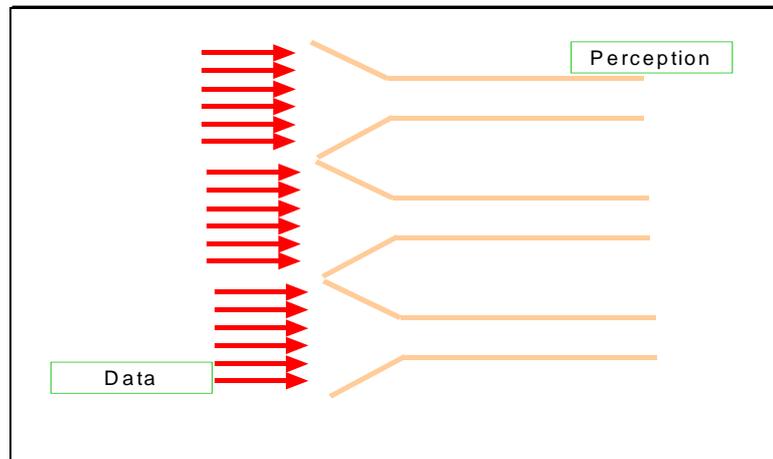


Figure 2.1: Four Wheels of Human Thinking (De Bono 1993: 55).

It seems that the main purpose of most people's thinking is in fact to abolish thinking in an attempt to make sense out of confusion and uncertainty. De Bono (Tyler & De Bono, 2003: 12) say that the mind works to recognise familiar patterns in the outside world. Through patterning the mind is trying to find a familiar pattern and follow the already known route. This then makes further thinking unnecessary. An example of this phenomenon is driving a car. The moment you find a route known to you, you do not need to use a map or compass or ask for directions. Finding your way happens without your really thinking about it. In a way our thinking is an ongoing search for these familiar roads that make thinking unnecessary. The purpose of perception is to allow patterns to form and then to use them. The purpose of thinking, as we have said, is to find familiar patterns and so remove the need to think any more (Tyler & De Bono: 21).

In summary, we can say that patterning is the arrangement of information on the memory surface of the mind. A pattern is a repeatable sequence of neural activities. In practice a pattern is any repeatable concept, idea, thought or image. The pattern may also refer to an arrangement of other patterns, which together make up an approach to a problem, a point of view, a way of looking at things.

There is no limit to the size of the pattern and the only requirements are that a pattern should be repeatable, recognisable and usable (Tyler & De Bono: 26).

If one looks at the elements of entrepreneurial thinking, it appears that an entrepreneur uses unique patterning and preferences in the decision-making process. An entrepreneur is normally a positive person who asks why and how things work, sees possibilities, creates many ideas and handles ambiguity with ease.

## **2.4 Herrmann's Whole Brain metaphor**

### **2.4.1. Background**

While De Bono uses the Four Wheels of Human Thinking metaphor (see Figure 2.1) to explain information processing and patterning in the brain, Herrmann also worked on human brain patterns and came up with the Whole Brain metaphorical model, consisting of four quadrants for determining thinking style preferences. The following section explores the thinking style preferences (patterning) as developed by Herrmann (1996).

While patterning and the use of patterns are normal functions of the brain, they differ from the creative and innovative thinking normally associated with entrepreneurs. Ko & Butler (2002: 2) quote Shaver & Scott (1991), who argue that some people discover opportunities because of their superior information-processing ability, search techniques and scanning behaviour. They also refer to Koestler's (1976) theory that ideas exist in interrelated matrixes (groups of patterns). In normal thinking, one idea leads to another idea within the same matrix. Such information processing involves linking elements within the same matrix and thus produces no novelty.

When creative thinking is needed, however, one must move from one matrix to another. Such matrices of information include a number of alternative viewpoints

and strength of believe related to amongst others, resources, customers and markets (Ko & Butler, 2002: 2).

It has long been recognised that people have different styles of knowing and thinking and that the left brain deals with the analytical, systematic and logical aspects, and the right brain with creativity and artistic and intuitive information (Lumsdaine & Binks, 2003: 47). However, it was Ned Herrmann, a scientist with a degree in physics who worked in the Human Resource Department of General Electric who, after years of research into creativity and the human brain, realised how specialised the brain is in its functions (Lumsdaine & Lumsdaine, 1995: 75; Lumsdaine & Binks, 2003: 49).

According to Herrmann (1995: 1), the brain is specialised physically and mentally and can be organised into four separate and distinct metaphorical quadrants, each with its own language, perception, values, gifts and ways of knowing and being. These four quadrants represent the four thinking structures of the brain. People are all unique mixes and these preferences result in different expressions of behaviour (Lumsdaine & Lumsdaine, 1995: 76). Herrmann then adopted a four-quadrant model of thinking which enabled a clearer understanding of how people think. Although the four quadrant thinking model was based on the divisions in the physical brain, it is a metaphorical model showing the brain's complexity and versatility when involved in the simplest thinking task (Lumsdaine & Binks, 2003: 49).

The four quadrants can be seen as an organising principle of all our thinking preferences into a sensible whole (see Figure 2.2). Herrmann (1996: 29) explains the Herrmann Brain Dominance Instrument (HBDI) as an instrument that charts your location in the world of thinking style preferences; it is a metaphor for how he believes the brain works. Herrmann (1995: 17) argues that brain dominance is expressed in terms of how we prefer to learn, understand and express something and calls these *cognitive preferences*, or preferred modes of knowing. When

faced with a problem, our preferred mode of knowing is the one most likely to be used in such a situation.

Nieuwenhuizen & Groenewald (2004: 68) used a similar technique of preferential thinking classified into quadrants called the NBI (Neethling Brain Instrument) to determine the training and teaching needs for entrepreneurship education. This instrument is similar to the one devised by Herrmann (HBDI).

When people strongly prefer one mode, they may actually reject / avoid another. For facts-based individuals intuition may be suspect, while an intuitive person may find factual data boring or distracting. According to Lumsdaine & Binks (2003: 49), the stronger our preference for one way of thinking, the stronger will be our discomfort with the opposite mode. People functioning in opposite modes have great difficulty in communicating with and understanding each other because they see the world through different eyes or filters (patterns).

Can we influence or change our preferences? Brain researchers agree that individual differences in behaviour result at least in part from genetically determined differences in the brain. However, parenting, teaching, life experience and cultural influences contribute far more than genetic inheritance (Herrmann, 1995: 19).

In his search for a tool to diagnose thinking preferences he realised that the tools available, for example the Myers-Briggs Type Indicator, were all based on psychological constructs. Herrmann (1993: 43) argues, however, that dominance (handedness) is part and parcel of the normal human condition, both mentally and physically. As a result of this normal dominance, we are “handed”, “footed”, “eyed”, “eared” and, in a general sense, “brained”. He postulates that a model needs to have two functions; firstly, a scale for measuring preferences in mental functioning, just as we measure handedness, and secondly, the ability to relate these measures to specific thinking and learning styles or preferred modes of thinking.

He then developed his own assessment tool, now called the Herrmann Brain Dominance Instrument or HBDI (Lumsdaine & Binks, 2003: 49). Appropriate uses for the HBDI include, but are not limited to, the following areas (Bunderson, 1995: 3):

- Better understanding of self and of others
- Enhanced communication
- Enhanced productivity through teamwork
- A work climate conducive to creativity
- Authenticity
- Enhanced teaching and learning
- Better management
- Counselling
- Building of composite learning groups

Many questions have been asked about how HBDI works and about the validity of the instrument. The next section elaborates on the issues mentioned.

#### **2.4.2 Principles of the HBDI**

The Herrmann Brain Dominance Instrument consists of 120 questions to be completed by an individual. These are scored by a computer program at Herrmann International headquarters in North Carolina. The numerical results are also shown in a graphical profile (Lumsdaine & Binks, 2003: 49).

When thinking preferences are assessed with the HBDI, the output is a brain dominance profile. When the relative dominances are marked on axes bisecting the four quadrants, with the four scores connected by lines, the result is a four-sided figure or profile. Circles dividing the quadrants into areas of preference indicate the scale or intensity of dominance (see Figure 2.2). The innermost circle is designated as Region 3. People scoring in this region for a particular quadrant

will avoid thinking in this mode, but this does not mean they cannot think in this manner. A score in Region 2 shows a secondary preference; people are comfortable with using this thinking mode. A score in Region 1 indicates a strong preference for this thinking mode (Lumsdaine & Lumsdaine, 1995: 81)

A question often asked is whether the Herrmann Brain Dominance Instrument (HBDI) actually measures what it purports to measure and if it provides a valid, reliable measure of human mental preferences. The HBDI has been scientifically scored in three separate studies, while more than sixty doctoral dissertations based on the HBDI and the whole brain concept have enhanced the validity of the instrument (De Boer & Steyn, 1999: 98). Bunderson (1995: 1) has also reported the following in answer to these questions:

- Four stable discrete clusters of thinking preference exist. These four clusters are compatible with the model explained in Herrmann (1995)
- The scores derived from the instrument are valid indicators of the four clusters
- The scores permit valid inferences about a person's preferences for and avoidance of each of the clusters of mental activity
- The use of the instrument meets high professional standards, as it has so far been applied effectively in learning, teaching, counselling and self-assessment settings

One can thus conclude that the Herrmann Brain Dominance Instrument is an instrument that can produce consistent data regarding thinking patterns and is an instrument that goes beyond measuring only the left- and right-brain thinking (Herrmann, 1995: 73). It is, however, important to keep in mind that the HBDI is not a test for competencies but an indication of *preferences* and *potential* competencies and that the profiles according to Herrmann are not good or bad, right or wrong (De Boer & Steyn, 1999: 99).

### 2.4.3 Description of the four quadrants

The whole brain model, although originally thought of as a physiological map, is today entirely a metaphor. The circular display represents the whole thinking brain, which then divides into four conscious modes of knowing, each with its own behaviours (Herrmann, 1995: 63). Each quadrant is labelled with a letter: A, B, C and D, beginning with upper left and running counter-clockwise to upper right. The circular profile evolved out of the linear continuum, which is the reason for going counter-clockwise in this way (see Figure 2.2).

Before taking a closer look at the four quadrants, one needs to keep three ideas in clear focus:

- A given profile is not good or bad, right or wrong. A person's profile represents nothing more than a personal thinking preference at a given time
- HBDI measures preference for a mental activity, which is completely different from measuring for competence
- Profiles tend to stay constant, but they can and do change over time (Herrmann, 1995: 76)

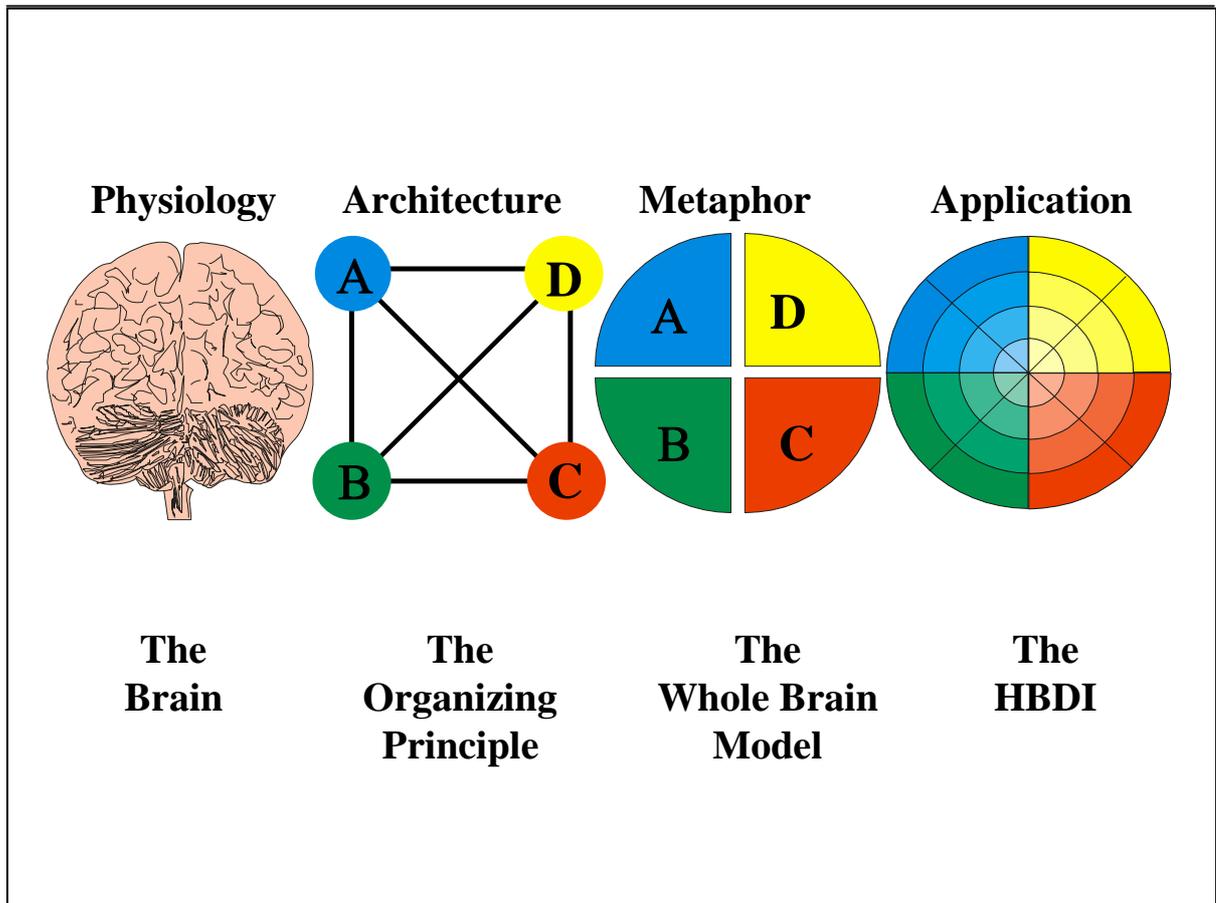


Figure 2.2 HBDI evolved from the metaphoric Whole Brain model, which is based on the four-quadrants organising principle of the physiological functioning of the human brain (De Boer & Steyn, 1999: 99).

Knowledge of one's preferred processing modes illuminates what degree of satisfaction or comfort you may experience in your career when you encounter a learning situation or a difficult interpersonal communication situation (Ned Herrmann International Africa Holdings (Pty) Ltd: 1). It is, however, important to understand that profile data received over years strongly imply that the preferences for each of the four quadrants equal out over the population, so that the population in general represents a composite whole brain (Herrmann, 1995: 78).

In the following section each of the four quadrants is explored separately and in detail as if it were a person's primary or only mode of operating.

#### 2.4.3.1 Quadrant A thinking

People who prefer the A-quadrant thinking normally favour activities that involve analysing, dissecting, figuring out, solving problems logically and getting the facts. In making decisions, they will rely on logic based on certain assumptions combined with an ability to perceive, verbalise and express things precisely. People functioning in the A quadrant tend to reduce the complex to the simple, the unclear to the clear and the cumbersome to the efficient. Facts play a crucial part in verbal statements. Simplifying statements, for example “time is money” may be used for decision-making (Herrmann, 1995: 79).

A-quadrant people are masters of logic and reason. Their output takes the form of principles, mathematical formulas and conclusions about where to go next. In the business environment they honour arguments above personal experience and facts above intuition. They tend to avoid emotions, preferring to stick to facts and logic. They often appear cold, aloof and arrogant and human feelings are often overlooked. Mr Spock in *Star Trek* is an example of an A-quadrant individual (Herrmann, 1995: 80).

In summary, we can conclude that an A-only person will have thinking processes that could be described as: logical, analytical, facts-based and quantitative. If we look at how the person will act, we see a rational self who analyses, quantifies, is logical, critical, realistic, likes numbers, knows about money and knows how things work (Herrmann, 1996: 30). According to Lumsdaine & Lumsdaine (1995: 83), people with quadrant-A thinking prefer to talk about “the bottom line” or “getting the facts” or “critical analysis”.

Engineers, actuaries, accountants and surgeons are a few occupations an A quadrant person may pursue. Their typical communication will include such phrases as “getting the facts”, “the bottom line” and “critical analysis” (Lumsdaine & Binks, 2003: 50).

## Single dominant – Quadrant A profile

Analyser

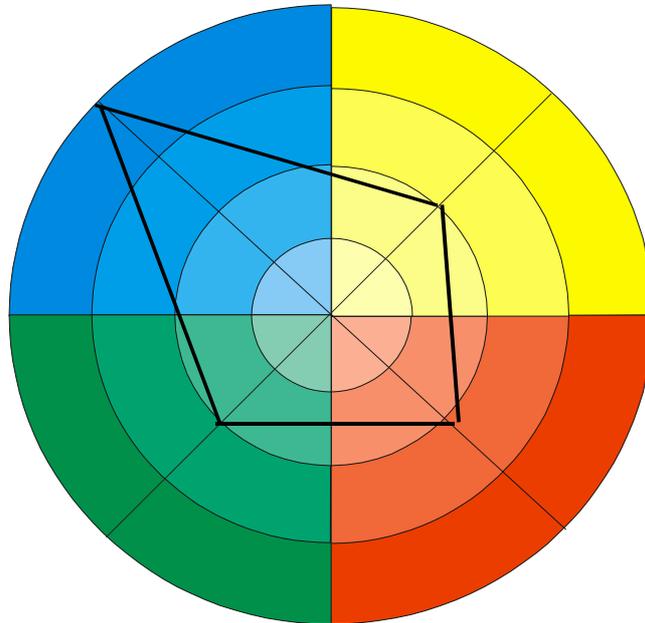


Figure 2.3 A-only Profile

Source: Herrmann (1995: 78)

Relating this to the entrepreneurial process (Chapter 4) one could therefore expect A-only people to be more logical, analytical, mathematical and rational when evaluating an opportunity. The questions that come to mind are:

- Will such individuals focus on different information about the opportunity?
- Will they overlook information relevant to the other quadrants?
- Can this thinking preference constitute a bias?
- Will the specific preference enhance the decision to start-up or not?
- Could it contribute to different misconceptions?

Referring to De Bono's theory that the brain is a self-organising system in which incoming information is linked to already existing patterns, it can be postulated

that people with a preference for quadrant A information will seek familiar information. This results in the use of established patterns rather than being original and creative.

#### 2.4.3.2 Quadrant B thinking

The B-only quadrant has certain similarities to its A-only quadrant. People in these quadrants are both verbal, take a linear approach and reject ambiguity. They both distrust emotions and intuition and like to be in control of their environment and themselves. Yet where A-only focuses on facts, logic and the present, B-only wants to know what has worked in the past. B-only has a hands-on approach and is basically action oriented and may seem to have little respect for A-only intellectual complexities. B-only wants answers only (Herrmann, 1995: 80).

B-only people function effectively in a world of rules where there is a place for everything. They like to make decisions based on long-established procedures. If something has worked before they see it as tried and true (Herrmann, 1995: 81).

One of B-only people's strengths is their ability to focus on one thing at a time and to persist in order to get things done. They are perfectionists when it comes to detail. They are, however, rigorous and demanding towards themselves and their subordinates. They like to keep things safe and predictable and to work according to procedures and precision. They are masters of bringing order out of chaos (Herrmann, 1995: 81).

B-only people are often seen as domineering, boring, small-minded, insensitive and antisocial. They fear to lose control, and in their effort to be in control often intrude and offend. They find change and emotions difficult to handle in the quest for being in control (Herrmann, 1995: 81).

In summary, we can conclude that a B-only person will have thinking processes, which could be described as: organised, sequential, planned and detailed. If we look at how the person will act, we see a safekeeping self who takes preventative action, establishes procedures, gets things done, organises, is reliable, neat, and timely and has plans (Herrmann, 1996: 30). According to Lumsdaine & Lumsdaine (1995: 87), the interesting words quadrant B thinkers use are “breaking the rules” or “leader”, because they notice when people do not follow procedures and they are aware of proper leadership.

Planners, bookkeepers, administrators and clerks are typically the occupations a B quadrant person will enjoy. People with strong B-quadrant preferences talk about “the way it was done before”, “play it safe” and “self-discipline” (Lumsdaine & Binks, 2003: 51).

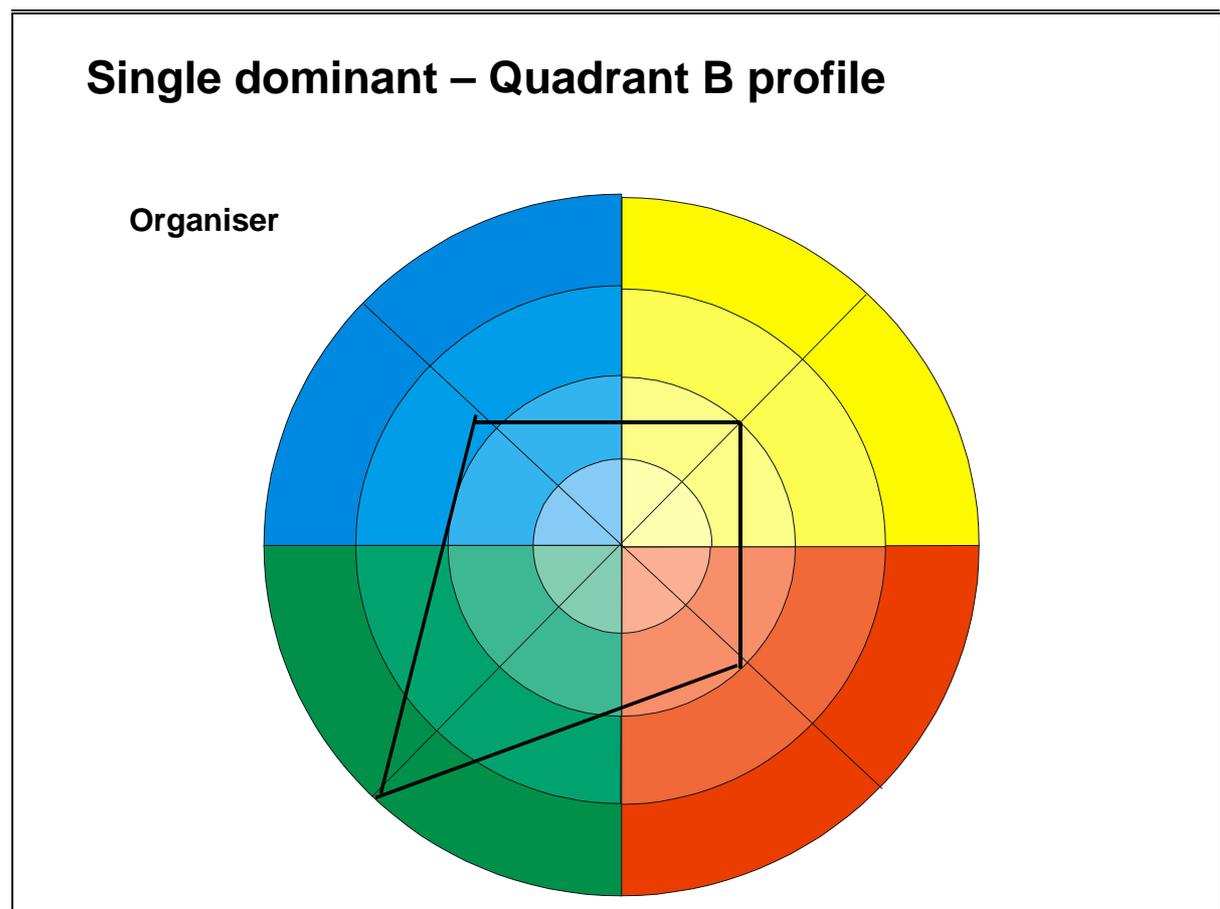


Figure 2.4 B-only Profile

Source: Herrmann (1995: 80)

Relating this to the entrepreneurial process, one could therefore expect B-only people to be more conservative, risk averse, careful and requiring more security when evaluating an opportunity. The same questions that were previously asked come to mind. However, one additional question can be added:

- Will B-only individuals be more risk sensitive when evaluating a potential opportunity?

Referring to De Bono's theory that the brain is a self-organising system in which incoming information is linked to already existing patterns, it can be postulated that people with a preference for quadrant-B information will also seek familiar information. This results in the use of established patterns rather than being original and creative.

#### 2.4.3.3 Quadrant C thinking

C-quadrant people may be looked on as sensitive, receptive and as a moment-to-moment barometer of moods, atmosphere, attitudes and energy levels. When the mood of a person or group changes, C-only people will pick up the emotional current and are normally ready to respond in a soothing and conciliatory way (Herrmann, 1995: 82).

C-only people are aware of the people around them and their primary modes are emotional and spiritual. They want to care for and help others. They are also empathetic, nurturing and musical. Their downside can be seen in their aversion to A-quadrant, B-quadrant and D-quadrant people, owing to their refusal to deal with facts, goals, time and money. Communicating is important to a C-only person, with connections more important than the content (Herrmann, 1995: 83). The C-only person is often seen by others as agreeable, nice to have around and supportive of harmony and beauty, quite often sentimental and always people-

oriented. They are often thought of as non-conformist by A and B standards (Herrmann, 1995: 84).

In summary, we can conclude that a C-only person will have thinking processes that could be described as: interpersonal, feeling based, kinaesthetic and emotional. If we look at how the person will act, we see a feeling self who is sensitive to others, likes to teach, touches a lot, is supportive, is expressive, emotional, talks a lot and feels (Herrmann 1996: 30). According to Lumsdaine & Lumsdaine (1995: 89), quadrant C thinkers talk about “the family” or “teamwork” or “personal growth” and “values”.

Baron (1998: 281) refers to “affect infusion” (how and when feelings shape thought), in which shifts in our current moods can influence our decisions. People will often ask themselves how they feel about something, and if the feeling is positive, decide they like it. This affective state influences judgements and decisions by serving as a heuristic – a convenient rule for inferring with reactions to a specific person, event or stimuli. Linking Baron’s findings to Herrmann’s HBDI, this correlates with quadrant C thinking.

People who prefer the C-quadrant thinking mode tend to enjoy working in groups. Teachers, social workers, nurses, trainers, counsellors and musicians have strong preferences for the interpersonal and therefore quadrant-C thinking (Lumsdaine & Binks, 2003: 52).

## Single dominant – Quadrant C profile

Personaliser

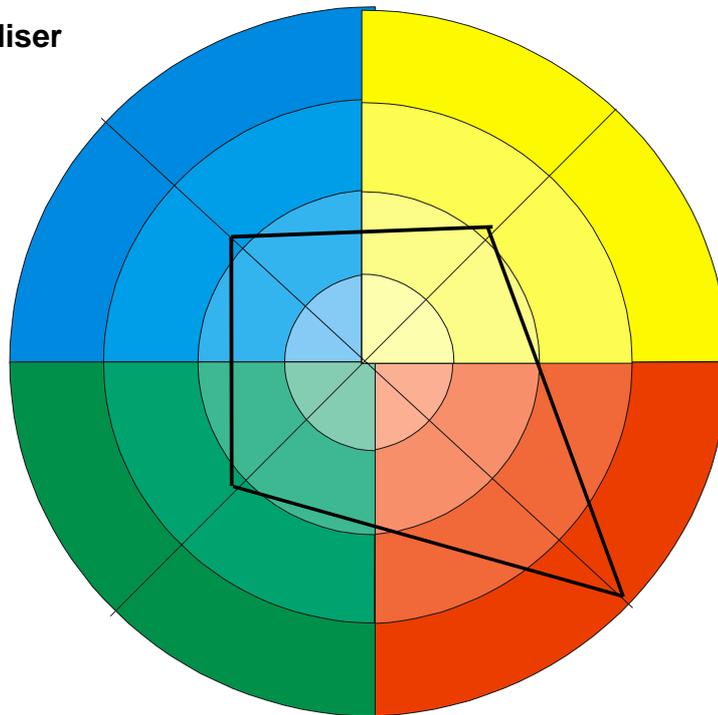


Figure 2.5 C-only Profile

Source: Herrmann (1995: 82)

Relating this to the entrepreneurial process, one could therefore expect C-only people to be more interpersonal, emotional, musical and spiritual when evaluating a potential opportunity. Possible questions to be asked:

- Will C-only people focus on the facts when making the decision to start-up or be led by human issues?
- Will they take the necessary steps and follow procedures?
- Will they have to “feel good” about the opportunity?

Referring to De Bono’s theory that the brain is a self-organising system in which incoming information is linked to already existing patterns, it can be postulated

that people with a preference for quadrant C information will seek familiar information. This results in established patterns influenced mainly by feelings and emotions.

#### 2.4.3.4 Quadrant D thinking

When meeting D-only people the most outstanding attribute you would probably notice is their use of metaphors and your lack of understanding of what they have said. They are original in their ideas and thrive on the excitement of new ideas, possibilities, variety, uncertainty and surprises (Herrmann, 1995: 84).

D-only people are not very good at working with others, because they are largely non-verbal and use pictures instead of words to explain. D-only people find it difficult to adhere to deadlines. They do not like to work in teams, do not like detail and have a fear of structure. Their world consists of visions and images of ideas in metaphorical terms; it is imaginative, colourful, artistic, fanciful, open-ended and sometimes confusing. Understanding is less valuable than experience (Herrmann, 1995: 85).

The challenge for D-only people is to accommodate the realities of the other quadrants and, instead of seeing them as impediments, include them as useful contributions to their own process. D-only people need to understand that they need the rest of the quadrants in order to bring their visions to reality (Herrmann, 1995: 85).

In summary, we can conclude that a D-only person will have thinking processes, which could be described as imaginative and speculative. If we look at how the person will act, we see a self who infers, takes risks, is impetuous, breaks rules, likes surprises, is curious and plays (Herrmann 1996: 30). According to Lumsdaine & Lumsdaine (1995: 92), D-quadrant people will talk about “the big picture” or “playing with the idea” or “innovative” or “cutting edge”.

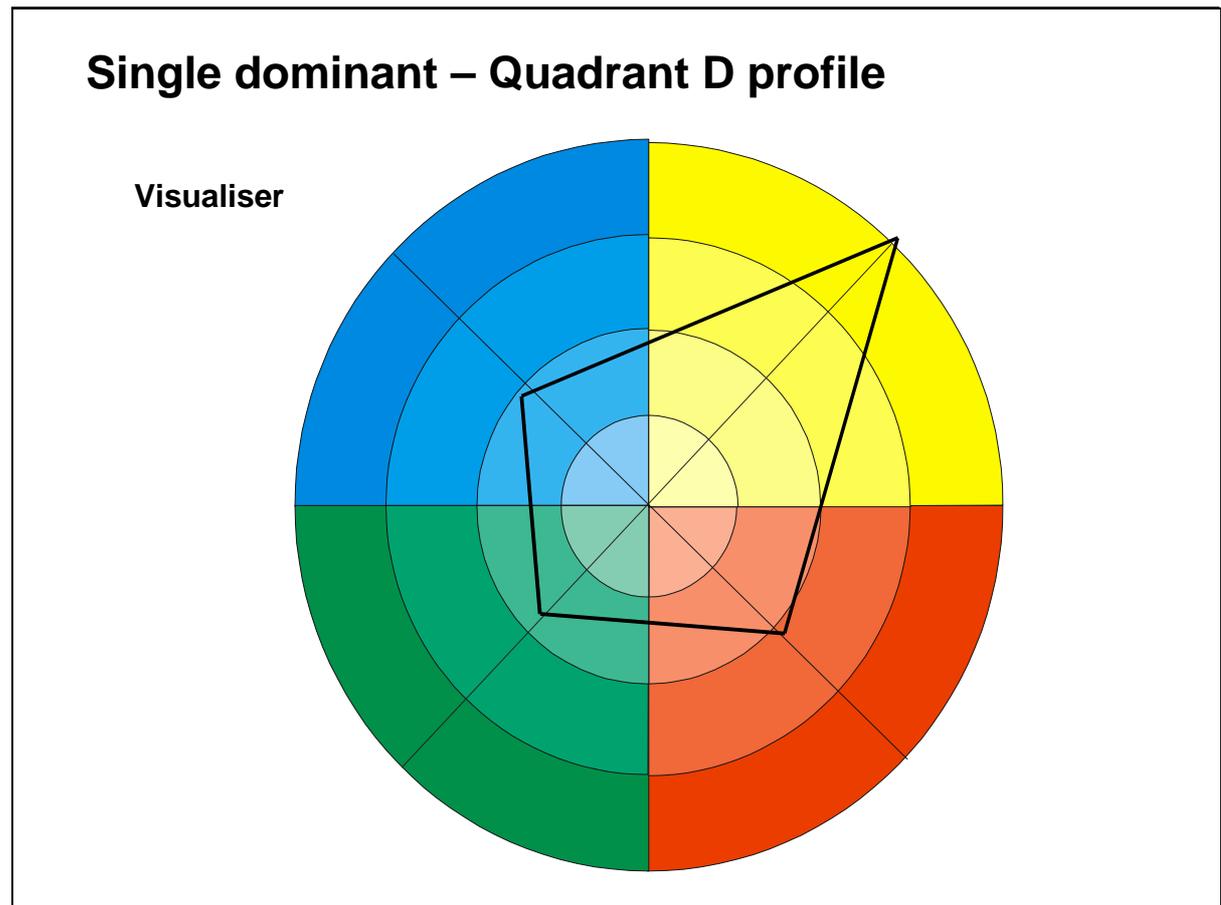


Figure 2.6 D-only Profile

Source: Herrmann (1995: 84)

People with a D-quadrant preference enjoy design, art, architecture and geometry. Explorers and artists typically have strong D quadrant preferences as well as people (such as engineers, researchers in medicine and physics) working in research and development (Lumsdaine & Binks, 2003: 53).

Relating this to the entrepreneurial process, one could therefore expect D-only people to be more creative, imaginative, intuitive, experimental and innovative when evaluating a potential opportunity to start a venture (Herrmann 1996: 36).

Possible questions to be added may be the following:

- Will D-only thinkers go on facts or be guided by how they see the bigger picture?

- Will they make their decision based on intuition or facts?
- Will they be led by the possibilities of the opportunity?
- What role will risk play in their decision?

Referring to De Bono's theory that the brain is a self-organising system in which incoming information is linked to already existing patterns, it can be postulated that people with a preference for quadrant D information will look "outside the box" rather than seek familiar information.

The differing mental preferences show themselves more dramatically in the way we do and do not communicate with one another. Communication with other people can be seen as the most visible manifestation of the brain dominance similarities and differences. The example of "two peoples divided by a common language", referring to the English and Americans, applies to those of us with dissimilar brain dominance profiles. This can result in misconceptions (Herrmann, 1995: 161). Misconceptions are of particular interest for this study and are explored in Chapter 3.

In order for meaningful communication to take place between two people, they need to speak the same "mental dialect" and must be aware of and sensitive to other different mental dialects (Herrmann, 1995: 173). What we say clearly reflects our values, beliefs, assumptions, expectations, biases, prejudices, experiences and brain dominance preferences (Herrmann, 1995: 175).

## **2.5 Differences in dominance**

### **2.5.1 Single dominance thinking**

Single-dominant profiles refer to a person with only one primary dominance (see Figure 2.8), with secondary or tertiary preferences for the other three quadrants.

In the sample used in Hermann's study, only 5% of the population were single dominant, about equally distributed across the four quadrants.

Having a single-dominant profile can be an advantage in that little internal conflict occurs. The single-dominant person tends to see the world through a consistent set of lenses (patterns), leading to perceptions and decision-making processes that are harmonious and predictable.

The other side of the coin is that single-dominant people have to deal with others (95% of the population) who see the world differently from them. Living in harmony with other people requires the ability to see things the way they do. Single-dominant people also find it difficult to move between the quadrants, which can result in a lesser ability for independent creative processing (Hermann 1995: 86).

Relating this to the entrepreneurial process, single-dominant people may tend to overlook the activities of the other quadrants, which may lead to a focus on only one part of the information when faced with an opportunity.

### **2.5.2 Double dominance thinking**

Double-dominant profiles refer to a person with two primary dominances, with secondary or tertiary preferences for the other two quadrants. People with a double-dominant preference constituted 38% of people in the sample. People with double dominance have two strong preferences, either in the same hemisphere or in the cerebral or limbic areas. The following section will describe the differences between the two modes.

#### 2.5.2.1 Double dominant thinking (in the same hemisphere, left or right)

People who have double-dominant profiles in either the right (C & D) or the left (A & B) hemisphere (see Figure 2.9) tend to feel internally integrated. When both dominant profiles are in the same hemisphere, the quality of thinking is strengthened. Both left quadrants, A and B, are verbal and structured in their thinking, efficient, time-oriented, linear and precise. The C and D quadrants are intuitive, nonlinear, experientially oriented, and sensitive to beauty.

On the negative side, these people tend to avoid the mode of the other hemisphere. For the left side, the dominantly right person can seem “flakier” and less reliable to others, whereas the double dominant left appears to others to be more controlling and less agreeable to be around (Herrmann, 1995: 87).

#### 2.5.2.2 Double dominant thinking – cerebral (upper) or limbic (lower)

When the two primaries occur in the opposing hemispheres directly across from one another (see Figure 2.7) in A and D or B and C, a new set of advantages and difficulties arise. Internally the individual may experience turmoil. The major modes are in quadrants that oppose one another, as in ideas versus actions, feelings against thinking, people against things, the future against the past and risk-taking against staying safe. When things move smoothly in their lives, they can integrate the two in decision-making, but under pressure they often find themselves switching from one mode of thinking to another and unable to make a decision, paralysed between them.

The positive side to this scenario is that it can lead to a powerful combination of abilities, such as those of a person who can envision the business as it could be (D), but also do the detailed work needed to get it done (A). A person with the ability to package (B) and present (C) his services directly to a client would be beneficial to any business (Herrmann, 1995: 88).

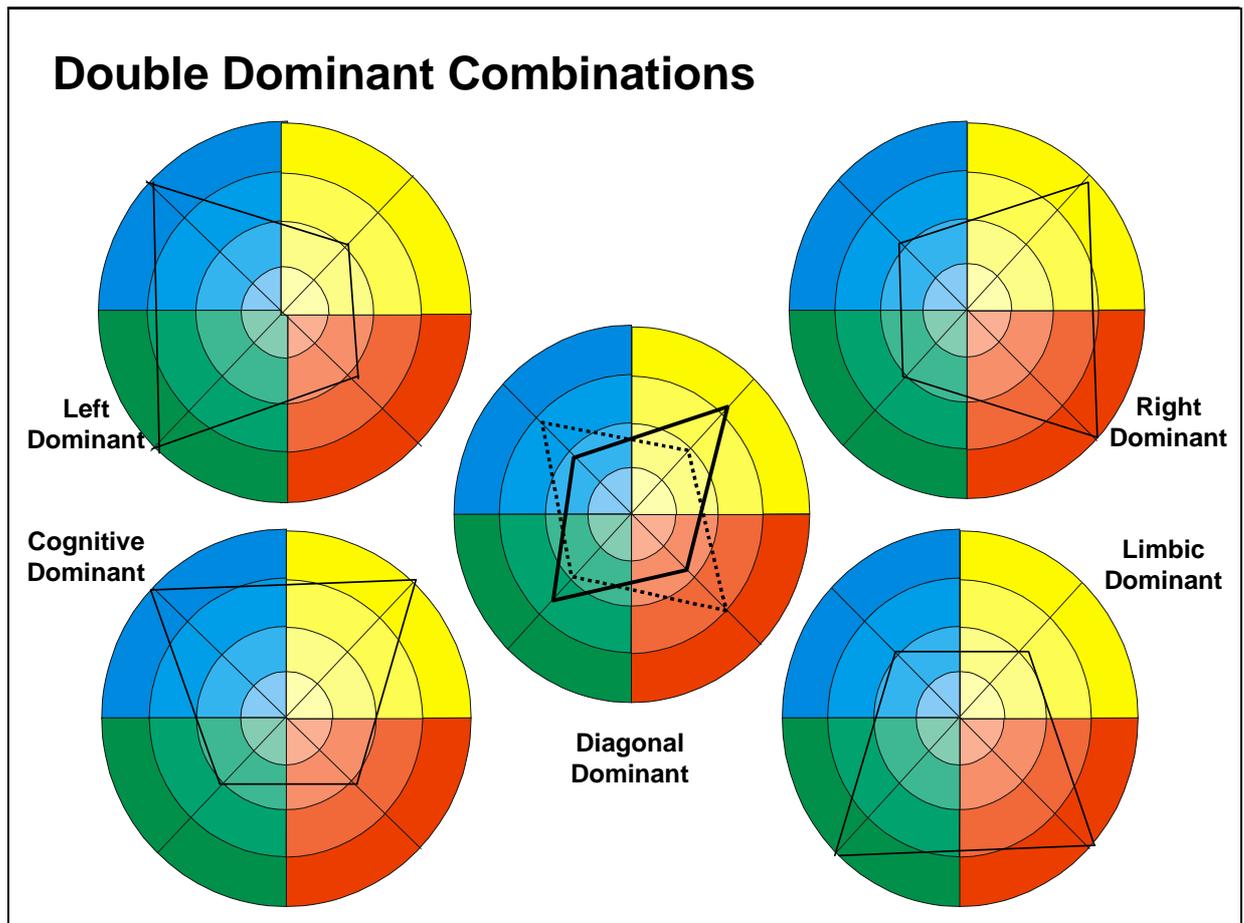


Figure 2.7 Double dominance

Source: (Herrmann, 1995:88)

#### 2.5.2.3 Double dominant in opposite quadrants

Dominant individuals in opposite quadrants (see Figure 2.7) are often described as experiencing a pull between two very different, sometimes contradicting, thinking processes. Ideally, they are able to integrate and balance out these two different perspectives when making decisions. However, under less ideal circumstances there may be a tendency to vacillate or, at worst, to feel paralysed between both.

Relating this to the entrepreneurial process, double-dominant people tend to include more information when solving a problem than single-dominant people, but may still ignore some information relevant to the other quadrants.

### **2.5.3 Triple dominant thinking**

In this scenario a person has only one quadrant that is not primary. These profiles account for 34% of the profiled population. The linguistic ability of triple-dominant individuals is expanded and gives them the ability to speak to three-quarters of the population without any strain (Herrmann 1995: 89).

Relating this to the entrepreneurial process, triple-dominant people may include information regarding three quadrants, ignoring only one type of thinking preference. Although they do not include all information, they tend to have a more balanced or complete perception of the possible opportunities and information than the double-dominant person.

### **2.5.4 Quadruple dominance**

Having all four quadrants as dominant quadrants occurs in only 3% of the profiled population. This gives these people a unique advantage and enables them to communicate freely and without any strain to all the people in this population because they do not experience aversion to any operating mode. They tend to have a balanced view in any given situation.

Relating this to the entrepreneurial process, quadruple-dominant people have the ability to take all types of information into account when evaluating or deciding to pursue an opportunity. Such people look at a possible opportunity with a whole-brain perspective that may give them the competitive edge, because they do not overlook any type of information. This may however also result in an inability to make decisions due to the selection of which information is relevant or not.

## 2.6 Conclusion

In conclusion, it is important to acknowledge the fact that many diagnostic tools and descriptive analyses of human personality (Myers Brigg and Hermann Brain Dominance are two of them) have been developed in order to identify categories of cognitive approaches to problem-solving and communication patterns (Leonard & Strauss, 1997: 113). All the instruments agree on the following basic points (Leonard & Strauss, 1997: 113):

- Preferences are neither inherently good nor bad
- Distinguishing preferences emerge early in our life and remain relatively stable through the years
- We can learn to expand our repertoire of behaviour
- Understanding others' preferences helps people to communicate and collaborate

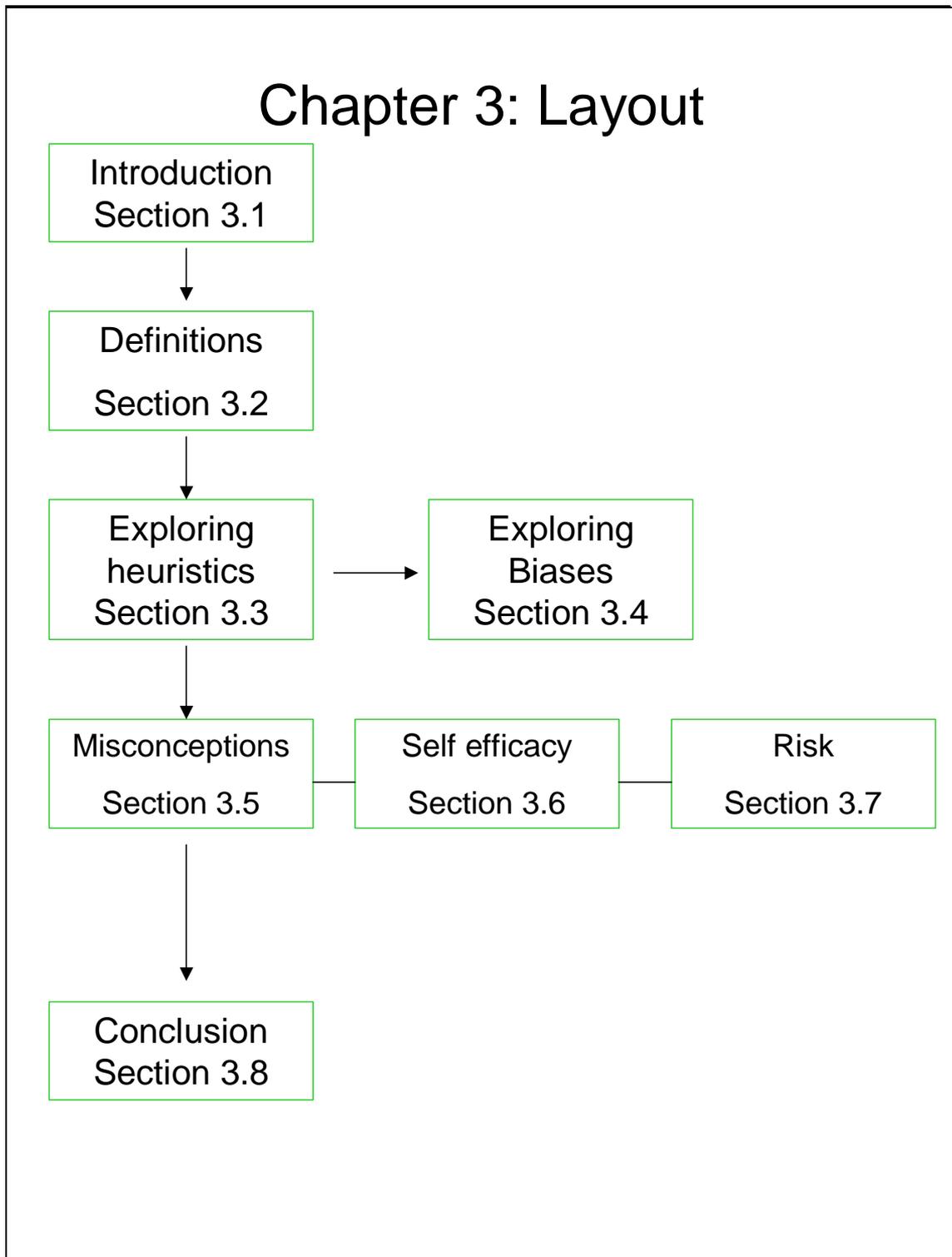
While this study investigates whether thinking styles have an influence on decision-making where a decision to pursue an opportunity has to be made, Chapter 2 describes two things:

- The concept of patterns (matrixes, lenses, thinking styles and preferences)
- The patterns described by HDBI

According to Lumsdaine & Binks (1998: 47), the thinking styles of people characterise their approach to problem solving. One person may carefully analyse a situation before making a rational decision based on available data; another may see the same situation in a broader context and will look for alternatives. One person may be detailed, cautious, step-by-step, using the available procedures; while another has a need to talk the problem over with other people; while yet another will solve the problem intuitively. However, each of us uses our approach based on our prior experience and knowledge and, according to De Bono, our patterning system.

If an entrepreneur does link the new opportunity to the already known, we can hypothesise that a thinking style acts as a natural heuristic when the entrepreneur uses and acquires information necessary to solve the problem of starting or not starting a business. The next chapter explores heuristics and biases in more detail.

## Chapter 3: Cognition, heuristics and biases



### 3.1 Introduction

The field of entrepreneurship seeks to understand how opportunities are discovered, created and exploited (Markman, Balkin & Baron, 2002: 149). The cognitive perspective, on the other hand, emphasises the fact that mental processes include everything we think, say or do during the start-up process. These mental processes also include the cognitive mechanisms (styles) through which we acquire, store, transform and use information (Baron, 2004: 221).

The cognitive perspective provides us with useful lenses (patterns) with which to explore entrepreneur-related phenomena and to address some meaningful issues that we have not been able to probe effectively up to now (Mitchell et al 2002: 93). Shepherd & Krueger (2002: 177) agree that social cognition research helps to give direction to the study of entrepreneurial thinking. Pretorius, Le Roux & Millard (2004: 3) also quote the remark of Gatewood, Shaver, Powers & Gartner (2002: 187) that recent research has demonstrated the impact that cognitive and social processes have on entrepreneurial behaviour.

Although cognitive research has been going on for over a century, research in the entrepreneurial domain has prospered over the last two decades (Baron, 1998: 278). Pretorius et al (2004: 3) quote several authors who have identified different areas specifically relevant to entrepreneurship:

- Our capacity to process new information about the world around us is severely limited and can be readily exceeded (Baron, 1998: 278)
- As human beings we seek to minimise cognitive effort in coping with the information overload. As a result, we often use various heuristics (shortcuts) in our thinking techniques that reduce mental effort (Baron, 1998: 278)
- Because of our limited information-processing capacity and our tendency to minimise mental effort and several other factors (e.g. the powerful

impact of emotions on thought), we are often less than totally rational in our thinking (Baron, 1998: 278)

- Various aspects of human cognition are subject to a wide range of biases and errors (Baron, 1998: 278)
- The environment in which entrepreneurs operate is complex and demands quick decisions; the concepts of cognitive psychology are increasingly being found to be useful tools for probing entrepreneurial related phenomena
- The role of intuitive (sensing) rather than rational (thinking) on decision-making is underestimated (Hayes & Allison 1994: 59)
- The rich, broad field of social cognition literature gives us several new insights into how to develop an entrepreneurial-friendly “cognitive infrastructure” at both self and collective efficacy level (Shepherd & Krueger, 2002: 177).
- When receiving equivocal information, individuals are likely to perceive that which they are predisposed to see (Palich & Bagby, 1995: 59). Such predispositions and preferences for information have been categorised by Herrmann (1996) into four categories: factual, procedural, affective and imaginative information (see Chapter 2).

According to Baron (2004: 237), the cognitive perspective should be viewed as complementary to, rather than incompatible with, other points of view in entrepreneurship such as personality and characteristic traits. The cognitive perspective may provide additional insight into the complex process of entrepreneurship.

The failure of past research into the “entrepreneurial personality” to clearly distinguish the unique contribution of the entrepreneur as a person to the entrepreneurial process has created a vacuum within the entrepreneurship literature that is waiting to be filled. Research in entrepreneurial cognition aims to understand how entrepreneurs use simplifying models to piece together previously unconnected information that helps them to identify and invent new

products or services and to assemble the necessary resources to start and grow businesses (Mitchell et al, 2002: 97).

According to Mitchell (2002: 97), research in entrepreneurial cognition emerged in the mid-1990s, when some of the first work was done on cognitive biases and heuristics in strategic decision-making. In the context of past entrepreneurial cognition research, some of the problematic aspects of entrepreneurial cognitions have been argued to occur in entrepreneurial environments characterised by information overload, high uncertainty, strong emotions, time pressure and fatigue. These include counterfactual thinking, affect infusion, self-serving bias, planning fallacy and self-justification (Baron, 1998: 278); overconfidence or representative errors (Busenitz & Barney, 1997); and overconfidence, illusion of control and misguided belief in the law of small numbers (Simon, et al, 2000). The work of Tversky & Kahneman over the past several decades helped to uncover systematic biases in human decision-making processes. Many of these biases, such as framing, representativeness and availability, have become well known in the literature (George, Duffy & Ahuja, 2000: 195). Markman, Baron & Balkin (2004: 2) also identified cognitive mechanisms such as alertness, overconfidence, counterfactual thinking and self-efficacy associated with one's pursuit of a new business.

The assertion of the cognitive view of entrepreneurship represents a refreshing change: the articulation of a theoretically rigorous and empirically testable approach that does systematically explain the role of the individual in the entrepreneurial process. Mitchell et al (2002: 95) reported that, based on the research they have reviewed, the cognitive viewpoint may be seen as an effective tool in probing and explaining the previously unexplained phenomena within the entrepreneurship domain.

Simon & Houghton (2002: 106), as well as Zacharakis & Shepherd (2001), assert that perceptions and biases vary according to the nature of the venture. They conclude that biases are unlikely to be universally evident. Their presence,

magnitude and consequences depend upon the decision task. They also postulate that future researchers should distinguish between different types of entrepreneurial decisions, because entrepreneurial risk-taking is situation specific.

Before the different types of heuristics and biases are reported, it is important to define some of the concepts the chapter is dealing with in order to ensure clarity.

## **3.2 Definitions of heuristics and bias, cognition and entrepreneurship**

Heuristics, or short cuts or rules of thumb, are perceived to lead to cognitive biases or simplifying strategies. Entrepreneurs appear to make greater use of heuristics and biases, which allow for quicker information processing. Before the influence of heuristics and biases are investigated, one needs to define the concepts the study is dealing with.

The key definitions for this chapter are:

### **3.2.1 Heuristics and Biases**

According to Gowda (1999: 59), heuristics and biases can be seen as systematic deviations from rationality in people's judgement and decision-making; they form the core of behavioural decision theory, a descriptively accurate model of human judgement and choice. For the purposes of this study, heuristics and biases are separated and dealt with individually.

#### **3.2.1.1 Heuristics**

For this study heuristics are defined as non-rational decision rules or cognitive mechanisms that simplify an entrepreneur's decision-making process. These simplifying approaches enable entrepreneurs to seize opportunities by providing

decision-making short cuts in complex decision settings (Lichtenstein, Lumpkin & Shrader (2003: 23).

The use of short cuts or heuristics is, according to Gowda (1999: 60), sometimes efficient in that they facilitate judgements without tremendous information-processing cost. They may, however, lead to inefficient or suboptimal outcomes. Thus a venture might not be started if more rational decision-making rules were used (Lichtenstein et al 2003: 23), but it might be started when heuristics were applied.

Sub-section 3.3 refers to other heuristic definitions found in the literature, by authors such as Farrel & Howorth (2002: 1), Hisrich & Peters (2002: 175), Alvarez & Busenitz (2001: 58) and Busenitz & Barney (1997: 12).

#### 3.2.1.2 Biases

For this study biases are defined as decision-making errors. Gowda (1999: 60) quotes Camerer (1995), who postulates that when judgemental heuristics lead to suboptimal outcomes, they are termed biases.

#### **3.2.2 Cognition and cognition psychology**

Cognition and cognition psychology, on the other hand, concern themselves with the study of individual perceptions, memory and thinking. Cognition can be defined as all processes by which sensory inputs are transformed, reduced, elaborated, stored, recovered and used. Cognition psychology emerged to help explain the mental processes that occur within individuals as they interact with other people and the environment around them. The development of social psychology theory considers that individuals exist within a total situation configuration of forces described by two pairs of factors:

- Cognition and motivation

- The person in the situation

Social cognition theory, for example, introduces the idea of knowledge structures; that is, mental models / patterns (cognitions) that are ordered in such a way as to optimise personal effectiveness within a given situation. Thus, where entrepreneurship consists of individuals and teams creating work for other persons within a market environment, the concepts developed in cognitive psychology are increasingly being found to be useful tools for understanding entrepreneurial-related phenomena (Mitchell et al, 2002: 97).

### **3.2.3 Entrepreneurship**

Entrepreneurship is a quality possessed by individuals who create opportunities where others do not, and who attempt to exploit those opportunities through various modes of organising, without regard to resources currently controlled (Mitchell et al, 2002: 96). The entrepreneurial process is explored in more detail in Chapter 4.

### **3.2.4 Entrepreneurial cognition**

Entrepreneurial cognition can therefore be defined as the knowledge structures that entrepreneurs use to make assessments, judgements or decisions involving opportunity evaluation, venture creation and growth. In other words, research in entrepreneurial cognition is about understanding how entrepreneurs use simplifying mental models to piece together previously unconnected information that helps to identify and invent new products or services, and assemble the necessary resources to start and grow a *business*. This definition could be a useful platform for further work in this field because it incorporates thinking and perception issues developed by cognitive psychologists, while comprehending the domain of entrepreneurship research (Mitchell et al, 2002: 97).

Wright, Hoskisson, Busenitz & Dial (2000) define entrepreneurial cognition as the extensive use of individual heuristics and beliefs that impact on the decision-making process.

Baron (1998: 290) argues that the role of studying cognitive mechanisms in entrepreneurship is primarily that of formulating means for holding in check errors stemming from these cognitive mechanisms. The decisions reached by the entrepreneurs and the strategies they adopt then have an increased chance of success. Baron (1998: 289) reports an overview of cognitive mechanisms potentially relevant to entrepreneurship (see Table 3.1).

Table 3.1 Overview of cognitive mechanisms potentially relevant to entrepreneurship.

Source: Baron (1998: 289).

<b>Mechanisms / Process</b>	<b>Description</b>	<b>Relevance to Entrepreneurship</b>	<b>Predictions</b>
Counterfactual thinking	The tendency to imagine what might have been the case in a given situation.	“If only thoughts” cause individuals to feel dissatisfaction with outcomes; missed opportunities may lead to intense regrets because of lost potential benefits.	Entrepreneurs are more likely to have “if only thoughts” or regrets over missed opportunities than other people.
Affect infusion	Affective states produced by one source influence judgements and	Can lead to serious errors in judgement and decisions	Entrepreneurs engage more often in careful, effortful thought

	decisions about other, unrelated sources.	including business situations.	than other people; Entrepreneurs experience stronger emotions at work than other people; together these tendencies make them more susceptible to affect infusion.
Attributional styles	Attribution of positive outcomes to internal causes (own talent or effort) but negative outcomes to external causes (the self-serving bias).	Attributing positive outcomes to internal causes can lead to overconfidence in one's abilities; blaming others for negative outcomes.	Entrepreneurs are more prone to self-serving bias than other people. Successful entrepreneurs are less susceptible to self-serving bias than unsuccessful entrepreneurs.
Planning Fallacy	Tendency to underestimate the time it will take to complete a project or to overestimate how much can be	Unrealistic timetables for the completion of various tasks.	Entrepreneurs are more prone to the planning fallacy than other people, leading to the tendency to make overly

	accomplished in a given time.		optimistic predictions about future outcomes.
Escalation of commitment: self-justification	Tendency to keep on investing time, effort & money in losing courses of action because of the initial commitment.	Escalation of commitment can lead to a waste of resources (young companies cannot afford it); self-justification is an important factor in the above scenario.	Entrepreneurs are more susceptible to escalation of commitment effect and self-justification than other people.

Sub-sections 3.3 and 3.4 specifically deal with heuristics and biases relevant to the decision-making necessary to start a venture.

### 3.3 Exploring Heuristics as a construct

According to Manimala (1992: 477) the focus of entrepreneurship studies has turned to a new variable, namely entrepreneurial heuristics. The research stream is now starting to identify the fact that entrepreneurs' more prevalent use of heuristics in their decision-making process is at least a partial extension of who they are as individuals (Wright et al, 2000).

Manimala did groundbreaking work in this area in 1992. The following recent definitions by Manimala and other authors were found in the literature.

Manimala (1992: 480) defines entrepreneurial heuristics as 'thumb-rules' or decision-rules underlying entrepreneurial decision-making actions.

Busenitz & Barney (1997: 12) describe heuristics as a term used to refer to simplifying strategies individuals use to make decisions, especially in uncertain and complex conditions. In their research Busenitz & Barney (1997: 14) found that entrepreneurs use heuristics more extensively in their decision-making process than managers in larger organisations. They also assert that entrepreneurs are more prone to the use of decision-making biases and heuristics than managers in larger organisations.

According to Alvarez & Busenitz (2001: 758), the term heuristics refers to simplifying strategies which entrepreneurs utilise to make strategic decisions, especially in more complex situations when only incomplete and / or uncertain information is available.

Hisrich & Peters (2002: 175) define heuristics as: “Developing a new idea through a thought process progression”. According to these authors, heuristics relies on the entrepreneur’s ability to discover, through a series of thoughts, insight and learning. They further state that heuristics are probably used more often than we think, due to the fact that entrepreneurs often have to settle for an estimated outcome of a decision, instead of a certainty.

Farrel & Howorth (2002: 1) define heuristics as the cognitive short cuts decision-makers utilise in order to simplify information processing.

Scholars in Political Economy have long recognised that people utilise short cuts when faced with decision-making tasks that require significant processing of information. Goglia (2004: 560) also argues that heuristic processing is generally faster, so one would predict shorter reaction times to various stimuli from entrepreneurs than from others. This reaction-time measure could be used to determine whether entrepreneurs do prefer using heuristics rather than systematic processing. Utilising such short cuts is not advisable if it leads to suboptimal results and lowers a decision-maker’s efficiency (Gowda, 1999: 61).

It is clear that people rely on several important and systematic short cuts when making judgements about the probabilities of events. While such possible errors in judgement could theoretically be ameliorated through education, deviations from rationality in the realm of choices are caused by factors other than “rational laziness”. Interestingly people tend to stand by ‘inferior’ or ‘irrational’ choices even after they are made aware of their mistakes. This is because when individuals make choices, their heuristics are driven more by intuition than by cognition, that is they represent true preferences (Godwa, 1999: 63).

Baron (1998) and Busenitz & Barney (1997) state that in most research done on cognition it was assumed that all individuals tend to make heuristic decisions in a similar manner and are vulnerable to common errors. Recent research, however, indicates that entrepreneurs use heuristics more in their decision-making than do managers in established organisations. Alvarez & Busenitz (2001: 758) state that managerial cognition is based more on facts, whereas entrepreneurial cognition builds from limited or key experience and beliefs.

Katz & Shepherd (2003: 23) quote Alvarez & Busenitz, (2001) as saying that the ability to make these types of start-up decisions may actually confer advantages on entrepreneurs by making them able to undertake ventures in ways that other potential founders would be unwilling to attempt.

Entrepreneurial cognition is used here to refer to the wide-ranging use of individual heuristics and beliefs that impact on the decision-making process (Busenitz & Lau, 1996; Wright et al, 2000). Managerial cognition, on the other hand, refers to a more systematic decision-making process in which managers use accountability and compensation schemes, structural coordination of business actions across various business units, and justification of future developments using quantifiable budgets (Alvarez & Busenitz, 2001: 758)

Heuristic-based reasoning can have a huge impact on the actions of entrepreneurs, enabling them to make decisions more quickly in an effort to make

the most out of a brief window of opportunity (Tversky & Kahneman, 1974), as opposed to the cognition of managers, who use elaborate policies, procedural routines and structural mechanics that ultimately lead to the erecting of barriers to seizing innovative opportunities (Alvarez & Busenitz, 2001: 758).

According to Alvarez & Busenitz (2001: 759), the more frequent occurrence of heuristic-based reasoning in decision-making by entrepreneurs suggests that they think in a different way, guiding them to make decisions in fundamentally different ways from those who approach situations in a more factual way, for instance managers in established organisations.

This heuristic-based reasoning enables entrepreneurs to make more rapid sense out of uncertain and intricate scenarios. Such decisional approaches can guide the entrepreneur to more opportunities, faster learning and unconventional innovations.

In an empirical study, Busenitz & Barney (1997) examined the difference between entrepreneurs and managers in large organisations with respect to two biases and heuristics:

- Overconfidence (overestimating the likelihood of being right)
- Representativeness (the propensity to over-generalise from limited characteristics or observations).

They found that in these aspects entrepreneurs behave in a substantially different way from managers in large organisations.

Busenitz & Barney (1997: 758) further point out that, “With entrepreneurs in particular, the window of opportunity (see Chapter 4) would often be gone by the time all the necessary information became available for more rational decision-making. Additionally, successfully starting a new business usually involves

overcoming multiple hurdles. Using biases and heuristics as simplifying mechanisms for dealing with these multiple problems may be crucial.”

Although many types of heuristics are prevalent in the literature, this study concentrates on heuristics used in the decision-making process.

### **3.3.1 Major types of heuristics**

Manimalas (1992) made an exceptional contribution to entrepreneurial cognition research by focusing on the correlation between individual entrepreneurial heuristics and the mainstream of information processing's focus on generalised (cognitive style) heuristics, as well as on the differences between entrepreneurial and managerial decision-making (Baron, 1998). This enabled him to make an important contribution to the growth of entrepreneurship theory, by introducing the idea that degrees of entrepreneurial innovativeness are associated with grouping of individual heuristics (Manimala, 1992: 480).

Manimala also progressed some way towards his objective by correlating specific heuristics and heuristic orientations with categories of innovativeness. His pilot study identified a list of more than 600 heuristics. Through a process of combinations and eliminations this was reduced to 186 heuristics that he subdivided into 57 categories, or as he called them, 'major heuristics'.

Vallaster (2000) summarised the categories of the major types of heuristics, per originator (author), with the effects on the strategic decision-making process (see Table 3.2). She stated that although the notion of heuristics has been accepted as a major component of the strategic decision-making process, their characteristics, evidence for their use, and directions in the use of heuristics in decision-making are generally uncertain. Table 3.2 lists key heuristics as defined by different authors. This is followed by a discussion of some of the most prominent heuristics at work in an entrepreneurial environment.

Table 3.2: Main reported generic types of cognitive heuristics

<b><u>AUTHOR: TVERSKY AND KAHNEMAN (1974)</u></b>	
<b><u>TYPE OF HEURISTIC</u></b>	<b><u>EFFECTS ON STRATEGIC DECISION-MAKING PROCESS</u></b>
Refer to past cases (hindsight heuristic)	Similar past cases are identified, using their decision outcomes as guides
Simplification	Aspects of the decision problem are intentionally ignored in order to reduce the complexity of a strategic problem
Imitation	Similar decisions taken previously are identified and adopted
Risk aversion	Small-scale experiments which relate to recent or high-profile failure cases are carried out and specified types of risk are searched
Satisfying representativeness	Decision-makers are engaged in a search for an acceptable solution rather than the optimal one; alternatives are only generated if the first possibility is rejected.
Availability heuristic	Tendency of decision-makers to recall or imagine frequently occurring events and critical incidents more easily than rare ones.
<b><u>AUTHOR: BARNES (1984)</u></b>	

<u><b>TYPE OF HEURISTIC</b></u>	<u><b>EFFECTS ON STRATEGIC DECISION-MAKING PROCESS</b></u>
Inability to understand the fundamental principle of sampling	Limited linkages between two variables might lead to actually non-existent causalities
Cooperation	Knowledge is pooled; risk is shared with competitors, customers and suppliers
<u><b>AUTHOR: HALEY AND STUMPF (1989)</b></u>	
<u><b>TYPE OF HEURISTIC</b></u>	<u><b>EFFECTS ON STRATEGIC DECISION-MAKING PROCESS</b></u>
Input biases	Decision-makers selectively rely on data due to availability, accessibility or salience of some information leading to false estimations of situations.
Operational biases	Limited samples of past data form the basis of future decisions, with errors likely to occur
Output biases	Decision-makers (un)-consciously influence the result as desired
<u><b>AUTHOR: SCHWENK (1984, 1986, 1988; 1996)</b></u>	
<u><b>TYPE OF HEURISTIC</b></u>	<u><b>EFFECTS ON STRATEGIC DECISION-</b></u>

	<b><u>MAKING PROCESS</u></b>
Escalating commitment	Overconfidence and a “loss of touch towards reality” may lead to resistance to change in the strategic decision-making approach
“Self-serving attribution patterns”	Decision-makers attribute success to own actions and qualities, whereas poor performance is generally ascribed to external factors
Biases in recollection	Decision-makers tend to recall past strategic decisions as being more rational and consistent with current strategies than they actually were

*Source:* Adapted from Vallaster (2000)

Many heuristics and biases are mentioned in Table 3.2, and the literature includes many more, such as reference point effect; risk seeking in the domain of losses; loss aversion, the status quo bias and the endowment effect; as well as certainty effect and zero risk bias (as described by Gowda 1999: 65). For the purposes of this study, however, only the following heuristics, namely the availability heuristic, representative heuristic and framing heuristic, will be explored further.

### 3.3.1.1 Availability heuristic

#### Definition

Tversky & Kahneman (1972) define representativeness as the tendency to assess the probability of an event’s occurrence more on the basis of its similarity to a population and the process by which it is generated than to the base rate of

its occurrence in the population (Farrel & Howorth 2002: 2). People assess the frequency of a class or the probability of an event by the ease with which instances or occurrences can be brought to mind; in other words, if people can readily think of an example of events, they will inflate their probability estimates of the likelihood of its occurrence (Gowda, 1999: 62).

The availability heuristic, according to Barnes (1984: 130), has special relevance for risk perception. The biasing effects of memorability and imaginability may pose a barrier to open and objective discussion of risk (Barnes, 1984: 130). Gowda (1999: 62) argues that the availability heuristic affects how people assess the risks associated with different causes of, for example, death. People typically rate accidents as causing as many deaths as diseases, even though diseases kill more than ten times as many people. People appear to base their judgement on media coverage, which typically devotes substantially more coverage to accidents than to disease.

#### Entrepreneurial Application

Events happening frequently are easier to recall and imagine than rare events. Entrepreneurs may rely more on recent knowledge or events and give them more weight than is really warranted.

On the other hand, factors such as a sharp drop in earnings also cause entrepreneurs to overreact, thus causing them to diverge from their business plan or current action plan.

### 3.3.1.2 Representativeness heuristic

#### Definition

According to Busenitz & Barney (1997: 16), decision-makers manifest this heuristic when they are willing to generalise about a person or a phenomenon on the basis of only a few attributes of the person or a few observations of the phenomenon. In short, representative heuristics can be described as the willingness of decision-makers to generalise from small, non-random samples.

For example, people ascribe characteristics to groups and subgroups based on their experiences with or perceptions of members of a group. Individuals' experiences with certain members of a group may lead to their incorrectly ascribing the characteristic to the entire population (Gowda, 1999: 62).

#### Entrepreneurial application

According to Katz (1992), representativeness and especially the willingness to generalise from small, non-random samples is a decision-making short cut made by entrepreneurs. In such a setting, large random samples which could reliably estimate customer demand, production costs and other key pieces of information are rarely available (Busenitz & Barney 1997: 16).

Such data collection could prematurely reveal an entrepreneur's products / technologies to competitors. This scenario may force entrepreneurs to prefer to act on small non-random samples when making a decision to start a venture or go ahead with production (Busenitz & Barney 1997: 16).

### 3.3.1.3 Framing heuristic

#### Definition

People's response to information is influenced by how that information is presented to them. An appropriate framing of information can reverse people's preferences. Pretorius et al (2004: 6) argue on the basis of the tenets of cognitive theory that entrepreneurs may simply categorise and subsequently frame the same stimuli differently from non-entrepreneurs. That is, what has been widely recognised as a propensity for risk on the part of the entrepreneur may instead be an artefact of this alternate framing.

Entrepreneurs may not necessarily prefer to engage in more risky behaviour; instead their behaviour may be the result of their framing a given situation more positively than negatively, thus focusing on the high probability of favourable outcomes and responding according to these perceptions. In contrast, non-entrepreneurs may not share this "rosy" view, leading to their reacting more cautiously (Palich & Bagby, 1995: 427).

Thinking preferences as based on the Herrmann Brain Dominance Instrument (HBDI), discussed in Chapter 2, also influence all cognitive activities, including conceptualisation in equivocal and complex situation (Maree & De Boer, 2003: 453; Alvarez & Busenitz, 2001). The tendency to be led by one's preference for certain types of information and avoidance of others when perceiving the world around us supports the argument that different individuals frame the same situation differently (Pretorius et al, 2004: 6).

#### Entrepreneurial Application

The question arises of whether people could learn to change the way they frame the environmental conditions to benefit the start-up decision (Pretorius et al, 2004: 6).

In conclusion, heuristics can be regarded as the cognitive short cuts decision-makers utilise in order to simplify information processing. Heuristics are employed, mainly unconsciously, to simplify the decision-making process. This strain-reducing measure may lead to suboptimal decisions. Tversky & Kahneman (1974) argue that people are more inclined to make decisions using non-statistical, inferential heuristics, “rules of thumb”, than statistical principles. A heuristic is thus a cognitive method of circumventing informational limitations. Entrepreneurs need to rely on heuristics, given the high ambiguity and uncertainty that they typically face in their quest for starting and growing a new venture, even with limited information for making convincing decisions.

### **3.4 Exploring biases as a construct**

The following two descriptions of entrepreneurs suggest that entrepreneurs, more than other people, are exposed regularly to situations that test the limits of their cognitive capabilities and therefore increase their susceptibility to various forms of bias or errors (see Table 3.1) Baron (1998: 279).

- Schumpeter (1934: 7): “The entrepreneur seeks to reform or revolutionise the pattern of production by exploiting an invention or, more generally, an untried technological possibility.... Entrepreneurship essentially consists in doing things that are not generally done in the ordinary course of business routine.”
- Holt (1992: 11): “ Entrepreneurs are those who incubate new ideas, start enterprises based on those ideas ... have vision for growth, commitment to constructive change, persistence to gather resources and the energy to achieve unusual results.”

According to Simon & Houghton (2002: 105), entrepreneurship researchers have made great strides towards explaining why some individuals proceed with entrepreneurial action when others do not. Much of this research has concluded

that differences in individuals' perception of a potential entrepreneurial action play a major role in the decision to proceed. It was found that individuals who perceive lower risk associated with a venture are more likely to decide to start the venture. Simon & Houghton (2002: 112) also mention that numerous scholars have suggested that perceptions of feasibility and desirability lead to venture formation and other entrepreneurial activities.

Simon et al (1999: 112) state that some individuals neither comprehensively search for, nor accurately interpret, information because their cognitive capacity is limited. To cope with these limitations, they employ cognitive heuristics and simplifying strategies, which may lead to a number of cognitive biases. These cognitive biases may affect the entrepreneur's risk perception, because they might discount the negative outcomes and the uncertainty associated with their decisions, thereby underestimating the risk (Simon et al, 1999: 114). Entrepreneurs' perception may be distorted by cognitive biases such as overconfidence, a belief in small numbers, illusion of control, counterfactual reasoning, affect infusion, the planning fallacy and self-justification (Simon & Houghton, 2002: 107).

The above aspects that Baron (1998: 4) points out have specific reference to entrepreneurs, because entrepreneurs tend to maximise the impact of their biases; this is because it is not possible for entrepreneurs to make comprehensive decisions when they need to act quickly to exploit brief windows of opportunity (Busenitz & Lau, 1996).

Simon et al (1999: 113) explored in a study what influence the three biases of overconfidence, belief in the law of small numbers and illusion of control have on an entrepreneurs' risk perception and decision to start a business venture. Keh, Foo & Lim (2002) tried to replicate the research of Simon et al (1999), but also added the cognitive bias "planning fallacy" to their research.

Though biases help individuals cope with their cognitive limitations in uncertain circumstances, they may result in less rational, less comprehensive decision-making because cognitive biases systematically violate the laws of probability. Researchers who have studied cognitive biases postulate that the individual who originally founded the venture may display greater bias, because the entrepreneur's decision-making environment can be especially uncertain and complex. In these situations, cognitive biases contribute to the entrepreneurs' tendency to hold positive perceptions regarding a potential action (Simon & Houghton, 2002: 106).

Although many biases exist, this study will explore the following specific biases: the overconfidence bias; belief in small numbers bias; the illusion of control bias; and the planning fallacy bias. All four of these biases have an impact on the entrepreneur's decision to start or not to start a potential venture.

### **3.4.1 Specific biases**

#### **3.4.1.1 Overconfidence bias**

##### **Definition**

Overconfidence, according to Zacharakis & Shepherd, (2001), refers to the failure to know the limits of one's knowledge which could lead to overestimation of one's certainty regarding facts (Simon et al, 2000; Keh et al, 2002: 128). Overconfidence was first described by Oskamp (1995), and has been shown to exist in a wide variety of settings (Lichtenstein & Fischhoff, 1977; Bazerman, 1990).

According to Busenitz & Barney (1997: 15), overconfidence exists when decision-makers are overly optimistic in their initial assessment of a situation, and are then slow to incorporate additional information about a situation into their assessment due to their overconfidence. Overconfidence seems likely to manifest itself in decisions made by entrepreneurs to a greater extent than in decisions made by managers (Busenitz & Barney, 1997: 15).

Overconfidence may occur because individuals do not sufficiently revise their initial estimates after receiving new data, therefore they do not realise to what extent their estimation may be incorrect. They tend to base their certainty on the ease with which they can recall reasons for confidence (Simon et al, 1999: 117).

The question is often asked what effect cognitive biases have on an entrepreneur's risk perception. In order to explore this phenomenon we need to take a closer look at the effect cognitive biases have on the decision to start a new venture.

Entrepreneurs exhibiting overconfidence treat their assumptions as facts, and they may not see the uncertainty associated with conclusions stemming from those assumptions (Simon et al, 2000: 5). It can be deduced that due to the entrepreneurs being overconfident about their assumptions of fact, they may perceive less risk and this in turn will increase their probability of viewing a risky business opportunity favourably, leading to the decision to start the venture.

However, to look at the other side of the coin or to view it differently, if entrepreneurs wait until all the "facts" are in before starting to convince others that the venture is indeed legitimate, the opportunity they seek to exploit (see "window of opportunity" in Chapter 4) will very likely be gone by the time the complete data set has become available (Busenitz & Barney, 1997: 15).

#### Entrepreneurial Application

This bias is especially common in ill-structured decision situations, such as whether to introduce a new product. Overconfidence may occur because of the certainty with which the entrepreneurs can recall reasons for their confidence (i.e. availability heuristic).

They tend not to revise their initial estimates after receiving new data, due to

their initial overconfidence, and have a tendency to seek supporting evidence instead of disconfirming evidence (Russo & Schoemaker, 1992, as quoted by Keh et al 2002: 128).

Entrepreneurs exhibiting the overconfidence bias will seek confirmation support for their decision to start or introduce a product from positive sources, rather than gathering evidence from a negative source.

#### 3.4.1.2 The belief in the law of small numbers bias

##### Definition:

Belief in the law of small numbers is evident when an individual uses a limited number of information inputs (a small sample of information) to draw definitive conclusions about the much larger population (Tversky & Kahneman, 1971; Simon & Houghton, 2002: 113; Keh et al, 2002: 130). People ignore sample size in situations where it should play a role because of the representative heuristic which leads people to believe that small samples are highly representative of the population from which they were drawn. A sample may not represent the population, because small samples are variables and lack predictive validity.

Entrepreneurs who display the belief in the law of small numbers may be overly certain of their conclusions. In turn, they may not relate their conclusions about their endeavour to the base rates associated with similar endeavours about which quite a lot may be known (Simon & Houghton, 2002: 113). A statement by two people (a small sample) that a new venture will succeed may lead the entrepreneur to believe that he or she will succeed. The entrepreneur ignores the fact that over 50% of all new ventures fail (the base rate associated with similar endeavours). Using personal sources of information may lead to the belief in the law of small numbers and that they can generate rich and detailed information about a given subject.

Such individuals give more weight to information received from personal sources and they remember it more easily. According to Simon & Houghton (2002: 113), this bias is evident when an individual uses a limited number of information inputs (a small sample of information) to draw definitive conclusions about the much larger population.

A stronger belief in the law of small numbers coupled with mainly positive information is likely to induce an overly optimistic view of the venture and thus a lower perceived risk (Kahneman & Lovallo, 1993; Simon et al, 2000; Keh et al, 2002). Of course, as Busenitz & Barney (1997) point out, entrepreneurs do not have the resources to engage in systematic data collection (Keh et al, 2002: 130).

Simon et al (2000) postulate that it is more likely for entrepreneurs to receive disproportionately more positive information because failures are less likely to be well publicised. A stronger belief in the law of small numbers linked to disproportionately more positive information is likely to induce an overly optimistic view of the venture and thus lower perception of risk, making the decision to start more likely (Keh et al, 2002: 130).

#### Entrepreneurial Application

An example of this bias is where an entrepreneur decides to start a new business venture based on the fact that two or three individuals have said that they would be willing to buy the product from the new company.

These three people's responses do not represent the overall view of the whole population (Simon & Houghton, 2002: 115). This may cause entrepreneurs to discount more relevant statistical data about similar ventures. Market research in order to determine the real need in the market may also be ignored (Simon & Houghton, 2002: 115).

An entrepreneur who makes the decision to start a venture based on a few people's response therefore makes use of the belief in the law of small numbers bias.

#### 3.4.1.3 Illusion of control bias

##### Definition

An illusion of control bias occurs when an individual overemphasises the extent to which his or her skill can increase performance in situations where chance plays a large part and skill is not necessarily the deciding factor (Langer 1975; Houghton & Aquino, 2000; Keh et al, 2002: 131; Simon & Houghton, 2002: 112; Pretorius et al, 2004: 8).

Individuals exhibiting this bias have a higher expectancy of personal success than objective probability would warrant because they believe their skills are greater than those of others. An illusion of control may play a part in a variety of strategies, ranging from making acquisitions to production innovations (Simon & Houghton, 2002: 112). In order to alleviate their own uncertainty, individuals convince themselves that they can control and accurately predict the outcomes of uncertain future events (Simon et al, 2000: 6).

Keh et al (2002: 131) postulate that individuals exhibiting an illusion of control bias will underestimate risk because they believe their skills can prevent negative occurrences.

##### Entrepreneurial Application

An entrepreneur will view a possible opportunity more favourably than any

other person. His belief in his personal ability and skill may lead to the assumption that he personally can see the venture through. It has been suggested (Shaver & Scott, 1991; Keh et al, 2002) that entrepreneurs show a strong preference for exerting control over their outcomes because they believe they can exert control over people and events.

According to Simon & Houghton (2002: 112), an illusion of control bias may play a part in a variety of strategies, ranging from making acquisitions to production innovation.

The illusion of control bias will enhance the entrepreneur's decision to start the venture because of his belief in his own ability, which may lead to a lower risk perception. Because of his belief in his ability to make the venture work, irrespective of other external difficulties, he will make the decision to start based on the belief that he himself is the reason for success.

#### 3.4.1.4 Planning fallacy bias

##### Definition

Planning fallacy relates to the tendency of entrepreneurs to underestimate risks and overestimate the likelihood of success. The planning fallacy is described as occurring when the individual treats the current situation or decision as unique, thus isolating it from past experience, and not recognising the high levels of risk. Such individuals often forecast the future results not based on the lessons from the past, but on plans and glowing images of the future. These forecasts may be more optimistic than they should be (Baron, 1998: 285).

This indicates that entrepreneurs will perceive less risk when the planning fallacy influences them to a greater extent. According to Kahneman & Lovallo (1994), the planning fallacy can be referred to as a "cognitive blind spot". These tendencies may lead to unrealistic timetables for the completion of different tasks (Baron, 1998: 289).

### Entrepreneurial Application

An entrepreneur may ignore his past failures. Instead of analysing his previous projects to gain insight into what went wrong, he may embark on a new project without even considering how he could avoid making the same mistakes again.

According to Baron (1998: 285), entrepreneurs tend to treat the current situation or decision as unique and not anchored on the lessons of the past, thus providing themselves with an optimistic image of the future outcomes.

To conclude the section on biases, we need take a closer look at findings from the previous studies on cognitive biases. Authors such as Simon et al (2000) and Keh et al (2002) came to the following conclusions:

Simon, Houghton & Aquino (2000) stated that:

- The tolerance for risk does not affect one's decision to start a venture.
- Collectively, the cognitive biases explained a significant proportion of the variance in risk perception.
- Both the illusion of control and belief in the law of small numbers lowered risk perception.
- There was no significant relationship between overconfidence and risk perception; therefore overconfidence cannot affect the decision to start a venture indirectly through risk perception.
- There was a significant relationship between risk perception and cognitive biases.
- Overconfidence was not found to be significantly related to the decision to start a venture.

The findings made by Simon, Houghton & Aquino (2000) are graphically represented in Figure 3.1

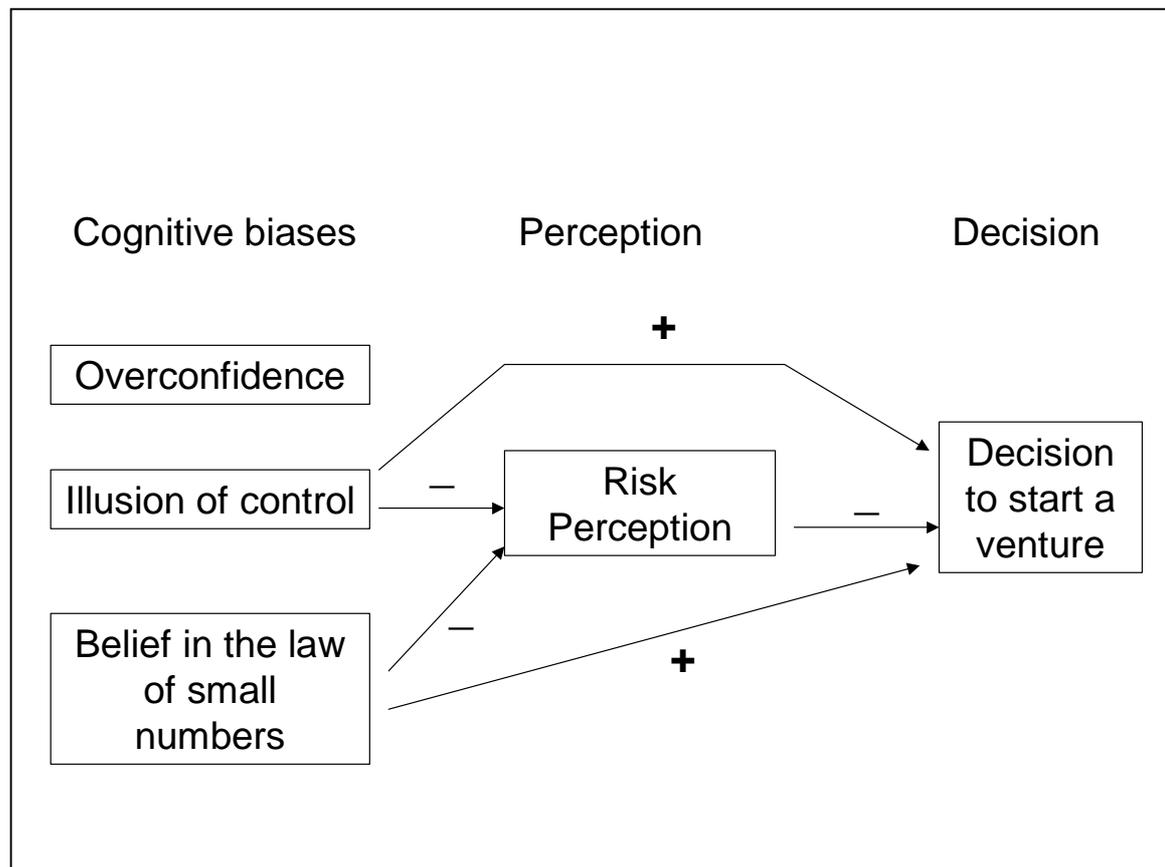


Figure 3.1 Model for the decision to start a new venture

Source: Simon et al (1999: 125)

Keh, Foo, Lim (2002: 4) stated that:

- Illusion of control and the belief in the law of small numbers have a significant relationship with opportunity evaluation.
- The effect of illusion of control on opportunity evaluation is fully mediated by risk perception.

- Belief in the law of small numbers has a direct affect on opportunity evaluation.
- The planning fallacy did not affect opportunity.

In conclusion, Lichtenstein et al (2003: 23) postulate that many benefits may accrue to entrepreneurs who rely on biases and heuristics to make decisions about launching a start-up venture. However, venture perceptions that are based on faulty assumptions must eventually be adjusted to fit environmental and market realities. According to these authors, the insights and information required to make such adjustments can be learned.

Cognitive learning is the type of learning that is most likely to be involved in reassessing biases and heuristics. Lichtenstein et al (2003: 23) quote Kim (1993) as arguing that cognitive learning occurs when there is a shift in the mental map that changes the way a problem or opportunity is perceived; no longer can the situation be viewed in the “biased” way it was seen before.

According to Drucker (1994), this approach whereby an entrepreneur’s “vision or theory” of the business must be altered in order to survive, in other words where old assumptions must be replaced by new knowledge, may seem chaotic and uncertain. For this to happen entrepreneurs must foster collaboration and creativity as well as flexibility and willingness to change (Lichtenstein, 2003: 23).

Entrepreneurial cognition plays an important role in identifying the role of the individual in the entrepreneurial process. It aids us in explaining why entrepreneurs do the things that they do. Cognitive biases help entrepreneurs to perceive less risk, causing them to be more willing to start a new venture.

It has, however, become evident that the differences between heuristics and biases as found in the literature are somewhat blurred. Some authors describe heuristics as short cuts, while others, like George et al (2000: 195) refer to

framing, representativeness and availability as biases, and yet others refer to them as heuristics (Tversky & Kahneman, 1972; Barnes, 1984; Godwin, 1999).

Gaglio (2004: 556) also argues that although the distinction between heuristic and biases is sometimes vague and somewhat blurred, it has become clear that our thinking is often strongly affected by a wide array of errors and biases – “cognitive tilts” that can lead one to faulty decisions, erroneous inferences and unrealistic expectations. It is, however, important to remember that all people make use of such thinking and that the entrepreneur is also not immune to such errors.

### **3.5 Misconceptions**

The biases discussed above may help entrepreneurs come to conclusions more rapidly in environments that have high uncertainty. Simon & Houghton (2002: 114) postulate, however, that even though cognitive biases reduce uncertainty and improve decision-making speed they may create specific misconceptions that could lead to incorrect action.

In the whole problem of a misfit between the entrepreneurs' cognitive make-up and the varying demands of the new venture over time, the central element is the individual entrepreneur. Both Busenitz & Barney (1997) and Baron (1998) found that entrepreneurs and managers use different biases and heuristics when faced with complex situations. These findings may be explained by the fact that entrepreneurs tend to operate in more uncertain and complex environments than do other individuals (Brigham & De Castro, 2003: 42).

The interaction between the individual's dominant decision-making style, pattern or preference and the particular demands of a given situation may lead to varying degrees of fit and ultimately to either positive or negative outcomes.

### 3.5.1 Specific misconceptions

There are typical “errors” that people make when evaluating an opportunity. The following context-specific misperceptions under investigation are:

- Underestimating competitive response
- Overestimating demand
- Misjudging the need for complementary assets
- The concept of fit.

#### 3.5.1.1 Underestimating competitive response

Very often entrepreneurs ignore the likelihood that the new venture will encounter substantial competition. According to Lieberman & Montgomery (1985: 5) and Simon & Houghton (2002: 114), underestimating competitive response affects the extent to which a company will gain an advantage by pioneering its product, contingent upon the actions of its competitors. In order to be successful, an entrepreneur who is a pioneer needs to do the following:

- Block the attempts of followers to imitate the offering;
- Pre-empt followers’ entry into a profitable market segment by generating loyal customers;
- Make sure that their product, not the product of late entrants, becomes the technological standard.

Entrepreneurs who pioneer face a lot of uncontrollable forces and need to partly rely on luck in order to be able to complete the above-mentioned tasks. Despite all these uncontrollable forces, pioneers still frequently fail to recognise that the actions of competitors are often beyond the firm’s / entrepreneur’s control. The underestimation of competitive response may increase the likelihood of introducing a pioneering product to the market. Biases cause individuals to

believe that competitive retaliation will not hinder their success, making them more likely to proceed with the product (Simon & Houghton, 2002: 115)

It can be suggested that entrepreneurs entering new markets neglect the probable reaction of existing firms because they believe that they have the ability to pre-empt competitors. This then may be associated with the illusion of control bias and believing that they are able to control their competitors' response (Simon & Houghton 2002: 115). Relying on the belief that the competitors' response will not affect the success of the enterprise, the entrepreneur may be more willing to proceed with the introduction of a pioneering product on the market.

#### Entrepreneurial Application

Pioneer entrepreneurs frequently fail to recognise that the actions of competitors are often beyond the entrepreneur's control. Entrepreneurs entering new markets may neglect the probable reaction of existing firms, believing that they have the ability to pre-empt competitors.

Biases may cause individuals to believe that competitive retaliation will not hinder their success, making them more likely to proceed with the product (Simon & Houghton, 2002: 115). This may lead to a lower risk perception when evaluating the opportunity, so that the decision to pursue is taken.

#### 3.5.1.2 Overestimating Demand

Entrepreneurs are often overly optimistic in their perception of market acceptability. They believe that the output from this new venture will achieve its planned acceptance in the marketplace. Entrepreneurs who pioneer, do not have a pre-existing customer base for their product that they are about to release to the

market, but in order to reap the benefits of pioneering there must be a substantial demand for the product. Pioneer entrepreneurs face substantial demand uncertainty, which could lead to failure.

In order to offset the large initial capital outlay associated with pioneering, the entrepreneur counts on large sales volumes in order to recoup his expenses. Many firms fail to generate the substantial sales they anticipated because they overestimated the demand (Simon & Houghton, 2002: 115). This kind of entrepreneur is idea driven rather than demand driven.

According to Simon & Houghton (2002: 115), the belief in small numbers bias may explain why entrepreneurs overestimate demand, because individuals who utilise limited amounts of information may unintentionally select positive and not negative information, which could lead to overly optimistic forecasts of what the demand for their product and in turn their sales could be.

The overestimation of demand misconception may lead the entrepreneur who is thinking of introducing a new product on the market to proceed with the pioneering action. The belief in small numbers is less likely to occur in established firms who are introducing non-pioneering products to the market. The assumed reason for this is the fact that established firms are more likely to be guided by established demand patterns, which will guide them to estimate the probable demand for the new product introduction more accurately.

#### Entrepreneurial Application

Entrepreneurs often base their assumptions on the belief in small numbers or their intuitive feel about the possibility of success. Hearing positive remarks from family and friends may be enough to lead them to conclude that the whole population will feel the same way.

Simon & Houghton (2002: 115) confirm this, arguing that entrepreneurs utilise biased samples such as a few potential customers or a couple of friends. Their input may generate positive conclusions and belief that they have an adequate feel for the market.

An overestimation of demand makes entrepreneurs more likely to proceed with the venture or product because they have a lower risk perception based on hearsay and not real market research.

### 3.5.1.3 Misjudging the need for complementary assets

Complementary assets can include the following: sales and distribution costs, storage and stock holding and finance for slow payment. They also include financial considerations such as the necessity to adopt both a cash-flow orientation and a profit and loss orientation when judging potential new business opportunities. Projected long-term profitability (3–5 years) should also be taken into account, as well as projected short-term cash flow (start-up to 3 years).

Simon & Houghton (2002) argue that many pioneer entrepreneurs' fail because they lack complementary assets. They also postulate that in order to achieve economic success, the know-how used to develop a pioneering product must be utilised in conjunction with other complementary assets. Most scholars argue that pioneers need extensive distribution systems in order to achieve rapid market recognition and large-scale manufacturing to gain the experience curve effects. Yet many entrepreneurs still misjudge the need for complementary assets (Simon & Houghton, 2002: 116).

Misjudging the need for complementary assets can contribute to misperception by creating an overly simplistic view of a very complex situation (Simon, 2002: 116).

These miscalculations may be more likely to occur in pioneering decisions, because the entrepreneurs in pioneering decision contexts do not have other industry models to compare their product with and therefore have fewer cues regarding the potential problems of lacking complementary assets (Simon & Houghton, 2002: 116).

#### Entrepreneurial Application

Entrepreneurs who misjudge the need for complementary assets such as sales and distribution costs tend to direct their attention to a limited set of variables and exclude other important variables. This helps to explain why entrepreneurs fail to consider the need for adequate distribution and production facilities when deciding to proceed with actions.

Entrepreneurs also need to prepare a proper financial plan based on the anticipated complementary assets needed to determine both short- and long-term profitability. A cash-flow analysis is therefore of crucial importance.

#### 3.5.1.4 Concept of fit

For this study the concept of fit looks at the misfit between the venture and the entrepreneurs that need to manage the new venture. The following are of importance when dealing with the concept of fit.

According to Katz & Shepherd (2003: 38), the concept of fit varies in the different fields. In strategic management, variables such as fit between the firm and its environment, strategy, structure, processes, resources and capabilities are of relevance. In the field of organisational behaviour most fit research incorporates

individual (person) variables, which are then matched with elements of the individual's work environment.

Katz & Shepherd (2003: 37) postulate that many key questions in entrepreneurship might also be successfully addressed through a fit approach. For instance questions such as the following may be asked:

- Why do entrepreneurs often make poor managers?
- Why must founders often be replaced by professional managers?

Misfit is implicit in both these questions. An assumption can be made that a greater degree of fit between the different variables involved will lead to greater venture performance.

#### Entrepreneurial Application

Many entrepreneurs are good at seeing the opportunity and performing activities needed to start the venture but not at managing the venture once it is up and running.

Misfit can also apply to the entrepreneur and the team and the venture team's overall managerial skills as well as those demanded by the new venture.

In conclusion we can postulate that there appears to be a relationship between cognitive biases and misconception which may lead entrepreneurs to misperceive certain factors in the business environment. Confirmation of this relation is part of this study. The small amount of research done on misconceptions led to the inconclusiveness of this construct in the empirical part of this study.

### 3.6 Self-efficacy

Markman et al (2003: 74) define self-efficacy as the belief in one's ability to perform certain tasks successfully. According to Urban (2004: 25), self-efficacy is an important motivational construct that influences the individual's choices, goals, emotional reactions, effort, coping and persistence. He also refers to Bandura (1986, 1997, 2001), who defines self-efficacy as individuals' conviction about their abilities.

Efficacious people are quick to take advantage of opportunity structures and figure out ways to circumvent institutional constraints or change them by collective action. Conversely, inefficacious people are less apt to exploit the enabling opportunities provided by the social system and are easily discouraged by institutional impediments (Bandura 1997: 6).

According to Urban (2004: 26), self-efficacy has become an important construct in behavioural management. Bandura (1986: 391) has defined perceived self-efficacy as "people's judgements of their capabilities to organize and execute courses of action required to attain designated types of performance". Shepherd & Kreuger (2002: 171) also quote Bandura (1991) and Wang (1995) as suggesting that people with high self-efficacy are those who have a high belief in their capacity to perform.

Self-efficacy refers to the conviction that one can successfully execute the behaviour required, or the amount of faith entrepreneurs have in their own ability to succeed (Pretorius et al, 2004: 7). Self-efficacy reflects on the perception of a person's capability to do a particular job or set of tasks. According to Markman et al (2002: 152) and Markman et al (2003: 85), self-efficacy impacts on our perceived control, how much stress, self blame and depression we experience while we cope with taxing circumstances and the level of accomplishments we realise.

Self-efficacy involves a generative capability in which cognitive, social and behavioural subskills are organised into integrated courses of action requiring perseverant effort. Self-efficacy is central to most human functioning, and since action is based more on what people believe than what is objectively true, thoughts are a potent precursor to one's level of motivation, affective states, and actions (Markman et al, 2003: 85). According to Urban (2004: 28), entrepreneurship literature has found that persons who believe that their skill and ability set is adequate for achieving success with new ventures are motivated to exert the necessary effort.

If self-efficacy impacts on career undertakings, performance and success, the question may be asked whether it also predicts or at least is related to entrepreneurial pursuits. Markman et al (2003: 85) suggest that this is the case because of the following three reasons:

- People avoid careers and environments they believe exceed their capabilities (regardless of the benefits these may hold). The higher their self-efficacy, the more challenging the activities they pursue.
- Entrepreneurs operate at the crux of change, innovation and market perturbation.
- Individuals with higher self-efficacy perform more adeptly than those with a lower self-efficacy.

Some research (Chen, Greene & Crick, 1998), as well as the pilot study of Markman et al (2004) engaging in exploitation activities, suggests that self-efficacy differentiates entrepreneurs from non-entrepreneurs. In the research done by Markman et al (2003: 92), a higher self-efficacy was reported amongst entrepreneurs than amongst other people.

### **3.7 Risk**

Cassons (1990: 11) describes entrepreneurial risk as the insecurity that exists due to the fact that the success of market penetration can never really be determined beforehand. The correct prediction of the question by the entrepreneur would therefore be an indication of success through a decrease in risk. Hence, risk can be described as the possibility of innovation having an unwanted result (Antonites, 2004: 58). Heuristics and biases may influence the perception of the risk and its probability.

Zimmerer & Scarborough (1996: 48) regard risk as the cause of the conflict situation wherein the entrepreneur will find him/herself. Therefore all risk variables must be studied in depth with regard to the potential reward that could be a result of the venture. The authors refer to the successful entrepreneur as one who capitalises on the constructive effect of the conflict situation that originates when a certain risk is taken. This includes the decrease of the negative reaction that can develop from the accompanying exhaustion and frustration which result from continuous failure. Antonites (2004: 58) also refers to the evaluation model of Zimmerer & Scarborough (1996: 51), who argue that the following risks could occur:

#### **3.7.1 Time risk**

Time risk refers to the time implication of taking a new idea right through the product development phase until it could be considered right for the market.

#### **3.7.2 Investment risk**

Investment risk refers to the cost of establishing a new venture and whether the entrepreneur has access to enough capital to enable the venture to survive to the point of being an entrepreneurial venture.

### **3.7.3 Technical risk**

Technical risk deals with all the technical aspects associated with the product development process in order to deliver a product that adheres to all technical quality standards.

### **3.7.4 Competitive risk**

The possibility always exists that competitors may come up with the same or comparable products in the market, while the success rate of competitors in comparable markets is also an indication of risk. The financial depth and strength of the competitors should not be omitted, as a “follower” strategy by the competitors could pose a risk. A timely closing of the window, as mentioned in “the window of opportunity” in Chapter 4, is needed to minimise such a risk.

To decide whether an idea is an opportunity involves judgement or decisions made under conditions of uncertainty and complexity. Risk is also closely associated with uncertainty, which is whether the entrepreneur is able to successfully turn an idea into an opportunity. Because failure could lead to financial losses, perceived risk is a significant aspect of how entrepreneurs evaluate available ideas. Thus, entrepreneurs are more likely to evaluate an idea more favourably when they perceive less risk in that idea (Keh et al, 2002: 126).

An entrepreneur’s readiness to take risks also involves a preparedness to capitalise on the opportunities identified in the market. Risk taking can be referred to as calculated, thought-through and not impulsive decision-making. According to Crous, Nortje & Van der Merwe (1995: 55), entrepreneurs evaluate themselves positively regarding their ability to solve problems, their tolerance for conflict and stress, the fact that they take calculated risks and the fact that they can function despite insecurity. According to Osborne (1995: 5), successful entrepreneurs

avoid opportunities where there is a high probability that they will be unsuccessful, regardless of the reward involved.

Although risk-taking seems to be the common denominator to most definitions of entrepreneurship, Palich & Bagby (1995: 427) postulate that entrepreneurs have no greater propensity to bear risk than non-entrepreneurs. They argue that entrepreneurs may simply categorise and frame the same stimuli differently from non-entrepreneurs. They also postulate that what has been widely recognised as a propensity for risk on the part of the entrepreneur may instead be an artefact of this alternate framing. It seems that entrepreneurs may not necessarily prefer to engage in more risky behaviour, but instead their behaviour may be the result of framing a given situation more positively than negatively, focusing on the probability of favourable outcomes and responding according to these perceptions. They also argue that non-entrepreneurs may not share this “rose-tinted” view, resulting in their being more cautious.

According to Palich & Bagby (1995: 428), the characteristics reported as risk-taking are the result of systematic differences in cognitive processes. Research has shown that entrepreneurs are notably more optimistic in their assessment of business opportunities.

If we summarise Palich & Bagby’s viewpoint, it seems that they argue that although entrepreneurs are widely considered to be risk-takers, their business-related behaviours may be the result of their unique perception from systematic differences in cognitive processes, not a desire to pursue ventures because they are risky per se. In their discussions they concluded that in accordance with cognitive theory, entrepreneurs may not actually prefer to take risks but rather, due to schema accessibility, they simply tend to associate business situations with cognitive categories that suggest more favourable attributes.

Keh et al (2000: 126) also argue that less known are the antecedents of the risk perception of entrepreneurs. They quote Simon et al (2000), who have shown

that people's cognitive biases affect their decision to start a business venture and postulate that it is not certain whether entrepreneurs exhibit the same cognitive biases. Kirzner (1973) argues that entrepreneurs are entrepreneurially alert and able to discern opportunities when others do not, although this assertion has been challenged by authors such as Gaglio (1997). Researchers have found that the cognitive processes of entrepreneurs and non-entrepreneurs are different. Keh et al (2002: 126) quote Baron (1999), who postulates that entrepreneurs focus on the future and engage in less counterfactual thinking than non-entrepreneurs.

Keh et al (2002: 126) argue that various cognitive processes affect opportunity evaluation, which is mediated by the entrepreneur's risk perception. According to Das & Teng (1997), traits and cognition are two major approaches which help us to distinguish entrepreneurs from non-entrepreneurs and to understand how people make decisions (Lim et al, 2002: 126). They also quote Palich & Bagby (1995) who argue that the trait approach asserts that entrepreneurs can be recognised by traits such as risk propensity, need for achievement and locus of control. Keh et al (2002: 126) also quote Allison, Chell & Hayes (2000), who argue that the cognitive approach is concerned with the entrepreneur's preferred way of gathering, processing and evaluating information, while according to Palich & Bagby (1995), the individual constructs opportunity and risk is on his / her mind. Therefore, as Krueger (2002) points out, perception and other cognitive phenomena are critical to opportunity evaluation and risk perception (Keh et al, 2002: 126).

As previously mentioned, the research done using the trait approach has had limited success in explaining entrepreneurial behaviours and perceptions. According to Keh et al (2002: 127), the quality of decision-making can be improved with a better understanding of risk and its role in opportunity evaluation. It is obvious that entrepreneurs who perceive less risk are more likely to make risky decisions. Although there are many cognitive factors involved, Simon et al (2000) argue that the biases of overconfidence, illusion of control and belief in

small numbers directly influence risk perception and the decision to start a business (Keh, 2000: 127).

### **3.8 Conclusion**

In conclusion, the above sections should not be interpreted to mean that we view cognitive biases in a negative light. Although they can lead to important misperceptions (Baron, 1998; Simon & Houghton, 2002), they also facilitate the entrepreneur's willingness to take risky actions that can benefit society and the firm (Busenitz & Barney, 1997; Simon & Houghton, 2002).

Gaglio (2004: 534) also argues that much of the work regarding cognitive heuristics to date has tended to focus on ways in which cognitive processes introduce bias and error into entrepreneurial reasoning. The unstated implication is that flawed reasoning may be associated with venture failure. However, the judgement and decision-making literature also notes that cognitive heuristics can have positive effects (Kahneman & Tversky, 1982) and can facilitate successful entrepreneurial activity (Gaglio, 2004: 534).

Regardless of whether the net effects of biases are positive or negative, an increased understanding of how particular biases arise and their consequences is beneficial (Simon & Houghton, 2002: 118). It is extremely difficult to minimise cognitive biases. Psychologists and others have been interested in determining how to mitigate or eliminate the effects of decision-making biases and heuristics for almost as long as such biases have been reported (George et al 2000: 195). They also quote Fischhoff, who calls the efforts to diminish the effects of biases "debiasing" and mention that "debiasing" efforts can include warnings, feedback and training.

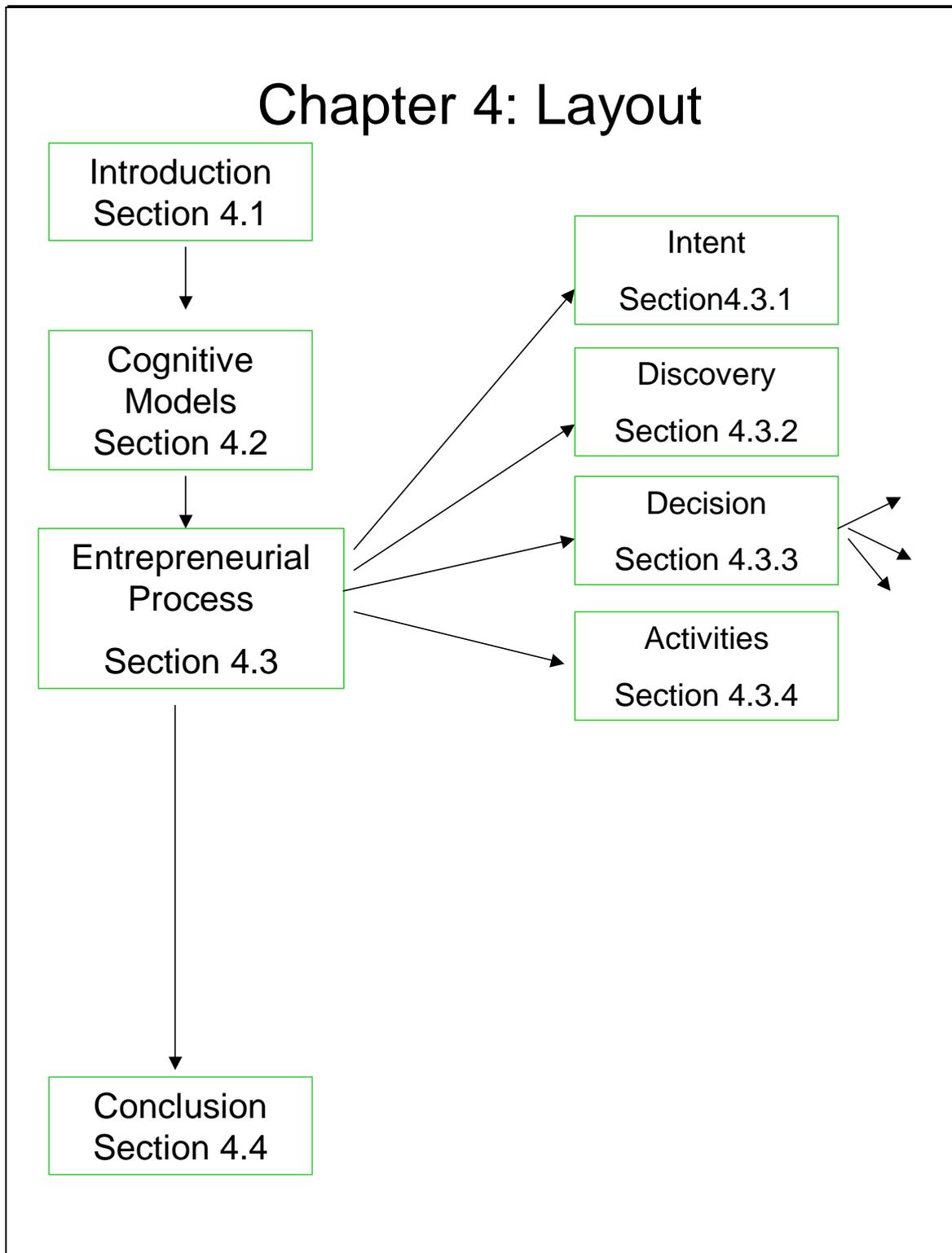
The framework provided in this chapter might lead to more insight into possible actions that entrepreneurs may take to minimise the detrimental effects of cognitive biases, either by decreasing the chances that biases will occur or by correcting their consequences after it happens (Simon & Houghton, 2002: 118).

However, decreasing and minimising the chance that biases may occur might be detrimental because it could inhibit the actions of the entrepreneur. If insight could be gained into which misconceptions are most likely to occur, it might help entrepreneurs to cope more effectively with the subsequent problems (Simon & Houghton, 2002: 118).

Entrepreneurs may, however, have a degree of success in this regard by paying more careful attention to their search processes. For example, entrepreneurs may need to invest more time in reading statistical information, rather than talking to a few individuals, to minimise their belief in small numbers. Similarly they may want to minimise their active involvement in the search process through delegation in order to lessen their illusion of control. Identifying specific information search processes and their associated biases might prove an important first step to minimise biases, if desired (Simon & Houghton, 2002: 118).

Even though many benefits may accrue to entrepreneurs who rely on biases and heuristics to make decisions about launching a start-up, venture perceptions that are based on faulty assumptions must eventually be adjusted to fit environmental and market realities. Katz & Shepherd (2003: 23) postulate that the insights and information required to make such adjustments can be learned through cognitive learning. Cognitive learning is the type of learning most likely to be involved in reassessing heuristics and biases. Katz & Shepherd (2003: 23) quote Kim (1993) as arguing that cognitive learning occurs when there is a shift in the mental map that changes the way a problem or opportunity is perceived. The result is that the problem is no longer viewed in the biased way.

## Chapter 4: Entrepreneurial Process Perspective



## 4.1 Introduction

*“You see things and you say ‘Why?’” But I dream things that never were and I say ‘Why not?’” (Shaw, 1992, in Gaglio, 2004: 533).*

Dreaming of things that do not yet exist, bringing them into being and gaining market acceptance are perhaps the most mesmerising of all entrepreneurial behaviours. This certainly represents the foundation of the modern conceptualisation of entrepreneurship (Stevenson & Gumpert, 1985, as quoted by Gaglio, 2004: 533). It is therefore also evident in the literature that a growing consensus exists that entrepreneurship involves the recognition and exploitation of opportunities (Kirzner, 1997; Shane & Venkataraman, 2000, as quoted by McMullen & Shepherd (2002: 1). Ucbasaran, Wright, Westhead & Busenitz (2003: 243) suggest that one of the fundamental reasons for the fascination with entrepreneurs and the inventions that they develop seems to centre around why and how they see new opportunities. An entrepreneurial opportunity involves the development of new ideas that most others overlook.

An opportunity may be dramatically depicted as “creatively destroying” existing industries (Schumpeter, 1950), or more humbly characterised as the “motivated propensity of man to formulate an image of the future” (Kirzner, 1985: 56). It is, however, more important to acknowledge that the process of identifying and shaping market opportunities is emerging as a focal point of the field of entrepreneurship (Gaglio, 1997b; Kirzner, 1979; Shane & Venkataraman, 2000; Venkataraman, 1997).

The possibility that entrepreneurs possess knowledge structures (i.e. the sum of their stored information and knowledge) that help to identify opportunities and that they differ from those of other persons has frequently been suggested in the entrepreneurial cognition literature. For instance, as noted above, Shane (2000; 2001) has found evidence suggesting that opportunity recognition is closely linked to the amount and kind of information individuals possess. In short, an entrepreneur’s knowledge structures may play a key role in the entrepreneurial

process (Baron & Ward, 2004: 558). Ucbasaran et al (2004: 243) postulate that those with an entrepreneurial cognition orientation (i.e. extensive use of heuristics) often see new opportunities where others do not.

While stocks of information create mental schemas providing a framework for recognising new information, opportunity recognition and information search by entrepreneurs may be a function of the individual's capacity to handle complex information (Venkataraman, 1997). He believes that three areas of differences between individuals exist:

- Cognitive differences
- Knowledge and information differences
- Behavioural differences

One or two people, either the entrepreneur alone or the entrepreneur with a manager, normally run new ventures. It can therefore be suggested that their beliefs (cognitive differences) and decision-making processes (based on knowledge and information differences) are likely to be more concentrated than those of large organisations (Forbes 1999: 417). "Why", "when" and "how" certain individuals exploit opportunities appears to be a function of the joint characteristics of the opportunity and the nature of the individual (Shane & Venkataraman, 2000, as quoted by Ucbasaran et al, 2004: 243).

Forbes (1999: 416) postulates that cognition research has the potential to shed new light on many aspects of new venture creation, such as:

- The new venture creation process, which includes the initial identification and interpretation of opportunities
- The process of representing those opportunities to investors, employees and customers
- The process by which representation of opportunity becomes templates for structuring and engaging in business activities

- The fact that every entrepreneurial venture is unique and its successes are the result of its having faced and addressed a wide variety of issues

It is, however, necessary as well as useful, in order to make sense of the whole entrepreneurial process, to view the process of entrepreneurship in a more generalised way. This may then provide a framework for understanding entrepreneurship, and guidelines for decision-making when planning to start a new venture (Wickham, 2001: 37).

In order to better understand the entrepreneurial process we need to take a closer look at three elements:

- The definition of an entrepreneur as presented by different authors in the literature
- A cognitive model and the window of opportunity process in an attempt to generalise the entrepreneurial process
- The entrepreneurial process

Different authors have defined entrepreneurs and entrepreneurship as follows:

Hisrich and Peters (1998) see the entrepreneur as someone creating something new with value by devoting time and effort, assuming the accompanying financial, physical and social risks, and receiving the resulting rewards of monetary and personal satisfaction and independence.

Timmons (2000) believes entrepreneurship is the process whereby the entrepreneur creates or takes an opportunity and pursues it, regardless of the resources currently controlled.

Nieman & Bennet (2002: 58) postulate that an entrepreneur is a person who sees an opportunity in the market, gathers resources and creates and grows a business venture to meet these needs. He or she bears the risk of the venture and is rewarded with profit if it succeeds.

Gaglio (2004:554) defines an entrepreneur as an individual who recognises or discovers an opportunity to create something new (e.g. a new product or service, new market, new production or raw material, or a new way of organising existing technologies) and who then uses various means to exploit this opportunity.

There are as many definitions as there are authors. The aim of this study is not to create another definition; the focus is rather on identifying the key elements associated with entrepreneurship, namely:

- Opportunity – as the key element
- The person acting as an entrepreneur
- Resources application
- Business risk perception
- Profit or reward
- Value creation for customers
- Entrepreneurial process
- Growth of the venture

One can therefore argue that the process starts with the entrepreneur's perceiving an opportunity, gathering resources and growing the business, as well as accepting the business risks involved. In order for an entrepreneur to be successful (creating value, making profit and growing the business), the entrepreneur needs to be able to complete a new venture creation process. The following discussion will introduce a cognitive model suggested by Forbes (1999) and the window of opportunity metaphor of Wickham (2001) as a generalised approach for understanding the entrepreneurial process.

## **4.2 Two models of relevance**

The two models under investigation in an attempt to generalise the entrepreneurial process are:

- The cognitive model of Forbes (1999)
- The window of opportunity metaphor of Wickham (2001).

Forbes (1999:428) proposed a cognitive model in an attempt to help generalise the new venture creation process. He suggests a five-stage cognitive model in the development of the new venture. The five stages; intention; scanning; interpretation; action; and performance, are now explored:

- Intention

Forbes postulates that entrepreneurs appear to base their intention to create a new venture on the perceived feasibility and desirability of that action. Social support, role models and mentoring may have a decisive influence on individuals who are uncertain about their entrepreneurial ambitions.

- Scanning

There is, according to Forbes (1999: 427), substantial evidence that entrepreneurs prefer informal sources of information. This may include engaging their social networks and gaining word-of-mouth recommendations from their customers and business affiliates. Trade magazines are a commonly used source of impersonal information (Brush 1992). Entrepreneurs often overlook the more formal sources of information, which may mean that those who make use of formal information may be able to exploit information to their strategic advantage.

- Interpretation

Forbes (1999: 427) suggests that there is at least preliminary evidence for the existence of entrepreneurial cognition, and quotes Busenitz & Lau (1996), who argue that entrepreneurs have a distinctive set of thought processes they use to interpret data. These include a reliance on decision-making biases and a tendency to interpret equivocal situations favourably. Other research shows that there may be significant differences in cognition among entrepreneurs (Cooper et al, 1995, as quoted by Forbes, 1999: 427). Entrepreneurial cognition may in some instances be detrimental to entrepreneurs. Intervention techniques may help to identify and correct these biases.

- Action

Mental models may play a critical role in enabling entrepreneurs to structure behaviour. Entrepreneurs often use metaphors to convey ideas that they have difficulty in expressing. They often use organisational milestones, such as the first month of positive cash flow, as a way of bracketing time and lending structure to the ambiguous process of new venture creation. In other words, Forbes postulates that entrepreneurs make use of mental models to structure their activities.

- Performance

General performance measures are used, such as sales growth, profit, opportunity, return on investment and return on equity.

Wickham, on the other hand, uses a metaphor to explain the entrepreneurial process. Metaphors are ever present in communication and represent an attempt to illuminate an idea by drawing attention to something it is like. The “window of opportunity” is a metaphor used to give form to the process of identifying, evaluating and exploiting a new business opportunity. This section is based on the work of Wickham (2001: 209).

According to Wickham (2001: 210), the first stage in this metaphor is described as a solid wall representing the competitive environment the entrepreneur seeks to enter. The wall is solid due to the competition from established businesses. However, established businesses leave gaps that present the window of opportunity for the entrepreneur to exploit. The window of opportunity consist of five stages:

- Seeing the opportunity (scanning for new opportunities)

This involves scanning the solid wall (of protection) to find the windows and spot the gaps (cracks) left by the existing role-players in the market. This process demands an active approach in identifying new opportunities and innovatively reacting to them.

- Locating the window (positioning the new venture)

The entrepreneur develops an understanding of where the window is located. It requires an understanding of both the positioning of the venture and how the venture can position itself relative to the existing players in the market.

- Measuring the window (what the potential venture is worth)

This step involves evaluating the opportunity and recognising the potential it offers for creating new value. Measuring the window also demands that the entrepreneur develop an understanding of the risks the venture might encounter. Measuring refers to quantification of the opportunity in financial, risk and return terms. It also determines the resource requirements to successfully start and operate the venture.

- Opening the window (gaining commitment)

Opening the window refers to turning the vision into reality and actually starting the new business. This is about acting on the opportunity. The commitment of stakeholders is crucial in this stage. Starting the business gives the entrepreneur the opportunity to move through the window.

- Closing the window (sustaining competitiveness)

Once the window has been opened and the entrepreneur has moved through it, it must be closed in order to keep the competition out. If the entrepreneur moves through successfully and he or she is able to keep others out, it means that a long-term sustainable competitive advantage for the business has been created.

The window does not stay open forever. When the first person makes a move, the window opportunity diminishes because someone else has then closed it. The window is open for only a short period of time. The opportunity or opportunity opening has a time limit in which the entrepreneurs have to take hold thereof.

The growth of any market means that an opportunity arises at a certain time and as growth increases it becomes satisfied and the opportunity possibilities

decrease. The length of time that the opportunity is 'open' is thus very important (see Figure 4.1).

Each of the five stages mentioned in the two models presents itself to the entrepreneur as a series of decisions, which need to be addressed so that the business can be developed. The entrepreneurial process involved in the seizing of the opportunity is now explored.

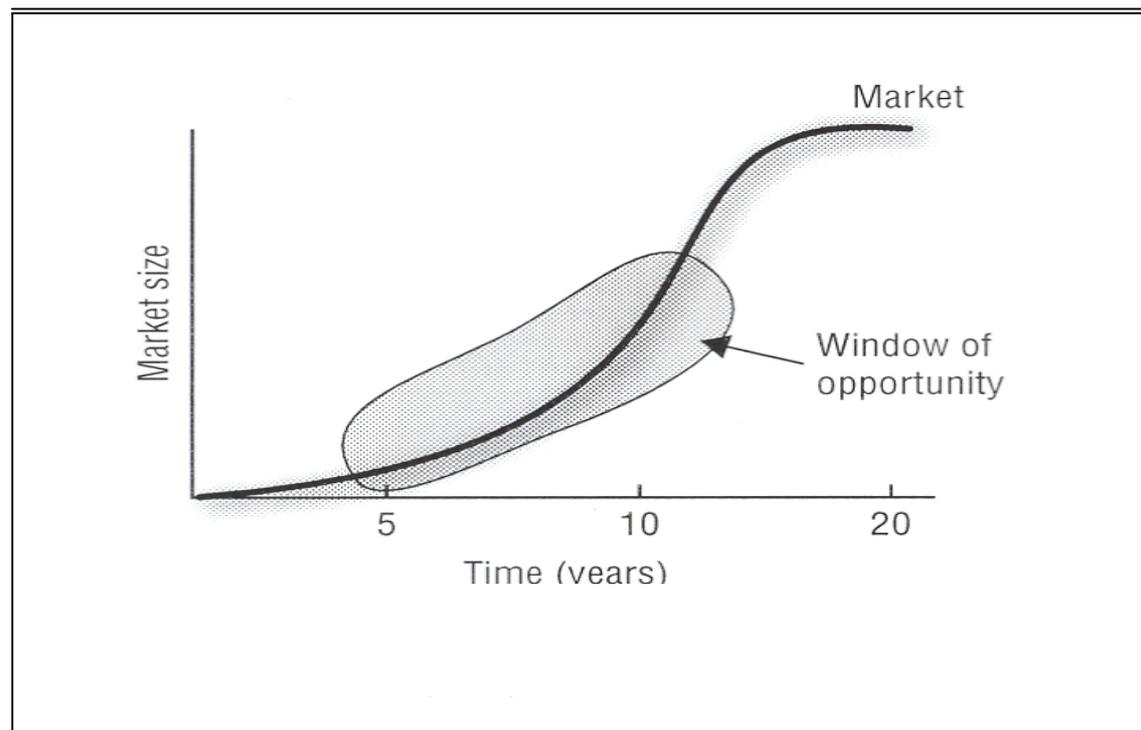


Figure 4.1 Analysis of an opportunity

Source: Timmons (1999: 84).

### 4.3 Entrepreneurial process

Through the years many authors have suggested models to explain the entrepreneurial process and act as a framework for understanding entrepreneurship. Baron & Shane (2005: 14), Timmons & Spinelli (2004: 47), Krueger et al (2004: 414), Lim et al (2002: 125), Wickham (2001: 37) and Shook, Priem & McGee (2003: 381) are cited as their recent works summarise previous

works. For this study the focus will mainly be on the process as suggested by Shook et al (2003: 381) as the principal model.

Baron & Shane (2002: 14) argue that the entrepreneurial process cannot be divided into neat and easily distinguished stages but can in general be divided into the generation of the following stages:

- Assembling the resources needed to launch a new venture
- Launching the new venture
- Managing and growing the business
- Harvesting the rewards.

Forbes (1999: 418) also suggests that the new venture creation process includes conceiving of or executing the start of a new organisation, which may include:

- Activities undertaken in preparation for the creation of a new venture
- The founding event itself
- Activities undertaken in the first several years of the venture development.

According to Baron & Shane (2002: 9), the entrepreneurial process begins when one or more persons recognise the opportunity and the fact that it is worth pursuing. The opportunity emerges from a complex pattern of changing conditions, which could be due to a change in political, social, technological, economic or demographic conditions. Opportunities vary greatly in their potential value, resulting in only some being worth pursuing; for only some opportunities is the return potential ratio favourable enough to justify efforts to exploit them. These authors also believe that at the heart of the entrepreneurial process is a connection (a nexus) between the opportunity and people that start the process and sometimes change the world.

Timmons & Spinelli (2004: 47) suggest that entrepreneurship is a way of thinking, reasoning and acting that is opportunity-obsessed. They also argue that entrepreneurship results in creation, enhancement and realisation, as well as

renewal of value for all participants and stakeholders. At the heart of the entrepreneurial process, they hold, are:

- The creation and/or recognition of opportunities
- The will and initiative to seize these opportunities
- The taking of both personal and financial calculated risks, balancing the risk against potential reward.

Timmons & Spinelli (2004: 57) depict a model in which the following can be seen as the driving forces necessary to create a new venture opportunity:

- The opportunity is seen at the heart of the process, with many ideas needed to realise one good opportunity.
- Secondly, resources need to be found. Timmons postulates that many untried entrepreneurs have the misconception that you first need all the resources in place, especially money, to succeed with a venture.
- Thirdly, the entrepreneurial team is a key ingredient in the higher potential venture.

Timmons & Spinelli (2004: 58) suggest that the rounding off of the three driving forces of the model depends on the fit and balance between them (See Figure 4.2).

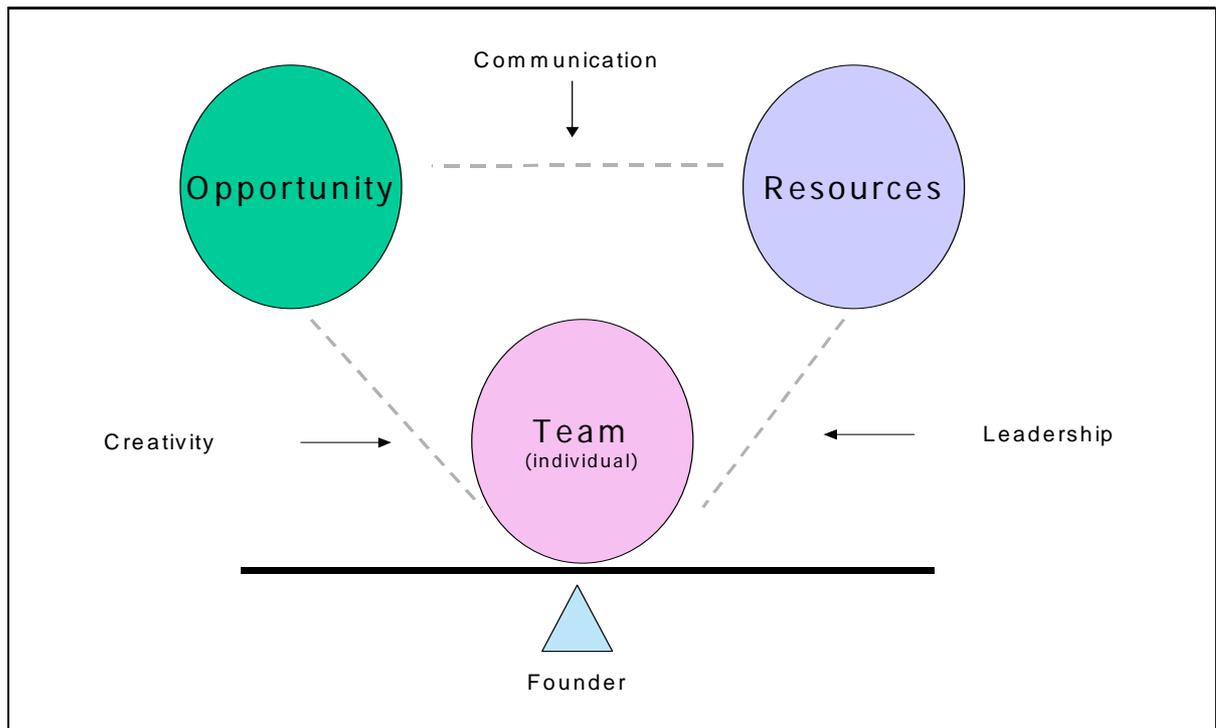


Figure 4.2 Driving forces for opportunity realisation

Source: Timmons & Spinelli (2004: 57)

Krueger et al (2004: 414), like Timmons & Spinelli (2004), postulate that entrepreneurship is a way of thinking that emphasises opportunities over threats. Their emphasis, however, is on the opportunity identification process, which is seen as an intentional process. Krueger et al (2000: 414) quote Bagozzi et al (1989), who argue that intention is an unbiased prediction of action even where a lapse in time exists. They postulate that a strong intention to start a business should eventually result in an attempt, even if circumstances such as marriage, a lucrative job or childbearing may dictate a delay.

Keh et al (2002: 125) quote Bygrave & Hofer (1991), who argue that the entrepreneurial process involves all functions, activities and actions associated with the perception of opportunities, and the creation of organisations to pursue these opportunities. Kuratko & Welsch (2001: 178) also suggest the following regarding opportunity perception:

- Organisations do not see opportunities, but individuals do
- Opportunity perception depends closely on the perception that the situation is positive and controllable
- Opportunity perception reflects an intentional process; in short, intentions are driven by perceptions of feasibility or desirability
- Entrepreneurs have mental models that they share, the scripts and schemas that differentiate entrepreneurs from others (Bird, 1988; Mitchell & Chesteen, 1995). Entrepreneurs have access to the availability of both an “opportunity“ schema and a “threat’ schema
- The decision to undertake entrepreneurial activity requires a pre-existing belief that the activity is both desirable and feasible
- At the heart of these scripts and schemas are critical perceptions that map elegantly onto the common framework of intentionality

Wickham (2001: 37) argues that the entrepreneurial process is based on four interacting elements:

- The entrepreneur
- A market opportunity
- A business organisation
- Resources to be invested.

The entrepreneurial process is thus seen as the result of the actions of the entrepreneur, which can only take place if the entrepreneur acts to develop an innovation and promote it to customers. It is a dynamic process with a constant interaction between the four fundamental elements needed for success. Ardichvilli et al (2003: 113) suggest that the processes of opportunity identification and development by entrepreneurs are, however, also influenced by factors such as:

- Entrepreneurial alertness
- Information asymmetry and prior knowledge
- Discovery versus purposeful search
- Social networks

- Personality traits including risk-taking, optimism and self-efficacy, and creativity.

Although all the above-mentioned authors have contributed to a clearer understanding of the entrepreneurial process, the following organising model as proposed by Shook et al (2003:381) will be used to further explore the entrepreneurial process. The organising model of Shook et al (2003: 381) includes four stages of venture creation:

- Entrepreneurial intent to start-up
- Searching for and discovering an opportunity
- Decision to exploit the new venture
- Engaging in the exploitation activities.

The role of the enterprising individual has been studied within each of these phases. They also suggest that there is room for research to develop the understanding of the cognitive processes during the different stages, but simultaneously point out that the number of variables that determine each specific venture creation situation are so many that meaningful comparison of entrepreneurs is almost impossible. The complexities associated with each of the combinations of variables prove to be impossible to quantify (Pretorius et al, 2004: 4). The four stages will now be explored individually.

#### **4.3.1 Entrepreneurial Intent to start-up**

McMullen & Shepherd (2002: 1) quote Mises (1949) as stating that action takes place in a flux of time and is therefore inherently uncertain. They also believe that for entrepreneurial action (i.e. the creation of new firms, products, processes, markets, or combinations thereof (Smith, 2001) to occur, one must exercise judgement under uncertainty (Cantillon, 1755). Knowledge can be seen as an essential aspect of this judgement (Shane, 2000), but without considering motivation, an incomplete picture is provided. Although motivation is a crucial ingredient for entrepreneurial action, Krueger et al (2000: 421) postulate that

intentions are the single best predictor of any planned behaviour, including entrepreneurship.

Entrepreneurial intentions, according to Krueger (2000; 2003) and Baron & Ward (2004: 556), can be defined as the cognitive state that precedes the decision to act (e.g. form a new venture). Kuratko & Welsh (2001: 173) also argue that in the absence of intentions no action is likely to take place. Intentions represent the belief that one will perform certain behaviour, the belief that one will act. Thus intent logically precedes action. Understanding intentions helps researchers and theoreticians to understand related phenomena such as:

- What triggers opportunity scanning
- The source of ideas for a business venture
- How the venture ultimately becomes a reality.

Krueger et al (2000: 412) postulate that entrepreneurship is a way of thinking; one that emphasises opportunities over threats. According to them, not only entrepreneurs but also those who teach and train them should benefit from a better understanding of entrepreneurial motives. The lens provided by intentions affords them the opportunity to understand why they made certain choices in their vision of the new venture. These authors also argue that the opportunity identification process is clearly an intentional process.

A study done by Krueger et al (2000: 412) compared the intention-based model of Ajzen (1987) and Shapero (1982). Ajzen's theory of planned behaviour (TPB) argues that intentions in general depend on perceptions of personal attractiveness, social norms and feasibility, while Shapero's model emphasises the perceptions of personal desirability, feasibility and the propensity to act. Krueger et al (2000: 424) developed the following model based on the work of Shapero and Ajzen (see Figure 4.3). The model illustrates the fact that intentions predict planned behaviours. As entrepreneurship is a planned behaviour, they believe that the adapted-intentions models may be useful in understanding the antecedents of intentions, which implies understanding the behaviour.

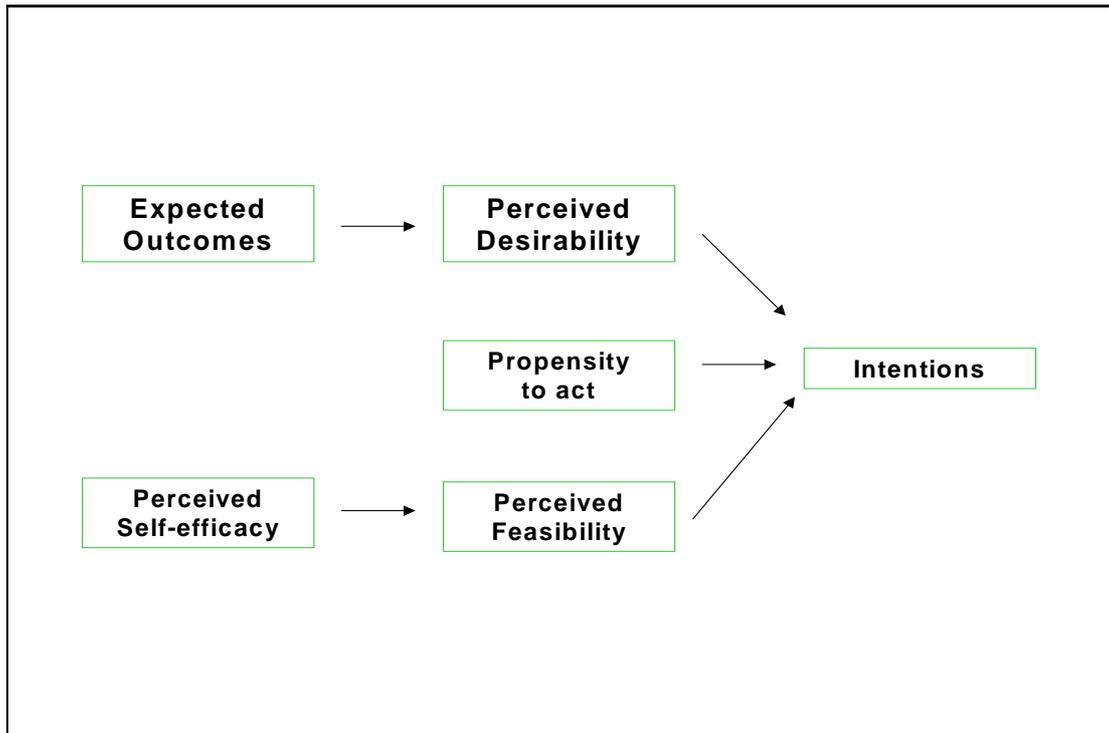


Figure 4.3 The Shapero-Krueger model (2000: 424) of intention-based behaviour.

The perception-based literature argues that the entrepreneurs' decisions to initiate a venture or entrepreneurial action are based upon their *intentions* to proceed, which in turn are generated by their *perception* that the action is both *feasible* and *desirable*. Given the importance of entrepreneurial activity to society, researchers have isolated factors that increase perception of feasibility and desirability. For example, findings suggest that the breadth of an individual's prior exposure to entrepreneurship, the positive nature of exposure, supportive social norms and cultural values such as high-power distance, individualism, low uncertainty avoidance, and high masculinity may all increase feasibility and desirability (Simon et al, 2002: 107).

Although researchers have not found that traits directly affect action, they may influence perception. For instance, other research suggests that self-efficacy (defined as persons' belief in their ability to perform a given task) may positively influence desirability and feasibility, leading to an increase in research interest in self-efficacy (Simon et al, 2002: 107).

The following section investigates why, how and where an entrepreneur searches and discovers opportunities.

#### **4.3.2 Searching for and discovering an opportunity (scanning)**

Antonites (2004:100) quotes Mart Twain:

*“I was seldom able to see an opportunity until it had ceased to be one.”*

According to Timmons (1999: 80), an opportunity can be defined as a phenomenon that seems attractive. Attractiveness refers to the profitability it offers the entrepreneur as well as to the value it will hold for the consumer destined to use it. The opportunity must be maintainable, and in the free market system it usually presents itself in a changing environment or situation. It is also important to note that an opportunity is situational.

An opportunity can also be defined as a future situation that the decision-makers deem personally desirable and feasible (i.e. within their control and competence). The state of being “desirable” and “feasible” is subjective to the individual. An opportunity is said to exist when a bundle of resources can be sold at a higher price than the cost of packaging and delivering it. However, most entrepreneurs do not have problems generating ideas, as there are numerous sources of ideas, and evaluation is the key to differentiating an idea from an opportunity (Keh et al, 2002: 126).

According to Ardichvili, Cardozo & Ray (2003: 108), an opportunity in broad terms may be the chance to meet a market need (or interest or want) through a creative combination of resources in order to deliver a superior value (Schumpeter, 1934; Kirzner, 1973; Casson, 1982).

Gaglio (2004: 534) argues that although many in the entrepreneurial discipline use the term “opportunity” meaning the chance to start a business (quoting Hills, Shrader & Lumpkin, 1999; Long & McMullan, 1984), one can also follow the tradition established by leading theorists (Schumpeter, 1950; Kirzner, 1979) and

define “opportunity” as the chance to introduce innovative (rather than imitative) goods, services or processes to an industry or economic marketplace. The identification or discovery of innovative opportunities involves breaking the existing means-end framework and creating an alternative one.

Opportunities are per definition limited and are presented in the window of opportunity as discussed earlier in the chapter. Hisrich & Peters (2002: 41) regard the window of opportunity as one wherein the true and perceived value of opportunity must be determined as well as the risk and income that could result from it. They postulate that the “window” could be the most measurable determinant of risk and income. The risk reflects the market, competition, technology and the amount of capital needed.

The question of why some people and not others discover opportunities is an intriguing and practical one. Baron & Shane (2005: 68) argue that research on this question offers fairly clear answers, namely the central role of information. They postulate that some people are more likely to recognise opportunities because they have better access to certain kinds of information, as well as the fact that they utilise the information better once they have it. They also speculate that if we can understand why some people recognise opportunities that others do not, it may offer valuable clues as to how to increase the ability to recognise opportunities.

Baron & Shane (2005: 68) also suggest that entrepreneurs possess a mental framework (a schema) that assists them in being alert to and therefore recognising opportunities. This schema (pattern) or “mental scaffold” is built up through experience and helps us to process information efficiently. These schemas provide a framework into which new information can be slotted and assist us in linking new information to information already stored in memory (see Chapter 2 on patterning and thinking preferences). Gaglio (2004: 534) confirms this thinking and states that cognitive behaviours are present during entrepreneurial opportunity identification.

Keh et al (2002: 125) quote Krueger (2000) as arguing that in order to understand what promotes or inhibits entrepreneurial activities, it is important to understand how entrepreneurs construct credible opportunities, and the role of perceptions in that process. According to Keh et al (2002: 125), many researchers argue that opportunity recognition is the cornerstone of entrepreneurship.

Ardichvili et al (2003: 106) also argue that the ability to identify and select the right opportunity for new businesses is amongst the most important abilities of a successful entrepreneur. Entrepreneurs identify business opportunities to create and deliver value for stakeholders in prospective ventures (Ardichvili et al, 2003: 106). They also quote Venkataraman (1997), who explains the discovery and development of opportunities as a key part of entrepreneurship.

The extent to which individuals recognise opportunities and search for information to evaluate the opportunity will depend on the make-up of the various dimensions of the individual's human capital (Usbasaran et al, 2003: 243). These authors also quote Kaish & Gilad (1991) and Woo, Folta & Cooper (1992), who identify two broad perspectives relating to opportunity and search behaviour of the entrepreneur:

- Perspective-based or neo-classical economic theory, which takes a conscious search perspective in which information search is a means of optimising performance (Caplan, 1990; Stigler, 1961, as quoted by Usbasaran et al (2003: 245)
- Entrepreneurial alertness, based on the work of Kirzner (1973), which suggests that opportunities cannot be accurately modelled as a rational search process, since opportunities are unknown until discovered (Kaish & Gilad, 1991), as quoted by Usbasaran et al (2003: 245). Entrepreneurial alertness then refers to the “flashes of superior insight” that enable the entrepreneur to recognise an opportunity (Usbasaran et al, 2003: 244)

Many different models of opportunity recognition and/or development have been presented in recent years (Bhave, 1994; Schwartz & Teach, 1999; Singh et al, 1999; De Koning, 1999; Sigrist, 1999), based on different and often conflicting

assumptions. These are borrowed from disciplines ranging from cognitive psychology to Austrian economics. Although they help us to understand opportunity identification, they also fall short of offering a clear understanding of the process (Ardichvili et al, 2003: 107).

Moving from identification of an opportunity to the starting of the venture involves a series of decisions made by the entrepreneur. The next section investigates the decision to actually start the venture.

#### **4.3.3 Decision to exploit the new venture**

The importance of prior knowledge of an industry is an important variable in the decision-making process of an entrepreneur. According to Baron & Ward (2004: 557), Shane (2000) studied eight entrepreneurs who had discovered entrepreneurial opportunities. Shane found that prior knowledge of a particular market increased the likelihood of discovering an opportunity in that market.

Minniti (2004: 637) argues that entrepreneurial decisions are strategic decisions and as such do not take place in a vacuum. Decisions are contingent on and significantly influenced by their environment. She also postulates that the entrepreneur's combination of decisions and choices creates something that was not there before. Minniti (2004: 641) quotes Kirzner (1973, 1979), who argues that when an entrepreneur's alertness produces a discovery, the entrepreneur learns more about the opportunity and in the process of acting on the new knowledge keeps on acquiring more information. Markman, Baron & Balkin (2004: 1) also point out that early empirical studies suggest that entrepreneurs spend significantly more time searching for information than do executives (Kaish & Gilad, 1991).

This study deals specifically with the decision to start or not to start a proposed venture, as set out in the case study (see Appendix A). The role of cognition in entrepreneurial decision-making is of relevance in order to determine how the decision to start was influenced by cognitive processes. This section deals with the decision to start and specific cognitive processes that may be of relevance.

#### 4.3.3.1 Cognition and the entrepreneurial decision to exploit

As already discussed in Chapter 3, cognition (mental models) and cognitive psychology concern themselves with the study of individual perception, memory and thinking (Mitchell et al, 2002: 96). According to Pretorius et al (2004: 4), they involve all processes by which sensory input is transformed, reduced, elaborated, stored, recovered and used. As stated before, social cognition theory considers that individuals exist within a total situation or configuration of forces described by two pairs of factors, one being cognition and motivation and the other being the person in the situation.

Cognition has to do with the mental processing used by individuals to interact with their environment and is relevant to the distinction between entrepreneurs and non-entrepreneurs. Mitchell et al (2002: 97) argue that entrepreneurial cognition relates to the knowledge structures that people use to make assessments, judgements or decisions involving opportunity evaluation, venture creation and growth. Pretorius et al (2004: 5) postulate that research in entrepreneurial cognition is about understanding how entrepreneurs use simplifying mental models to piece together previously unconnected information that helps them to identify and invent new products or services, and to assemble the necessary resources to start and grow businesses as well as pursuing opportunities (or not).

Figure 4.4 shows a model for information processing suggested by Miller (1987) as quoted by Allison & Hayes (1994). Perception (pattern recognition and attention) and thought (inductive reasoning as seen in classification, analytical reasoning and judgement) can influence the final response of the individual (Pretorius et al, 2004: 5). Permanent memory further plays a moderating role in both perception and thought with regard to such aspects as feeling, angle, background, experience and culture, which is defined as the collective mental knowledge of groups (Mitchell, Smith, Morse, Seawright, Perero & McKenzie, 2004: 13).

Pretorius et al (2004: 5) quote Baron (1998: 297) as suggesting that entrepreneurs are more exposed to factors such as information overload, high uncertainty, high novelty, strong emotions, time pressure and fatigue than non-entrepreneurs. This leads them to being increasingly susceptible to the use of heuristics and biases such as counterfactual thinking, regret affect infusion, self-serving bias, planning fallacy and self-justification in their decision-making.

The decision to use a case study in order to lead up to the question of the decision to start or not to start a venture was suggested by the information-processing model of Allison & Hayes (1994) (see Figure 4.4). The role of risk perception, self-efficacy, misconceptions and illusion of control bias in decision making are further explored.

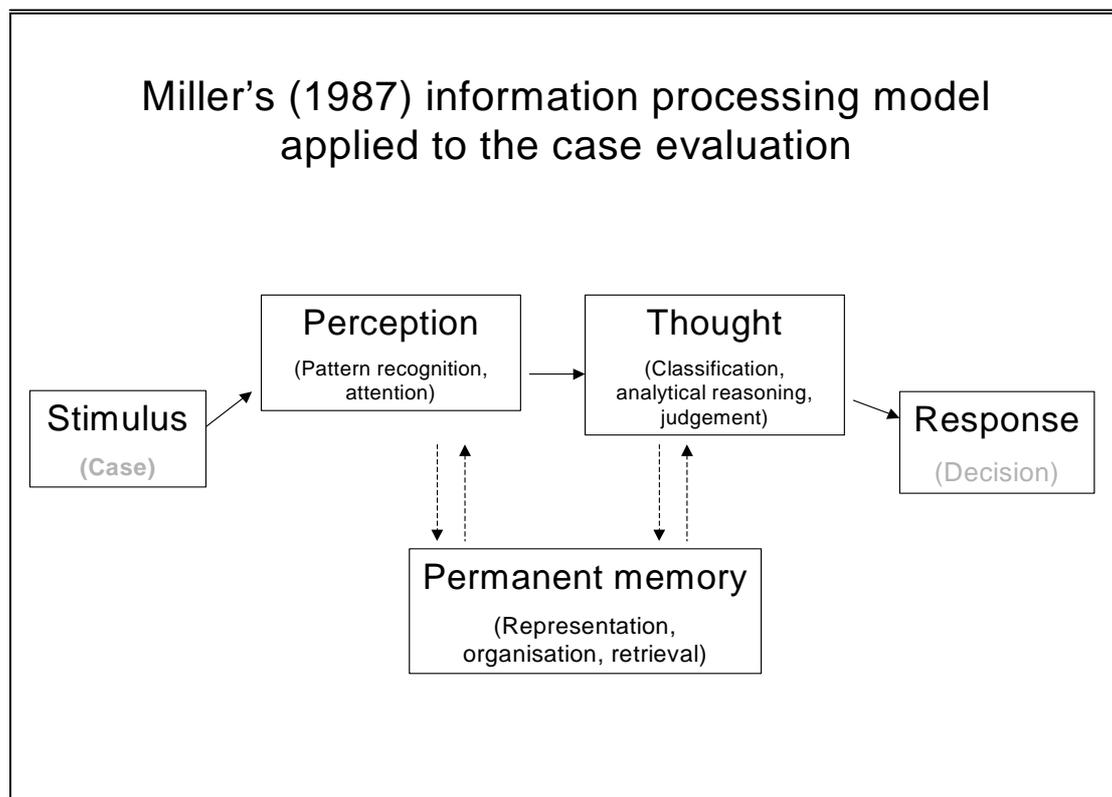


Figure 4.4 Information processing model (Miller 1987) as quoted by Allison & Hayes (1994) with additions to explain the role of this study (Pretorius et al, 2004: 5).

#### Entrepreneurial Application

Entrepreneur's function in an environment with a high information overload due to the many decisions regarding product, service, markets, competition and many other start-up related issues they need to take. Using cognitive processes and models helps the entrepreneur to deal with the information overload more effectively, resulting in the ability to speed up the decision-making process.

This may, however, lead to decision errors due to the short cuts taken to avoid dealing with the all information at hand.

#### 4.3.3.2 Risk perception and making the decision to exploit

The question is often asked what effect cognitive biases have on an entrepreneur's risk perception. Risk perception refers to the subjective judgement of the amount of risk inherent in a situation and has been found to differ between entrepreneurs and non-entrepreneurs (Keh et al, 2002: 19). According to Baron (2004: 237), reduced risk perception is the reason why some people but not others become entrepreneurs.

Risk perception is also influenced by cognitive biases. According to Simon et al (1999: 113), before the decision to exploit a venture opportunity is taken, risk perception may differ because certain types of cognitive biases lead individuals to perceive less or more risk. Pretorius et al (2004: 6) remind us that cognitive biases are common mental short cuts used to make judgements and that these judgements are at the heart of the decision-making process.

#### Entrepreneurial Application

The risk perception of entrepreneurs seems to be influenced by their cognitive biases. This may lead to a lower risk perception, resulting in a decision to start

the venture. Simon et al (1999: 125) found in their study that individuals who perceive lower levels of risk were more likely to form a venture.

Cognitive biases are seen to be at the heart of the decision-making process, resulting in entrepreneurs making judgements about the risk more easily.

#### 4.3.3.3 Misconceptions and making the decision to exploit

Cognitive biases seem to reduce uncertainty and improve decision-making speed, but may lead to context-specific misconceptions. As discussed in Chapter 3, the following misconceptions often lead entrepreneurs to ineffective decision-making regarding the decision to start or not to start a new venture creation (based on the work of Clouse, 1990: 45):

- Underestimating competitive response
- Overestimating market demand
- Overestimating long-term profit
- Misjudging asset requirements
- Overestimating short term cash-flow requirements
- Misjudging the managerial fit (jockey and horse metaphor).

Gaining insight into these and other potential misconceptions that might arise may help entrepreneurs cope more effectively with problems, leading to a scenario where better and more informed decisions take the place of over-quick decisions.

#### Entrepreneurial Application

As already stated, cognitive biases may reduce uncertainty and improve decision-making speed. This, however, may lead to ineffective decision-making (based on incomplete information), which may result in context-specific misconceptions regarding the decision to start or not start the venture. Simon & Houghton (2002:

117) argue that people use an information lens, which suggest that the entrepreneurs' information context and information search process contribute to cognitive biases, which lead to context specific misperceptions that in turn generates the decision to start.

It is therefore important that entrepreneurs be aware of these misconceptions in order to allow for better and more informed decision-making.

#### 4.3.3.4 Self-efficacy and making the decision to exploit

As discussed in Chapter 3, self-efficacy is defined as the belief in one's own ability to accomplish something. In social cognitive theory, a sense of personal efficacy is presented as proportional beliefs that are embedded in a network of functional relationships with other factors that operate together in the management of different realities (Bandura 1997: 3).

High self-efficacy leads to increased initiative and persistence and thus improved performance. Indeed people with high self-efficacy think differently and behave differently from people with low self-efficacy (Pretorius et al, 2004: 7). Kuratko & Welsch (2001: 172) also suggest that perceptions of competence strongly influence our perceptions of whether a situation is controllable. Perception of self-efficacy is a substantial antecedent of perceived opportunity (Krueger & Dickson, 1994 as quoted by Urban 2004 : 21). If we see ourselves as competent we are more likely to see a course of action as feasible which may more probably result in seizing the opportunity.

#### Entrepreneurial Application

Entrepreneurs perceive themselves as competent and able to control the situation. This perception of self-worth may lead to the decision to start the

venture even when it is a poor opportunity.

Individuals that perceive themselves as entrepreneurial capable are expected to be alert and sensitive to opportunities and be able to take advantage of such opportunities if worthwhile. According to Krueger (2000: 6) “we do not find opportunities, we construct them. Opportunities are in the eye of the beholder; this tells us that perceptions are critical (as quoted by Urban, 2004: 21).

#### 4.3.3.5 Illusion of control bias and decision-making

Illusion of control is a bias in which an individual overemphasises the extent to which his or her skills can increase performance in situations where chance plays a larger role and skill is not necessarily the deciding factor. Two reasons are reported for this illusion of control:

- People are motivated to control their environment and the feeling of competence will result from being able to control the uncontrollable.
- Skill and chance factors are closely associated and it is often hard to discriminate between them.

As mentioned in Chapter 3, illusion of control is different from overconfidence, which refers to an overestimation of one's certainty regarding one's meta-knowledge instead of one's skills or ability to cope with and predict future events (Russo & Shoemaker, 1992, reported by Keh et al (2002: 131). Entrepreneurs show an unusually strong preference for exerting control over their outcomes because they believe they can exert control over people and events (Pretorius et al, 2004: 8), resulting in a lower risk perception and positive evaluation of the opportunity, leading to the decision to start the new venture. According to Keh et al (2002: 131), the overall result of illusion of control is that individuals may underestimate risk because they believe their skills can prevent negative occurrences.

### Entrepreneurial Application

The entrepreneur's illusion of control biases may lead to the belief that the individual can control the outcome of a situation. The decision to start is then based on the entrepreneur's belief that he himself is the reason why the start-up will be successful.

The belief in their own ability may lead entrepreneurs to an underestimation of the risks involved. Entrepreneurs are prepared to take the chance based on their desire to control the environment, as well as their perceived skills. It may, however, be difficult for them to discriminate between skill and chance, which may lead to a "rosier" view of the possibility for venture success. As mentioned above Keh et al (2002: 131) argue that individuals exhibiting an illusion of control will underestimate risk because they believe their skills can prevent negative occurrence.

The decision of whether or not to initiate a venture is central to the understanding of entrepreneurial activity. Although different authors discuss new venture creation from various perspectives, decision-making is an important part of each author's conceptualisation. Clouse (1990: 45) quotes Timmons (1985), who argues that when an entrepreneur is faced with a constant flow of opportunities, the decision on whether to focus on an opportunity or to say no to it is critical.

Clouse (1990: 46) points out that authors offer a variety of criteria to consider in decision-making when starting a new venture. The four most important aspects of a new venture decision are as follows:

- Market-related aspects, in order to determine the market potential of the product or service offered and the competitive response
- Financial decisions, in order to manage cash flow and a profit and loss orientation

- Decisions regarding resources needed
- A good fit between the skills and abilities of the entrepreneur or the entrepreneurial team

These aspects of decision-making correlate with the typical misconceptions discussed in Chapter 3.

Simon & Houghton (2002: 116) have explored how the context of the decision gives rise to particular biases and how those biases may give rise to context-specific misconceptions and subsequent action. They also looked at the decision context of a pioneering product introduction, and how that context may affect the ultimate decision whether or not to introduce a pioneering product (Simon et al, 2002: 116).

In the context of entrepreneurial decision-making we can distinguish three steps (Simon & Houghton, 2002: 107):

- The first stage of information processing highlights the need for entrepreneurs to **search** for information
- In the second stage, this information must **be interpreted, or encoded** to be meaningful to the entrepreneur before the entrepreneur can make a decision.
- In the third place **to make a judgement** about going forward with a specific idea or not

This entire decision-making process is constrained in many ways:

- Individuals have limited resources and cannot gather and interpret all the information available
- The information processing occurs in a specific information context that affects how the information is acquired and what sources of information are used. Two broad categories are the firm's characteristics and the specific decision under consideration

- Thinking preferences impact on the selection of information and the use thereof

If we look at the type of information embodied in firm's characteristics we see information such as organisational age and size. New firms are seen as firms between the ages of conception and eight years. As the venture progresses through the different stages, it encounters different problems. The age of the firm thus has a great effect on decision-making (Simon & Houghton, 2002: 108).

The decision context may also influence the information search process. The two possible options for investigation are a pioneering action (being first in the market) or introducing mainstream products. According to Simon & Houghton (2002: 108), information processing that results in misconceptions may be more problematic for entrepreneurs who pioneer. They quote Zacharakis & Shepherd (2001), who postulate that when entrepreneurs are surrounded by unfamiliar tasks, greater bias is likely to arise due to the fact that there is often very little relevant information or the information available is not applicable.

As mentioned by Mitchell et al, (2002: 10), cognitions are structured in the minds of individuals and these knowledge structures act as scripts (patterns) that are the antecedents of decision-making. Individuals draw upon them when making decisions, which may result in information-processing errors. They do, however, help to increase the speed of decision-making.

#### **4.4 Activities (Engaging in the exploitation activities)**

According to Brockner et al (2004: 207), many laypersons equate entrepreneurship with the act of creating or inventing an idea or concept that proves to satisfy the needs of multiple stakeholders. Alexander Graham Bell, Henry Ford and Bill Gates helped to create products that have changed the lifestyle of people across the world. While idea generation is an important (early) step in the entrepreneurial process, it is by no means the only one. Thomas Edison, creator of the light bulb, once said that success is "one percent inspiration and 99 percent perspiration" This statement suggests that once the idea is

generated it only has the potential to be successful. The further step, namely the activity (or perspiration), will determine how well the entrepreneur can complete the entrepreneurial process.

Thus, the definition of entrepreneurial activity encompasses more than launching of a new business organisation. Existing organisations, in an attempt to maintain competitive advantage, are trying to develop innovative products and processes. Some scholars (McGrath & MacMillan, 2000) argue that the entrepreneurship mindset is the new paradigm for strategic thinking (Brockner et al, 2004: 205).

Gatewood et al (1995: 372) argue that creating a business is a process fraught with difficulty and failure. They also postulate that the cognitive orientation or ways of thinking of potential entrepreneurs would have a significant influence on their willingness to persist in entrepreneurial activities in the face of these difficulties. According to them entrepreneurs who believe they can control the environment through their actions will be more likely to persist in entrepreneurial activities when they encounter difficulties in the start-up process. They also suggest that how entrepreneurs think about themselves (self-efficacy) and their situation (illusion of control, misconceptions) will influence their willingness to persist towards the achievement of their goal. An entrepreneur's persistence influences two aspects of starting a business:

- The activities undertaken to start a business
- Success at starting a business

According to Gatewood et al (1995: 373), one can, in general, assume that the more time and effort devoted toward accomplishing a task, the more likely it is that the achievement of this task will occur.

Although creating a business is fraught with difficulties and the starting of the venture requires self-efficacy and illusion of control, the important next step in the process is to actually move into the start-up mode. Brockner et al (2004: 207) point out that whether the idea is realised depends upon how well entrepreneurs complete the next steps in the process: that is where the activity or "perspiration"

of which Edison spoke becomes relevant. More specifically, once an idea with potential is spawned, it needs to be screened or reality tested and several hard questions should be asked in order to be able to complete the start-up process successfully. The following questions are of relevance:

- Is there a market for the product / service?
- Will we be able to deliver?
- What is the competitive advantage?
- What are the risks associated with the venture and how can we manage it best?

If the screening process indicates that the entrepreneur can proceed, the next activity is resource procurement (financial, technological and human), followed by a business model (including a prototype) to prove the idea viable. The last phase, sometimes called the roll-out phase, consists of a larger commitment to the production process.

Ardichvili et al (2003: 106) also argue that entrepreneurs identify business opportunities to create and deliver value for stakeholders in prospective ventures. While elements of opportunities may be “recognised”, opportunities are made, not found, which implies activity. They postulate that careful investigation of and sensitivity to market needs as well as an ability to spot suboptimal deployment of resources may help an entrepreneur to begin to develop an opportunity, which may or may not result in a business. Opportunity development, according to them, involves entrepreneurs’ creative work. They also argue that the focus should be on opportunity development (activity) rather than on opportunity recognition, because the need or resource recognition or perception cannot become a viable business without the development thereof.

Ardichvili et al (2003: 106) also argue that the development process begins when entrepreneurial alertness exceeds a threshold level. The reason for the alertness may be the coincidence of several factors such as personality traits, prior knowledge and experience, as well as social networks. The particular activities

within the process are also affected by specific knowledge about market needs and resources.

The entrepreneurial process as discussed in this chapter is the result of the action taken by the entrepreneur. The model as presented by Shook et al (2003: 381) was used as a basis for discussing the entrepreneurial process. The success of the entrepreneurial process, according to Brockner et al (2003: 204), relies on a combination of beliefs and behaviours. They suggest that two types of foci are necessary for the entrepreneurial process to be successful: a promotion focus and a prevention focus. Both these foci are part of a regulatory focus theory that attempts to shed light on the entrepreneurial process. The prevention focus is concerned with security, safety and responsibility, while the promotion focus is concerned with advancement, growth and accomplishment of the venture. Both foci are a function of the situation as well as the person.

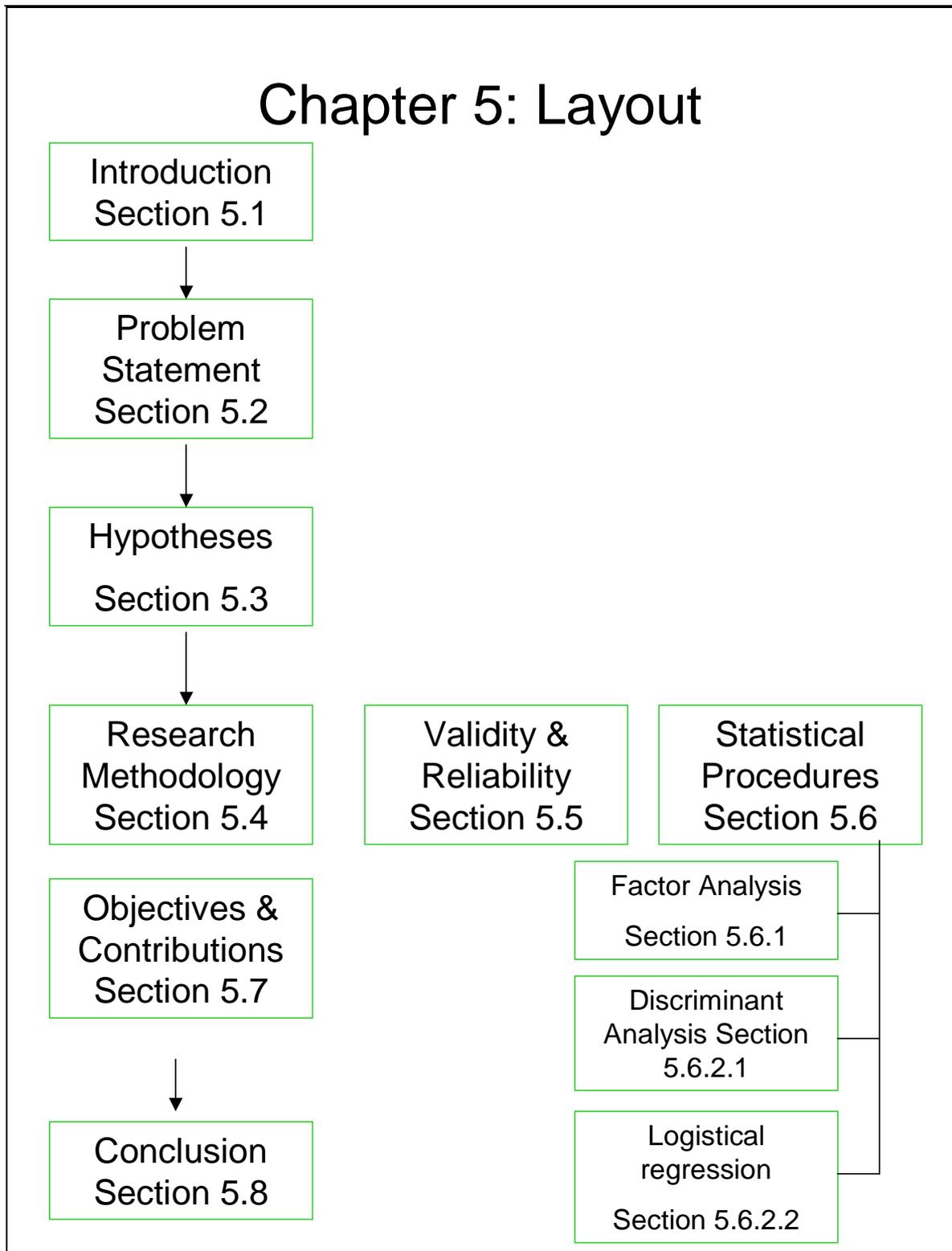
#### **4.5 Conclusion**

From this chapter it is evident that certain elements are required for an entrepreneurial venture to be successfully brought about. The identification of the opportunity, the gathering of resources and the decisions taken regarding the potential of the venture, its viability and long-term sustainability, are all important factors to be taken into account. Opportunities are per definition time-limited, and taking all aspects mentioned into account may help the entrepreneur to successfully start and grow the business. The entrepreneurial process was used to provide a framework for understanding the process.

It also becomes clear that cognitive processes are part and parcel of the entrepreneur's perception and thinking and form the backbone of entrepreneurial decision-making.

The literature review being concluded, the next chapter (5) discusses the methodology applied to the empirical part of the study.

## Chapter 5: Research Methodology



## 5.1 Introduction

*“A plan well defined is half solved”*

(Churchill, 1996:80)

As discussed in the literature section of the study, the major investigation evolves round the entrepreneurial process, dealing specifically with the decision whether or not to start a venture opportunity. An attempt is made to determine whether any of the constructs under discussion acts as a heuristic or bias and therefore influences the decision to exploit the opportunity.

The aim of this chapter is to explain the research process followed in the empirical part of the study. The elements of the research process are discussed below.

## 5.2 Problem Statement

The definition of the problem to be researched is, according to the AMA (the American Marketing Association), the most important step in any research project (Martin, Loubcher & van Wyk, 1996: 82). Trochim (1997) also mentions the problem definition as one of the most difficult and least discussed aspects of research.

The problem to be addressed in this study is:

- To clarify the potential impact of thinking preferences, heuristics and biases, specifically the illusion of control bias, self-efficacy, misconceptions and risk perception (independent variables) on the decision to exploit a business opportunity (dependent variable)

The following specific constructs are investigated:

- Thinking or information preferences as determined by HBDI

- Illusion of control bias
- Misconceptions – the following concepts were included under misconceptions associated with the decision to start:
  - Overestimation of long-term profit
  - Underestimation of competitive response
  - Managerial fit
  - Overestimation of short-term cash flow
  - Misjudgement of asset requirements
  - Overestimation of demand
- Business risk perception
- Self efficacy effect

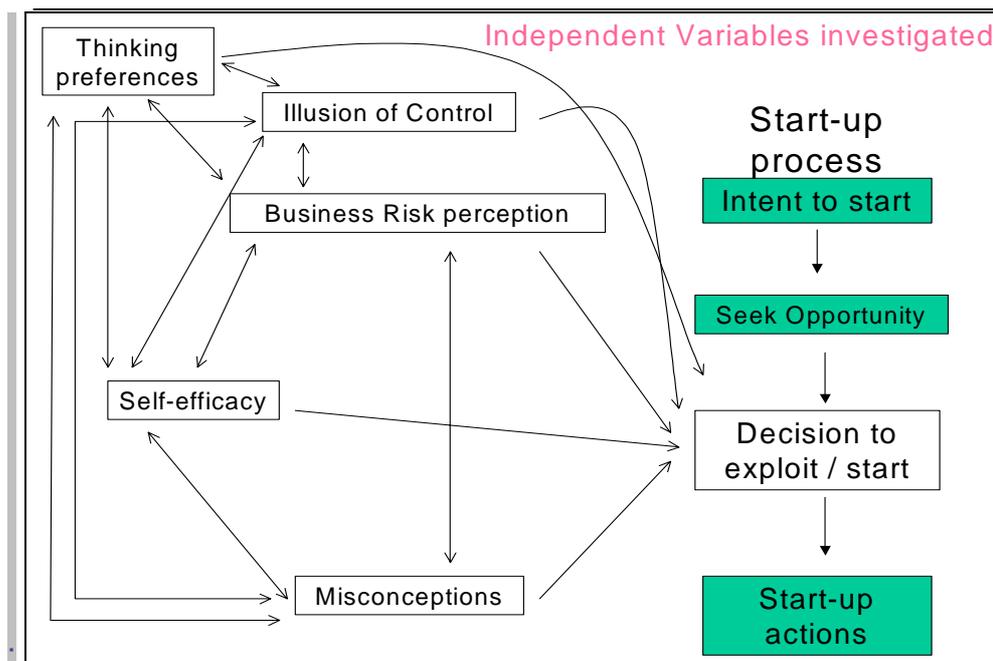


Figure 5.1 Independent variables investigated

### 5.3 Hypothesis

When a proposition is formulated as a statement for empirical testing, it is referred to as a hypothesis. According to Terre Blanche & Durrheim (2002: 117), Cooper & Schindler (1998: 43), and Sekaran (1992: 72), hypotheses are educated guesses about a problem's solution, or expectations about groups in a population expressed in empirical testing. A hypothesis is of a tentative and conjectural nature. Hypotheses serve several important functions. They provide a framework for working within certain boundaries / limits and also give direction to the study.

The null hypothesis ( $H_0$ ) indicates that there are no differences between groups or no relationship between measured variables. The alternative hypothesis ( $H_a$ ) indicates a difference or relationship between measured variables.

The following hypotheses were stated for this study:

- H1o Business risk perception does not influence the decision to exploit a venture opportunity.
- H1a Business risk perception influences the decision to exploit a venture opportunity.
  
- H2o Misconceptions do not influence the decision to exploit a venture opportunity
- H2a Misconceptions influence the decision to exploit a venture opportunity.
  
- H3o Illusion of control does not influence the decision to exploit a venture opportunity.
- H3a Illusion of control influences the decision to exploit a venture opportunity.

H4o Self-efficacy does not influence the decision to exploit a venture opportunity.

H4a Self-efficacy influences the decision to exploit a venture opportunity.

H5o Information preferences as determined by HBDI do not influence the decision to exploit a venture opportunity.

H5a Information preferences as determined by HBDI influence the decision to exploit a venture opportunity.

## **5.4 Research Methodology**

The term methodology refers to the system of methods and principles used in a particular discipline (*Collins Dictionary*, 1995). If the definition is applied to this specific study it refers to the methodology and principles used in the research.

While methodology is also concerned with how we come to know, it is much more practical in nature and refers to the specific ways or the methods that we can use to better understand our world. According to Trochim (1997), epistemology and methodology are intimately related: the former involves the philosophy of how we come to know the world and the latter involves the practice.

The aim of this section is to provide an insight into the practical ways and methods that were used in gathering the information necessary for the empirical part of this study. The universe and sample frame will be discussed, as well as the sample method and size. The method of data collection and questionnaire design will be described, while the last part of the chapter will deal with the data processing, analysis and evaluation of results.

### **5.4.1 Data required**

- The population (universe)

Defining the universe or relevant population is the first and very critical step in the sampling process and indicates the total collection of all elements about which inference is to be made. The universe or population in this study is typical entrepreneurs that face a decision to start or not to start a venture. The sample therefore includes students, managers and entrepreneurs that may face such a decision. Respondents with an HBDI profile were a prerequisite for research of hypothesis 5 (information preferences). However, the availability of respondents with an HBDI profile was a limiting factor, owing to the cost of an assessment.

- The sample frame

Once the population is defined, the next step is to obtain a frame of the sample (Sudman & Blair, 1998: 338; Cooper & Schindler 2001: 163). The sampling frame is closely related to the population and is a list of elements from which the sample is actually drawn.

Approximately 305 questionnaires were distributed to the following selected sample of respondents:

- B Com students majoring in Entrepreneurship
- B Com students not majoring in Entrepreneurship but with a business focus
- Students from Humanities majors (non business focus)
- M Phil Entrepreneurship and PhD students
- Managers at creativity and thinking preference training sessions
- Practising entrepreneurs (selected randomly in the Johannesburg / Pretoria area).

The respondents have completed HBDI profiles (see Appendix C). Therefore the study makes use of convenience sampling.

#### 5.4.2 Data collection methods

There is no simple answer to which of the available methods of data collection the researcher should use when collecting primary data. It all depends on the purpose and nature of its use (Blankenship & Breen, 1993: 122).

A decision was taken to base the questionnaire on a case study (Appendix A), to eliminate previous industry experience that might influence the respondents' decision to start in one way or another. The case study deals with the animal-feed industry; a business opportunity is introduced for using cut grass from lawns to be turned into animal fodder. This is not a well-known industry to many people. No business-specific industries with which the respondents might be familiar could therefore play a part.

Mitchell et al (2002: 113) postulate that the entrepreneur's conclusion would be somewhat influenced by the fact that his or her venture shared relevant characteristics with other new ventures. They also argue that using personal sources of information may generate rich and detailed information about a given subject. The case-study content used in this study is therefore ideally chosen in this regard, because no such example exists in the market, and respondents would not have personal experience of such a venture to influence their decisions.

The case study introduces a business opportunity for using cut grass from lawns to be turned into animal fodder. Information was selected to cover different thinking preferences, misconceptions, self-efficacy, heuristics and biases as well as the respondents' risk perception, in an attempt to determine whether these have an influence on the entrepreneur's decision to start a business. The respondents made a decision on the viability or otherwise of the opportunity, whether to sell the concept or start the business or definitely not start the business. The respondents also needed to indicate at what stage of reading through the case they made the decision to start or not start the venture.

The case study was followed by an eight-page questionnaire (Appendix B) that was developed with structured questions to be completed by the respondents.

- Questionnaire design

The first step was to develop a questionnaire with structured questions to cover all constructs involved, namely:

- Misconceptions
- Business risk perception
- Illusion of control
- Self-efficacy
- HBDI thinking profiles–part of sample selection

The questions for self-efficacy were obtained from Markman, Baron & Balkin (2003: 103).

- Rating scale

A standard 7-point Likert scale (Cooper & Schindler 2001: 240) was used, in which 7 is good and 1 is poor.

- Testing of questionnaire

According to Sudman & Blair (1998: 300), there is always a chance that some questions could cause problems and questionnaire testing is needed to identify and eliminate these problems.

To identify and eliminate such problems, the questionnaire (in the pilot phase) was given to knowledgeable respondents in the field for testing. The questionnaire was then adapted and some unclear statements were changed or replaced.

The questionnaire consisted of positive and negative questions in order to ensure that no underlying weakness existed and to eliminate pattern forming on the part of respondents while completing the questionnaire.

- Data processing, basic analysis and evaluation of results

The case study and questionnaire were handed out in class (for students and trainees) to create a controlled environment. An hour was allowed for reading the questionnaire and answering the questions. The reason for the controlled environment was to create a “pressure situation” to ensure the respondents made use of their first thinking impressions to decide whether to start or not to start the proposed opportunity.

The entrepreneurs were grouped or dealt with individually.

The responses were captured directly from the questionnaire by data processors and imported into the SAS software package at the Department of Statistics at the University of Pretoria. Some basic calculations were made to check the reliability of the data.

The final analysis and cross-tabulations were then made.

- Response rate

The number of questionnaires handed out was 305, of which 300 could be used. One was defaulted and 4 entrepreneurs did not complete the questionnaire. The response rate obtained was 98,7%.

- Editing and coding

According to Martins et al (1996), “editing entails a thorough and critical examination of a completed questionnaire in terms of compliance with the criteria for collecting meaningful data and in order to deal with questionnaires not duly completed”. All questionnaires, once received, were edited and checked for

completeness and accuracy. After questionnaires with missing and incomplete data had been discarded, 300 workable questionnaires were obtained.

Coding refers to the process whereby codes are assigned to the answers of respondents (Martin et al, 1996: 299). A coding frame was drawn up according to which every answer was coded in order to simplify the data capturing.

- Data transformations

Once the data has been entered it is almost always necessary to transform the raw data into variables that are usable in the analysis (Trochim 1997). The following transformations were performed in this study:

- Reversal items

Were used in the questionnaire in some instances to help reduce the possibility of a response set. In order for all scores for scale items to be in the same direction, the ratings were reversed for the specific items.

## **5.5 Validity and Reliability**

According to Durrheim & Terre Blanche (2002: 83); Schindler & Cooper (2001: 210) and Des Vos, Strydom, Fouche & Delport (2002: 166), many forms of validity exist. The two major ones are external validity and internal validity. The ensuring of validity and reliability is a prerequisite for research data in order to circumvent possible shortcomings and pitfalls in research results (Ehlers 2000: 136). Each will be explored separately.

### **5.5.1 Validity**

- Internal validity refers to the extent to which a test measures what it is intended to measure.

- External validity refers to the extent of generalisability of the results of a study across persons, settings or events.

### **5.5.2 Reliability**

- In most contexts the notion of consistency emerges. Reliability is a necessary contributor to validity, but is not a sufficient condition for validity (Cooper & Schindler, 2001: 215). In other words, high reliability does not guarantee validity (Des Vos et al, 2002: 168).
- Reliability is concerned with estimates of the degree to which a measurement is free of random or unstable error.
- One of the most commonly used measures of reliability is the Cronbach alpha coefficient (Bagozzi 1994: 18), which provides a measure of internal consistency.

## **5.6 Statistical Analysis**

The primary purpose of collecting data in any research is to answer questions. To be able to fulfil this obligation, data needs to be analysed and interpreted, in other words explained and given meaning.

In quantitative research, data analysis is normally used to refer to the process of breaking down collected data into constituent parts in order to obtain answers to research questions. According to Des Vos et al (2002: 223), data analysis involves the process of reducing data into intelligible and interpretable form so that the relations of research problems can be studied, tested and conclusions drawn. Data can be presented as descriptive statistics and inferential statistics.

Descriptive statistics is the method used to describe characteristics of a population or a sample. It therefore aims at describing data by investigating the distribution of scores for each variable and by determining whether the scores on

different variables are related to each other (Terre Blanche & Durrheim, 2002: 101). In other words, descriptive analysis allows the researcher to represent data in a manner that is easily interpretable. Frequency tables using percentages were used to display demographic data (see Tables 6.1–6.6).

Inferential (confirmatory) statistics was the method used to draw conclusions about the population itself. In other words, while the descriptive analysis allows the researcher to generalise from the sample to the population, inferential analysis allows the researcher to draw conclusions about the population on the basis of data obtained from samples (Terre Blanche & Durrheim, 2002: 117).

Based on the distribution of the descriptive statistics obtained from the study that showed a normal distribution, parametric analytic techniques were used to perform the inferential analysis. These included factor analysis, item analysis, ANOVA and discriminant analysis.

### **5.6.1 Factor Analysis**

The term “factor analysis” was first introduced by Thurstone (1931) and is a generic name for a group of multivariate statistical methods whose primary purpose is to define the underlying structures of a set of variables and to reduce a set of variables, measures and items to a smaller set of common factors (Hair, Anderson, Tatham & Black, 1995: 366). It examines the relationship of each of a large series of variables to every other one, to determine which are highly correlated with others. The process ends with a reduced number or packages of variables (Blankenship & Breen, 1993: 266).

The main application of factor analysis techniques is, firstly, to reduce the number of variables and, secondly, to detect structure in the relationship between variables: that is, to classify variables. Therefore, factor analysis is applied as a data reduction or structure detection method. The most common market research application is principal component analysis (Sudman & Blair, 1998: 557), which is explained briefly.

The extraction of principal components amounts to a variance maximising (varimax) rotation of the original variable space. For example, in a scatterplot one can think of the regression line as the original x-axis rotated so that it approximates to the regression line. This type of rotation is called variance (variability) of the new variables (factor), while minimising the variance around the new variable (Statsoft, 1997).

According to Sudman & Blair (1998: 548), the key descriptive results obtained from a factor analysis are the eigenvalues and factor loadings, while in some instances factor scores are calculated.

When a satisfactory factor solution has been derived, some meaning is assigned to each factor, which involves substantive interpretation of the pattern of factor loading for the variables (Hair et al, 1995: 397). While all significant factor loadings are usually used in the interpretation process, it is suggested that, as a rule of thumb, one should ignore variables with loadings less than 0.50.

According to Sudman & Blair (1998: 549), the overall factor analysis can generally be considered effective if the total variance explained by the selected factors exceeds 70%. If this is not the case, it should be noted in the report.

The factor analysis done in this study determined the following factors:

- Business risk perception
- Illusion of control
- Misconceptions
- Self-efficacy
- Information used as determined by the HBDI quadrant scores

These factors are discussed in Chapter 6.

## 5.6.2 Statistical Modelling

Two statistical models were fitted to the data in order to make a prediction of the decision to start. The fitted models were:

- A linear discriminant model to predict the respondents who would start or not start the venture based on business risk perception and misconceptions
- A logistical regression model in order to predict the probability of respondents who would start or not start the venture based on the business risk perception and misconceptions

### 5.6.2.1 Logistical regression approach

A logistical regression approach is typically used to model a binary outcome variable (Start / Do not start). The following regression function was used:

$$\text{With } P(\text{Start}) = \frac{1}{1 + e^{-(\beta_1 + \beta_2 X_2 + \beta_3 X_3)}},$$

with

$\beta_1, \beta_2, \text{ and } \beta_3$  regression parameters measuring the impact of the explanatory variables on the probability of starting the business

$X_2$ , a measurement of the **misconception** construct

$X_3$ , a measurement of the **risk** construct

The estimated model is:

$$\hat{P}(\text{Start}) = \frac{1}{1 + e^{-(2.413 + 0.956 X_2 - 1.094 X_3)}} \quad (\text{p-value} < 0.0001),$$

yielding a classification table as discussed in Chapter 6.

#### 5.6.2.2 Discriminant analysis

Discriminant analysis can be defined as a statistical technique for predicting the probability that an object will belong in one of two or more mutually exclusive categories (dependent variable) based on several independent variables.

Discriminant analysis in this study was performed to determine how well the determined factors (misconception and risk) could predict the decision to start the business. Self-efficacy and illusion of control did not contribute to the calculated function.

A discriminant analysis models the outcome variable (Start / Do not start) by estimating a linear discriminant function. The estimated discriminant function is then used for classification purposes. The following discriminant function was estimated:

$D = -1.688 - 0.920X_2 + 1.304X_3$ , where positive values will classify an individual case in the Do not start group, and negative values will classify the individual in the Start group.

### **5.7 Objectives, outcomes and contributions of the research**

#### 5.7.1 Objectives and outcomes of the study

The primary objective of the study endeavours to investigate whether and how the decision to pursue a business opportunity is influenced by factors from the entrepreneurial cognition domain. Many authors (Mitchell, Shepherd, Simon and Houghton, to name only a few) are currently investigating the entrepreneurial cognition domain.

The major objective leads to the following secondary objectives:

- To contribute to the body of knowledge regarding the entrepreneurial cognition domain
- To investigate factors influencing the decision to start a new venture opportunity
- To develop an understanding of the specific factors contributing to the decision to start a new venture opportunity

The primary outcomes of this study are to establish strengths of relationships between (see Figure 5.1):

- Decision to exploit / start the new venture opportunity and
- Business risk perception
- Misconceptions
- Illusion of control
- Self-efficacy
- Information preferences as determined by HBDI.

The secondary outcomes of this study are:

- To determine whether HBDI preferences function as a heuristic
- To determine whether differences exist between the different constructs

### **5.7.2 Contribution of study**

The study attempts to contribute to the following;

- The multidisciplinary view of the entrepreneur and the entrepreneur's role in new venture creation
- Gaining insight into the cognitive processes used by the entrepreneur in making the decision to start a new venture opportunity, based on findings from empirical research conducted
- The cognitive field and the already existing body of knowledge in the entrepreneurial cognition field, and in addition

- To empirically report on the relations that exist between the dependent variable, namely the decision to start, and the many factors that can influence the decision to start

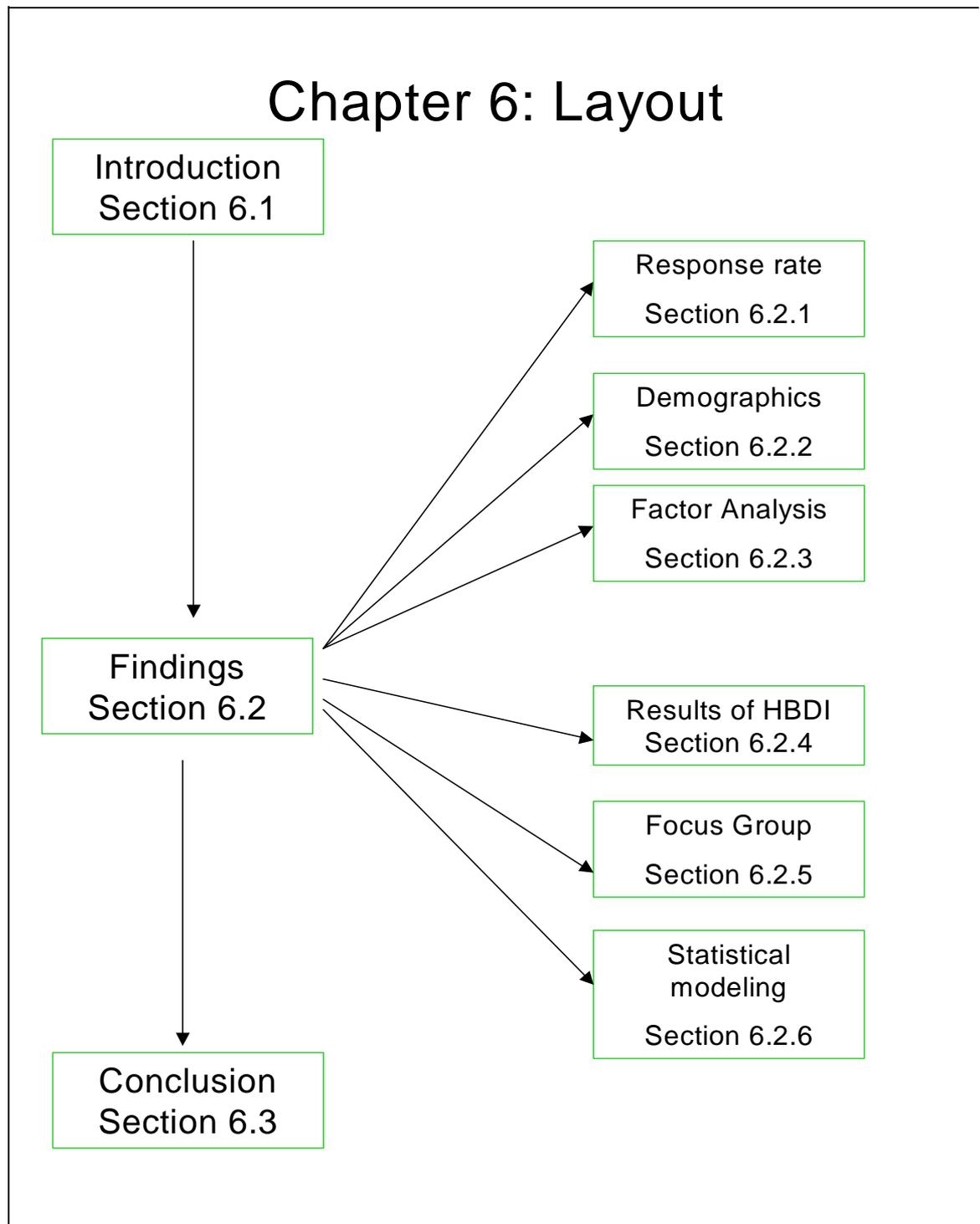
The focus of the study was specifically on the entrepreneurs and the decision to start a new venture opportunity, as well as the cognitive processes used.

## **5.8 Conclusion**

The chapter provided a description of the methodology applied in this study. It began by providing an overview of the research process, research questions, hypotheses and the sampling process. The measuring instruments used were specified and finally the type of data analysis was mentioned.

Chapter 6 will report the results of the empirical investigation.

## Chapter 6: Findings



## 6.1 Introduction

In this Chapter the results of the empirical study are reported. The results of this empirical study are provided in tabular format. The first part of the chapter presents all the demographic data followed by the results of the factor analyses, variance analysis, focus group, discriminant analysis as well as logistical analysis.

## 6.2 Findings

Response rate

Of the 305 questionnaires handed out, 301 were returned with only one invalid questionnaire. The respondents for the other four missing questionnaires, all of them entrepreneurs, decided not to complete the questionnaire due to time constraints. Thus the response rate was 98,7%.

### 6.2.2 Demographics

The demographic results are presented in the tables below:

Table 6.1 Language distribution in the sample

Language	Frequency (n)	Percentage (%)
Afrikaans	166	55.33
English	50	16.67
African	64	21.33
Others (German, Portuguese, Spanish, Greek & French)	20	6.67
Total	300	100

More Afrikaans-speaking students completed the questionnaire, probably due to the fact that the students study at the University of Pretoria, an Afrikaans / English speaking university. The rest of the study was done in the Pretoria area.

Table 6.2 Gender distribution in the sample

Gender	Frequency (n)	Percentage (%)
Male	151	50.33
Female	149	49.67
Total	300	100

An equal distribution of males and female respondents were reported.

Table 6.3 Education background (or work background) distributions in the sample

	Frequency (n)	Percentage (%)
B.Com Business	73	24.33
B. Com Entrepreneurship	29	9.67
Humanity Students	20	6.67
Post Graduate Entrepreneurship	46	15.33
Entrepreneurs in own business	44	14.67
Other (Matric only, Diploma in IT, Engineering)	88	29.33
Total	300	100

The study was done in an Economic faculty and training sessions at private companies. The respondents referred to as “other” either has matric as their highest qualification or a diploma in IT or engineering etc.

Table 6.4 Respondents own evaluation of previous business experience

Business Experience	Frequency (n)	Percentage (%)
No business experience	120	18.33
Previous business experience	179	81.67
Total	299	100
Missing value 1		

The number of respondents reporting previous business experience seems to be high. Many students reported business experience probably based on market days held at schools, part time work experience or knowledge through training. It is doubtful whether they have “real” business experience.

Table 6.5 Desire to start own business in future

Status	Frequency (n)	Percentage (%)
Not interested in business	55	18.33
Want to start own business / already in business	245	81.67
Total	300	100

The category for wanting to start your own business includes those already in business, as the aim of the question was to evaluate the intention for or against starting a business.

Table 6.6 Occupation as indicated by respondents

Groups	Frequency (n)	Percentage (%)
Students	156	52
Entrepreneurs with own business	47	16
Managers	50	1
Employees	46	15
Total	299	100
Frequency missing 1		

Table 6.7 Frequency matrix between 1st viability thought and interest in starting own venture

Frequency Expected Percent Row Pct Col Pct	Not Viable	Viable	Total
Not interested	26 17.903 8.72 47.27 26.80	29 37.097 9.73 52.73 14.43	55  18.46
Want to start	71 79.097 23.83 29.22 73.20	172 163.9 57.72 70.78 85.57	243  81.54
Total	97 32.55	201 67.45	298 100.00
Statistical difference was reported for Chi-Square ( $p < 0.0099$ ) between the expected and reported values.			

Table 6.8 Frequency matrix between the decision to start and the interest in starting own venture

Frequency Expected Percent Row Pct Col Pct	Not Start	Start	Total
Not interested	11 8.0667	44 46.933	55

	3.67 20.00 25.00	14.67 80.00 17.19	18.33
Want to start	33 35.933 11.00 13.47 75.00	172 163.9 57.72 70.78 85.57	245  81.67
Total	44 14.67	256 85.33	300 100.00
No statistical differences were reported between the expected and reported values.			

### 6.2.3 Factor analysis

As mentioned in Chapter 5, factor analysis is used for data reduction and secondly for the detection of structures (underlying dimensions) in a set of variables.

The instrument was designed to measure thinking preferences (HBDI), risk perception, illusion of control, several misconceptions and self-efficacy. Factor analysis of the 300 respondents allowed for content validity using Cronbach alpha.

A confirmatory factor analysis was performed on the final 300 returned questionnaires to test the homogeneity of underlying constructs. This resulted in the identification of four major factors (see Table 6.9) namely:

- Factor 1: Misconceptions
- Factor 2: Business risk perception
- Factor 3: Illusion of control
- Factor 4: Self-efficacy

No factors could be determined for the HBDI preferences. However, the HBDI assessment (Appendix C) has shown through analysis to successfully identify brain quadrant scores (see Chapter 2). These scores were used in further analysis.

Table 6.9 Item analysis for the factors

	Factor 1	Factor 2	Factor 3	Factor 4
N	300	300	300	300
Mean	4.447	3.614	4.403	5.972
Std deviation	1.015	1.080	1.338	0.763
Skewness	-0.306	0.510	- 0.511	-1.016
Mode	4.333	3.375	5 000	6.000
Median	4.458	3.500	4.667	6.125
Canonical correlation	0.966	0.924	0.882	0.858
Cronbach alpha	0.891	0.855	0.753	0. 746
Descriptive name	Misconceptions	Business Risk Perception	Illusion of control bias	Self-efficacy

Table 6.10 Change in Cronbach Alpha Coefficient with any one variable deleted

Factor 1 - Misconception		
Deleted Variable	Correlation with Total	Alpha
The cash flow will mostly be good	0.705	0.876
FE management will be able to handle the challenges they will face	0.650	0.880
FE is well protected from future competition	0.572	0.884
FE will sell all the production easily	0.597	0.882
Cash inflows will be regular	0.544	0.886
Lauricio has the skills to make the venture work	0.617	0.881
FE is able to limit the entry of new competitors	0.508	0.888
It will be easy to convince users to buy this unique product	0.588	0.883
Fe will quickly have enough infra structure set up to reach breakeven point and achieve economy of scale	0.690	0.878
Profitability will improve over time	0.443	0.890
Cash flow amounts will be adequate for the first three years	0.655	0.880
FE has the right people to deliver on this project and succeed	0.636	0.880
Factor 2 – Business Risk Perception		
Deleted Variable	Correlation with Total	Alpha

The probability of FE doing poorly is very high	0.616	0.835
The amount FE could lose by introducing the concept is substantial	0.551	0.843
There is great uncertainty when predicting how well FE will do with the concept introduction	0.496	0.850
The overall riskiness of FE's concept is highV26	0.560	0.842
Overall I would label the option of introducing the concept as a business venture, as something negative	0.594	0.838
I would label introducing the concept as a potential loss	0.683	0.828
Introducing the concept will have negative ramifications for FE's future	0.612	0.836
There is a high probability of FE losing a great deal by introducing the concept	0.676	0.828
Factor 3 – Illusion of control bias		
Deleted Variable	Correlation with Total	Alpha
I can forecast the total demand for the product better	0.575	0.679
I can forecast when the larger competitors will enter the market	0.578	0.674
I can make the business a success even though others may fail	0.591	0.658
Factor 4 – Self-efficacy		
Deleted	Correlation	Alpha

Variable	with Total	
I am strong enough to overcome life's struggles	0.409	0.728
I am at root a weak person	0.510	0.707
I can handle the situations that life brings	0.472	0.721
I am usually an unsuccessful person	0.432	0.723
I often feel there is nothing I can do	0.581	0.690
I feel competent to deal effectively with the real world	0.346	0.738
I often feel I am a failure	0.533	0.701
I usually feel I can handle the typical problems that come up in life.	0.286	0.745

Table 6.11 Spearman's rank correlation between factors and the decision to start the venture

	Factor 1 Misconception	Factor 2 Business risk	Factor 3 Illusion bias	Factor 4 Self-efficacy
Factor 1 Misconception	1.0000			
Factor 2 Business risk	-0.49**	1.0000		
Factor 3 Illusion of control	0.41**	-0.34**	1.0000	
Factor 4 Self-efficacy	-0.06	0.05	0.11	1.0000
Start up decision	0.49**	-0.58**	0.33**	0.09
** = significant at p<01 * = significant at p<05				

To illustrate above relationships, see Figure 6.1

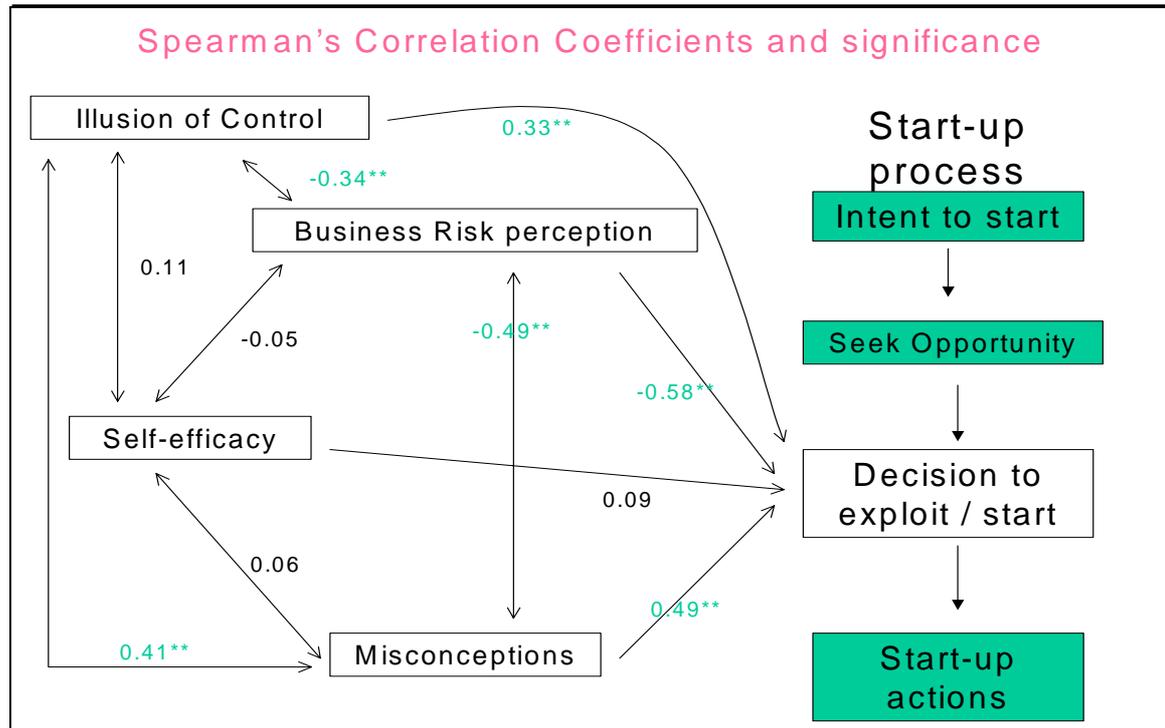


Figure 6.1 Relationships between factors

#### 6.2.4 Analysis of variance for factors

Table 6.12 Analysis of variance for Factor 1 – Misconceptions

Source		Misconception		Significance	
	df	Sum Square	Mean Square	F-value	Pr>F
Model	17	107.900	6.347	9.70	<0.0001
Error	279	182.604	0.654		
Corrected Total	296	290.504			
1 <sup>st</sup> Viability thought	1	15.996	15.996	24.44	<0.0001
Start-up decision	1	14.483	14.483	22.13	<0.0001

Sell decision	1	7.918	7.918	12.00	0.0006
Occupation	3	3.526	1.175	1.80	0.1481
Language	3	14.015	4.672	7.14	0.0001
Gender	1	0.045	0.045	0.07	0.7932
Education	5	0.868	0.374	0.57	0.7224
Previous buss exp	1	1.868	0.094	0.14	0.7054
Want to start	1	0.145	0.145	0.22	0.6378
R <sup>2</sup> = 0.371					

Misconceptions differed for the first viability thought, start-up decision, decision to sell, language but not for the others.

Table 6.13 Analysis of variance for Factor 2 – Business Risk Perception

Source		Business Risk		Significance	
		Sum Square	Mean Square	F-value	Pr>F
Model	17	130.736	7.690	10.04	<0.0001
Error	279	213.679	0.766		
Corrected Total	296	344.415			
1 <sup>st</sup> Variable thought					
1 <sup>st</sup> Variable thought	1	15.088	15.088	19.70	<0.0001
Start-up decision	1	31.148	31.148	40.67	<0.0001
Sell decision	1	10.432	10.432	13.62	0.0003
Occupation	3	1.001	0.334	0.44	0.7275
Language	3	5.495	1.832	2.39	0.0689
Gender	1	2.558	2.558	3.34	0.0687
Education	5	2.991	0.598	0.78	0.5640
Previous buss exp	1	0.923	0.923	1.21	0.2732

Want to start	1	2.143	2.143	2.80	0.0955
$R^2 = 0.380$					

Business risk perception differed for the first viability thought, start-up decision and decision to sell but not for the others.

Table 6.14 Analysis of variance for Factor 3 – Illusion of Control bias

Source		Illusion of control		Significance	
		Sum Square	Mean Square	F-value	Pr>F
Model	17	57.462	3.380	4.03	<0.0001
Error	279	233.747	0.838		
Corrected Total	296	291.200			
$R^2 = 0.197$					
1 <sup>st</sup> Viability thought	1	15.418	15.418	18.40	<0.0001
Start-up decision	1	3.566	3.566	4.26	0.0400
Sell decision	1	0.764	0.764	0.71	0.3403
Occupation	3	3.390	1.130	1.35	0.2598
Language	3	10.909	3.636	4.34	0.0052
Gender	1	1.837	1.837	2.19	0.1398
Education	5	1.151	0.230	0.27	0.9268
Previous buss exp	1	0.054	0.054	0.06	0.8004
Want to start	1	0.434	0.434	0.52	0.4723
$R^2 = 0.197$					

Illusion of control differed for the first viability thought, start-up decision ( $p < 0.05$ ) and language but not for the other variables.

Table 6.15 Analysis of variance for factor 4 – Self-efficacy

Source		Self-efficacy		Significance	
		Sum Square	Mean Square	F-value	Pr>F
Model	17	30.637	1.802	1.91	0.0174
Error	279	263.565	0.945		
Corrected Total	296	294.291			
1 <sup>st</sup> Viability thought	1	0.043	0.043	0.05	0.8310
Start-up decision	1	0.940	0.940	1.00	0.3193
Sell decision	1	2.258	2.258	2.39	0.1233
Occupation	3	3.904	1.301	1.38	0.2500
Language	3	2.456	0.819	0.87	0.4590
Gender	1	0.000	0.000	0.00	0.9905
Education	5	10.191	2.038	2.16	0.0590
Previous buss exp	1	4.696	4.696	4.97	0.0266
Want to start	1	1.722	1.722	1.82	0.1781
R <sup>2</sup> = 0.104					

Self-efficacy differed for previous business experience ( $p < 0.05$ ) but not for any of the other variables.

Variables for which statistical differences were reported are further investigated in the following tables.

Table 6.16 Factor differences between means of respondents with or without previous business experience

Factor 1 - Misconception		
Variable	Mean	Std Dev
Previous business experience	4.531	0.880
No previous business experience	4.378	1.090
Factor 2 – Business Risk Perception		
Variable	Mean	Std Dev
Previous business experience	3.670	0.983
No previous business experience	3.571	1.140
Factor 3 – Illusion of control		
Variable	Mean	Std Dev
Previous business experience	4.350	1.273
No previous business experience	4.218	0.380
Factor 4 – Self-efficacy		
Variable	Mean	Std Dev
Previous business experience	5.788	0.812
No previous business experience	6.094	0.707

No differences between means for the factors of respondents with or without previous business experience were reported.

Table 6.17 Comparison between dependent factor means for those who decided to start the business and those who decided against starting (Multi-way analysis of variance) as well as 1<sup>st</sup> viability thought. Cronbach Alphas for the factors are also indicated.

Factor with	Don't start Mean (Std Dev)	Start Mean (Std Dev)	Statistic	Value	Significance Level
N = 300	N = 43	N = 254	-	-	-
Misconceptions	3.442 (0.865)	4.613 (0.930)	F	22.13	< 0.0001**
Business Risk perception	4.850 (1.180)	3.401 (0.908)	F	40.67	< 0.0001 **
Illusion of control bias	3.566 (1.373)	4.533 (1.281)	F	4.26	0.0400*
Self-efficacy	5.875 (0.901)	5.987 (0.740)	F	1.00	0.319 NS
	1 <sup>st</sup> thought - not viable Mean (Std Dev)	1 <sup>st</sup> thought - viable Mean (Std Dev)			
N = 300	N = 96	N = 201	-	-	-
Misconceptions	3.881 (0.943)	4.707 (0.933)	F	24.44	< 0.0001**
Business Risk perception	4.203 (1.126)	3.328 (0.933)	F	19.70	< 0.0001 **
Illusion of control bias	3.753 (1.452)	4.698 (1.163)	F	18.40	< 0.0001**
Self-efficacy	5.958 (0.708)	5.977 (0.792)	F	0.05	0.831 NS
** = p < 0.01, * = p < 0.05, NS = Not significant					

Table 6.18 The means of factors as determined by educational groups

Factor 1 - Misconception		
Educational Groups	Mean	Std Dev
B Com Business	4.660	0.876
B.Com Entrepreneurship	4.635	0.655
Humanity Students	4.558	0.821
Post Graduate Entrepreneurship	4.553	1.083
Entrepreneurs in own business	3.922	1.222
Other (Matric only, Diploma in IT, Engineering)	4.368	1.026
Although educational groups did not differ significantly, entrepreneurs in own business tended to be much lower on misconception than other groups		
Factor 2 – Business Risk Perception		
Educational Groups	Mean	Std Dev
B Com Business	3.555	1.003
B.Com Entrepreneurship	3.138	0.741
Humanity Students	3.483	0.597
Post Graduate Entrepreneurs	3.369	1.083
Entrepreneurs in own business	3.841	1.335
Other (Matric only, Diploma in IT, Engineering)	3.851	1.102
Although educational groups did not differ significantly, entrepreneurs in own business tended to be higher on business risk perception while entrepreneurship students tended to be much lower on business risk perception.		
Factor 3 – Illusion of Control Bias		
Educational Groups	Mean	Std Dev
B Com Business	4.557	1.119
B.Com Entrepreneurship	4.621	1.136
Humanity Students	4.383	1.523

Post Graduate Entrepreneurship	4.576	1.349
Entrepreneurs in own business	4.280	1.547
Other (Matric only, Diploma in IT, Engineering)	4.146	1.390
Although educational groups did not differ significantly, entrepreneurs in own business and odd grouping (other) tended to be much lower on illusion of control bias than other groups.		
Factor 4 – Self-efficacy		
Educational Groups	Mean	Std Dev
B Com Business	5.873	0.707
B.Com Entrepreneurship	6.164	0.723
Humanity Students	5.938	0.773
Post Graduate Entrepreneurship	6.136	0.664
Entrepreneurs in own business	6.099	1.547
Other (Matric only, Diploma in IT, Engineering)	5.846	0.831
No significant differences were observed for self-efficacy.		

Table 6.19 The means for the factors as determined by gender

Factor 1 - Misconception		
Gender	Mean	Std Dev
Male	4.389	1.112
Female	4.491	0.902
No significant differences were observed.		
Factor 2 – Business Risk Perception		
Gender	Mean	Std Dev
Male	3.662	1.148
Female	3.560	1.006
No significant differences were observed.		

Factor 3 – Illusion of Control Bias		
Gender	Mean	Std Dev
Male	4.536	1.313
Female	4.251	1.348
No significant differences were observed.		
Factor 4 – Self-efficacy		
Gender	Mean	Std Dev
Male	6.056	0.707
Female	5.885	0.811
No significant differences were observed.		

Table 6.20 The means for the factors as determined by language

Factor 1 - Misconception		
Language	Mean	Std Dev
Afrikaans	4.296 a	0.982
English	4.198 a	0.955
African	4.953 b	1.009
Other Others (German, Portuguese, Spanish, Greek & French)	4.644 ab	2.545
a, b = Means in columns with different symbols indicate significant differences at $p < 0.01$ Respondents from African languages reported the highest misconceptions.		
Factor 2 – Business Risk Perception		
Language	Mean	Std Dev
Afrikaans	3.700	1.080
English	3.820	1.086
African	3.272	1.061
Other (German, Portuguese,		

Spanish, Greek & French)	3.400	0.899
No significant differences were observed		
Factor 3 – Illusion of Control Bias		
Language	Mean	Std Dev
Afrikaans	4.232	1.335
English	4.213	1.189
African	4.844	1.333
Others (German, Portuguese, Spanish, Greek & French)	4.767	1.406
a, b = Means in columns with different superscripts indicate significant differences at $p < 0.01$		
No significant differences were observed		
Factor 4 – Self-efficacy		
Language	Mean	Std Dev
Afrikaans	6.051	0.702
English	5.900	0.860
African	5.918	0.769
Others (German, Portuguese, Spanish, Greek & French)	5.644	0.929
No significant differences were observed.		

Table 6.21 The means for the factors as determined by occupation

Factor 1 - Misconception		
Occupation	Mean	Std Dev
Students	4.587	0.833
Entrepreneurs	3.872	1.198
Managers	4.251	1.085
Employees	4.667	1.070
No significant differences were observed		

Factor 2 – Business risk		
Occupation	Mean	Std Dev
Students	3.535	0.919
Entrepreneurs	3.888	1.367
Managers	3.607	1.243
Employees	3.590	1.081
No significant differences were observed		
Factor 3 – Illusion of Control Bias		
Occupation	Mean	Std Dev
Students	4.421	1.232
Entrepreneurs	4.298	1.501
Managers	4.080	1.575
Employees	4.647	1.921
No significant differences were observed		
Factor 4 – Self-efficacy		
Occupation	Mean	Std Dev
Students	5.893	0.788
Entrepreneurs	6.194	0.728
Managers	5.949	0.766
Employees	6.017	0.699
No significant differences were observed.		

Table 6.22 The approximate line where the thought occurred that the concept is viable

Line where decision was made that concept is viable	Frequency	Percent	Cumulative Percent
1 - 29	39	17.33	17.33
30 – 59	124	55.11	72.44

60 – 89	20	8.89	81.33
90 – 119	17	7.56	88.89
120 – 149	11	4.89	93.78
150 – 179	3	1.33	95.11
180 – 209	6	2.67	97.78
210 - 235	5	2.22	100.00
Frequency Missing = 6			

55% percent respondents decided between line numbers 30 – 59 that the business was viable. 80% respondents decided before line 90 that the business was viable. These respondents decided very early in the case study that it was a viable concept and did not make use of all the information available in the case study to come to their decision.

Table 6.23 Mean line of case study where first decision of viability was taken

	Not Start	Start
Mean	63.518	55.653
STD Dev	57.675	50.343
No significant differences were observed with a t test. (t =1.01 p > 0.314)		

Table 6.24 Reason for decision to start or not start the venture

No	First Thought	Yes	%
1	Enough detail	1	0.5
2	My instinct / gut feel says its viable	5	2.5
3	Seems novel / good idea / concept / innovative idea, product / secret formula (protection)	75	37.5
4	Large scale of production / availability of grass makes it viable and easy to start	34	17
5	I like the way they think / makes sense	3	2.5

6	Financial viable / cheaper / cost effective	17	8.5
7	They did research	9	4.5
8	Supply and demand principle / need in market	15	7.5
9	Can provide jobs for many people	9	4.5
10	LP is positive, dedicated and well educated	18	9
11	Can work if run on basis of “collect a can or paper” an already known business concept	4	2
12	No reason	5	2.5
		200	100
1	First thought	No	%
2	Not enough details	5	5
3	Only a good idea not opportunity / too risky / sound too good to be true	34	34
4	Financially not viable	15	15
5	Not enough grass during the year (Winter) / volume of grass to big	5	5
6	Too dependant on external factors like people	10	10
7	Logistically to complex	9	9
8	No knowledge of animal industry	13	13
9	Do not address a need in the market / acceptance in market	7	7
10	No reason	2	2
		100	100

A variety of reasons were presented by the respondents for their decision to start or not to start.

The main reason for making the decision to start (37.5%) was recorded as the respondents thinking that the animal fodder concept was unique and secondly (17%) the availability of raw material.

The main reason reported for not starting the business was the fact that the concept was seen as a good idea but not necessarily a good opportunity due to the risks involved (34%) and secondly because of it is seen as financially not viable (15%).

#### 6.2.5 Results of HBDI thinking preference analysis

It is important to consider the following:

None of the quadrant scores for HBDI could be identified in a separate factor analysis.

However, according to Bunderson (1995:1) four discrete clusters of thinking preferences do exist and the scores were used for the further analysis.

Factor differences between quadrant scores could not be identified.

Biographical factors such as gender, language and education did not show differences between quadrants.

The following tables report the scores for some of the important variables.

Table 6.25 The first thought about viability as reported by respondents

Question posed: While reading the case my very first thought about whether the concept is viable or not was .....			
Decision	Variable	Mean	Std Dev
No, not viable	Quadrant A	81.250	25.967
	Quadrant B	79.694	16.783
	Quadrant C	61.263	22.302
	Quadrant D	68.791	21.772
Decision	Variable	Mean	Std Dev
Yes, viable	Quadrant A	68.923	22.988

	Quadrant B	78.171	17.305
	Quadrant C	72.280	22.765
	Quadrant D	75.089	22.591

Table 6.26 Choice between not starting or starting the business

Question posed: Should FE proceed with introducing the concept to the market?			
	Variable	Mean	Std Dev
No, definitely not start the venture	Quadrant A	78.424	22.867
	Quadrant B	81.545	16.336
	Quadrant C	65.303	21.435
	Quadrant D	69.424	22.644
	Variable	Mean	Std Dev
Yes, definitely start the venture	Quadrant A	71.852	24.793
	Quadrant B	78.163	17.241
	Quadrant C	69.408	23.421
	Quadrant D	73.730	22.451

Table 6.27 Choice between selling the concept or starting the business

Question posed: If FE had the choice to sell the concept and make a modest profit, what should they do?			
Decision	Quadrant scores	Mean	Std Dev
Yes, sell the concept for a modest profit to a potential buyer	Quadrant A	77.000	24.751
	Quadrant B	79.947	16.675
	Quadrant C	64.303	22.594
	Quadrant D	71.053	22.175
Decision	Variable	Mean	Std Dev

No, definitely start self	Quadrant A	70.712	24.314
	Quadrant B	78.007	17.356
	Quadrant C	71.059	23.161
	Quadrant D	74.131	22.633

### 6.2.5 Focus Group

A focus group with experts in the field of entrepreneurship was formed to answer the questions whether the concept is viable and whether to start the enterprise or not.

The reason for the decision to form a focus group was due to the writer's thought that the idea for the venture was great but the opportunity however flawed. The hypothesis was that misconceptions would support the idea and overlook key elements supporting the opportunity.

A large sample of the respondents surprisingly selected the start-up option. It was then decided to gather an expert panel to discuss the case study.

#### 6.2.5.1 Panel view on whether the opportunity was viable or not viable

All participants said that the concept is viable and six of the focus group decided to start the venture. Only one respondent was against starting the venture. The reasons given by the panel members for starting the business are as follows:

- Uniqueness of product
- Well researched product
- I will make it work

- Grass rich in protein ideal for animal food
- Availability of raw material
- Profit seems possible
- Job creation aspects
- Low input cost

The reasons given for not starting the business:

- Logistically complicated
- People depending aspects (Franchise)
- Bulkiness of raw material and product
- Sweet idea not necessarily an opportunity

#### 6.2.5.2 Panel view on whether the opportunity was start business / sell concept

The participant's reaction to whether to start the concept or sell it resulted in all but one participant wanting to sell rather than to start the venture himself.

Summary of the panel discussion comments

In the discussion followed by the completion of the question the following comments were made:

- The idea is definitely viable if managed correctly.
- It is a bulky product and logistics can be a problem
- Variability of the quality of raw material and associated risk of rotting
- Reliant on people to make it work (franchisees)
- Quality of the product needs to be assured

In conclusion the verdict reached by the expert panel was overwhelming for the starting of the business. When the case was initially designed, the feeling was that it is only a nice idea but not necessarily an opportunity. However all the respondents of the focus group felt that the key success factor was their own ability to make it work.

## 6.2.6 Statistical modelling

### 6.2.6.1 Linear discriminant analysis

A linear discriminant model was used to classify the respondents in two categories namely starting the venture or not starting the venture.

Discriminant analysis was performed to determine how well the factors could predict the decision to start or not to start the venture. The estimated model as presented in Chapter 5, resulted in the following classification function (see table below):

Table 6.29 Classification Function for Linear Discriminant Analysis

Group	Decision not to start	Decision to start
Variable		
Misconception	6.997	7.917
Risk perception	7.908	6.605
Constant	-31.906	6.605

Table 6.30 Classification matrix for linear discriminant analysis

Actual		Predicted		Percent correct
	Number of cases	Decision to start	Decision not to start	
Not started	44	36	8	81.3
Started	256	48	208	81.3

The linear discriminant model was used to determine how well the model could predict the probability of starting the business based on the factors. The model could predict 81, 3% of the respondents correctly as not starting or starting the venture. It was however unable to improve the accuracy of the decision to start above that of the actual start-ups.

It was therefore necessary to go one-step further, using the logistical regression model to try and predict the probability of starting the venture.

#### 6.2.6.2 Logistical regression

Table 6.31 Frequency procedures for the Logistical regression

Frequency Percent Row Pct Col Pct	Decision not to start	Decision to start	Total
	Prediction		
Actual: Not started	20 6.67	24 8.00	44 14.67

	45.45 68.97	54.55 8.86	
Actual Started	9 3.00 3.52 31.03	247 82.33 96.48 91.14	256 85.33
Total	29 9.67	271 90.33	300 100.00

6.32 The Classification matrix for logistical regression (Based on Table 6.27)

Actual		Predicted		Percent correct
	Number of cases	Decision not to start	Decision to start	
Not started	44	20	24	45.45%
Started	256	9	247	96.48%

The logistical regression model was used to predict the probability of starting the venture. The model could predict 96.5% of the respondents who started, correctly. The logistical regression model was better able to predict the respondents who will start the venture than the linear discriminant model.

It therefore seems useful to apply the discriminant analysis model to predict respondents that will not start and the logistical regression model to predict the respondents that will start the venture.

### 6.3 Conclusion

This chapter presented the main findings of the empirical part of the study:

The descriptive statistics for the demographic data showed normal distribution except for the language distribution.

The factor analysis confirmed four factors namely business risk perception, misconceptions, illusion of control as well as self-efficacy. No factor was confirmed for the HBDI thinking preferences. The factor analysis indicated relatively high construct validity of the measuring instrument as evident by the high Cronbach alphas.

Multiway ANOVAs for the four factors shows the following:

Business risk Perception:

Statistical differences were reported for the first viability thought, the start-up decision as well as the decision to sell.

Misconceptions:

Statistical differences were reported for the first viability thought, the start-up decision, and the decision to sell as well as for language.

Illusion of control:

Statistical differences were reported for the first viability thought, the start-up decision as well as for language.

Self-efficacy:

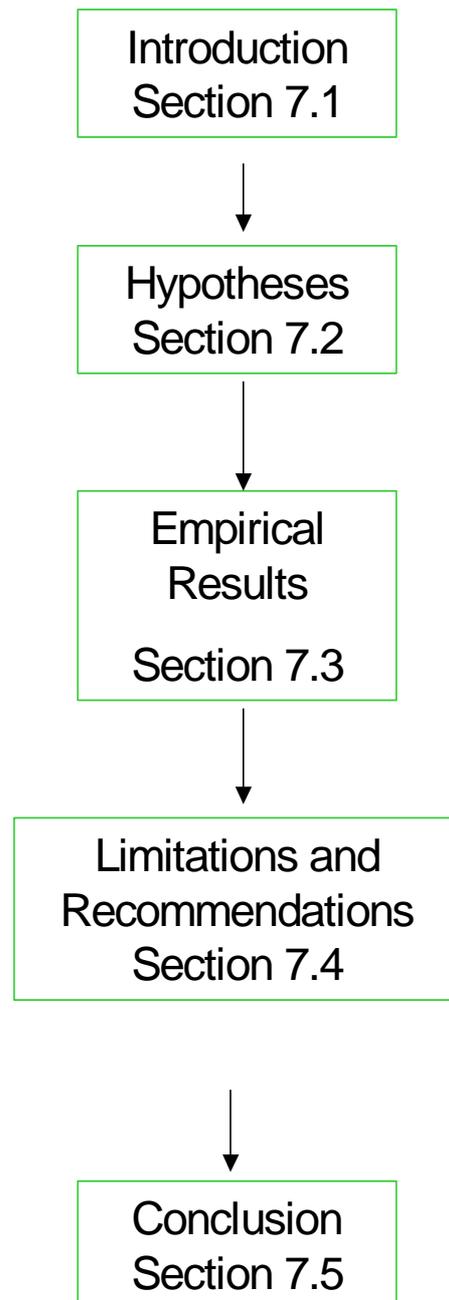
No statistical differences were reported for self-efficacy.

A linear discriminant analysis model was used to predict the decision to start or not start the venture. The linear discriminant analysis model improved the prediction of the decision not to start the venture and could predict 81.3% accurately. A further step however was taken and a logistical regression model was used to improve the prediction of the decision to start the venture (96.48%).

Chapter 7 discusses the findings, makes final conclusions, provides recommendations and makes suggestions on areas for further research.

## Chapter 7: Discussion of findings

### Chapter 7: Layout



## 7.1 Introduction

The research questions governing this study were:

- Do patterning and thinking preferences (HBDI cognitions) have an influence on the decision to start a venture?
- Does business risk perception have an influence on the decision to start a venture?
- Does the illusion of control bias have an influence on the decision to start a venture?
- Do misconceptions have an influence on the entrepreneur's decision to start a venture?
- Does self-efficacy have an influence on the decision to start a venture?
- What is the relationship between the above factors?

In order to investigate the questions at hand, related literature was reviewed in Chapters 2 to 4. In Chapter 2 cognitive styles, patterning and thinking preferences were examined. In Chapter 3 the concepts of cognition, heuristics, biases, self-efficacy, misconceptions and risk perception were explored, while Chapter 4 investigated the entrepreneurial process. The methodology was presented in Chapter 5 and the analysis of the results in Chapter 6.

## 7.2 Hypotheses

This chapter discusses the findings of both the literature and the empirical study in order to answer the five research questions that were translated into the following six hypotheses:

- H1o Business risk perception does not influence the decision to exploit a venture opportunity.
- H1a Business risk perception influences the decision to exploit a venture opportunity.

- H2o Misconceptions do not influence the decision to exploit a venture opportunity
- H2a Misconceptions influence the decision to exploit a venture opportunity.
- H3o Illusion of control does not influence the decision to exploit a venture opportunity.
- H3a Illusion of control influences the decision to exploit a venture opportunity.
- H4o Self-efficacy does not influence the decision to exploit a venture opportunity.
- H4a Self-efficacy influences the decision to exploit a venture opportunity.
- H5o Information preferences as determined by HBDI do not influence the decision to exploit a venture opportunity.
- H5a Information preferences as determined by HBDI influence the decision to exploit a venture opportunity.

In order to be able to accept or reject the hypotheses, the empirical results of the study should be investigated and a conclusion drawn.

### **7.3 Empirical results**

The literature review showed that mental or cognitive models are powerful thinking tools or metaphors, which may enhance communication, teamwork and decision-making. The thinking preferences of a person are seen as a characteristic in his or her approach to problem solving. Thinking styles may act

as a natural heuristic when an entrepreneur uses and acquires information necessary to make the decision to start or not to start a business.

### 7.3.1 Factor analysis

Considering the results for the confirmation analysis, four factors were identified (see Table 6.9). The factors are:

- Factor 1: Misconceptions
- Factor 2: Business risk perception
- Factor 3: Illusion of control
- Factor 4: Self-efficacy

The designed instrument was able to measure these four factors but not specific misconceptions or thinking preferences.

### 7.3.2 Correlation analysis

The Spearman's Rank correlations (Table 6.11), also shown in Figure 6.1, indicate the relationships between the dependent variable and the independent variables in the study. The relationships between the dependent variable, namely the decision to start, and the independent variables: business risk perception ( $r = 0.58^{**}$ ), misconceptions ( $r = 0.49^{**}$ ), and illusion of control ( $r = 0.33^{**}$ ) are highly significant.

No relationship between the decision to start and the independent variable self-efficacy was reported. There is, however, a strong relationship reported in the literature between self-efficacy and entrepreneurial intention. This study, however, focuses on the decision to start as the third step in the entrepreneurial process. The entrepreneurial intent is the first stage in the entrepreneurial process used in this study (see Chapter 4). It is, however, postulated that a strong relationship between self-efficacy and the intent (to start a venture) may not necessarily mean that a strong relation exists between the actual decision to start

and self-efficacy. However, the relationship between self-efficacy and the decision to start should be further investigated.

A highly significant negative relation exists between business risk perception and misconceptions ( $r = -0.49^{**}$ ). A highly significant relation also exists between illusion of control and misconceptions ( $r = 0.41^{**}$ ). These correlations suggest that a lower business risk perception can lead to a more easily taken decision to start the venture.

The conclusion is drawn that both the independent variables: business risk perception and illusion of control, have an influence on the misconceptions of the entrepreneur based on the inter-correlations. This finding indicates that the higher the misconception of the entrepreneur, the lower the risk perception and the more likely the decision to start the venture.

This is also applicable to the illusion of control as an independent variable, because the higher the entrepreneur's illusion of control, the more misconceptions arise, which may have a direct influence on business risk perception, which may again have a direct influence on the decision to start the venture.

A significantly strong relation is also reported between illusion of control ( $r = -0.34^{**}$ ) and business risk perception. This finding indicates that the more the entrepreneur feels in control the lower the risk perception becomes, leading to a more easily taken start-up decision.

### **7.3.3 Factor analysis for HBDI**

While the instrument (see Appendix A, questions 13.1–13.20) could not confirm any factors for thinking preferences, the results of the HBDI assessment were used to categorise thinking preferences. The HBDI is a valid instrument, as reported by Bunderson (1995).

Table 6.26 reports whether the first thought of the respondents (divided into highest quadrant preference categories based on their profile scores) was that the concept was viable or not. No significant differences were reported between the different dominant quadrants.

Table 6.27 reports whether the respondents would start or not start the business. Again the respondents were divided according to their highest quadrant preference categories based on their profile scores. No statistically significant differences were reported between the different quadrants.

Table 6.28 reports the choice between selling the concept or starting the business. The respondents were again divided according to their highest quadrant preference categories based on their profile scores, but no significant differences were reported between the different dominant quadrant categories.

From these results it is evident that none of the quadrant preferences were identified as factors in the factor analysis. It is however important to note that in a validity study done by Bunderson (1995:1), four discrete clusters of thinking preferences were identified (see Chapter 2). These scores, as obtained through the HBDI assessment (Appendix C), were therefore used to classify individuals into the preference categories.

The fact that no differences could be determined between the dominant quadrant groups could mainly be ascribed to two reasons:

- Only the dominant quadrants of the respondents were used for grouping respondents in the study. Many respondents are double dominant, triple dominant or quadruple dominant, which makes meaningful categorisation more difficult.
- The decision-making process is seen as a whole-brain process, with business people and entrepreneurs switching between the quadrants as determined by the situation.

Further research, however, should try to overcome the effect of other dominance scores. The conclusion could then be drawn that entrepreneurs move their thinking between quadrants, using a whole-brain approach when they make a decision to start, or in fact any decision regarding new venture creation.

#### **7.3.4 The analysis of variance**

The means between factors and the decision to start the venture based on the opportunity presented are as follows (see Table 6.17):

- A highly significant difference is reported for the factors misconceptions ( $p < 0.0001$ ), and business risk perception ( $p < 0.0001$ ) for the decision to start.
- A significant difference between the Illusion of control ( $p < 0.05$ ) and the decision to start is reported.
- Self-efficacy did not report any significance ( $p < 0.319$ ) for the decision to start or not start.

No significant difference was reported between the factors and gender (Table 6.19) or occupation groupings (Table 6.21). Although no significant difference was reported for the factors misconception and illusion of control between educational groups (Table 6.18), business owners tended to score higher on business risk perception, while entrepreneurship students tended to score much lower on business risk perception. It could be argued that business owners had already gained experience, which led to a different paradigm as well as an increased use of biases and lower use of misconceptions. Students' lower risk perception and lower illusion of control may be linked to lack of practical experience, although they believe themselves to have adequate theoretical knowledge. The use of students may therefore be seen as a limitation to the study.

People whose first language was an African language (Table 6.20) reported the highest misconceptions, with significant differences at  $p < 0.01$ . The same level of misconceptions is reported for other groupings. What this indicates is not clear, but it could involve areas outside those that this study attempted to investigate. For instance, culture may play a role in the perceptions and beliefs of individuals and may lead to certain culture-specific misconceptions.

### **7.3.5 Approximate line for the first viability thought**

It is interesting to note that when reading the case study, 55% of the respondents decided that the business was viable (see Table 6.22) before line 60, and 80% of the respondents decided it was viable before line 90. It may therefore be argued that respondents did not use all the information in the case study to come to their decision. This supports the hypothesis that the respondents made use of heuristics and biases to make their decisions. What this entails is not clear but this aspect could warrant further investigation.

A variety of reasons were given as support for the decision to start or not to start the business (Table 6.24). The main reasons given for the decision to start was that it seemed to be a good, novel or innovative idea, product or secret formula (37%) and secondly the grass / raw material was readily available (17%). For the decision not to start the main reasons were that it was only a good idea, but not an opportunity (34%) and financially not viable (15%).

It is, however, also interesting to note that the focus group or expert panel gathered to decide if the opportunity was viable or not all made the decision that the opportunity was viable; in fact 85% of the focus group said that they themselves would definitely start the venture. The panel's decision to start was based on their own perceived ability to make it work. If one links this outcome to the opinion of Keh et al (2002: 131), quoting Shaver & Scott (1991), that entrepreneurs show an unusually strong preference for exerting control over their outcomes because they believe they can exert control over people and events, then the expert panel or focus group's decision may be seen as relevant. The

success factor as seen by the focus group was their ability to make the opportunity work.

### **7.3.6 Linear discriminant analysis**

The linear discriminant analysis (Table 6.30) was used to classify the respondents into two categories, namely those starting and those not starting the venture, and to determine how well the factors could predict the decision to start or not to start the venture. The linear discriminant model could correctly predict 81.3% of the respondents deciding to start as well as 81.3% of the respondents deciding not to start the new venture opportunity.

### **7.3.7 Logistical regression analysis**

In an attempt to enhance the probability of respondents starting the venture, the logistical regression model (Table 6.32) correctly predicted 96.5% of the respondents deciding to start the venture opportunity. Based on the above prediction results, the conclusion is drawn that the logistical regression model predicts the respondents that will start the venture better than the discriminant analysis model.

### **7.3.8 Revisiting the hypothesis**

H1o Business risk perception does not influence the decision to exploit a venture opportunity.

Based on the empirical results the first null hypothesis is rejected and the alternative hypothesis accepted. Business risk perception has a highly statistically significant negative relation with the decision to start the venture ( $r = -0.58^{**}$ ). Few themes are as synonymous with entrepreneurship as risk. Entrepreneurs clearly accept higher levels of risk in their careers and business decisions than, for instance, managers or employees in business (Busenitz & Barney, 1997: 24).

Risk is also a particularly interactive concept (Gowda, 1999: 68), and therefore the relations between risk perception, illusion of control and misconceptions reported in this study are of relevance. The highly significant negative relations between business risk perception, the illusion of control ( $r = -0.34^{**}$ ) and misconceptions ( $r = -0.49^{**}$ ) indicate a higher use of cognitive mechanisms, resulting in a lower risk perception and therefore a greater likelihood of a decision to start a new venture opportunity.

H2o Misconceptions do not influence the decision to exploit a venture opportunity

Based on the empirical results, the second null hypothesis is rejected and the alternative hypothesis accepted. Misconceptions do have a highly statistically significant relation ( $r = 0.49^{**}$ ) with the decision to start the venture. A highly significant relation also exists between misconception and illusion of control ( $r=0.41^{**}$ ) as well as a highly significant negative relation between misconceptions and business risk perception ( $r = -0.49^{**}$ ). The results indicate that the more misconceptions an entrepreneur holds, the higher the illusion of control and the lower the risk perception, with a higher probability of a decision to start a new venture opportunity.

H3o Illusion of control does not influence the decision to exploit a venture opportunity.

Based on the empirical results the third null hypothesis is rejected and the alternative hypothesis accepted. Illusion of control has a significant statistical relation with the decision to start the venture ( $r = 0.33^{**}$ ). A highly significant relation also exists between the illusion of control bias and misconceptions ( $r = 0.41^{**}$ ), as well as a highly significant negative relation between business risk perception and illusion of control bias ( $r = -0.34^{**}$ ). It is suggested that the findings indicate that the illusion of control bias, due to the high relations with misconceptions, may lead to a lower business risk perception and therefore the

decision to start a new venture opportunity. The result of the illusion of control bias is that individuals may overemphasise the extent to which their skill can increase the venture's performance, which may lead to the belief that the entrepreneur can control the outcomes, leading in turn to the underestimation of risk (Keh et al, 2002: 131).

H4o Self-efficacy does not influence the decision to exploit a venture opportunity.

Based on the empirical results the fourth null hypothesis is accepted. Self-efficacy has no relation with the decision to start the venture. No evidence could be found that self-efficacy has a relation with misconception, business risk perception or the illusion of control bias. Although Shepherd & Krueger (2002: 171) quote Krueger & Brazeal (1994) as indicating that self-efficacy is positively associated with a new venture creation opportunity, no evidence of any relation could be found between self-efficacy and the decision to start a new venture opportunity.

H5o Information preferences as determined by HBDI do not influence the decision to exploit a venture opportunity.

Based on the empirical results the fifth null hypothesis is accepted. Information preferences as determined by HBDI thinking preferences have no relation with the decision to start the venture. No evidence could be found that respondents use only their dominant thinking preference in their information search to determine the start or non-start of a new venture opportunity.

#### **7.4 Limitations of the study and recommendation**

When interpreting the results of this study, cognisance should be taken of certain limitations experienced in the study. Further research regarding the decision to start or not start a new venture opportunity and the factors influencing such action

should be designed in such a way as to overcome some of the limitations of the present study.

The use of a convenience sample was a limiting factor due to the high cost of the HBDI profile. The study also failed to group respondents who have double, triple and quadruple quadrant preferences. They were all grouped as if single dominant, using only their highest dominance score. To be able to investigate the actual influence of thinking preferences (HBDI) on the decision to start a new venture opportunity, an instrument that can actually group different quadrant preferences meaningfully needs to be developed. The instrument used in this study failed to distinguish between respondents with single dominance scores and those with two or more high dominance scores.

Using students as part of the study was both a limiting and beneficial factor in this study. Being at university already implies a selection based on performance of the individual and does not represent the total population, but instead narrows the population down to those with a privileged position in society (Pretorius et al, 2004: 13). Markman et al (2002:150) also make a case against the use of students when attempting to understand cognitions of entrepreneurs. The only reason why students were seen as beneficial to the study was the fact that they have no experience in the entrepreneurial field, which might force them to make use of heuristics, biases and their information preference in their decision to start or not start the new venture opportunity.

A number of cognitive styles and other heuristics and biases were excluded from this study and could also be potentially relevant. This research only examined illusion of control, misconceptions, business risk perceptions and self-efficacy. Other cognitive factors and specific biases and heuristics already identified in the literature may also have an influence on or relation with the decision to start a new venture opportunity. Future research would need to examine other heuristics and biases to more completely explain the entrepreneur's decision to start or not start a new venture opportunity.

It is, however, important to recognise that a cognitive approach can enrich our understanding of the mental models that guide and shape an entrepreneur's decision-making processes. Research to determine the link between an entrepreneur's mental models and the decision to start or not start a new venture opportunity may be beneficial to the existing body of knowledge of entrepreneurial cognition. These applied benefits might aid in the development and design of techniques to assist entrepreneurs in various ways, such as helping them to avoid errors and pitfalls in order to make a more informed decision when starting a new venture opportunity.

One of the reasons for studying the role of mechanisms in entrepreneurship is to formulate means of holding in check errors stemming from cognitive mechanisms, so that decisions reached by the entrepreneur have an increased chance of success (Baron, 1998: 290).

The length of the questionnaire and the time it took to complete it was a definite limitation when dealing with entrepreneurs. All the entrepreneurs felt that the questionnaire was too long and time consuming to complete. A reduced questionnaire would really improve their willingness to participate. The respondents had already spent twenty to thirty minutes reading the case study before answering the questionnaire. The whole exercise took about one hour.

For the findings to be representative of a South African context, a wider geographical area and industry-specific owners / entrepreneurs should be targeted. To narrow the study down to industry-specific entrepreneurs would make a greater contribution to the entrepreneurial cognition field and the body of knowledge that exists. The generalisation of the results to owners / entrepreneurs in different types of industries should not be assumed.

## 7.5 Final conclusions

The major themes of this study can be summarised as follows:

- (1) Entrepreneurs' thinking may differ from that of other persons, leading to a specific preference for a certain kind of information use (HBDI preference) when making the decision to start a new venture opportunity:
- (2) Entrepreneurs may be more susceptible to various kinds of heuristics (short cuts) or biases (errors) than other people, which may lead to a lower risk perception and therefore a more likely decision to start a new venture opportunity:
- (3) Misconceptions, the illusion of control bias and self-efficacy also act as cognitive mechanisms leading to a "rosier" view of a possible new venture creation opportunity, resulting in a lower risk perception and therefore the decision to start a new venture opportunity:
- (4) The main focus of the study is on the decision to start or not to start the new venture opportunity and the influence of the factors as mentioned above on the decision to start or not. The entrepreneurial process in this study only deals with the decision to start and not the intention, resources or other activities involved.

A key aim of the study was to determine the relation between the decision to start / not to start a new venture opportunity and factors such as information used (HBDI preferences), business risk perception, illusion of control bias, misconceptions and self-efficacy. The study concludes that misconceptions, business risk perception and illusion of control, but not self-efficacy and information use (HBDI preferences), influence the decision to start the new venture opportunity

A reason for the finding that self-efficacy does not influence the decision to start the venture opportunity might be linked to the fact that although self-efficacy positively relates to the intent, intent does not necessarily imply action. According to Brigham & De Castro (2003: 66) who quote Chatman (1991), intentions have been linked to actual behaviour in person-organisation fit studies, but it should be acknowledged that intentions do not always translate into actual behaviour.

It is therefore interesting to find that although previous research determined that self-efficacy is high in the entrepreneurs' intent to start the venture opportunity, the conclusion based on the findings in this study confirms that intentions do not necessarily lead to action. Further research is necessary to determine whether expressed intentions ultimately lead to a specific action or behaviour.

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## **Appendixes**

### **Appendix A**

## Fodder Enterprises (FE)

### EXPLORING THINKING BIASES, HEURISTICS AND PERCEPTIONS DURING DECISION MAKING ABOUT STARTING A VENTURE OR NOT

Dear Owner, Manager, Student, Respondent,

Thank you for giving up an hour of your precious time for this research without which success is not possible.

The following questionnaire is part of an extensive research study undertaken to investigate the phenomenon of thinking biases and heuristics during the decision to start a venture. Your personal thinking is crucial. There are no right or wrong answers but it is important to indicate **your personal view and thinking** irrespective of what you may believe others will think.

The aim of the study is to investigate how people use information under complex and ambiguous conditions.

It will be highly appreciated if you would complete it as thoroughly as possible. All information will be treated as confidential and will only be used for academic purposes and reported as mathematical averages, variances and correlations.

Thank you very much,

Ingrid le Roux  
PhD Candidate  
University of Pretoria  
Tel: 083 556 3169

Study Leader:	Dr. Marius Pretorius
	Chair of Entrepreneurship
	Tel: (012) 420-3394
	Cell: 082 822 6333

.....  
**Instructions for completion:**

- 1. Please answer all questions regarding the case as accurately, objectively and as extensive as possible.*
2. Make a cross (X) in the space provided which reflects your answer/choice most accurately, for each of the questions.
3. Where asked for comments or to specify, please keep these as brief and clear as possible.
4. Don't ponder too long on a question – your first thoughts are important.

Please answer the questions in sequence and do not go back to change previous answers.

**Take one minute to page through the questionnaire to see the style of the questions before you start reading the case.**

**Do not discuss with other respondents – if necessary, ask the supervisor/s if you need something**

**Then read the case study and complete the questionnaire**

## **Fodder Enterprises (FE)**

Researching the development of animal feed from different by-products such as tomato, pineapple, potato and orange peels at the juice factory as well as a brewer's grain from the beer brewery led to many failures. It was always the problem of too much moisture and getting it out of the final product. The end result was mostly one of rotting end product. But let us begin at the beginning.

### **Background**

The story began as follows:

Lauricio Petorni (LP) was an animal scientist with an M Sc degree in Animal nutrition. Working at the Nosuche University (NU) for almost 20 years, his field of expertise/interest was mainly focused on the development of cheap feedstuffs to feed animals with. He had extensive experience in treatment of maize and wheat residue (left-over after harvesting) to improve digestibility before feeding it to cattle. His peers knew him as a dedicated researcher who could focus narrowly on his research problems.

The competition for grains between humans and animals is also increasing. Especially ruminants (cattle and beef) are under more pressure than for single stomached animals (Chickens and pigs) because of the big difference in feed conversion ratio (FCR) between the species. For example cattle uses 6.5kg maize to gain 1kg of live mass under feedlot conditions. Chicken requires 1.8kg feed for one kg live mass and pigs have a ratio 2.8:1 when intensively fed. It is therefore sensible to feed maize to chickens and pigs rather than cattle especially when maize production costs are constantly rising.

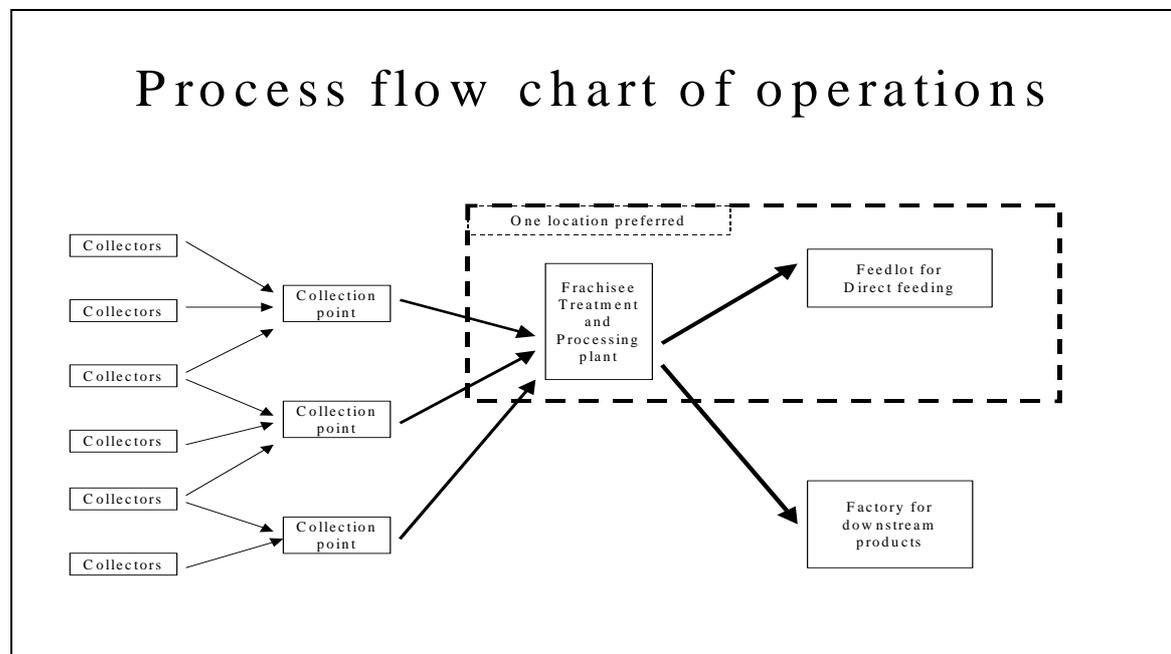
With the sharp fluctuations in price, feedlot owners are further pressurised to find alternative feed sources. It all depends on the rain – normally when it rains the price falls, when it is dry the price increases. Unfortunately, irregular importing of cheap maize for human consumption influenced this generalised relationship of price and rain. All this contributed to the need for finding

alternative sources of animal feed. Living in Southern Africa where there are many droughts on a regular basis, the research LP undertook was highly relevant.

## The idea

Mowing the lawn one hot summer day in 1993 it suddenly struck him. All the gardens, the grass, the problem to get rid of the cut grass etc. etc. Everything fell into place as he realised he was cutting the first samples of his research for the next five years. He immediately started packing some grass samples into plastic bags to take to work on Monday. Why has nobody thought about it – it was so obvious and the resource (cut grass) seemed to be unlimited? How many gardens and parks with grass to be cut are there in all the cities and towns? The potential is unthinkable.

In 1997 he received the first prize for best innovation at the annual Science Commission Innovation Fair (SCIF) totalling R40 000.



## The initial problems

In the beginning there were many obstacles such as too much moisture, rotting (high butyric levels resulting in compost rather than fodder) during

storage, unstable preservation, variable nutritional levels after treatment, time delays during gathering the raw material, storage limitations and several more.

Over several years he worked out a preservation formula that created a fairly stable product. With a strictly followed process he established a system that eliminated the problems one by one. He can now take the cut grass, treat it, preserve it and then feed it to cattle or sheep.

## **The proposed system**

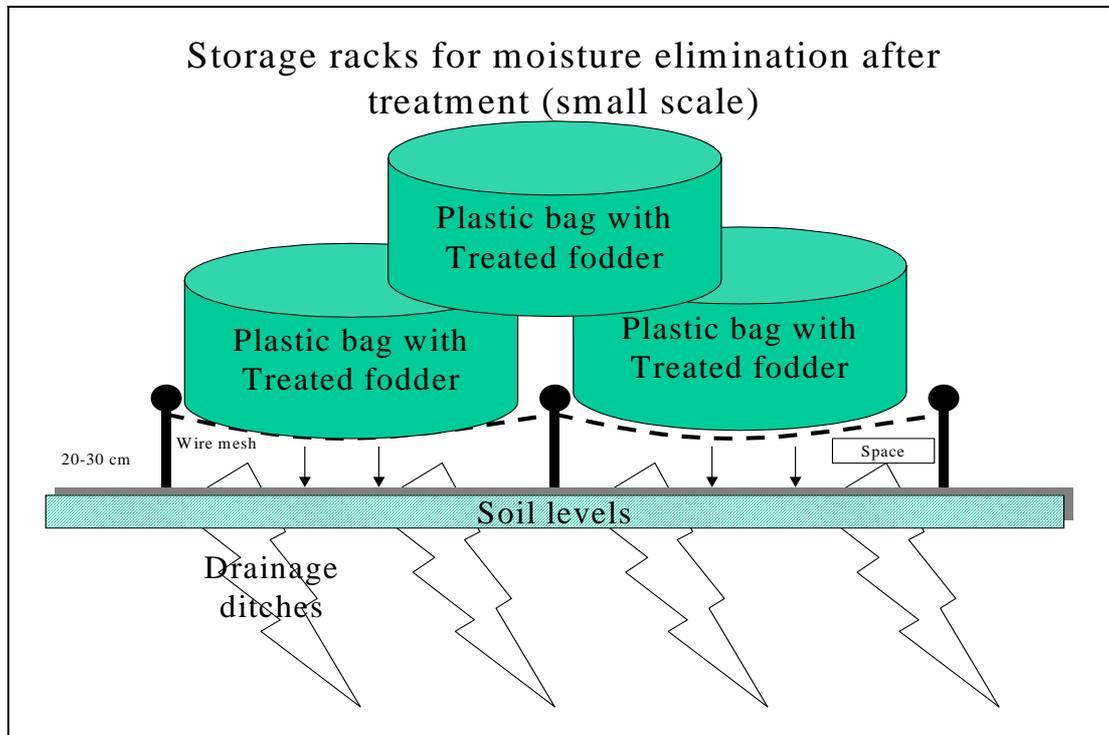
The final system followed the basic process and steps of:

- Take the cut grass (after mowing the lawn) in plastic bags to a central collection location
- Do the first quality control at this point by removing foreign objects and determining price based on quality of the grass
- Move grass to the treatment area
- Ensure the correct moisture levels (can add water afterwards if necessary)
- Add the secret formula and mix properly
- Placing it in larger plastic bags and close the bags properly or
- Place grass on filter racks and inject the correct amount of ammonia gas
- Ensure moisture drainage over the following 2 to 4 weeks
- Store for two to four weeks depending on the ambient temperature
- Remove the pre-dried fodder (final product) for final quality check and
- Then dry the fodder before starting the feeding process or
- Send the final fodder to the production plant, if it is not fed to animals in the feedlot

There are two basic systems or a combination for franchisees:

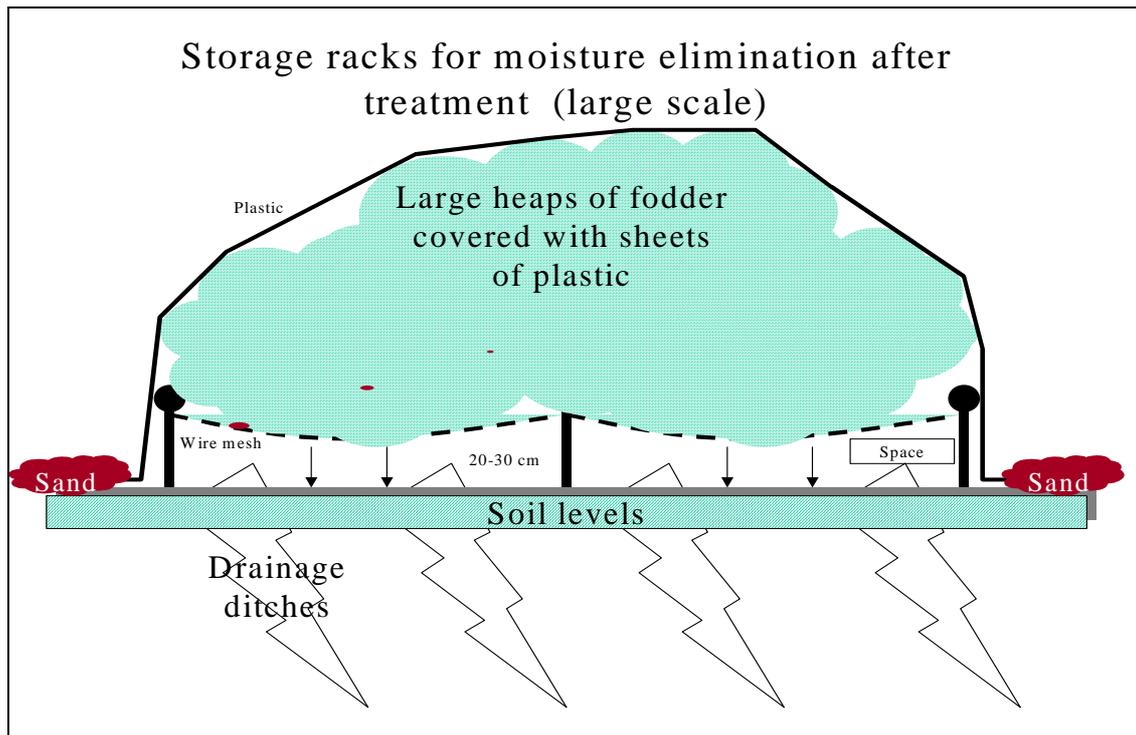
- Small quantities in hay bags (allows for a gradual start-up) or

- Large quantities covered under plastic sheets that allows for some measure of scale economies
- It is however possible to use them in combination and this allows for relative flexibility.



There are several finer details that are not reported in the case because it is seen as the competitive advantage of the process. It is mostly based on detail knowledge about the formula, the application process and certain key sensitivities that can make the process fail completely. He ensured that he knows these finer points as it all contributes to the protection of the competitive advantage.

After seven years the formula is now finally registered for use under the Law for animal feeds of 1957 regulations. This process is supported by many hours of hard work and several applications, tests and research results done by the Agricultural department research station at Irene.



## The opportunity

### 1.1 The market and projected demand

Availability of the raw material is unlimited and while he made so many calculations to determine how much grass is available, it is mind boggling to quantify. All he knows that it is a lot.

There are several market segments that he believes to consider for the raw fodder (pre-dried) product namely:

- The existing commercial farmers using the fodder for their cattle
- Future potential farmers
- The small scale rural farmers (Imagine the positive effect that the system can have on the preservation of the severely overgrazed environment)
- Existing feedlot operators
- Small holding owners looking for opportunities
- Agricultural Cooperatives producing and selling feeds to their clients

The production of the final fodder product has an additional and different target market namely:

- Any entrepreneurs interested in developing the business system as potential franchisees (they will always buy the formula from him like the Coca-cola principle) – ideally these can also be farmers who want to produce both feed and meat.
- Existing garden service operators who are already doing most of the business anyway as part of their business
- Small operators selling the grass to franchisees – Imagine every unemployed person can now have access to a job by either cutting lawns and selling the “grass residue” or by collecting offal and delivering it to the collection point on a daily basis for a fee and thereby have their own small businesses.
- Municipalities that experience problems with large garden refuse problems
- Owners of sports grounds that have a problem with grass residue – think how many schools can earn additional income to even out their negative balances.

The size of the market is significant – Talking to John Rawlins, Chairman of the feedlot association for the past seven years and life long very close and trusted friend of his father, he believes there is not enough grass to replace the use of maize completely but using the fodder will reduce costs significantly. “It would make the South African beef industry a lot more competitive in the world” was his final comment. Lauricio was practically brought up by John Rawlins.

## **1.2 The economic model**

Compared to maize at an average price of R1119/ton during 2003, the price of fodder worked out at R310/ton, which is between 25 to 30% of the cost of maize. Its nutritional value however is about 53 - 58% that of maize when feeding young slaughter cattle.

Table 1 Nutritional value and relevant information comparison

	<b>Maize</b>	<b>Fodder</b>
Metabolizable energy (MJ/kg)	11.9	6.7 – 7.3
Crude Protein (% of Dry Matter)	8.3	7.5
Feed cost / kg live mass gain (R/kg LM)*	R7.90	5.10
Expected average daily live mass gain expected (g/day)	750 – 850g/day	420 – 470g/day
Days to feed to reach target mass	120 – 130 days	200 – 220 days

\*It is known that feed cost makes up 75% of total costs in a feedlot and non-feed costs (NFC) the rest.

Fixed cost to establish a processing plant amounted to R250 000 for a franchisee. He would need a site of minimum 1 ha, which made it very desirable for small holding owners. Repayments are indicated in the financial projections.

Breakeven volume for a plant seems to be approximately 350 000 tons per month for nine months per year (See Table 2).

His own calculations based on many hours behind his computer suggest that he must find at least 17 good franchisees suggests that he could make over R3 000 000 per year from year four onwards (for at least 10 years). Looking at the growth of franchising in South Africa the number seems to be no problem.

The first three years will burn cash at a rate of over R2 000 000 per year thus giving a positive cash flow after three years and cash breakeven after year five. Of course, finding more good franchisees will improve the situation significantly.

However, not finding the correct franchisees could lead to a failure of the project and he will end up with nothing left of his life savings as well as R900 000 in debt. The investors would also hate him, as they will have lost a

between R500 000 to a million each. Not being successful will also bring serious harm to his family, as he will have to use all the provisions in the form of insurance, savings, inheritance and home loans made for their future, as investment in the project.

### **1.3 Financing**

The feed production plant is estimated to cost R3 500 000 (quoted by an engineering firm) including the land that he has already secured in the Bronkhorstspuit area. Lauricio thinks that if they erect the plant themselves, they would be able to save approximately R 1 100 000.

At this plant the final product combinations will be done and the fodder be turned into cattle blocks, pellets and different combinations of feed for the different species and age groups. Products such as dairy pellets, calf grower meals, lamb crumbs etc. etc. will also be produced.

This plant will provide approximately 80 jobs all year round once it is in full operation excluding all the other jobs created for unemployed entrepreneurs who can set up their own income streams.

The banks are not exactly negative about the plan because they are not chasing the deal as Lauricio hoped they would have. Especially the bank manager did not appear overly friendly towards him and was so focussed on the financial ratios. The bank seems willing to extend a 50:50 loan based on equity provided. It seems that they actually require more security than the value of the project instead of the loan only. The final decision of the bank is awaited at the moment.

This feed production plant is an extension of the first process through value addition to the fodder being used in the feedlots or on the farms. It is done to ensure stability to the product and to extend its shelf life. The fodder, after opening of the bags, does not have a long life and once the bags are opened the feed must be consumed within seven days (in the bags, the fodder can be stored for years). This however poses no problems under feedlot conditions or

on farms where smaller groups of animals are fed because they are fed daily anyway.

#### **1.4 Competitive Environment and Advantage**

The formula is a definite advantage that appears difficult to copy, if at all. If a franchisee leaves after learning the system, he will still have to obtain the formula from LP in future if he wants to start/proceed with his own operation.

There are researchers working on the same concept but no one has knowledge of the formula. Once the different cooperatives latch on, like the one that made the offer, they would probably be able to copy the concept. This is no concern to LP because he believes that five years will give him enough time to establish him as market leader anyway.

#### **1.5 The Resources**

##### **Equipment and facilities for franchisees**

Needed for a feed production plant is a small holding of approximately one hectare and preferably close to the origin of “production”. Collection points can be used as intermediate steps to enable the unemployed access without major transport problems. The further from the source’s origin, the cheaper the resource but the more the cost of transport, the ever-relevant trade-off.

A plant requires an ammonia applicator that retails for approximately R21 000 and at least one LDV and preferably one 3 ton Dyna of approximately R 187 000.

Other structures required include wooden poles with wire mesh to allow for drainage of the excess moisture. Some smaller farming tools such as hayforks, shovels etc are also required (See also the associated diagrams).

Careful use of the plastic bags or large plastic sheets allow for re-use and can assist in driving down the costs.

An electric dryer of approximately R65 000 can be installed under a roof to expedite the drying process but it is optional. The sunshine that typical of the African summer is sufficient to use especially with so many unemployed people around. Actually drying is not necessary when the fodder is directly fed to the animals.

### **Capital and Management**

Lauricio has already convinced nine other people (all members of his matric class in 1975 and the most were his buddies in the army later) to become investors and each has contributed R500 000 (R250 000 in cash for which some extended their home loans and the rest in promise to be paid on final bank approval) so he is having R5 000 000 (half on promise) to get the show on the road. LP is the entrepreneurial brain and having accumulated lots of untaken leave he is planning to use sabbatical leave of one year to get the project of the ground and managing everything (he has to go back for the same period after the sabbatical leave or else have to repay the institution for one year's salary).

He has structured the deal with the investors in such a way that none of the key elements such as the formula and the licences make up part of the deal while only the feed factory is part of their deal. He kept it (the formula as competitive advantage) out in a separate business. Franchisees will always obtain their formula from LP directly as this is how he plans to protect his trade secret.

Interestingly that he recently had an offer from an agricultural Cooperation for R7 500 000 to sell his idea, the formula, the licences and research results. This leaves him with R2 500 000 (excluding his own R500 000 that he has not paid in yet) and each investor with 50% return on investment (ROI) after the first year. They (the Cooperative) have also offered him a position and good salary guaranteed for three years to run their research laboratory associated with project for them. He has contemplated the offer big time but felt that he has invested several years of research and his life into this project and could not see his way open to sell his life work for money only. There is more to life

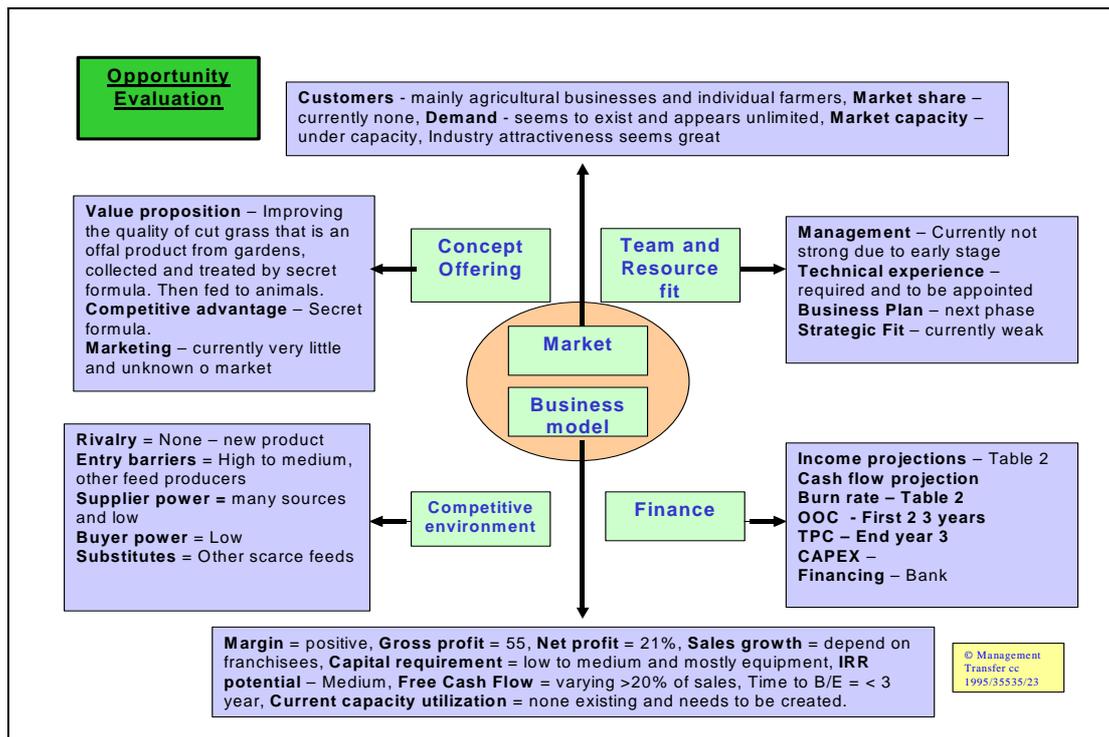
than money and this is his “baby”. Also, he would like to turn the ridicule of co-researchers in years gone by around by proving himself. He wanted the achievement to be his and nobody else’s. The acknowledgement is very important to him.

The management requirements for franchisees are not too high and a few retired people with their own transport can easily be trained to run the respective operations. He developed an opportunity analysis after reading up some books on small business start-ups (see diagram).

## **1.6 The advantages of the project**

There were some excellent advantages to be gained from this business namely:

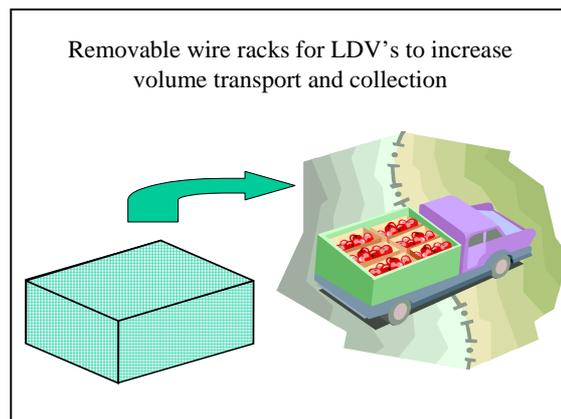
- The effect of less garden refuse that is costly to dispose can be solved
- Unemployed people can find jobs easily by starting their own businesses (Estimations indicate that an individual could make approximately R50 to R80 per day for selling the cut grass at R0.20 to R0.50 /kg)
- Think about it as a double income business – people pay you to remove their cut grass (offal) and you can sell it before or after value addition
- With the newly imposed ban on the use of animal by-products as components of animal feeds there is a dire need for more natural raw material with high protein values that can be used
- The problem with acidosis (acidic stomachs due to high levels of maize grain) is reduced by 95% and animals is much more healthy
- The raw material is already cut to the exact size for optimal digestibility
- The latest tests indicate that the fodder is also a cheap alternative for feeding of game during the regular dry spells experienced in Southern Africa. Ongoing research is currently establishing what supplements will give best results.



## 1.7 The Disadvantages of the project

Like all products there are some disadvantages that need to be overcome namely:

- The product is bulky which makes it expensive per weight to transport (volume per weight relationship) – special transport racks have been designed to fit onto LDV's to increase trip weights – see picture



- Erratic cash flow is expected for the first three years and where-after things will smooth out if the systems are installed properly
- If quality is not well controlled and tested, the fodder turns into compost, which cannot be fed to animals (they do not eat it due to low palatability). Therefore quality control is executed at the first point of collection and is a crucial component of the whole process.

- Incorrect application of the formula and ammonia can lead to aflatoxin production (mould formation), which is poisonous to animals – quality assurance is therefore crucial to avoid potential claims for deaths in feedlots. This demands hands-on management by franchisees especially before and during treatment.
- Being dependant on the availability of grass there is a lull during the winter months of May, June, July, and August (which allow a quiet period of distribution especially during dry spells as well as maintenance of equipment etc.)
- The key need is that of storage of the fodder for which a large space is required. The space required does not need to be covered, so open space is fine.

### **1.8 The challenge**

Lauricio is now faced with the final decision of going ahead when the bank gives their approval. Or not?

**Appendix B**

**EXPLORING THINKING BIASES, HEURISTICS AND PERCEPTIONS DURING DECISION MAKING ABOUT STARTING A VENTURE OR NOT**

Section A: Biographical information

Full names and Surname: \_\_\_\_\_ Student Number: \_\_\_\_\_

Contact number : \_\_\_\_\_ (needed in case clarification may be needed)

Mark your highest qualification with an "X"

	Qualification		Currently busy with
1.1	B Com Entrepreneurship 2 <sup>nd</sup> year		
1.2	B Com Entrepreneurship 3 <sup>rd</sup> year		
1.3	B Com Other _____ (please indicate)	Year _____	
1.4	BA _____ (please indicate)	Year _____	
1.5	M Phil Entrepreneurship student		
1.6	PhD Entrepreneurship student		
1.7	MBA student		
1.8	Any other _____		
1.9	Recently in own business (< 5 yrs)		
1.10	In own business for more than 5yrs		
1.11	None at all		
1.12	Odd grouping		

V4-5				2
------	--	--	--	---

Indicate your agreement with the following statements

		Strongly disagree	Disagree	Slightly disagree	Unsure	Slightly agree	Agree	Strongly agree			
1.13	I have previous business experience	1	2	3	4	5	6	7	V6		3
1.14	I definitely want to start my own business in future (If in business already, mark 7 please)	1	2	3	4	5	6	7	V7		4
1.15	People think of me as innovative	1	2	3	4	5	6	7	V8		5
1.16	I have knowledge of the animal feed industry	1	2	3	4	5	6	7	V9		6

My current occupation is: \_\_\_\_\_

V10-11			7
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My home language (mother tongue) is \_\_\_\_\_

My gender is Male / Female

V12-13			8
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V14			9
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My age at my last birthday was \_\_\_\_\_ years.

V 15-16			10
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Section B: Venture start-up decision and risk orientation

It is important that you answer the questions in sequence. Never skip a question or go back to add something to anything previously written than to the question you are working on.

While reading the case my very first thought about whether the concept is viable or not was ....

	<b>Definitely not viable</b>						<b>Definitely viable</b>	
1.17	1	2	3	4	5	6	7	V 17

1.18	Please indicate what made you think that at that first moment?								
								A	
								B	
								C	
								D	

V	18	19	20	21
Item	12	13	14	15

1.19	The approximate line when the thought struck me was line number .... (Line numbers on left hand)		V 22 - 24				16
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Write down all the things (not necessarily about the case specifics) that you thought about when reading the case. Please spend at least 3 minutes on this question

V	25	26	27	28
Item	17	18	19	20

Now, put yourself in the shoes of Lauricio Petorni and Fodder Enterprises (FE) and answer the following questions based on the available case information by marking the appropriate level of agreement with the statements. Mark on the scale of 1 to 7. Do not mark 4 for these two questions.

		Definitely not start			Unsure	Definitely Start			V		
1.20	Should Fodder Enterprises proceed with introducing the concept to the market?	1	2	3	4	5	6	7	29		21

		Definitely sell concept			Unsure	Definitely start self			v		
1.21	Assume that all the principals (stake holders) of FE had the choice of taking the offer of selling the concept and make the modest profit, What should FE do?	1	2	3	4	5	6	7	30		22

I believe that ....

		Strongly disagree							Strongly agree		V	item	
1.22	The probability of FE doing poorly is very high	1	2	3	4	5	6	7		31		23	
1.23	The amount FE could lose by introducing the concept is substantial	1	2	3	4	5	6	7		32		24	
1.24	There is great uncertainty when predicting how well FE will do with the concept introduction	1	2	3	4	5	6	7		33		25	
1.25	The overall riskiness of FE's concept is high	1	2	3	4	5	6	7		34		26	
1.26	Overall I would label the option of introducing the concept as a business venture as something negative	1	2	3	4	5	6	7		35		27	
1.27	I would label introducing the concept as a potential loss	1	2	3	4	5	6	7		36		28	
1.28	Introducing the concept will have negative ramifications for FE's future	1	2	3	4	5	6	7		37		29	
1.29	There is a high probability of FE losing a great deal by introducing the concept	1	2	3	4	5	6	7		38		30	

The three most important pieces of information in the case that influenced my decision to start the venture or not (in order of importance) were ....

	Piece if of information used for my decision	Reason why this influenced my decision			
1 <sup>st</sup>				A	
				B	
				C	
				D	
2 <sup>nd</sup>				A	
				B	
				C	
				D	
3 <sup>rd</sup>				A	
				B	
				C	
				D	

V	39	40	41	42	43	44	45	46
Item	31	32	33	34	35	36	37	38

The three most important pieces of information not given by the case and that I needed for a better decision to start the venture or not (in order of importance) are ...

	Piece if of information needed for my decision	Reason why this is needed for a better decision			
1 <sup>st</sup>				A	
				B	
				C	
				D	
2 <sup>nd</sup>				A	
				B	
				C	
				D	
3 <sup>rd</sup>				A	
				B	
				C	
				D	

V	47	48	49	50	51	52	53	54
Item	39	40	41	42	43	44	45	46

The following influenced my decision to start the venture or not – Rate each individually.

	Statement	Strongly disagree	Disagree	Slightly disagree	Unsure	Slightly agree	Agree	Strongly agree	V	item
1.36	The exact monthly breakeven volume = 350 000 tons (+-line 130)	1	2	3	4	5	6	7	55	47
1.37	The cost saving that could be achieved (shown in Table 1)	1	2	3	4	5	6	7	56	48
1.38	His persistence to overcome all the problems he faced through the years	1	2	3	4	5	6	7	57	49
1.39	The business appeared to have unlimited alternatives to grow	1	2	3	4	5	6	7	58	50
1.34	The financial calculations supplied in Table 2	1	2	3	4	5	6	7	59	51
1.35	The control Lauricio kept over his formula (i.e the competitive advantage)	1	2	3	4	5	6	7	60	52
1.36	His desire and passion to achieve at the highest level and not sell the concept is commendable	1	2	3	4	5	6	7	61	53
1.37	The way all the parts were put together to make up the concept	1	2	3	4	5	6	7	62	54
1.38	The 50% of capital that was required / needed from the bank	1	2	3	4	5	6	7	63	55
1.39	The job security that he could get from the Cooperative if he sells the concept to them	1	2	3	4	5	6	7	64	56
1.40	The number of unemployed people who's lives could be changed if the project is successful	1	2	3	4	5	6	7	65	57
1.41	The perceived value of the concept as shown by the price he was offered by the cooperative	1	2	3	4	5	6	7	66	58
1.42	The 50% return on investment they could make if they sold immediately	1	2	3	4	5	6	7	67	59
1.43	The apparent security brought by the registration under the animal feed law of 1957	1	2	3	4	5	6	7	68	60
1.44	The potential that there will be serious harm brought to his	1	2	3	4	5	6	7	69	61

University of Pretoria etd – Le Roux, I (2005)

	family if the project fails									
1.45	The uniqueness of the idea	1	2	3	4	5	6	7	70	62
1.46	The value of the offer by the cooperative guided my thinking	1	2	3	4	5	6	7	71	63
1.47	The step-by-step account of the process to be followed to produce the fodder	1	2	3	4	5	6	7	72	64
1.48	Because Bill Rawlins was a trusted friend of his father, his opinion is highly valued	1	2	3	4	5	6	7	73	65
1.49	The potential spin-offs (like environmental benefits) that could come from this project	1	2	3	4	5	6	7	74	66

The following played a role in my decision to start the venture or not.

	Statement	Strongly disagree	Disagree	Slightly disagree	Unsure	Slightly agree	Agree	Strongly agree	V		item
1.50	I could think of a similar case to use as a comparison to help me in the decision	1	2	3	4	5	6	7	75		67
1.51	I have some rules of thumb (guidelines) of my own that I use to make a choice like this	1	2	3	4	5	6	7	76		68
1.52	I always trust my gut-feel blindly for decisions like this	1	2	3	4	5	6	7	77		69
1.53	I was in a very good mood when completing the questionnaire	1	2	3	4	5	6	7	78		70
1.54	I have someone that I would consult before a decision like this	1	2	3	4	5	6	7	79		71
1.55	I felt very pressurised to make the decision of starting or not	1	2	3	4	5	6	7	80		72
1.56	I am sure that my decision is correct	1	2	3	4	5	6	7	81		73
1.57	I work easily (without stress) in an uncertain environment	1	2	3	4	5	6	7	82		74
1.58	The case gave sufficient information for me to make a decision	1	2	3	4	5	6	7	83		75
1.59	The case was easily understood	1	2	3	4	5	6	7	84		76
1.60	I had no language problems reading the case	1	2	3	4	5	6	7	85		77

Putting myself in Lauricio's shoes I think

	Statement	Strongly disagree	Disagree	Slightly disagree	Unsure	Slightly agree	Agree	Strongly agree	V		Item
1.61	I can forecast the total demand for the product better	1	2	3	4	5	6	7	86		78
1.62	I can forecast when the larger competitors will enter the market	1	2	3	4	5	6	7	87		79
1.63	I can make the business a success, even though other may fail	1	2	3	4	5	6	7	88		80

## Section D: Conceptions about the opportunity, environment framing

Despite the information presented in the case, for each of the statements **I think that ...**

	Statement	Strongly disagree	Dis-agree	Slightly disagree	Unsur e	Slightly agree	Agree	Strongly agree	√	item
1.64	There will <u>not</u> be competition that will enter the market within 3 years	1	2	3	4	5	6	7	89	81
1.65	The demand for the product is far more than what can be produced by FE	1	2	3	4	5	6	7	90	82
1.66	The planning makes sufficient provision for the logistics (inbound and outbound) of this project	1	2	3	4	5	6	7	91	83
1.67	Projected long term profitability seems good for FE	1	2	3	4	5	6	7	92	84
1.68	The cash flow will mostly be good	1	2	3	4	5	6	7	93	85
1.69	FE management will be able to handle the challenges they will face	1	2	3	4	5	6	7	94	86
1.70	FE is well protected from future competition	1	2	3	4	5	6	7	95	87
1.71	FE will be able to sell all the production easily	1	2	3	4	5	6	7	96	88
1.72	FE underestimated the assets and equipment needed to make the project work	1	2	3	4	5	6	7	97	89
1.73	Long term profitability is better than short term profitability	1	2	3	4	5	6	7	98	90
1.74	Cash inflows will be regular	1	2	3	4	5	6	7	99	91
1.75	Lauricio has the skills to make the venture work	1	2	3	4	5	6	7	100	92
1.76	FE is able to limit the entry of new competitors	1	2	3	4	5	6	7	101	93
1.77	It will be easy to convince users to buy this unique product	1	2	3	4	5	6	7	102	94
1.78	FE will quickly have enough infra structure set up to reach breakeven point and achieve economy of scale	1	2	3	4	5	6	7	103	95
1.79	Profitability will improve over time	1	2	3	4	5	6	7	104	96
1.80	Cash flow amounts will be adequate for the first three years	1	2	3	4	5	6	7	105	97
1.81	FE has the right people to deliver on this project and succeed	1	2	3	4	5	6	7	106	98

Looking at the FE scenario, **I think that .....**

	Statement	Strongly disagree	Dis-agree	Slightly disagree	Unsur e	Slightly agree	Agree	Strongly agree	√	item
1.82	There are more external opportunities than threats	1	2	3	4	5	6	7	107	99
1.83	The plan shows more strengths than weaknesses	1	2	3	4	5	6	7	108	100
1.84	There is a better chance for success than for failure	1	2	3	4	5	6	7	109	101
1.85	The environment seems ideal for this project now	1	2	3	4	5	6	7	110	102
1.86	FE has more going for it than against it	1	2	3	4	5	6	7	111	103
1.87	Performance potential of FE will increase over time	1	2	3	4	5	6	7	112	104

**Self Efficacy**

Please indicate the extent to which you agree with each of the following statements

	Statement	Strongly disagree	Dis-agree	Slightly disagree	Unsure	Slightly agree	Agree	Strongly agree	V	item
1.88	I am strong enough to overcome life's struggles	1	2	3	4	5	6	7	113	106
1.89	At root, I am a weak person	1	2	3	4	5	6	7	<b>114</b>	<b>107</b>
1.90	I can handle the situations that life brings	1	2	3	4	5	6	7	115	108
1.91	I am usually an unsuccessful person	1	2	3	4	5	6	7	<b>116</b>	<b>109</b>
1.92	I often feel there is nothing I can do well	1	2	3	4	5	6	7	<b>117</b>	<b>110</b>
1.93	I feel competent to deal effectively with the real world	1	2	3	4	5	6	7	118	111
1.94	I often think I am a failure	1	2	3	4	5	6	7	<b>119</b>	<b>112</b>
1.95	I usually feel I can handle the typical problems that come up in life	1	2	3	4	5	6	7	120	113

**HBDI Profile information**

Please make sure your name (and student number if relevant) is included to enable us to obtain the HBDI profile information if you do not know it.

I have completed the HBDI profile assessment Yes / No

Name and Surname \_\_\_\_\_ Student no \_\_\_\_\_

	Score	V	item
1.96	Profile score for A	121 – 123	114
1.97	Profile score for B	124-126	115
1.98	Profile score for C	127-129	116
1.99	Profile score for D	130-132	117
1.100	Adjective pair score for A	133-134	118
1.101	Adjective pair score for B	135-136	119
1.102	Adjective pair score for C	137-138	120
1.103	Adjective pair score for D	139-140	120

## Appendix C



# HBDI

## Herrmann Brain Dominance Instrument Thinking Styles Assessment

This 120-question survey form results in a profile of your preferred thinking styles. By understanding your thinking style preferences you can achieve greater appreciation how you learn, make decisions, solve problems, and communicate, and why you do these things—and others—the way you do. The survey measures preferences rather than skills. It is not a test; there are no wrong answers. You will gain the greatest understanding by answering the questions frankly and sincerely

### Herrmann International

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Use of this form is subject to your agreement with the following conditions: (i) The instrument must be used in its entirety; no portion may be extracted and used separately. (ii) No change or alteration of the instrument in any way is permitted; to preserve the integrity of the instrument and its scoring methodology, the instrument must be used exactly as it is produced here. (iii) Any use of the instrument must contain the notice of copyright held by The Ned Herrmann Group. (iv) The title - Herrmann Brain Dominance Instrument - is an integral part of the instrument, and must always appear on the document.

### INSTRUCTIONS

A profile of your mental preferences will be determined by your responses to the following 120 questions. Answer each question by writing in the appropriate words or numbers, or marking the boxes provided. This is not a test, and there are no right or wrong answers. You are only indicating your preferences. Please respond to questions as authentically as possible, keeping in mind your **total self, at work and at home**. When you have completed the survey form, confirm that you have answered every question. Then complete the name and address information on the back of the form, and send or fax pages 2 to 5 to Herrmann International Africa at the address on the cover.

Refer to the glossary of terms for clarification of the terms used. Save the glossary page for reference when you receive your profile results.

## GLOSSARY OF TERMS

**analytic** • Breaking up things or ideas into parts and examining them to see how they fit together.

**artistic** • Taking enjoyment from or skillful in painting, drawing, music, or sculpture. Able to coordinate color, design, and texture for pleasing effects.

**conceptual** • Able to conceive thoughts and ideas; to generalize abstract ideas from specific instances.

**controlled** • Restrained, holding back, in charge of one's emotions.

**conservative** • Tending towards maintaining traditional and proven views, conditions, and institutions.

**creative** • Having unusual ideas and innovative thoughts. Able to put things together in new and imaginative ways.

**critical** • Exercising or involving careful judgement or evaluation, e.g., judging the feasibility of an idea or product.

**detailed** • Paying attention to the small items or parts of an idea or project.

**dominant** • Ruling or controlling; having strong impact on others.

**emotional** • Having feelings that are easily stirred; displaying those feelings.

**empathetic** • Able to understand how another person feels, and able to communicate that feeling.

**extrovert** • More interested in people and things outside of self than internal thoughts and feelings. Quickly and easily exposes thoughts, reactions, feelings, etc. to others.

**financial** • Competent in monitoring and handling of quantitative issues related to costs, budgets, and investments.

**holistic** • Able to perceive and understand the "big picture" without dwelling on individual elements of an idea, concepts, or situation. Can see the forest as contrasted with the trees.

**imaginative** • Able to form mental images of things not immediately available to the senses or never wholly perceived in reality; able to confront and deal with a problem in a new way.

**implementation** • Able to carry out an activity and ensure fulfillment by concrete measures and results.

**innovating** • Able to introduce new or novel ideas, methods, or devices.

**integration** • The ability to combine pieces, parts and elements of ideas, concepts and situations into a unified whole.

**intellectual** • Having superior reasoning powers; able to acquire and retain knowledge.

**interpersonal** • Easily able to develop and maintain meaningful and pleasant relationships with many different kinds of people.

**introvert** • Directed more towards inward reflection and understanding than towards people and things outside of self. Slow to expose reactions, feelings, and thoughts to others.

**intuitive** • Knowing something without thinking it out – having instant understanding without need for facts or proof.

**logical** • Able to reason deductively from what has gone before.

**mathematical** • Perceiving and understanding numbers and being able to manipulate them to a desired end.

**metaphorical** • Able to understand and make use of visual and verbal figures of speech to suggest a likeness or an analogy in place of literal descriptions, e.g., "heart of gold."

**musical** • Having an interest in or talent for music and/or dance.

**organized** • Able to arrange people, concepts, objects, elements, etc. into coherent relationships with each other.

**planning** • Formulating methods or means to achieve a desired end in advance of taking actions to implement.

**problem solving** • Able to find solutions to difficult problems by reasoning.

**quantitative** • Oriented toward numerical relationships; inclined to know or seek exact measures.

**rational** • Making choices on the basis of reason as opposed to emotion.

**reader** • One who reads often and enjoys it.

**rigorous thinking** • Having a thorough, detailed approach to problem-solving.

**sequential** • Dealing with things and ideas one after another or in order.

**simultaneous** • Able to process more than one type of mental input at a time, e.g. visual, verbal, and musical; able to attend to more than one activity at a time.

**spatial** • Able to perceive, understand and manipulate the relative positions of objects in space.

**spiritual** • Having to do with spirit or soul as apart from the body or material things.

**symbolic** • Able to use and understand objects, marks, and signs as representative of facts and ideas.

**synthesizer** • One who unites separate ideas, elements, or concepts into something new.

**technical** • Able to understand and apply engineering and scientific knowledge.

**teaching/ training** • Able to explain ideas and procedures in a way that people can understand and apply them.

**verbal** • Having good speaking skills; clear and effective with words.

**writer** • One who communicates clearly with the written word and enjoys it.

## BIOGRAPHICAL INFORMATION

Please complete **every** question according to the directions given. Each response, including your answers to questions 2, 3 and 4, provide important data. When directions are not followed or data is incomplete we are unable to process your survey, and must return it to you.

1. Name \_\_\_\_\_ 2. Gender: M  F

3. Educational focus or specialist subject(s) \_\_\_\_\_

4. Occupation or job title \_\_\_\_\_

Describe your work (please be as specific as possible) \_\_\_\_\_

## HANDEDNESS

5. Which picture most closely resembles the way you hold a pencil?

A



B



C



D



6. What is the strength and direction of your handedness?

A  Primary left

B  Primary left  
Some right

C  Both hands equal

D  Primary right,  
some left

E  Primary right

## SCHOOL SUBJECTS

Think back to your performance in the elementary and/or secondary school subjects identified below. Rank order all three subjects on the basis of how well you did: **1** = best; **2** = second best; **3** = third best.

7. \_\_\_ Maths

8. \_\_\_ Foreign language

9. \_\_\_ Native language or mother tongue

**Please check that no number is duplicated:** The numbers **1**, **2**, and **3** must be used **once** and **only once**. Correct if necessary

## WORK ELEMENTS

Rate each of the work elements below according to your strength in that activity, using the following scale: **5** = work I do best; **4** = work I do well; **3** = neutral; **2** = work I do less well; **1** = work I do least well. Enter the appropriate number next to each element. **Do not use any number more than four times.**

10. \_\_\_ Analytical

16. \_\_\_ Technical Aspects

21. \_\_\_ Innovating

11. \_\_\_ Administrative

17. \_\_\_ Implementation

22. \_\_\_ Teaching/Training

12. \_\_\_ Conceptualising

18. \_\_\_ Planning

23. \_\_\_ Organisation

13. \_\_\_ Expressing Ideas

19. \_\_\_ Interpersonal Aspects

24. \_\_\_ Creative Aspects

14. \_\_\_ Integration

20. \_\_\_ Problem Solving

25. \_\_\_ Financial Aspects

15. \_\_\_ Writing

**Please tally: Number of 5's \_\_\_\_\_, 4's \_\_\_\_\_, 3's \_\_\_\_\_, 2's \_\_\_\_\_, 1's \_\_\_\_\_.** If there are more than **four** for any category, please redistribute.

## KEY DESCRIPTORS

Select **eight adjectives** which best describe the way you see yourself. **Enter a 2 next to each of your eight selections. Then change one 2 to a 3 for the adjective which best describes you.**

26. \_\_\_ Logical

35. \_\_\_ Emotional

43. \_\_\_ Symbolic

27. \_\_\_ Creative

36. \_\_\_ Spatial

44. \_\_\_ Dominant

28. \_\_\_ Musical

37. \_\_\_ Critical

45. \_\_\_ Holistic

29. \_\_\_ Sequential

38. \_\_\_ Artistic

46. \_\_\_ Intuitive

30. \_\_\_ Synthesizer

39. \_\_\_ Spiritual

47. \_\_\_ Quantitative

31. \_\_\_ Verbal

40. \_\_\_ Rational

48. \_\_\_ Reader

32. \_\_\_ Conservative

41. \_\_\_ Controlled

49. \_\_\_ Simultaneous

33. \_\_\_ Analytical

42. \_\_\_ Mathematical

50. \_\_\_ Factual

34. \_\_\_ Detailed

**Please count: seven 2's and one 3?** Correct if necessary.

## HOBBIES

Indicate a **maximum of six** hobbies you are actively engaged in. Enter a **3** next to your major hobby, a **2** next to each primary hobby, and a **1** next to each secondary hobby. Enter only **one 3**.

- |                            |                             |                            |
|----------------------------|-----------------------------|----------------------------|
| 51. _____ Arts/Crafts      | 59. _____ Gardening/Plants  | 67. _____ Sewing           |
| 52. _____ Boating          | 60. _____ Golf              | 68. _____ Spectator Sports |
| 53. _____ Camping/Hiking   | 61. _____ Home Improvements | 69. _____ Swimming/Diving  |
| 54. _____ Cards            | 62. _____ Music Listening   | 70. _____ Tennis           |
| 55. _____ Collecting       | 63. _____ Music Playing     | 71. _____ Travel           |
| 56. _____ Cooking          | 64. _____ Photography       | 72. _____ Woodworking      |
| 57. _____ Creative Writing | 65. _____ Reading           | _____ Other _____          |
| 58. _____ Fishing          | 66. _____ Sailing           | _____                      |

Please review: **Only one 3** and **no more than six hobbies**. Correct if necessary.

## ENERGY LEVEL

73. Thinking about your energy level or "drive," select the one that best represents you. Mark box **A**, **B**, or **C**.
- a.  Day person      b.  Day/night person equally      c.  Night person

## MOTION SICKNESS

74. Have you ever experienced motion sickness (nausea, vomiting) in response to vehicular motion (while in a car, boat, plane, bus, train, amusement ride)? Check box **A**, **B**, **C**, or **D** to indicate the number of times.

- a.  None      b.  1-2      c.  3-10      d.  More than 10

75. Can you read while traveling in a car without stomach awareness, nausea, or vomiting?

- a.  Yes      b.  No

## ADJECTIVE PAIRS

For **each paired item** below, check the word or phrase which is more descriptive of yourself. Mark box **A** or **B** for **each pair**, even if the choice is a difficult one. **Do not omit any pairs**.

- |                         |                          |                          |                      |                             |                          |                          |                          |
|-------------------------|--------------------------|--------------------------|----------------------|-----------------------------|--------------------------|--------------------------|--------------------------|
| 76. .... Conservative   | <input type="checkbox"/> | <input type="checkbox"/> | Empathetic           | 88. .... Imaginative        | <input type="checkbox"/> | <input type="checkbox"/> | Sequential               |
| 77. .... Analyst        | <input type="checkbox"/> | <input type="checkbox"/> | Synthesizer          | 89. .... Original           | <input type="checkbox"/> | <input type="checkbox"/> | Reliable                 |
| 78. .... Quantitative   | <input type="checkbox"/> | <input type="checkbox"/> | Musical              | 90. .... Creative           | <input type="checkbox"/> | <input type="checkbox"/> | Logical                  |
| 79. ... Problem-solver  | <input type="checkbox"/> | <input type="checkbox"/> | Planner              | 91. .... Controlled         | <input type="checkbox"/> | <input type="checkbox"/> | Emotional                |
| 80. .... Controlled     | <input type="checkbox"/> | <input type="checkbox"/> | Creative             | 92. .... Musical            | <input type="checkbox"/> | <input type="checkbox"/> | Detailed                 |
| 81. .... Original       | <input type="checkbox"/> | <input type="checkbox"/> | Emotional            | 93. .... Simultaneous       | <input type="checkbox"/> | <input type="checkbox"/> | Empathetic               |
| 82. .... Feeling        | <input type="checkbox"/> | <input type="checkbox"/> | Thinking             | 94. .... Communicator       | <input type="checkbox"/> | <input type="checkbox"/> | Conceptualizer           |
| 83. .... Interpersonal  | <input type="checkbox"/> | <input type="checkbox"/> | Organiser            | 95. .... Technical things   | <input type="checkbox"/> | <input type="checkbox"/> | People-oriented          |
| 84. .... Spiritual      | <input type="checkbox"/> | <input type="checkbox"/> | Creative             | 96. .... Well-organised     | <input type="checkbox"/> | <input type="checkbox"/> | Logical                  |
| 85. .... Detailed       | <input type="checkbox"/> | <input type="checkbox"/> | Holistic             | 97. .... Rigorous Thinking  | <input type="checkbox"/> | <input type="checkbox"/> | Metaphorical Thinking    |
| 86. ... Originate Ideas | <input type="checkbox"/> | <input type="checkbox"/> | Test and Prove Ideas | 98. ... Like Things Planned | <input type="checkbox"/> | <input type="checkbox"/> | Like Things Mathematical |
| 87. ... Warm, Friendly  | <input type="checkbox"/> | <input type="checkbox"/> | Analytical           | 99. .... Technical          | <input type="checkbox"/> | <input type="checkbox"/> | Dominant                 |

Please review: **Did you mark one and only one of each pair?** Correct if necessary.



**FROM**

You must provide an address and indicate the method of payment in order to receive your HBDI results. Please print.  
Name \_\_\_\_\_ Date \_\_\_\_\_

Company \_\_\_\_\_

Division \_\_\_\_\_

Company address \_\_\_\_\_

\_\_\_\_\_

Daytime phone (\_\_\_\_) \_\_\_\_\_ Evening phone (\_\_\_\_) \_\_\_\_\_ Fax (\_\_\_\_) \_\_\_\_\_

Home address \_\_\_\_\_

\_\_\_\_\_

E-mail address \_\_\_\_\_

Note: There is a fee for processing this survey form.

Payment method (please make a payment into the following account and fax the deposit / electronic transfer document +27-(0)12-807-6002)

Banking details

**Ned Herrmann International Africa Pty (Ltd)**

**ABSA (Hatfield)**

Branch Code : 335545

Account number 4055061035

**CONFIDENTIAL RESEARCH**

The following questions are not used in scoring the HBDI. However, the answers to these questions are valuable in our

continuing brain dominance research. Skip any questions you wish, but please answer as many as you feel you can.

Indicate the birth order of your brothers, sisters, and self by marking the appropriate symbols with crosses. Then circle the symbol representing yourself.

<b>MALE</b>													<b>MALE</b>
	Oldest	2nd	3rd	4th	5th	6 <sup>th</sup>	7th	8th	9th	10th	11th	12th	
<b>FEMALE</b>													<b>FEMALE</b>

Date of birth \_\_\_\_\_ Citizenship \_\_\_\_\_ Native language \_\_\_\_\_

Ethnicity: Black  White  Asian  Other: \_\_\_\_\_

If you are a parent, please indicate: number of children \_\_\_\_\_ age of oldest \_\_\_\_\_ age of youngest \_\_\_\_\_

Couple status: married  separated  divorced  living together  widow/widower  single

To what extent were you formally educated for the field you are now working in?

not at all  somewhat  to a great degree  fully

Have you filled out the HBDI survey previously? If so, and your name or address has changed since then, please specify the previous name or address

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

How do you see yourself? Please distribute 100 points between these four descriptions:

Rational \_\_\_\_\_ Organised \_\_\_\_\_ Interpersonal \_\_\_\_\_ Imaginative \_\_\_\_\_

Please check the best descriptor indicating your mood or the way you felt at the time you were completing this survey:

happy  enthusiastic  interested  OK  relaxed  indifferent  
 distracted  tired  unhappy