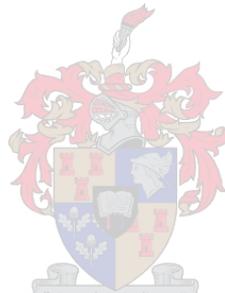


**Entrepreneurial strategic thinking in the context of
uncertain decision-making environments:
A cognitive perspective of opportunity recognition**

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Declaration

By submitting this research assignment I, Sandheep Ramluckan, declare that the entirety of the work contained therein is my own, original work, that I am the owner of the copyright thereof (unless to the extent explicitly otherwise stated) and that I have not previously in its entirety or in part submitted it for obtaining any qualification.

S. Ramluckan

December 2017

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Abstract

When faced with a potential opportunity for a new venture, an entrepreneur has to decide whether to pursue or not pursue that opportunity. Such a decision is very often made in the context of unknown or unknowable knowledge and a great deal of uncertainty.

How entrepreneurs deal with uncertainty and make decisions about a business opportunity in the context of uncertainty was the focus of this exploratory study. Because there are many different aspects of opportunity recognition, the researcher examined and compared the decision-making of expert and novice entrepreneurs relative to the supply and demand factors associated with an entrepreneurial opportunity.

The approach of this research was to develop a comprehensive theory on opportunity recognition by addressing the perceptions as well as the antecedents and components of an opportunity. Theory development is supported by the empirical findings of the current study as well as by literature on entrepreneurial decision-making and cognitions.

The findings indicate that novice entrepreneurs seek to develop new or novel products to cater for existing markets, while expert entrepreneurs seek to replicate existing products in new markets and they use their prior knowledge to assist them in navigating the potential challenges that a new market brings.

Additionally, when comparing opportunity recognition of expert and novice entrepreneurs in terms of their supply-demand combinations, findings indicate that novice entrepreneurs' opportunity recognition is supply-driven while expert entrepreneurs' opportunity recognition is demand-driven.

Finally, this research conceptually explored the role of the decision-making situations in the recognition of entrepreneurial opportunities. The research study offers a theoretical foundation for introducing the construct of entrepreneurial satisficing into the entrepreneurship domain.

Key words

Entrepreneurship; Opportunity recognition; Cognition, Decision-making

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CHAPTER 1

INTRODUCTION

1.1. INTRODUCTION

The creation of a new venture is an activity that takes place when neither the goal nor often the initial conditions are known at the start but rather, are constructed during the process. This is because usually, there is no single right or best solution, and even the starting situation may be so complex and constantly changing that it is difficult to analyse it reliably to the extent necessary (Makimurto-Koivumaa & Puhakka, 2013:1).

A focal construct in new venture creation is the decision-making processes of the entrepreneur, which includes identifying a problem, creating or discovering alternative solutions, evaluating alternatives and then selecting a particular solution (Zivdar & Imanipour, 2017:732). Equally important is the entrepreneur's propensity for uncertainty, since as pointed out by Pryor et al., (2015), "entrepreneurs' respective conceptualizations of opportunity represent their idiosyncratic resolution of the uncertainty that defines what the opportunity is and how the opportunity can be exploited".

Several scholars argue that in the face of high uncertainty, different entrepreneurs are likely to form different perceptions about an opportunity's potential and possible effects, which vary according to the entrepreneurial contexts (Shepherd, Williams & Patzelt, 2015:11; Shepherd & Patzelt, 2017:257). Additionally, recent empirical studies suggest that entrepreneurs adopt different decision-making modes based on their perception of the level of risk or uncertainty associated with new venture creation decisions (For example, Engel, Dimitrova, Khapova & Elfring, 2014:12; Maine, Soh & Dos Santos, 2015:53).

The current study explores variances in the entrepreneur's level of experience and expertise and what effect these variances have on their decision strategies for mitigating uncertainty associated with entering new markets or developing novel products. Central to the current study is the mediating role of cognition in entrepreneurial decision-making, particularly during the conceptualisation of opportunities for a new business venture.

Entrepreneurship literature suggests that ever more, scholars are starting to record that entrepreneurial cognition mediates the relationship between an entrepreneurial context and an entrepreneurial outcome (See Mathews, 2016:7); which suggests that the entrepreneurs' cognitions are pivotal to the entrepreneurial process. As an example, Schmidt's (2015:549) study on the role of judgment in the creation of novel strategies connects cognition to idiosyncratic resources and strategic opportunities by arguing that cognition mediates the link between

resources and opportunities. At the same time Mathews (2016:7) points out that the future of a new venture created is in relation to the maximization of the cognitive resources used in the opportunity identification and decision-making stages”.

This research examines new venture creation decisions from a perspective that considers the cognitive states and perceptions of entrepreneurs which further informs the critical role of cognitive constructs in entrepreneurial decision-making (Robinson & Marino, 2015:149). In so doing, this study builds on the arguments advanced in several earlier studies which explore decision making during opportunity recognition in the context of effectuation and causation processes (For example: Engel, Dimitrova, Khapova & Elfring, 2014:12; Maine, Soh & Dos Santos, 2015:53; Sarasvathy, Kumar, York & Bhagavatula, 2014:71).

The main investigation of these studies is whether novice entrepreneurs adopt causation processes and whether expert entrepreneurs adopt effectuation decision-making processes during opportunity recognition. Such investigations imply that novice entrepreneurs view opportunity in terms of risk factors and expert entrepreneurs in terms of uncertainty, but since uncertainty is inherent in the new venture creation process, a key question is should causation and effectuation be seen as polar opposites on a continuum or more as complimentary decision- making modes.

1.2. RESEARCH APPROACH

In order to be able to explore and analyse variances in the new venture creation processes of entrepreneurs during different stages of their entrepreneurial journey, it is necessary to consider the thinking and decision-making of entrepreneurs. That is to say, that it is essential to study the cognitions of the entrepreneurs. As such, the current study adopts a cognitive perspective in exploring the opportunity recognition processes of entrepreneurs during the idea conceptualisation stage of new venture creation process.

A cognitive approach to entrepreneurship focuses primarily on the mental processes of individuals as they interact with other individuals and their surrounding environment (Berglund, 2015:472). Such an approach recognizes that human behavior reflects the unique experiences and orientation people bring to a given circumstance (Hsieh & Kelley, 2016:297), and is therefore relevant to the study of opportunity recognition since a cognitive approach offers great research insights for explaining new venture creation decisions (Robinson & Marino, 2015:149).

Many recent studies have acknowledged the pivotal role of cognition in understanding central aspects of the entrepreneurial process, including opportunity recognition and identification (For example, Baron, 2014; Mathews, 2016:7; Robinson & Marino, 2015:149). Moreover, several scholars have utilised a cognitive perspective to explain or theorise about the mediating role of cognition in entrepreneurial processes. Recent scholarly works which have adopted a cognitive

approach to posit various entrepreneurship theories include: Robinson (2015:149), theory of overconfidence; Zivdar et al., (2017:732), antecedents of new venture creation decisions; Williams et al., (2015:218), rules-based reasoning in opportunity evaluation; Maine et al., (2015:53), entrepreneurial decision-making modes; Engel et al., (2014:12), self-efficacy and effectuation; Cornelissen et al., (2010:539), inductive reasoning.

One method to investigate cognition's central role in entrepreneurship, is to draw on the knowledge of successful entrepreneurs (Baron, 2014). In exploring variances in the decision making of expert and novice entrepreneurs, the current study draws on the knowledge of successful entrepreneurs who were designated as expert entrepreneurs, while first-time entrepreneurs were designated as novice entrepreneurs. The evaluation criterion used for designating entrepreneurs as either expert or novice is explained later in the study.

Furthermore, in exploring variances in the decision-making of two cohorts of entrepreneurs at different stages in their entrepreneurial journey, the current study takes on a process approach. Such an approach tends to focus on cognition and entrepreneurial outcomes as emergent effects and thus assume more complex causal links between individual entrepreneurs, their cognition and actions (Grégoire, Cornelissen, Dimov & Burg, 2015:125).

Several scholars advocate the importance of using process approaches in entrepreneurship studies and the need to study entrepreneurs in the whole continuum of the entrepreneurial process as a means of achieving a good understanding of entrepreneurial action (For example, Grégoire, Cornelissen, Dimov & Burg, 2015:125; Harms & Schiele, 2012:95; Zivdar & Imanipour, 2017:732).

Zivdar et al., (2017:732) argue that entrepreneurial action is a phenomenon that results in a new venture as one of its main objective outcomes, and ignoring the formation process of these outcomes results in a defective explanation of this phenomenon, and deviation from the main tenets of entrepreneurship as an academic discipline (Zivdar & Imanipour, 2017:732).

A process approach has proved useful for studying various aspects of new venture creation. For example, Harms and Schiele (2012:95) adopt a process-based perspective to analyse entry mode selection for international new venture creation. By framing the international market entry as an entrepreneurial process, the researchers were able to analyse the antecedents and consequences of causation and effectuation in the entry mode selection.

Finally, the main value of a process approach is that it recognises that within the opportunity recognition process, there are different paths to arriving at an opportunity (Vogel, 2016:3). As an example, Vogel (2016:6) provides a framework that illustrates various idea-generation paths that may be pursued in the process of advancing a venture idea to venture opportunity.

1.3. RESEARCH GAP

Several recent studies have noted that research on entrepreneurial decision-making in the context of uncertainty is notably lacking. For example in a recent systematic literature review of entrepreneurial opportunity recognition, George et al., (2016:309) indicate that contrary to conventional wisdom, the field is fragmented and empirically underdeveloped. Their comprehensive literature analysis shows that only a handful of authors have contributed specifically to developing dialogues related to opportunity recognition. They note that:

“Most studies employ environmental conditions and personality traits as control or predictor variables. Thus, further study should emphasize the importance of environmental conditions, while placing more attention on quantifying its influences on the opportunity recognition process. We could also expect that considering the influence of the environment may explain when the opportunity creation or the discovery process becomes more relevant to opportunity exploitation. Moreover, researchers can explore and test the cognitive differences among individuals in their decision-making style (e.g. risk vs. uncertainty) and its influence on the opportunity recognition process”.

Several scholars support the call for cognitive entrepreneurship studies that explore whether cognitive differences among individuals account for variances among new venture creation activities. For example Robinson et al., (2015:149) stress that if such a relationship exists between a relevant cognitive construct and the new venture creation process, in theory and practice, the absence of empirical evidence warrants further inquiry.

Furthermore, George et al., (2016:309) note that the majority of conceptual and empirical studies on opportunity recognition have focused primarily on opportunity discovery, meaning that opportunity creation remains largely unexplored in empirical studies. Their call for future studies to consider opportunity creation and explore it under different conditions and in different research contexts, is heeded by the current study.

The broad range of research outlined thus far suggests that cognitive differences among individuals are an important factor in explaining why different individuals view similar opportunities differently. Thus, within the framework of the individual and “opportunity”, a central task for entrepreneurship research is to develop and test theory about how characteristics of “opportunities”, directly and in interaction with actor characteristics, give shape to entrepreneurial processes (Davidsson, 2015:674).

The two main views on opportunity recognition evolve from theories posited about opportunity discovery and opportunity creation. The opportunity discovery view is closely associated with

causation decision-making while the opportunity creation view is associated with effectuation decision-making mode. A key difference between discovery and effectuation theory is that under the discovery view, the means are known and the ends unknown and the entrepreneur “discovers” previously unknown means for achieving a known end, which is profit maximization. Under the effectuation view, the entrepreneur creates the connection between the means and the most suitable ends (Essig, 2015:227).

The discovery view, which has its grounding in the Austrian School of Economics, takes on almost static view of the entrepreneurial process. It fails to adequately address the interactive and dynamic nature of the entrepreneurial process especially in such domains as technology entrepreneurship that is characterised by the introduction of novel and disruptive technologies for which markets sometimes do not exist and have to be created from anew. In such contexts, the creation / effectuation view is more equipped for explaining the process of entrepreneurship as it unfolds and new means-ends relationships are created.

In recent years, much research has been devoted to progressing knowledge on effectuation and significant contributions have been made. Nonetheless, a gap in the theory on new venture creation decision-making in the context of uncertainty, stems from our lack of literature regarding the pathways or connections entrepreneurs create between means and the most suitable ends’, particular with respect to the supply-side and demand-side components of an entrepreneurial opportunity.

Hence, a limitation of extant theory on opportunity recognition is that it fails to adequately explain the role of supply-side and demand-side factors in explicating entrepreneurial opportunities. The current study seeks to explore variances in the causation and effectuation-based decision-making processes of expert and novice entrepreneurs, with the goal of contributing to scholarly understanding of the opportunity recognition process

Through its empirical findings, the current study expands knowledge on the specific supply-demand pathways or connections that entrepreneurs pursue when conceptualising an opportunity for new venture creation and the cognitive decision rules that expert entrepreneurs adopt in order to manage or mitigate the uncertainty inherent in new venture creation decisions.

1.4. RESEARCH OBJECTIVE

Shepherd et al., (2015:11) conducted a review of the literature on entrepreneurial decision-making in which they concluded that a variety of factors influence opportunity decisions. In particular, their review highlighted the following:

- Entrepreneurs are heterogeneous in their use of decision-making techniques or “tools,” and these differences have an impact on the decision to create a new venture.
- Entrepreneurs are heterogeneous in their knowledge and experiences, and these differences have an impact on the entrepreneurial decision to internalize or externalize opportunity-exploitation decisions.
- Entrepreneurs are heterogeneous in how they perceive environmental conditions, including uncertainty and market conditions, and these differences affect decisions related to entrepreneurial opportunity.

This review by Shephard et al., (2015:11) highlights the uniqueness and idiosyncratic nature of entrepreneurial decision-making and it is this heterogeneity between entrepreneurs with different levels of entrepreneurial experience and expertise that provides the framework for the current study.

The main takings from Shepherd et al's., (2015:11) review are that differences among entrepreneurs exist on three important fronts. These are: (i) entrepreneurs differ in terms of their perceptions of the environmental uncertainty, (ii) entrepreneurs differ in terms of their experience and expertise, (iii) and entrepreneurs differ in terms of their decision-making. Because of these differences, entrepreneurs are likely to differ in the manner in which they recognise, create or discover opportunities for new venture creation.

In an attempt to shed more light on the key factors that influence opportunity recognition practices of entrepreneurs, the current study explores variances in the decision making modes of expert and novice entrepreneurs as they conceptualise new venture creation opportunities in the technology sector. Even though the current study explores variances between two groups of entrepreneurs namely, expert and novice entrepreneurs and their venture creation decisions, it is important to note that the aim of the current research is not to highlight differences between expert and novice entrepreneurs. Rather, the aim of the current study is to shed light on how these differences influence decision-making about a new venture opportunity and what can be learnt from skilled and experienced decision-making processes that expert entrepreneurs utilise to manage uncertainty inherent in the new venture creation process.

The grounding for this is based on the premise that the development of expertise in starting new ventures leads to important changes in how individuals make decisions (Engel, Dimitrova, Khapova & Elfring, 2014:12).

1.5. RESEARCH PROBLEM AND QUESTIONS

The process of new venture creation is characterised by highly uncertain decision-making contexts. This is even more so in the case of new venture creation in the technology sector where entrepreneurial decision-making processes iterate over long periods of time (Maine, Soh & Dos Santos, 2015:53).

Research suggests that there are two distinct entrepreneurial decision-making processes, namely, causation and effectuation. Causation has connotations of rational planning based on prediction strategies, whereas effectuation is associated with non-predictive, emergent strategies. Furthermore, in effectuation goals emerge in the course of the process, whereas in causation, goals are defined prior to decision-making (Harms & Schiele, 2012:95). Harms et al., (2012:95) suggest that these differences in the two approaches are important as the choice of either causation or effectuation affects the type of opportunities that are finally exploited.

Engel et al., (2014:12) note that novice entrepreneurs still tend to rely on predictions and forecasts as they move their ideas through the venture creation process but they argue that entrepreneurs' initial decisions are made in the face of uncertainty that renders predictive decision-strategies based on causation model largely inadequate. They submit that effectuation – a non-predictive logic used by expert entrepreneurs – is positioned as a viable alternative since it does not require foresight but is rather concerned with directly shaping only those elements of the future currently within one's control.

There is support from previous literature that suggests that in highly uncertain situational contexts, entrepreneurs are more likely to adopt effectuation decision-making processes rather than causal decision-making processes. However, there is also support that favours the view of these processes as being complimentary to each other. For example, Maine et al., (2015:53) conducted a study in which they investigated effectuation and causation as two opposing decision-making modes which lead to opportunity creation and recognition. Maine et al., (2015:53) found evidence pointing towards the iterative nature of opportunity generation and of entrepreneurial decision-making modes. In particular, they found that as entrepreneurs respond to their evolving environment and to the level of regulatory and funding constraint, entrepreneurs could shift from effectuation to causation, remain in one particular mode, or adopt a combination mode.

Kalinic et al., (2014:635) noticed that entrepreneurs prefer causal to effectual logic if information availability and information processing capability allow it. They argue that entrepreneurs decision-making do fluctuate between effectual and causal modes based on the level of uncertainty and entrepreneurs' propensity to base decisions on affordable loss principle.

Since the choice of either causation or effectuation affects the types of decision made and ultimately the types of opportunities that are exploited by the entrepreneur, it is important to understand whether differences exist between the decision-making processes of expert and novice entrepreneurs. In this respect, the study posits its first research question:

1. *Are there differences in the modes of decision-making that expert and novice entrepreneurs adopt during the process of recognising an entrepreneurial opportunity?*

The basic components of entrepreneurial opportunities include a demand side, a supply side, and an economic means for transactions to take place between the two (Grégoire & Shepherd, 2012:753). In other words, an opportunity consists of a supply-side, a demand-side and the means to bring these together.

Cohen et al., (2007) suggest that opportunities are likely to be recognised by combining known supply and demand elements of a market in ways that are more efficient. Gregoire et al., (2012:753) expand on this by proposing that differences in opportunity ideas result from differences in entrepreneurs cognitive efforts to find alignment between supply and demand sides of the opportunity. Hence, an exploration of expert and novice entrepreneur's efforts to find alignments between supply and demand sides of an opportunity is relevant to the current study, as variances would provide further insights into the decision-making processes of these two groups.

Jones and Pitelis (2015:309) argue that in fast shifting environments, entrepreneurs act on their 'path dependent' and 'shaped' images to create demand and supply-side conditions, and it is through such paths that they are able to appropriate value and hence realise their vision. Similarly, Maine et al., (2015:53) in their study on decision-making modes, suggest that individual entrepreneurs frame their decision problems and assess the contingencies and constraints associated with imagined paths or predicted paths into the future.

Wood et al., (2014:252) state that there are a host of individual-level factors likely to influence the entrepreneurs' opportunity beliefs. In other words, opportunity-related information is cognitively processed in terms of what it means for the individual given the linkages and outcome predications the individual can make based on prior knowledge, experiences, and desires; and all these factors have a certain path dependency which is unique to the individual (Wood, McKelvie & Haynie, 2014:252).

While prior research acknowledges that entrepreneurs seek specific pathways through which they seek to appropriate value from an opportunity, it is still not clear whether differences exist in the type of pathways that expert and novices construct during the recognition of opportunities and how these paths influence or affect the entrepreneurs' perception of uncertainty.

This leads the researcher to propose the second research question in this study, which is:

2. *Are there differences in their supply-demand pathways instituted by expert and novice entrepreneurs during the conceptualisation of an opportunity for new venture creation?*

Kirkley (2016:151) suggests a model of the entrepreneurial decision making process for a new venture creation as taking place at three related levels or stages of analysis. These stages include the entrepreneur analysis, environmental analysis and the strategic decision process on the best approach to enter the market. This implies that there are critical factors throughout all three stages that need to be taken into account when contemplating a new venture (Kirkley, 2016:151).

Stated another way, there is risk and uncertainty associated with all three stages of analysis. For example, while some uncertainty may be removed when the entrepreneur clearly identifies a potential idea, there is still a degree of risk associated with creating a solution, and uncertainty connected with the best strategic approach (Kirkley, 2016:151).

If, as Packard et al., (2017) suggest, that entrepreneurship should be conceptualized as a “series of transitions from one type of perceived uncertainty, and the form of judgment that accompanies it, to another”; then it is evident that the entrepreneur is continuously making decision in the context of uncertainty. Considering the rapidly changing nature of the technology industry, such decision have to be made quickly as the entrepreneurs looks to get a product into the market place before their potential competitors.

It is widely accepted that when entrepreneurs gain repeated experiences within certain markets or in the development of ventures; they build richer and more specific mental models or scripts of their environment. It is such cognitive structures that entrepreneurs draw on or cognitively extend to new situations and through this process, identify the opportunity for a new venture (Cornelissen & Clarke, 2010:539). Priem et al., (2012:346) offer evidence of this by linking entrepreneurial success and prior experience. They argue that entrepreneurs with prior experience with the same consumers or markets possess market specific ‘idea sets’ which allow them to recognise consumer needs.

The opportunity creation perspective is centred on the assumption that entrepreneurs act within a decision-making context that is characterised by uncertainty (Hmieleski & Baron, 2008). That is to say that an entrepreneur must deal with several sources of uncertainty during the process of recognising opportunities for potentially successful business ventures. Critical components of this process are the search, interpretation, and processing of information about the product, markets, and competitive advantage, as well as the entrepreneur’s prior experience and level of expertise in a particular domain. In short, entrepreneurs must develop information-processing mechanisms capable of dealing with both internal and external sources of uncertainty.

Hence, an entrepreneur's prior knowledge and experience play a critical role in his ability to identify and exploit entrepreneurial opportunities (Arentz, Sautet & Storr, 2013:461). Furthermore, prior research indicates that opportunity-specific expertise moderates the effect of uncertainty under unpredictable conditions (Sarasvathy, Kumar, York & Bhagavatula, 2014:71). In other words, prior knowledge acts as a moderator in identifying opportunities (George, Parida, Lahti & Wincent, 2016:309).

Mathews (Mathews, 2016:7) argues that since cognition mediates the relationship between an entrepreneurial context and an entrepreneurial outcome, the future of a new venture created occurs in relation to the maximization of the entrepreneur's cognitive resources used in the opportunity identification and decision-making stages.

Clearly, entrepreneurs' cognition plays a mediating role in how entrepreneurs identify opportunities for new venture creation. It is expected that serial, experienced entrepreneurs would have developed from accumulate experience and expertise, specific cognitive abilities that assist them in their decision making about potential new venture opportunities, particularly in the context of complex, uncertain situated environments.

In recent years there has been increased importance placed by scholars on the pivotal role of cognition in decision-making. Nevertheless, the current study is of the opinion that considerably more research should be conducted in order to fully comprehend what role accumulated experience and the subsequent development of entrepreneurial expertise, play in directing decision-making, particularly with regard to resolving uncertainty during decisions about potential new venture creation opportunities.

It can be expected that expert entrepreneurs due to their accumulated entrepreneurship experience, would have developed strategies or cognitive mechanisms for enhancing their ability to recognise opportunities and mitigate the uncertainty involved in new venture creation. In this regard, the main research question in the current study is broadly stated as:

3. *Are there specific cognitive mechanisms that expert entrepreneurs use in an attempt to mitigate uncertainty as they transition from one type of uncertainty to the next?*

1.6. RESEARCH DESIGN

The current study is grounded in an interpretative research paradigm and therefore, adopts an inductive and qualitative approach in addressing the study's research questions. Since theory generation is the main goal of this study, the researcher adopted a grounded theory methodology, supported by cognitive mapping technique for data analysis.

The sample for this study consisted of two groups of entrepreneurs. One group consisted of expert entrepreneurs who were chosen on the basis of having started up two or more successful ventures. Having started two or more ventures suggests some measure of expertise in opportunity recognition (De Koning & Muzyka, 1999). The second group consisted of novice entrepreneurs. The novice entrepreneurs were chosen on the basis that they were first time entrepreneurs.

Personal interviews were conducted with each entrepreneur to elicit their views on opportunity recognition. The interview technique was chosen over other techniques such as verbal protocols because in research methodology literature, interviews are recognised as one of the best methods for eliciting cognitive maps (Eden & Ackerman, 1998). During the qualitative interviews, open-ended questions were posed to the entrepreneurs so as to obtain raw data in the form of a narrative (Scavarda, Bouzdine-Chameeva, Goldstein, Hays & Hill, 2006). Interview transcripts were coded and the key constructs were used for the development of the cognitive mappings.

The researcher recognises that the singularity of grounded theory method warrants added clarity of how key issues in a grounded theory design differ from other forms of qualitative research and more particularly from a quantitative research design. In this regard, the researcher discusses three key differentiating components of grounded theory: that of the literature review, research questions and the generation of hypotheses.

Most importantly, the first step in grounded theory methodology is to enter the research setting with as few predetermined ideas as possible – especially logically deduced prior hypotheses (Bryant & Charmaz, 2007:1). This is because, intrinsically, grounded theory invites empirical researchers to develop their own ideas instead of applying ungrounded theories in their empirical field and restricting the empirical work on the testing of hypotheses (Kelle, 2010:191).

Kelle (2010:191) argues that grounded theory methodology was developed to represent an alternative to the classical hypothetico-deductive approach to research that requires the construction of clear-cut categories and hypotheses before data are collected. As such, grounded theory offers a rationale for researchers as they begin their research—the method eliminates and precludes the need for hypotheses and conjectures at the start (Bryant & Charmaz, 2007:1).

In quantitative research, precise hypotheses are generated before data collection. Hypotheses of this type guide good quantitative research as such hypotheses can be tested and falsified if counter evidence is discovered. But an attempt to design a grounded theory project on such basis would lead to methodological misuse (Kelle, 2010:191). Kelle (2010:191) elaborates on this and explains “one would collect lots of material not suited to test the specific hypotheses and definitely disregard the richness of the data one can collect with the help of qualitative methods.

In fact, the use of hypotheses before data collection is one of the fundamental differentiation factors of using grounded theory method. As Bryant et al., (2007:1) explains, grounded theory requires that the analyst remain sensitive to the data by being able to record events and detect happenings without first having them filtered through and squared with pre-existing hypotheses and biases.

The current study follows the guidelines for research design using grounded theory as discussed above. In particular, the researcher draws on three contributory scholarly works with clearly set out the guidelines for designing a grounded theory research project. These are: Auerbach and Silverstein, (2003), *Qualitative data: An introduction to coding and analysis*; Bryant (2014:116), *The grounded theory method, The Oxford handbook of qualitative research*; and Strauss and Corbin (1998), *Basics of qualitative research: Techniques and procedures for developing grounded theory*.

Auerbach and Silverstein, (2003), provide a particularly useful reading on grounded theory method in their account the authors explain their inability to conduct in-depth social research using quantitative research design in their research project, and they elaborate on the tension between quantitative and qualitative research and how they resolved key differences between these research designs.

Drawing from their publication, some of the key factors to consider when using grounded theory methodology concern the research design, particularly with regard to the differentiation between research hypotheses versus research concerns. Generally, grounded theory studies are designed around research issues rather than specific research questions. This is because, as Auerbach et al., (2003) point out:

“Grounded theory research allows the researcher to admit that he may not know enough to pose a specific question. In fact, he may not know what the right question is until he has finished collecting and analysing the data. Therefore, instead of reading the literature looking for a specific question or problem, grounded theory instructs him to look for issues that are open and unclear. Research issues are found by looking for perspectives that are left out and assumptions that need to be challenged”.

Furthermore, because grounded theory does not assume that the researcher knows enough to formulate specific hypotheses, it allows the researcher to begin a research study without having to test a hypothesis. Instead, it allows the researcher to develop hypotheses by listening to what the research participants say, and because grounded theory method involves developing hypotheses after the data are collected, it is called hypothesis-generating research rather than hypothesis-testing research (Auerbach & Silverstein, 2003).

Grounded theory is a conceptual thinking and theory building rather than theory or hypothesis testing method. Defining components of grounded theory practice include the simultaneous involvement in data collection and analysis and constructing analytic codes and categories from data, not from preconceived logically deduced hypotheses (Khan, 2014:224). Thus, if the data has been analysed without a preconceived theory or hypothesis, that theory is truly grounded in the data because it came from nowhere else (Allan, 2003:1).

The grounded theory method places emphasis on research founded on directly gathered data, rather than initial hypotheses, and offers a route whereby researchers can aim to produce novel theoretical insights in the form of substantive theories (Bryant, 2014:116). Thus, the view that research is something based on existing theories can be challenged, offering the alternative proposition whereby theories and hypotheses can be the results of a research project (Bryant, 2014:116).

Bryant et al., (2014:116) explains that this is not to suggest that the latter viewpoint eclipses the former, but rather that the sequence of “theory then hypotheses then research” can be supplemented or replaced by the sequence “research then theory and hypotheses. In other words, it is from the data that researchers develop working hypotheses to explain what they see (Phillips, 2014:1).

Rather than test static hypotheses and then move on to collect and analyze more data, as is common with deductive approaches, inductive theorists gather more data to refine their working hypotheses. When they reach theoretical saturation, the point at which they can predict what the next interviewee will say, it is time to begin writing up the results into a robust explanation or theory based on those data (Phillips, 2014:1).

Bryant (2014:116) emphasizes the importance of reiterating that grounded theory method-based research does not start out with specific hypotheses; but rather, hypotheses can be the result of this form of research. He suggests one example would be to look at how should such hypotheses be taken up and used in further research?

As per these recommendations, the current study follows a hypothesis-generating approach and develops hypotheses after data collection and analysis. Since theory may be viewed as a system of constructs in which the constructs are related to each other by propositions (Bacharach, 1989:496), the current study generates propositions to explain the relationships between constructs. This is in keeping with the design followed by authors in studies of a similar nature (For example, Gordon & Schaller, 2014:7; Kalinic, Sarasvathy & Forza, 2014:635).

Traditional research designs usually rely on a literature review leading to the formation of a hypothesis, which is put to the test by experimentation in the real world. In contrast, grounded

theory investigates the actualities in the real world and analyses the data with no preconceived hypothesis (Allan, 2003:1). This is one of the strengths of using grounded theory because it allows the researcher to look at phenomena with new eyes and from new perspectives without restriction within already existing hypotheses (Cho & Lee, 2014:1).

These statements speak to the true purpose of grounded theory that is not to make truth statements about reality, but, rather, to elicit fresh understandings about patterned relationships between social actors and how these relationships and interactions actively construct reality. Therefore, grounded theory should not be used to test hypotheses about reality, but, rather, to make statements about how actors interpret reality (Suddaby, 2006:633).

Hence, grounded theory does not start with testing an existing hypothesis, but uses the empirical data to generate concepts and theories; and in this way it does not bias emerging theory with a priori assumptions (Hussein, Hirst, Salyers & Osuji, 2014:1). Furthermore, theoretical sampling violates the ideal of hypothesis testing in that the direction of new data collection is determined, not by a priori hypotheses, but by ongoing interpretation of data and emerging conceptual categories (Suddaby, 2006:633). It is through this practice that the researcher arrives at a hypothesis in the form of a theory, at the conclusion of the research which conceptualises the chief concern of the study (Kenny & Fourie, 2014:1).

Furthermore, as Strauss and Corbin (1998) explain, there is more than one way of expressing relational statements. In their own publications, relational statements are not presented as explicit hypotheses or propositions, but rather, they tend to be woven innocuously into the narrative. In their book: *The basics of qualitative research*, Strauss et al., (1998) provide the basic guideline for a grounded theory research project in which they clearly state that:

“A researcher does not begin a project with a preconceived theory in mind. Rather, the researcher begins with an area of study and allows the theory to emerge from the data”.

A key factor in grounded theory method is the concept of emergence. Strauss et al., (1998) go on to explain:

“However, one must remember that because emergence is the foundation of our approach to theory building, a researcher cannot enter an investigation with a list of preconceived concepts, a guiding theoretical framework, or a well thought out design. Concepts and design must be allowed to emerge from the data”.

Having clarified the issue about hypotheses, the next issue that requires attention is the treatment of the research question/s in a grounded theory study. In short, in a grounded theory study,

research questions may be absent. In their place are purpose statements that make the focus of the report clear (Gilgun, 2014:1).

Additionally, Strauss et al., (1998) have this to say about the research question/s in a grounded theory study:

“What do questions look like in qualitative studies? How do they differ from those of quantitative studies, and why? The main purpose of this form of qualitative research is to develop theory. To do this, it is necessary to frame a research question in a manner that will provide the flexibility and freedom to explore a phenomenon in depth. Also underlying this approach to qualitative research is the assumption that all of the concepts pertaining to a given phenomenon have not yet been identified, at least not in this population or place. Or, if so, then the relationships between the concepts are poorly understood or conceptually undeveloped. Or, perhaps there is the assumption that nobody ever has asked this particular research question in quite the same way, so it is as yet impossible to determine which variables pertain to this area and which do not”.

Strauss et al., (1998) provide additional clarification on this by explaining that:

“Although the initial question starts out broadly, it becomes progressively narrowed and more focused during the research process as concepts and their relationships are discovered. So, the research question begins as an open and broad one, but not so open, of course, as to allow for the entire universe of possibilities. On the other hand, it is not so narrow and focused that it excludes discovery. Qualitative research does not entail making statements about relationships between a dependent variable and an independent variable, as is common in quantitative studies, because its purpose is not to test hypotheses. The research question in a qualitative study is a statement that identifies the phenomenon to be studied. It tells the readers what the researcher specifically wants to know about this subject”.

Because of these differences, the grounded theory method can often lead to tension between researchers and reviewers. Bryant (2014:116) discusses this further:

“Reviewers and research advisers found themselves presented with proposals that did not emanate from clearly formulated research questions or present hypotheses to be tested but that rather outlined generic areas of concern or specific contexts to be explored prior to articulation of clear objectives or issues”.

Bryant (2014:116) goes on to state:

“For those used to assessing research proposals in terms of the hypotheses presented or the clarity of the objectives articulated at the outset, grounded theory method-oriented examples were something of a conundrum. Often, such proposals gave only a very generic and ill-defined account of the nature of the planned research, with little if any overview of the relevant literature, and only the slightest indication of the detailed instruments and methods to be used. This led to grounded theory method proposals being treated as lacking in sufficient detail for any assessments to be made”.

Notably, those with positivist inclinations, often see grounded theory method as lacking in any firm foundation, since there are no hypotheses at the outset, and deficient in terms of rigor, since there is no measurement or quantitative verification (Bryant, 2014:116). However, as Bryant (2014:116) explains:

“Grounded theory is a method for qualitative research. It offers an alternative to hypothesis-based research, stipulating that, at the outset, the researcher(s) should not seek to articulate concepts or hypotheses to be tested, but rather that the initial aim should be to gather data as the basis for developing the research project in its initial stages. This can appear perplexing both to researchers and assessors, since there seems to be little in the way of guidance with regard to the research topic itself. In practice, however, researchers always do have some idea of their topics of interest and should be able to offer some initial characterization of the contexts that they are keen to study”.

Another contentious issue in grounded theory method is the treatment of the literature review. Grounded theory purists advocate that a grounded theory researcher should not conduct a literature review at the start of the research project. This is because, as Suddaby (2006:633) explains, “the real danger of prior knowledge in grounded theory is not that it will contaminate a researcher’s perspective, but rather that it will force the researcher into testing hypotheses, either overtly or unconsciously, rather than directly observing”.

The current study however subscribes to the view offered by Bryant (2014:116) who suggests:

“The result is that there is no way of avoiding some form of literature review in the early stages of one’s research. But, in the context of grounded theory method, there are a number of issues to take into account. One of these is that the literature itself can be treated as “data,” with the researcher pointing to key issues and concerns and using these as the basis for some initial coding. This may well help in developing

a proposal that, although devoid of specific research questions and hypotheses, still provides readers and assessors with an understanding of the general research area, as well as with the basis for some confidence that the research will develop and lead to appropriate outcomes”.

1.7. RATIONALE FOR GROUNDED THEORY METHODOLOGY

The choice of research design stems from the research problem. In the current study, the researcher was interested in exploring the cognitions of expert and novice entrepreneurs. In other words, sense-making and thinking influences the entrepreneurs decision making when conceptualising an entrepreneurial opportunity. As entrepreneurial thinking and decision-making were deemed complex constructs that were difficult to measure with quantitative methods since in-depth insight was required; the researcher opted for a grounded theory approach.

Given that grounded theorists inquire about how social structures and processes influence how things are accomplished through a given set of social interactions, grounded theory is suitable in studies where the researcher wishes to develop an explanatory of basic social processes (Starkes et al., 2009). In the current study, the rationale for adopting grounded theory stemmed from its value for theory generation about complex social processes. The fundamental aim of the grounded theory method is to assist the researcher to discover theory, which is derived from data by systematically gathering and analysing the data through the research process (Corbin & Strauss, 2008; Glaser & Strauss, 1967).

In other words, grounded theory is a theory generation method that assists researchers to derive emerging ‘grounded’ concepts from the data (Franco & Lord, 2011). As such, grounded theory provided a method for the researcher to develop a theoretical understanding of how the entrepreneur’s resolutions of uncertainty through the formation of supply-demand pathways, influence opportunity recognition of entrepreneurs.

The strengths of the grounded theory approach lie in its depth of inquiry and its unimpaird interplay between theory and empirical data (Fendt et al., 2008). Urquhart et al., (2013) noted that grounded theory produces rich theory with a very close tie to the data; and this is a major strength of grounded theory method, since the close tie to the data means that the theory will be substantive, i.e., pertaining to that particular area.

Grounded theory differs from other qualitative approaches, because traditional qualitative approaches collect data first before commencing the analysis and long after they have left the research site. In contrast, grounded theory uses the emerging theoretical categories to shape the data collection while doing the fieldwork; in other words data collection and analysis proceed simultaneously. By analysing data from the lived experience of the research participants, the

researcher can, from the beginning attend to how they construct their world (Lawrence et al., 2013).

Glaser and Holton (2007) strongly argued for differentiating grounded theory from qualitative data analysis. They argued that the explicit goal in the case of qualitative data analysis is that of description. Grounded theory on the other hand is more concerned with producing inductive theory about a substantive area through the systematic generation of a set of integrated conceptual hypotheses (Glaser & Holton, 2007).

The researcher compared grounded theory to other qualitative data analysis methods such as content analysis. Bernard (2006) suggests that grounded-theory research is mostly based on inductive coding while content analysis is mostly based on deductive coding. Inductive research is what you do when you are in the exploratory and discovery phase of any research project, while deductive research is what you do in the confirmatory stage of any research project (Bernard, 2006).

Cho et al., (2014) compared the grounded theory approach to qualitative content analysis and concluded that in terms of the goals of the study, the grounded theory approach is strongly suited to the generation of theory while qualitative content analysis is more suited to describing the meaning of materials and developing categories or themes. From a research outcomes perspective, while the grounded theory approach results in substantive theory, qualitative content analysis results a list of categories or themes. Finally, they stated that the strength of the grounded theory approach is its openness in creating a new theory, and that it has a well-defined analysis procedure. In contrast, they found that qualitative content analysis is inappropriate for open exploratory research and it is a less established analysis process.

Fendt et al., (2008) recommend that the fit between the method and the researcher is essential in striving for quality in grounded theory method. According to them, to choose a method necessitates a thorough and honest self-assessment in terms of beliefs, interests, and values but also of experiences and competencies. In grounded theory research, the researcher is an important part of the inquiry, and he or she can be an asset with unique contributions rather than just a resource that can be easily substituted by any other resource of a similar nature.

The grounded theory method has been used effectively in several entrepreneurship studies. For example, Gemmell et al., (2012) demonstrated its effective use to generate theory on the socio-cognitive processes of entrepreneurial ideation. According to them, the investigation of entrepreneurial ideation is best served through the use of qualitative research methods. Also, in their study of entrepreneurial persistence in depleted and constrained environments, Baker and Nelson (2005) used the grounded theory method to demonstrate how firms engage in

bricolage and how bricolage drives the “enactment of resources environments that are idiosyncratic to the firm”.

1.8. RESEARCH CONTRIBUTIONS

The opportunity construct remains a phenomenon of interest, as it holds promise for both the academic field of entrepreneurship and the practical pursuit of entrepreneurship by entrepreneurs (Welter & Alvarez, 2015:1398). However, as Welter et al., (2015:1399) “the large number of conceptual articles regarding opportunities without sufficient empirical work suggests that opportunities have not yet been understood sufficiently enough to enable rigorous testing”.

The current study contributes to the theory of decision-making in the opportunity recognition process. Through its findings on the decision-making modes of expert and novice entrepreneurs and the cognitive processes adopted by expert entrepreneurs to mitigate uncertainty, the current study makes a valuable contribution to the literature on entrepreneurial decision-making.

Welter et al., (2015:1398) argue that opportunities transition from creation opportunities to discovery opportunities. Their argument has implication for the decision-making processes since entrepreneurs in discovery states employ different processes than entrepreneurs pursuing creative states.

Ramoglou et al., (2016:410), introduce the ‘actualisation’ approach as an alternative to the conceptualisation of opportunities, and in so doing attempt to find a middle ground between the in the long-standing debate on whether entrepreneurial opportunities are best understood as objective, existing independent of entrepreneurial action, or as subjective and constructed by the entrepreneur (Foss & Klein, 2016:2).

The current study makes an additional contribution towards bridging the gap between the effectuation and causation modes of decision-making. In analysing opportunities in terms of supply-side and demand-side of the opportunity, the current research sheds new perspective on the means-ends argument.

Finally, by introducing the construct of satisficing into the entrepreneurship domain, the current study makes a theoretical contribution to cognitive entrepreneurship research and opens up avenues for further research in developing the construct and applying it in different contexts.

The chapters that follow hereon set the groundwork for the emerging theory by first presenting an overview of the current literature on entrepreneurial decision-making during opportunity conceptualisation. The remaining chapters that follow discuss the research methodology, data analysis and empirical findings. The organisations of these chapters are discussed next.

1.9. ORGANISATION OF THE STUDY

Chapter 1 gives an overview of the study. It discusses the positioning of the study, the research problem explored and the research design for data collection and analyses. The chapter ends with a discussion on the grounded theory methodology and the contributions of the study.

Chapter 2 starts with brief discussion on information processing models and then progresses to a review of the main construct of cognition. In particular, the literature review examines the literature on cognitive structures and cognitive processes with respect to entrepreneurial decision-making during opportunity recognition.

Chapter 3 discusses the various viewpoints and perspectives offered by researchers with respect to the opportunity recognition construct. In particular, the review examines the two main views of opportunity, which are opportunity discovery and opportunity creation. This chapter also provides an analysis of opportunity in terms of supply-side and demand-side components.

Chapter 4 reviews the literature on entrepreneurial decision-making and discusses the two main decision-making modes: effectuation and causation. This chapter then proceeds to examine decision making in the context of uncertainty and risk.

Chapter 5 provides a critical analysis of the construct of expertise. While it is widely acknowledged that expertise and prior experience is a key antecedent in opportunity recognition, the construct of expertise has received criticisms from some scholars and therefore requires further in-depth exploration. These criticisms are addressed in this chapter where the researcher unpacks key theories, concepts and arguments in an attempt to capture the complexity of applying the construct of expertise to the domain of entrepreneurship.

Chapter 6 discusses the research methodology and tools used for data collection for this study. This chapter discusses the main features of grounded theory method and cognitive mapping technique that was used as a supportive technique in data collection and analysis.

Chapter 7 discusses the analysis of data and the key constructs and themes that emerged from participant transcripts. This chapter provides in-depth analysis of each participant's transcripts, which are visually depicted through each participant's cognitive mapping. The chapter concludes with a composite cognitive mapping of each group and provides an analysis of the variance in the composite mapping of these groups.

Chapter 8 concludes the study with a discussion around the key findings of the study. It introduces the theory that was developed from this research and makes recommendations for its application and future research.

CHAPTER 2

COGNITIVE ENTREPRENEURSHIP

2.1. INTRODUCTION

This chapter provides the framework for understanding information-processing and cognitive processes. It builds on the view of the entrepreneur as an information processing system, where information processing refers to the gathering, interpreting and synthesis of information in the context of entrepreneurial decision-making. This is followed by a discussion on cognition with specific emphasis on the different cognitive structures and processes, which provides the framework for comparing the cognitive processes of expert and novice entrepreneurs.

The literature review continues in chapter 3 where the researcher discusses entrepreneurial decision-making and the two main modes of entrepreneurial decision-making, namely effectuation and causation with specific reference to decision-making contexts of uncertainty and risk. Chapter 4 discusses the role of prior knowledge and expertise in the entrepreneurial process, and finally, the literature review ends with a discussion in chapter 5 on the key process of opportunity recognition in terms of supply and demand components of an opportunity.

Fostered on the view that the recognition of entrepreneurial opportunities is both context-bound and entrepreneur-centred (Mathews, 2016:7), the literature review discussion for the current study is developed around the sequences of activities involved in conceptualising opportunities for a new venture creation as depicted in figure 2.1.

When making decisions on the various business opportunities, an entrepreneur has to deal with several sources of uncertainty such as new product development, the market domain and competitive environment. In addition, there is an element of uncertainty associated with the entrepreneur's ability and capabilities to execute the business decision. Hence, an entrepreneur must develop information-processing mechanisms capable of dealing with both internal and external sources of uncertainty.

The information processing capabilities of an individual are reflected in the individual's organisation of knowledge structures. The process, through which information is transformed into knowledge, is the result of two complementary dynamics (Choo, 2006). The first stems from the "structuring" of data and information that imposes or reveals order and pattern in the information, and the second stems from the human "acting" on data and information that attributes sense and salience. Through this process of cognitive structuring, an individual makes sense and assigns meaning and significance to data and information.

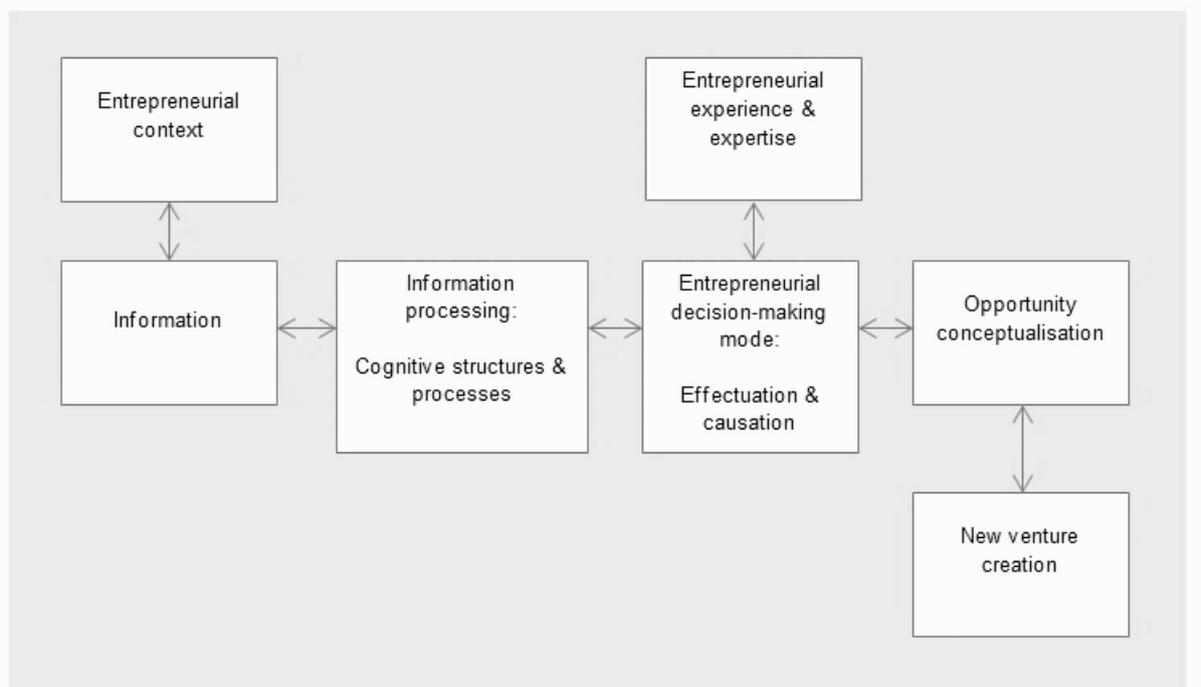


Figure 2.1: A process model of entrepreneurial decision-making in new venture creation

Source: Adapted from (Maine, Soh & Dos Santos, 2015:53; Mathews, 2016:7)

What meanings are constructed, however, depend on the schemas and mental models of the individual (Choo, 2006). Differences in the way that an individual perceives or makes sense of information may therefore account for the differences in the schemas or mental models of an individual.

“The idea that sense-making is focused on equivocality gives primacy to the search for meaning as a way to deal with uncertainty” (Blanco, 2007). Researchers studying sense-making process focus on the “idiosyncratic and inter-subjectively created meanings that people attach to their experiences” (Allard-Poesi, 2005). This view of idiosyncratic sense-making arises from a constructivist paradigm or philosophy.

While sense-making is well understood, one principle that is increasingly clear is that individuals draw heavily on accumulated experience to aid their understanding of the world (Fiske, Kinder & Larter, 1983). Sense-making can be viewed as a cognitive process (Burke-le Roux & Pretorius, 2017:1) which leads to the process of creating a mental model (Klein, Moon & Hoffman, 2006a). After all, when people try to make sense of events, they begin with some framework, however minimal this may be (Klein, Moon & Hoffman, 2006b).

A mental model is generally considered a memory representation that is linked to or expressed in terms of concepts, principles, and knowledge. When described in terms of a sense-making

mechanism, a mental model can be viewed as a representation that explains events rather than isolated stimuli (Klein et al., 2006a).

What people make sense of depends in part, on “what they want to represent and their tools of representation” (Allard-Poesi, 2005). The question of how an individual makes sense of information when faced with an overabundance of stimuli can be answered with findings from cognitive psychology, which suggests that the process of noticing and interpreting information is directed by cognitive structures called schemas. These cognitive frameworks are critical, simplifying, and sense-making mechanisms that allow individuals to make sense of stimuli-rich contexts and to act within them (Barr & Huff, 1997).

More specifically, schemas enable individuals to identify simplified and abstracted representations through which they make sense of and act within their environments. These simplified representations or mental models are viewed as an aggregate of interrelated information consisting of concepts and relationships (Barr, Stimpert & Huff, 1992).

Sense making occurs from the individual’s interpretation of the environment through connected sequences of enactment, selection, and retention. Individuals actively construct their environment by bracketing, rearranging, and labelling portions of their experience. This process of enactment enables the individual to convert raw data from the environment into equivocal data to be interpreted. The individual then chooses meanings that can be imposed on the data by overlaying past interpretations as templates to the current experience. This is referred to as the selection process, which produces an enacted environment that is meaningful in providing cause-effect explanation of the event taking place. Finally, the retention process involves the storage of the products of the previous processes, so that these enactments and interpretations can be retrieved in the future (Choo, 2001).

Choo (2001) differentiated between sense-making that is driven by beliefs and that which is driven by actions. In belief-driven processes, an individual starts from an initial set of sufficiently clear and plausible beliefs, which are then used as nodes to connect and impose meaning to information. In action-driven processes, the individual starts from their actions, and modifies the structures of meaning around them in order to give significance to their actions. Thus, meaning is created in order to justify or explain a particular action.

From the sense-making process, individuals discern patterns and form beliefs in order to give meaning and significance to information. Through use, practise and reflection, a particular set of information referring to a specific experience, becomes knowledge. According to Choo (2006), knowledge, which refers to an accumulation of experiences, is a result of ‘belief structuring’ which leads to a higher level of ordering and understanding than in the case for information. Knowledge

supplies the beliefs and assumptions that individuals use to perceive situations or events, and to explain cause-effect relationships between the individual and actions (Choo, 2006). A graphical illustration of this process is provided in Figure 2.2.

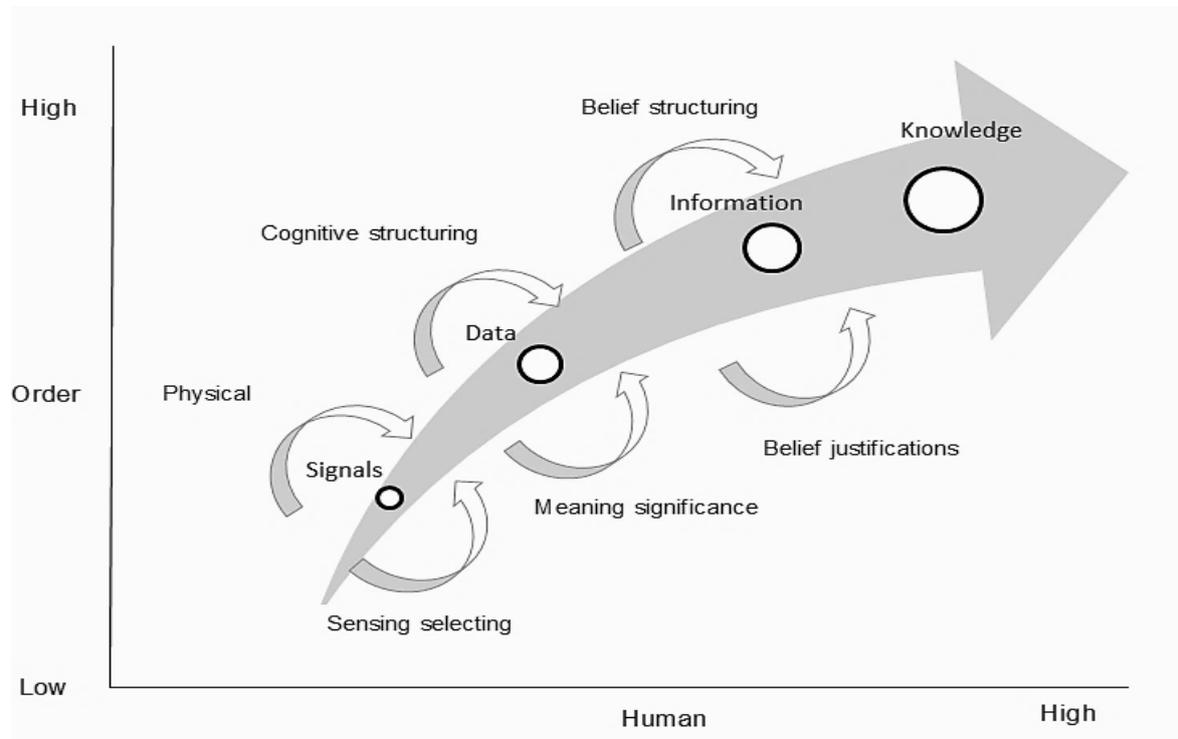


Figure 2.2: Knowledge structuring

Source: Choo, 2006.

2.2. INFORMATION PROCESSING

The two dominant models that explain how individuals approach information processing are the “top-down” approach, which is also referred to as “theory-driven”; and the “bottom-up” or “data-driven” approach (Walsh, 1995).

The top-down information processing approach suggests that individuals create knowledge structures, which assist them to process information and make decisions. In this case, information process is guided by an individual’s past experiences in similar circumstances, and the cognitive structures generated from experience affect the individual’s ability to encode and make inferences about new information (Walsh, 1995). The concept of a knowledge structure lies at the heart of top-down information processing and it is expected that this approach may be the dominant response in all but the most novel of situations (Walsh, 1995).

In contrast to the top-down information processing approach, bottom-up information processing is guided by the current information context. In this case, the information itself shapes an individual's response to it (Walsh, 1995).

Hoffman (2014) provided an explanation of top-down and bottom-up information processing on the basis of an individual's pattern recognition, which is the process an individual utilises to recognise and categorise stimuli in the environment. "Bottom-up processes start pattern recognition analysis with the information in the stimulus and continue analysis until the stimulus matches a concept; while top-down processes initiate from the concept generated by the perceiver's expectations and knowledge and continue until a matching stimulus is found" (Hoffman, 2014).

Linking information processing to cognitive literature, Vermeulen and Curseu (2008) explained that 'top-down' information processing is information processing that is affected by activated cognitive representations. This suggests that there is a basic distinction between knowledge representations and the processes through which these representations are altered in order to make a decision or to solve a problem (Vermeulen & Curseu, 2008).

In top-down information processing, cognitions, which refer to cognitive schemas or more generally to knowledge representations that are established in previous experience, influence the subsequent cognitive processes such as decision-making or problem-solving (Vermeulen & Curseu, 2008).

2.3. ENTREPRENEURIAL INFORMATION PROCESSING

Vaghely and Julien (2010) provided a working model of information processing, which they claimed provides a framework for understanding the entrepreneur's information processing and opportunity identification. In their model, Vaghely and Julien (2010) differentiated between a cognitivist vision of information processing and a constructionist perspective.

The cognitivist vision of information processing is based on a pattern-like or algorithmic model, which suggests that information shapes the entrepreneur's representation of reality in a normative way and entrepreneurs compare their representations of the environment in order to shape the logic of their network.

In contrast, constructionist information processing relies on a trial-and-error or heuristic model. This perspective suggests that entrepreneurs process new information in an interpretative way and they construct their reality by using information from their environment, which in turn leads to knowledge-based action (Vaghely & Julien, 2010).

Therefore, this perspective provides a view of opportunities as subjective phenomena that begin unformed and develop over time. Opportunities therefore, are the outcome of entrepreneur's effort

and action that arises from the interpretation of external stimuli upon which meaning is imparted (Wood & McKinley, 2010).

Vaghely and Julien (2010) suggested that entrepreneurial information processing integrates the constructionist information processing and cognitivist information processing perspectives into a pragmatic frame of the entrepreneur's opportunity recognition-construction mechanisms. "Entrepreneurs as information processors use more or less both approaches in order to identify opportunities; thus entrepreneurial opportunities can be recognized and constructed at the same time in a variety of combinations and recognized or constructed individually" (Vaghely & Julien, 2010).

Gänswein (2011) suggested that there are three different views on what governs human information processing in general. These views are differentiated on the basis of environmental or cognitive choices. According to Gänswein (2011), a deterministic view proposes that any outcome of individuals' information processing is determined by their environment. A second view, which is the view of choice, proposes that individuals themselves determine their information processing and any outcome would accordingly be a function of the individual's cognitive processes and characteristics only. Finally, actual information processing is situation specific and both theories are said to hold, because individuals are inseparable from their environments (Gänswein, 2011).

Finally, Lord and Maher (1993) emphasised that people are flexible information processors and do not always process information in the same manner. They suggest that generally, information processing is characterised by a limited-capacity model; however, in certain domains or contexts, alternative rational, expert, or cybernetic models better characterise human information processing.

The discussion on human information processing has provided various viewpoints of how individuals process information.

While Lord and Maher (1993) highlighted four of the general information processing models, each of which provides implicit frameworks for research, they noted that no single framework is superior as each approach possesses a unique capacity to explain elements of information processing for specific situations and purposes (Mitchell et al., 2009).

Mitchell et al. (2009) suggested that the expert model of information processing is of particular importance to entrepreneurship scholars because of its potential for explaining individual-based performance differences between expert entrepreneurs and novice entrepreneurs.

2.4. COGNITION

Since the researcher of the current study desired to investigate the information processing and sense-making processes of entrepreneurs, he adopted a cognitive perspective in studying the opportunity recognition process.

The entrepreneurial cognition perspective has been conceived as providing a link between the entrepreneur and the new venture creation. It differs from earlier research streams in that it shifts emphasis away from the personality traits of an entrepreneur to examining entrepreneurship in terms of an individual's cognitive behaviour (Gustafsson, 2009:).

In this respect, a cognitive perspective moves away from the argument that entrepreneurs are born to a view that individuals become entrepreneurs in situations they have desired or are subjected to. That is to say that they become entrepreneurs through a learning process thanks to which they acquire know-how and personal skills at various levels (Fayolle, 2007).

One advantage of a cognitive perspective is that it represents a theoretically rigorous and empirically testable approach that systematically explains the role of the individual as well as the context in the entrepreneurial process. Hence, a cognitive perspective provides an effective tool for probing and explaining the previously unexplained phenomena within the entrepreneurship research domain (Mitchel, Busenitz, Lant, McDougal, Morse & Smith, 2002).

A cognitive perspective sees entrepreneurship as a 'way of thinking' (Mitchell, Smith, Morse, Seawright, Peredo & McKenzie, 2002), and it emphasises the fact that everything we say or do is influenced by mental processes (Baron, 2004a). In adopting a cognitive perspective of opportunity recognition, this study adopted "an approach that focuses directly on the cognitive mechanisms through which we acquire, store, transform, and use information" (Baron, 2004a).

Research has recognised that the cognitive processes and knowledge structuring of individuals are largely idiosyncratic (Mohammed, Klimoski & Rentsch, 2000:165; Tegarden & Sheetz, 2003:113). That is to say that each individual makes sense of the world in their own unique way. Therefore, a cognitive perspective suggests that opportunity recognition is directed by the cognitive abilities of an entrepreneur and that the recognition of opportunities is influenced by the knowledge structuring and information processing abilities of an entrepreneur.

2.5. DEFINITION OF COGNITION

There has been much confusion in the literature with respect to the exact meaning of the term cognition. Forbes (1999) defined cognition as a distinct set of thought processes that entrepreneurs use to interpret data. In contrast, Swan (1997) used the term cognition to embody both cognitive structures and cognitive processes. According to her, the term cognition has been

used in the literature to encompass cognitive structures, which are mentally represented concepts and relationships, and cognitive processes which are the processes through which those mentally represented concepts are constructed, manipulated, and used in decision-making (Swan, 1997).

Huesmann (1998) defined cognitive processes as the psychological processes that human beings invoke to represent, process, and communicate information, and cognitions are denoted as the internal representations of information utilised in these processes. Huesmann (1998) argued that in some respects, all human social behaviour is mediated by cognitions and the cognitive processes of the participants. Therefore, cognitive processes can be viewed as mediating processes that connect biological, environmental, and situational inputs to behavioural output; but different patterns of cognitive processing are more conducive to one kind of social behaviour than to another (Huesmann, 1998).

Further confusion surrounding the definition of cognition stems from the usage of the term cognitive structure, which is often represented in the literature by a number of similar constructs, for example scripts, schemas, knowledge structures, and interpretive systems (Busenitz & Lau, 1996).

Building on the earlier cognitive science research, Busenitz and Lau (1996) posit a definition of schema as a “cognitive structure that represents the organised knowledge about a given concept and contains both the attributes of the concept and the relationship among the attributes”. According to them, schema can be viewed as one type of social information processing in which the social reality is understood and meanings are assigned to objects and events in a social environment. Schemas therefore provide a framework for an individual to enact their environment (Busenitz & Lau, 1996).

Cognition, which can be described as a “forward form of intelligence, is premised on an actor’s beliefs about the linkage between the choice of actions and the subsequent impact of those actions on outcomes”. Since such beliefs derive from the actor’s mental model of the world, greater conformity between the mental models of action-outcome linkages should likely lead to more effective decisions made about the action to be taken (Gavetti & Levinthal, 2000).

Cognitive representations are ways of reducing environmental complexity since they assist the decision-maker to impose order in unpredictable and uncertain environments. Because of this, in a more general context, cognitions are conceptualised as mediators between an individual’s knowledge and their behaviour (Vermeulen & Curseu, 2008).

Finkelstein, Hambrick and Cannella (2009) claimed that real strategic situations lack structure, and because they are not knowable, the identification and diagnosis of problems in such situations are open to varying interpretations. In such situations, stimuli are weak, complex and ambiguous and

decision-makers cannot rely on stimuli to make the ideal choices but rather depend on experience in figuring out what to do (Finkelstein, Hambrick & Cannella, 2009).

Cummins (2006) stated that cognition can be defined as “the internal structures and processes that are involved in the acquisition and use of knowledge”, including perception, learning, memory, language, thinking, and reasoning. Essentially, cognition refers to the belief systems that individuals use in order to “perceive, construct, and make sense of their world, and to make decisions about what actions to take” (Siau & Tan, 2005).

Mitchel *et al.* (2002) have incorporated thinking and perception issues from cognitive science, with the domain of entrepreneurship research, to define entrepreneurial cognitions as the knowledge structures that entrepreneurs use to make assessments, judgements, or decisions involving opportunity evaluation, venture creation, and growth. The key elements in their definition are: knowledge structures – whether heuristic or scripted, and decision-making, including assessment and judgment are set within the larger context of entrepreneurship’s distinctive and inclusive domain of opportunity evaluation, venture creation, and growth (Mitchell, Busenitz, Lant, McDougall, Morse & Smith, 2004).

Based on their definition of cognition, Mitchel *et al.* (2002) claimed 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 and services”.

From the review of literature, key themes in the definition of cognitive structures was extracted in order to provide a definition of cognitive structures as heuristic or scripted mental representations of information. These cognitive structures and processes provide a framework for individuals to enact their environment by mediating in the representation and processing of information. Consistent with this definition, a key assumption is that the each entrepreneur will process and represent information differently based on how this information is represented in their cognitive structures.

2.6. KEY THEMES IN COGNITIVE RESEARCH

Drawing on extant literature on cognitive research from the fields of social sciences, psychology and management sciences, Grégoire, Corbett and McMullen (2011) identified (i) mentalism, (ii) a process orientation, and (iii) the operation of cognitive dynamics as the three key features that when taken together, systematically characterise cognition research.

Mentalism reflects the cognitive perspective’s assumption that to understand human activity, it is important to consider the so-called cognitive elements of human action, that is, the mental

constructs and phenomena that proceed from human nature and the sum of one's idiosyncratic experiences (Grégoire, Corbett & McMullen, 2011). According to Grégoire *et al.* (2011), this emphasis on mental representations is notably expressed through the study of attributions, cognitive maps, knowledge structures, perceptions, scripts, and schemas.

A process orientation to cognitive research stresses that behaviour proceeds from complex interactions between an individual's environment and mind (Grégoire, Corbett & McMullen, 2011). According to Grégoire *et al.* (2011), the process orientation is most commonly associated with the information processing model and the so-called 'computational perspective on human behaviour'.

While the cognitive perspective focuses explicitly on mental representations and other constructs operating in the mind, the third feature of cognitive science – the operation of cognition at different levels of analysis – suggests that the articulation of such constructs need not be restricted to the individual level of analysis (Grégoire, Corbett & McMullen, 2011).

2.7. COGNITIVE STRUCTURES AND PROCESSES

Prior research from the disciplines of cognitive science, organisational and management studies, psychology and entrepreneurship have used different terminology for these knowledge structures. An overview of the main terms used by different scholars include stereotypes, prototypes, implicit theories, causal schemata, frames (Gioia & Manz, 1985), cognitive maps, cause maps (Lee, Courtney Jr & O'Keefe, 1992), scripts (Bower, Black & Turner, 1979), and schemata (Schank & Abelson, 1977).

2.7.1. Schema

An investigation in knowledge systems is concerned with how concepts are structured in the human mind, how such concepts develop, and how they are used in the understanding and behaviour (Schank & Abelson, 1977).

A prominent model in social psychology for explaining how knowledge is represented is that of schematic representations (Smith, 1998), otherwise known as schema. Schema models trace their roots to the earlier works of Koffka, Lewin and Kant, and later to Bartlett, Bruner, Bransford and Franks, Anderson and Pichert, and to Schank and Abelson (Smith, 1998).

A schema is a knowledge structure that individuals use to organise and to make sense of social and organisational information or situations (Gioia & Manz, 1985). Therefore, schemas can be viewed as systems for categorising and interrelating information (Gioia & Manz, 1985).

An important feature of schemas is that representations of these mental models or schemas can be used to measure knowledge of a domain, and can be useful as a means for communicating

how individuals think about that domain. These representations can be compared between parties to identify commonalities and inform how differences in mental models may be reconciled (Wood, Bostrom, Bridges & Linkov, 2012).

Several methods have been used by scholars to explicitly represent the content of mental models. These range from mathematical and logical descriptions to syllogism and conceptual networks such as belief networks, the semantic web, and concept maps (Wood, Bostrom, Bridges & Linkov, 2012).

2.7.2. Cognitive scripts

When many simpler event schemas representing expected events and actions are linked together in a sequence, the schema that is formed is called a script (Huesmann, 1998). A script makes use of both declarative and procedural knowledge. Procedural knowledge consists of heuristics or action sequences associated with a particular category, while declarative knowledge can be viewed as a set of facts associated with a particular category (Shepherd & Rentz, 1990).

A script is “concerned with the retention of context-specific knowledge of common or conventional behavior and event sequences” (Gioia & Manz, 1985). Thus, a script serves as a guide for behaviour that one believes is possible or appropriate for a particular situation by laying out a sequence of events that is likely to happen (Huesmann, 1998).

When individuals are repeatedly exposed to a specific event or interaction, they learn stereotypic action sequences for such occasions, which then guide the interpretation of information, the development of expectations, and the enactment of appropriate behaviours (Leigh & Rethans, 1984). It is assumed that individuals abstract scripts from repeated experiences with similar situations and then apply them to understanding of new experiences (Baldwin, 1992). Because scripts represent normative structures that are used to generate script-relevant expectations, they exert a powerful influence on effect and behaviour (Leigh & Rethans, 1984).

Scripts can therefore be viewed as a unique type of knowledge schema (Mitchell, 1997) that embodies knowledge of stereotyped event sequences (Abelson, 1981). As such, they provide a means to organise experience (Mukkulainen, 1990:83).

An important feature of prior research conducted on scripts as human memory structures, has been the demonstration that scripts have a content, which is empirically definable (Sharkey & Mitchell, 1985). In addition, scripts are intuitively plausible and well supported by experimental evidence (Mukkulainen, 1990:83).

This has important implications for research on scripts since, although scripts embody most of the conceptual issues raised by other types of schemata, they are simple and well-structured enough to permit more focused analysis and experimentation (Abelson, 1981).

Schank and Abelson's (1977) cognitive script theory postulates that upon activation, scripts stored in the long-term memory of an individual are used to direct behaviour. Scripts are perceived as having a dual function of encoding and representing information. In other words, scripts drive the information processing of the individual and they perform interpretive and inferential functions (Leigh & Rethans, 1984). In order for scripts to perform their dual function, the first requirement is for an individual to have a stable cognitive representation of a particular script (Leigh & Rethans, 1984).

Scripts are said to provide causal connectivity between stated actions and events, by formulating a set of connecting inferences, the generation of which is a context-sensitive process, which is guided by the content of the foregrounded script (Graesser, Gordon & Sawyer, 1979). Within the scenarios generated by the script, there are different types of causal elements and different types of causal links connecting these elements (Read, 1987). How these various elements can be causally linked is governed by a set of six rules on causal syntax (Read, 1987).

Mitchell *et al.* (2009) built on expert information processing theory to propose a theory of entrepreneurial scripts. Their theory suggests that experts store and retrieve information from long-term memory differently than do novices. The main assertion of their theory is that experts outperform novices within their area of expertise because they can recognise immediately that which novices require great effort to discover – compliance of expertise-specific circumstances with an expert script (Mitchell, Mitchell & Mitchell, 2009).

Pryor *et al.*, (2015) suggest that one of entrepreneurs' most important tools is their set of scripts which help define their actions and interactions through the various stages of the entrepreneurial process. In essence, scripts help resolve uncertainty by guiding behaviour in common social settings and interactions (Pryor, Webb, Ireland & Ketchen Jr, 2015).

Mathews (2016:7) directly relates the success of new ventures to the level of development of the entrepreneur's scripts. Mathews (2016:7) suggests that the nature and development of scripts is pertinent in the consideration of the different types of scripts that are to be active and evolving in the cognitive structures of entrepreneurs.

Opportunity recognition starts from the availability and the use of these scripts by the entrepreneur. These scripts, which are in the nature of technology, finance, marketing, engineering and production, pattern the nature and outcomes of the entrepreneur's information processing (Mathews, 2016:7).

“Pryor et al., (2015) differentiate between cognitive biases and scripts. According to them, scripts are a type of knowledge specifically related to guiding individuals in their behaviors and social interactions, whereas cognitive biases are not a type of knowledge, but rather a means for processing information.

2.7.3. Pattern recognition

Baron (2004b) proposed that opportunities emerge from a complex pattern of changing conditions that comes into existence at a given point in time as a result of the juxtaposition or confluence of conditions that were not previously present. These conditions stem from changes in knowledge and technology, as well as socio, political and economic changes (Baron, 2004b).

According to his theory, opportunities emerge when an active human mind forms a perception of a pattern from linking the various conditions together. The ability to do this depends in part on existing cognitive structures that specific individuals possess from previous experience and learning.

Cognitive structures serve as frameworks or templates that enable a person to perceive links between previously unconnected changes, knowledge or events. It is the perception of these links or connections that form the core of opportunity recognition (Baron, 2004b). However, the mere possession of cognitive structures that guide opportunity recognition is not enough. Individuals require the ability to modify or re-structure these cognitive structures in order to form a new ‘mental picture’ of an opportunity.

Baron and Ensley (2006) proposed that cognitive frameworks, such as prototypes, play a central role in pattern recognition, which is the process through which individuals recognise meaningful connections and patterns in complex and seemingly independent events or trends. Their prototype model of pattern recognition, which is based on prototype theory, suggests that through experience, individuals acquire prototypes which are idealised representations of the most typical member of a category.

A category in this context refers to a class of objects or events that appear to have similar features or characteristics (Baron, 2004c). As individuals encounter new events or objects, their existing prototypes then play an important role in the recognition of links between diverse events or trends and the perception of meaningful patterns in these connections (Baron & Ward, 2004).

Research into pattern recognition suggests that individuals often reference prototypes in order to recognize new stimuli. Prototypes, in essence represent the most typical member of a given class of events or objects and when an individual encounters a new stimulus, that stimulus is compared

with existing prototypes to assess whether it belongs to or is associated with characteristics of specific categories (Mueller & Shepherd, 2016:457).

It is through experience that entrepreneurs develop prototypes for the most idealized member of the “business opportunity” category. Mueller et al., (2016:457) do however stress, that while more advanced prototypes develop through experience, they are not a natural and inevitable result of experience. Rather, a given prototype’s clarity, richness, and focus on key attributes reflect one’s exposure to a multitude of diverse stimuli, willingness to interact with those stimuli, as well as the active, effortful processing of those experiences (Mueller & Shepherd, 2016:457).

An opportunity prototype, which can be viewed as a cognitive representation of the ideal business opportunity, is composed of the attributes an individual has found to be most desirable and predictive of success. Individuals operating with more expert opportunity prototypes, therefore have a richer, more fine-tuned understanding of what characteristics are closely tied to venture success (Mueller & Shepherd, 2016:457).

Santos et al., (2015:510) expand the entrepreneurial cognition literature by clearly identifying the basic cognitive dimensions involved in the prototypes used to recognize opportunities, and employed in subsequent decisions to pursue or exploit them. They build on pattern recognition theory to suggest that individuals who recognize business opportunities do so because they are able to perceive connections between apparently unrelated events or trends. These connections in turn, suggest the existence of meaningful patterns that can serve as the basis for business opportunities.

Findings from Santos et al., (2015:510) revealed that the prototypical features of business opportunities are better represented by a bi-dimensional model reflecting both viability and distinctiveness dimensions. They conclude that when entrepreneurs perceive patterns among unrelated events, they appear to assess two main characteristics of these patterns: their viability and their distinctiveness. The viability of perceived opportunities relates to the capacity to solve customers’ problems or meet their needs, the capacity to generate cash, and the associated risk, while the distinctiveness aspect of perceived opportunities refers to the analysis of the business idea compared to existing products or services, namely with regard to its superiority and potential to change the industry. The analysis of both the viability and distinctiveness of a business opportunity appear to lie close to the foundations of the opportunity recognition process (Santos, Caetano, Baron & Curral, 2015:510).

The exemplar model of pattern recognition emphasises the importance of specific knowledge rather than idealised prototypes (Baron, 2006). This model may be especially germane to studying the differences in novice and expert entrepreneurs because it suggests when an individual encounters new events or stimuli, these events or stimuli are compared with “specific exemplars of

relevant concepts already stored in the memory of the individual” (Baron, 2006). Evidence of this is provided in some respects by findings that experienced, repeat entrepreneurs search for opportunities in areas or industries where they are already knowledgeable (Baron, 2006).

Drawing on cognitive science research that suggests that both the exemplar and prototype models may be necessary to understand how individuals notice emergent patterns in complex and seemingly unrelated events, Baron (2006) argued that before an individual gains experience in a specific area, they may rely on prototypes for comparing newly encountered stimuli and events with these idealised representations. As an individual gains expertise in a given domain, they may shift to greater reliance on exemplars.

2.7.4. Effectuation

Sarasvathy (2001) proposed a model of entrepreneurial decision-making based on effectuation. According to this model, entrepreneurs frame decision problems using an effectual logic that inverts the principles in causal theories of entrepreneurship and strategic management (Dew, Read, Sarasvathy & Wiltbank, 2009). The key assertion of effectuation theory is that while “causation processes take a particular effect as given and focus on selecting between means to create that effect”, “effectuation processes take a set of means as given and focus on selecting between possible effects that can be created with that set of means” (Sarasvathy, 2001).

Although causation and effectuation are integral parts of human reasoning that can occur simultaneously, the distinguishing characteristics between causation and effectuation are in “choosing between means to create a particular effect, versus choosing between many possible effects using a particular set of means” (Sarasvathy, 2001).

In support of the theory on effectuation, Dew *et al.* (2009) compared differences in the way experts and novices frame decisions in building new ventures. Their study demonstrated that experts frame decisions using ‘effectual’ logic, while novices use a ‘predictive frame’. While effectual framing is about redrawing the problem space and reconstituting existing realities into new opportunities, causal framing involves the discovery and exploitation of existing opportunities within a given problem space (Dew, Read, Sarasvathy & Wiltbank, 2009).

A more detailed review of the literature on effectuation is contained in chapter 4.

2.7.5. Structural alignment

Grégoire *et al.* (2010) examined the role of cognitive processes and prior knowledge in the recognition of opportunities. They suggested a model of opportunity recognition as a cognitive process of structural alignment. This model proposes that individuals make sense of new information, and more specifically, information that is new to them, by comparing this new

information with their prior knowledge. Opportunity-relevant patterns are discerned by finding resemblance between events in the outside world and mental models of situations and contexts that are relevant for making sense of new information and identifying a course of action.

Grégoire *et al.*'s (2010) study builds on previous research in cognitive science, which found that individuals use structural alignment to make sense of new information. More importantly, research has indicated that structural alignment influences the performance of activities that demand high levels of abstract reasoning.

While providing strong evidence in support of the role that prior knowledge plays in opportunity recognition, the authors were unable to find evidence that individuals use prototypical mental models to recognise opportunities.

Mueller *et al.*, (2016:457) state that structural alignment processes have been shown to influence performance on creative tasks such as scientific innovation and new product ideation tasks akin to opportunity identification, as well as being directly involved in other higher-level reasoning processes, including problem solving, learning, and new category creation.

They contend that at its core, structural alignment involves cognitive processes of comparison between items or ideas which results in alignment that proceeds at two levels: a superficial level and a structural relationship level. A superficial alignment compares features or "parts" of an object, including representative attributes and characteristics, while structural relationships refer to more fundamental linkages between seemingly disparate features (Mueller & Shepherd, 2016:457).

2.7.6. Entrepreneurial alertness

Kirzner's theory of entrepreneurial alertness asserts that the mental representations and interpretations of entrepreneurs are driven by entrepreneurial alertness, which is a distinctive set of perceptual and cognitive processing skills that differentiate entrepreneurs from other actors (Gaglio & Katz, 2001). Expanding on this, Gaglio and Katz (2001) proposed that entrepreneurial alertness is a cognitive framework or schema that assists entrepreneurs to be alert to opportunities. Schemas, according to them, "are dynamic, evolving mental models that represent an individual's knowledge and beliefs about how physical and social worlds work". Since schemas guide an individual's information processing and reasoning for any specific event (Gaglio & Katz, 2001), entrepreneurial alertness has implications for how information is represented in the entrepreneur's knowledge structures.

It has been suggested by Kaish and Gilad (1991) that entrepreneurial alertness is an associative rather than problem-driven mental process. Unlike directed or problem-driven search, which

assembles known components into a coherent and anticipated whole, associative search links unrelated information cues to form a picture of opportunity (Kaish & Gilad, 1991). Entrepreneurs with well-developed alertness schemas seek and process more complex information (Gaglio & Katz, 2001).

Also, entrepreneurial alert individuals show a tendency to search for information that does not match their current schemas, and to adjust existing schemas on the basis of such non-matching information. As such, entrepreneurially alert individuals, because of their complex and adaptive mental frameworks, will be more able to “think outside the box” than persons lower in alertness (Baron & Ward, 2004).

The alertness perspective on entrepreneurship and the market process assumes that knowledge is dispersed, that is people possess different knowledge and their perception of information is subjective. These two tenets combined with idiosyncratic life experiences mean that some entrepreneurs will know about particular market characteristics or will see the importance of some services to customers when others will not (Arentz, Sautet & Storr, 2013:461).

Hence, as a basic schema, entrepreneurial alertness refers to the capacity to recognize existing opportunities, such as those emerging from changes in technology, markets, government policies, and competition (Li, Wang & Liang, 2015:1576). However, as pointed out by Arentz et al., (2013:461), discoveries do not primarily depend on individuals' inner psychological entrepreneurial dispositions but instead there exists differences in the way individuals make sense of their environment. Results from their study showed that prior knowledge may influence not only the kind of opportunities an individual may discover but also how alert an individual may be to these kind of opportunities.

2.7.7. Framing

Entrepreneurship literature suggests that in addition to effectuation and entrepreneurial alertness, some of the mechanisms and methods through which entrepreneurs alter their schema include framing and reframing, bricolage and counterfactual thinking (Gaglio & Winter, 2009).

Lumpkin and Lichtenstein (2005) suggested that opportunity recognition takes place by converting information to knowledge. This process, which is viewed as cognitive learning, involves changes in an entrepreneur's cognitive map such that the understanding or the interpretation of events changes. Thus, insofar as cognitive models block the emergence of new insight or recombination, cognitive insights offer tools for changing cognitive maps by questioning and reframing longstanding beliefs and attitudes (Lumpkin & Lichtenstein, 2005).

2.7.8. Bricolage

Baker and Nelson (2005) characterised entrepreneurial bricolage as the pursuit of opportunity through close regard to the resources at hand. They suggested that entrepreneurs create novel opportunities by applying idiosyncratic combinations of heterogeneous resources to new ideas and opportunities. In this respect, Baker and Nelson provided the most direct evidence about the fact that at least some entrepreneurs are aware of their attempts to break existing mental models (Gaglio & Winter, 2009).

2.8. COGNITIVE STYLE

Cognitive style is widely recognised as an important determinant of an individual's behaviour (Brigham & De Castro, 2003), as it influences the manner in which information is sought, processed and utilised (Choo, 2006).

Hayes and Allinson (1998) attribute a person's mode of information processing to their preferred cognitive style, which according to Baron (2004a), may also play a role in the success of an entrepreneur. According to Hayes and Allinson (1998), cognitive style is a person's preferred way of gathering, processing, and evaluating information. Cognitive style has an influence on how people scan their environment for information, how they organise and interpret this information, and how these interpretations influence and modify their mental models. Therefore, cognitive styles influence how mental models evolve and change (Hayes & Allinson, 1998).

Cognitive style is a higher-order heuristic that individuals employ when they consider, frame and solve a problem (Brigham & De Castro, 2003). Research from cognitive science draws a clear distinction between two modes or styles of thought: "systematic processing, which involves careful, analytic thinking; and heuristic processing, a contrasting style in which information is processed quickly and effortlessly, in accordance with various simple heuristics" (Baron, 2004a).

A similar distinction is made in a study Allinson, Chell and Hayes (2000) who differentiate between two qualitatively different types of information processing which can be best described as (1) analytic, deductive, rigorous, constrained and critical; and (2) synthetic, inductive, expansive, unconstrained, divergent, informal, diffuse and creative.

From their research on cognitive styles, Allinson *et al.* (2000) provided empirical support for the widely held view that successful entrepreneurs adopt an intuitive approach to information processing. An intuitive approach to information processing tends to be less conformist and involves an open-ended approach to problem-solving. This approach relies on holistic impressions, random methods of exploring, impulsive synthesis, and lateral rather than sequential reasoning.

This is in contrast to rational approaches “which favour a structured approach to problem-solving, working within the rules, using systematic methods of investigation, attending to detail, and using a sequential, step-by-step analysis” (Allinson, Chell & Hayes, 2000).

2.9. COGNITIVE BIASES AND HEURISTICS

Decades of cognition research indicate that our cognitive processes are far from totally rational (Baron, 2004a). Baron (1998) argued that due to the additional pressures that entrepreneurs undergo, they are more prone to cognitive biases and heuristics. He pointed out that some of key and relevant findings from the systematic research on human cognition indicate that we have limited capacity to process new information and due to information overload, our capacity for processing information can be readily exceeded. In addition, we seek to limit cognitive effort by using various mental short-cuts. As a result of these and several other factors, we tend to be less than rational in our thinking (Baron, 1998).

These cognitive biases and heuristics have been found to differentiate certain behaviours of entrepreneurs from those of non-entrepreneurs. For instance, it has been suggested that cognitive mechanisms such as counterfactual thinking which refers to the effects of imagining what might have been (Baron, 1998) or thinking in a way that is contrary to existing facts, is a useful heuristic for developing educated guesses about causal sequences because it explicitly focuses on causal connections (Gaglio, 2004). However, Baron (2000) argued that several considerations suggest that entrepreneurs are less likely to engage in such thoughts, as they tend to adopt a strong future-orientated perspective that may reduce their tendencies to reflect on past events.

Additional biases and heuristics such as (ii) affect infusion, which is the influence of current affective states on decisions and judgments; (iii) attributional style, which refers to tendencies by individuals to attribute various outcomes to either internal or external causes; (iv) the planning fallacy, which refers to strong tendencies to underestimate the amount of time needed to complete a given project or the amount of work that can be achieved in a given time; and (v) self-justification, which refers to the tendency to justify previous decisions even if they result in negative outcomes, have been found to influence how entrepreneurs make decisions and may explain how entrepreneurs behave with respect to opportunity recognition and new venture creation (Baron, 1998).

Gustafsson (2009:) noted that the terms biases and heuristics are often used interchangeably to denote discrepancies between the natural cognitive process and the normative rational strategies. Although the use of heuristics is a natural cognitive process, differences do exist between heuristic-based decisions of novice entrepreneurs and expert entrepreneurs (Gustafsson, 2009:).

Cognitive theory suggests that entrepreneurs tend to be susceptible to the use of cognitive biases heuristics which have been shown to affect entrepreneurial activities by causing individuals to engage in less than rational decision-making (Robinson & Marino, 2015:149). Because cognitive biases may affect the entrepreneur's recognition of relevant information and the mental processing of that information, these cognitive biases have the potential to influence the decision of the entrepreneur to pursue an entrepreneurial venture (Gordon & Schaller, 2014:7).

Illusion of control is a cognitive bias in which an individual overemphasises the extent to which his or her skills can increase performance in situations where chance plays a large part and skill is not necessarily the deciding factor. Research suggests that individuals that exhibit an illusion of control will underestimate risk because they believe their skills can prevent negative occurrences (Le Roux, Pretorius & Millard, 2006:51).

Robinson et al., (2015:149) capture the essence of cognitive biases and heuristics. They note that cognitive biases are subjective beliefs that help individuals cope with difficult decisions, while heuristics reflect the "rules of thumb" that lead to cognitive biases. Essentially, both are cognitive short cuts, which decrease the complexity associated with some decision processes by reducing the amount of information processed when making a decision. Heuristics and cognitive biases provide influential motivations to act, but despite the importance of a need for action, these heuristics and biases may result in persistent and systematic errors, thus, adversely affecting decision outcomes.

Nevertheless, heuristics are ways to move forward even in the absence of adequate information. Heuristics are mental shortcuts which individuals consciously and unconsciously resort to in the process of decision-making and problem resolution. It is with simple heuristics that individuals are able to make useful decisions and solve problems in a shorter time with less knowledge and effort (Mathews, 2016:7).

Gordon et al., (Gordon & Schaller, 2014:19-20) suggest that a mindful mindset serves to avoid cognitive biases that cloud one's ability to perceive and analyze all of the pertinent attributes of the entrepreneurial venture; recognize information as relevant to a particular decision-making process; and process information in an open and unbiased manner. This mode of processing results in an overall evaluation of a given opportunity based upon the true nature of available and relevant information.

2.10. DISCUSSION

A review of the literature on cognitive entrepreneurship suggests that cognition is an essential factor in entrepreneurship and a central factor in the opportunity recognition process (Baron & Ensley, 2006). Not only is the propensity to engage in entrepreneurial activity a function of

cognition (Busenitz & Lau, 1996), but cognition is posited as a critical factor in new venture formation (Forbes, 1999).

Scholars have noted the role of cognition in performing tasks central to the entrepreneurial process, such as identifying, evaluating, and acting on potential opportunities (Shepherd, 2015). Cognition has been linked to entrepreneurial learning (Cope & Down, 2010) and to creativity (Corbett, 2007). In short, scholars suggest that understanding entrepreneurial cognition is imperative to understanding the essence of entrepreneurship (Krueger & Mellani, 2010).

Thus, the importance of cognition as a construct for understanding the entrepreneurial process is emphasised in theoretical and empirical entrepreneurship research, which suggests that the study of cognitive mechanisms and their interactions with an individual's existing knowledge base is an integral mechanism in the understanding of the opportunity identification process (Corbett, 2007). That is to say that the primary contextual elements for the creation of entrepreneurial opportunities are prior knowledge and expertise (George & Bock, 2012) and the cognitive ability to value and exploit that knowledge (Corbett, 2007).

Furthermore, it is well documented that decision-makers have information-processing limitations. Hodgkinson *et al.* (1999) suggested that entrepreneurs are "limited-capacity information processors that are faced with complex informational cues at each stage of the decision-making process". In order to render the world manageable, strategic decision-makers employ a variety of heuristics which enable them to cope with a complex and uncertain business world by making a number of simplifying assumptions which reduce the burden of information processing (Hodgkinson, Bown, Maule, Glaister & Pearman, 1999).

Cognitive research suggests that simplification is a cognitive necessity in the cases of information overload (Reger & Huff, 1993), and Schwenk (1984) contended that in environments where uncertainty cannot be minimised by action, individuals may have to alter their perceptions of the environment so that it appears more certain. In such cases, decision-makers may repress awareness of the uncertainty and instead, act on a simplified model of reality that they construct (Schwenk, 1984). That is to say, decision-makers may use perceptual processes such as cognitive simplification to simplify the decision situation (Schwenk, 1984; Schwenk, 1988).

The underlying basis of cognitive simplification is that in unstructured, uncertain situations, individuals make use of strategic assumptions, which then form the basis for the frames of reference or schemata through which the decision-makers represent complex problems (Schwenk, 1988).

In summary, the main implications of a cognitive perspective are that:

1. It moves away from earlier research streams in that it shifts emphasis away from the personality traits of an entrepreneur to examining entrepreneurship in terms of an individual's cognitive behaviour.
2. A cognitive perspective sees entrepreneurship as a 'way of thinking' (Mitchell, Smith, Morse, Seawright, Peredo & McKenzie, 2002), and it emphasises the fact that everything we say, or do is influenced by mental processes (Baron, 2004a).
3. Notably, a cognitive perspective stresses that behaviour proceeds from complex interactions between the environment and the mind (Grégoire, Corbett & McMullen, 2011).
4. Lastly, a cognitive perspective argues that in some respects, cognitions and the cognitive processes of the participants mediate all human social behaviour. Therefore, cognitive processes can be viewed as mediating processes that connect biological, environmental, and situational inputs to behavioural output (Huesmann, 1998).

Hence, in the context of opportunity recognition, a cognitive perspective suggests that the recognition of opportunities is influenced by the cognitive processes of an entrepreneur, which act as mediators between the entrepreneur's thinking and the environment.

CHAPTER 3

OPPORTUNITY RECOGNITION

3.1. INTRODUCTION

This chapter provides the framework for understanding the various views on opportunity recognition and the main components and antecedents to opportunity recognition.

It is generally accepted that the nature of entrepreneurial opportunities is the central feature of the entrepreneurial phenomenon (Alvarez & Barney, 2007). But while research around opportunity recognition is theoretically rich, and the opportunity construct holds great promise as a basis for theory building (Short, Ketchen, Shook & Ireland, 2009), a fundamental problem with theorising about opportunity recognition is that theory building is often frustrated due to the fact that researchers don't all examine the same theoretic constructs (Hansen, Shrader & Monllor, 2011).

Hansen *et al.* (2011) pointed out that only a few scholars explicitly define opportunity, and when they do either define opportunity conceptually or operationally, they seldom follow previously published definitions. A review of current literature has revealed that entrepreneurial opportunities are frequently cited to in terms of different processes such as recognition, discovery, creation, evaluation, exploitation, and identification. As a result of this, scholars have often differed in their definitions of an entrepreneurial opportunity and on the major concepts used to operationalise the concept (Ardichvili, Cardozo & Ray, 2003).

While some scholars could claimed that these concepts refer to activities which are notably distinct from each other, others argued that these concepts correspond to the principal activities that take place before a business is formed or restructured; and while division into these three processes may facilitate explanation and analysis, in practice these three processes often overlap and interact with each other (Ardichvili, Cardozo & Ray, 2003).

3.2. OPPORTUNITY IDEATION

An idea is a concept or plan formed by mental effort (Vandenbosch, Fay & Saatçioğlu, 2001). Hence, in order to understand entrepreneurial ideation, it is necessary to understand how entrepreneurs formulate mental representations and it is important to understand the characteristics of these mental representations.

An opportunity must first be identified before it can be acted upon. Therefore, in order to understand what promotes or inhibits entrepreneurial activity, it is necessary to understand how entrepreneurs construct opportunities (Krueger Jr, 2007a). Krueger (2007a) claimed that while existing opportunities can be pursued and implemented, future opportunities are not there to be

found; rather, they are constructed by the individual. That is, “opportunities are thus very much in the eye of the beholder” and perceptions and cognitive phenomena are critical to this process (Krueger Jr, 2007a).

These assumptions are reiterated by Hayton and Cholakova (2012) who identified constructive cognitive processing as paramount to the development of an entrepreneurial idea. According to them, the development of entrepreneurial ideas typically occurs in a context that requires the entrepreneur to make inferences about information that is not directly observable; that is, the information required must be interpreted, imputed, and constructed by the entrepreneur.

These assertions point to a fundamental view that the conceptualisation of an idea is a subjective, idiosyncratic process. Every entrepreneur will make sense of information about a business concept and construct an idea about it in their own subjective way. That is to say, in some respects, each individual’s sense-making processes are unique. In addition, a normal part of opportunity recognition is the testing of novel ideas that are unproven (Lumpkin, Hills & Shrader, 2004).

Coalescing these statements leads to a view of ideation as an idiosyncratic sense-making process that involves the testing of unproven, novel ideas. That is, an idea can be viewed as an entrepreneur’s hypothesis about a business concept. This means that when an entrepreneur conceptualises an idea, they make an assumption about a business concept through the entrepreneur’s sense-making processes. That is to say that an idea can be viewed as an assumption made about a potential business opportunity that an entrepreneur then tests by executing or enacting that opportunity.

Gemmell, Boland and Kolb (2012), in their research on entrepreneurial ideation countered the traditional over-simplistic view of ideation as the first in a linear series of progressive activities to form a new business. Rather, they observed that ideation is an ongoing complex, cyclical and recursive social process of problem-solving and learning which is integral to and inseparable from a bigger cycle of innovation and new business formation.

Ames and Runco (2005) noted that successful entrepreneurs tend to produce many ideas. These entrepreneurs seem to frequently use their ideational skills in the natural environment and rely more on their own thinking than on routine and rote solutions to problems.

3.3. OPPORTUNITY OBJECTIFICATION

Wood *et al.* (2010) highlighted the vital role of cognition in opportunity recognition when they suggested “opportunities begin to emerge as the entrepreneur experiences the social world and forms a cognitive evaluation of that reality”. According to Wood *et al.* (2010), through this process, the individuals formulate ideas as envisioned futures that may or may not become opportunities. In

order for these ideas to become fully enacted opportunities, they must survive a process that begins with the objectification of the idea as an external opportunity for the entrepreneur.

Wood and McKinley (2010) defined opportunity objectification as the attribution of objective reality to an opportunity idea, so that the idea begins to be seen as an entity outside the observer's mind.

Support for this notion of objectification of opportunity ideas is provided by Ucbasaran, Westhead and Wright (2001) who suggested that objectification by experienced entrepreneurs may be less dependent on the generation of consensus through interactions with peers, instead conforming more closely to a solitary act of recognition.

In other words, this implies that “for the experienced entrepreneur, subjectivity may be transformed into objectivity in a sudden inversion—the entrepreneur just knows at some point that the idea is viable and represents an opportunity” (Wood & McKinley, 2010).

This view of opportunity objectification builds upon a cognitive perspective of entrepreneurship, which suggests that through experience, the entrepreneur develops with a well-established schema that allows the entrepreneur to sort opportunity ideas into viable and nonviable categories, and thereby permitting the entrepreneur to achieve opportunity objectification alone on their own volition (Wood & McKinley, 2010).

3.4. OPPORTUNITY RECOGNITION PROCESS

Li et al., (2015:1576) identify two main perspectives by which cognitive psychologists have discussed the opportunity recognition process. The first is based on the feature analysis model, the focus of which is the characteristics of opportunity. In this model, emphasis is placed on the importance of entrepreneurial experience and prior knowledge to identify opportunities, which according to the feature model, have a direct influence on opportunity recognition.

The second perspective is based on the models of pattern recognition, in which prototype, exemplar, and schema models are integrated into a single cognitive framework. In this model, individuals' opportunity recognition depends on prototypes or schema which guide opportunity recognition. As individuals gain more expertise and knowledge, key features of entrepreneurial opportunity may be linked together, thereby allowing these individuals to automatically identify complex patterns (Li, Wang & Liang, 2015:1576).

The study of opportunity creates a conundrum since it brings to the fore the tensions between ex-post insight and ex-ante foresight; since as Mason and Harvey (2013:1) argue, it is only by looking at opportunity backwards from the vantage point of the already known future that it is possible to speak of discovery, recognition and identification.

George et al., (2016:315) suggest that recognizing any particular entrepreneurial opportunity could be described as an example of either the discovery or the creation process, and research emphasis should rather be placed more on the driving factors that influences the two opportunity processes.

In this study, the researcher has conceptualised opportunity recognition not as an isolated process, but rather in terms of a collection of processes, which include perception, discovery and creation. The researcher found sufficient support in the literature for describing opportunity recognition as a collective process, and in particular, derived this conceptualisation from two influential works in entrepreneurship research, which provide the basis for this. These are that of Ardichvili *et al.*'s (2003) research on opportunity identification and development and Sarasvathy *et al.*'s (2003) proposed typology for opportunity recognition.

Ardichvili *et al.* (2003) proposed that opportunity recognition should be viewed as a collection of processes consisting of three distinct processes, which they characterise as follows:

- a) A perception of market needs and/or underemployed resources;
- b) The recognition or discovery of a match between particular market needs and specified resources; and
- c) The creation a new match between separate needs and resources.

Accordingly, these three processes represent perception, discovery, and creation respectively – not just recognition.

Support for this viewpoint of opportunity recognition as a collection of processes is provided by Dyer, Gregersen and Christensen (2008) who view opportunity recognition as including the processes of recognition, discovery, and creation; although they do acknowledge that entrepreneurs are more likely to engage in discovery or creation, since they are introducing something new to the market.

In their research on entrepreneurial opportunity identification, Vaghely and Julien (2010) suggested that entrepreneurs move between recognising and constructing opportunities during the process of identifying potential business opportunities. They posit a model of opportunity identification as an algorithmic-heuristic continuum that incorporates both the opportunity discovery and opportunity enactment point of view.

This process is underpinned by entrepreneurial action – which can be thought of as a dynamic, highly iterative process of engaging activities and experiences that inform and are informed by a potential opportunity (Shepherd, 2015).

3.5. TYPOLOGY OF OPPORTUNITIES

Sarasvathy *et al.* (2003) provided a simple typology of opportunities based on the pre-conditions for their existence.

According to them, opportunity recognition occurs when both sides of the opportunity exist in an obvious manner, and the opportunity develops from the recognition of ‘the match-up’ that brings the two sides together. That is, opportunity recognition takes place by connecting known products with existing demand (Dyer, Gregersen & Christensen, 2008). This notion of opportunity recognition has to do with exploitation of existing markets.

Opportunity discovery occurs when only one side of the opportunity exists – either the demand exists but the supply doesn’t, or vice versa. In this case, the non-existent side has to be discovered before the match-up can be implemented. That is, opportunity discovery starts with a known supply and proceeds in search of unknown demand, or starts from known demand and proceeds in search on unknown supply (Dyer, Gregersen & Christensen, 2008). Opportunity discovery in this context has to do with the exploitation of existing and latent markets.

Conversely, opportunity creation takes place when neither supply nor demand exists in an obvious manner and one or both sides of the market have to be created anew. This notion of opportunity creation has to do with the creation of new markets.

Sarasvathy *et al.*'s (2003) typology of opportunities is useful as it assists in conceptualisation of an entrepreneurial opportunity in terms of its supply and demand. Use of this typology is not intended to petition further debate on the subject or to make distinctions between the different views, but rather, and as Sarasvathy *et al.* (2003) themselves pointed out, to assist in understanding the relationships and interactions between them.

This view of analysing an entrepreneurial opportunity in terms of supply- and demand-sides is consistent with the definitions of entrepreneurial opportunities as offered by several other leading scholars in the field of entrepreneurship research.

Venkataraman and Sarasvathy (2001) stated that “an entrepreneurial opportunity consists of the opportunity to create future economic artefacts and as such, involves a demand-side, a supply-side and the means to bring them together” (Venkataraman & Sarasvathy, 2001).

This view of opportunity recognition as an interplay of supply-demand is supported by Grégoire *et al.* (2010), who defined an entrepreneurial opportunity as projected courses of action to introduce – and profit from, new and/or improved supply-demand combinations that seek to address market failure problems.

Cohen et al., (2007) provides a simplistic summary of the three views of opportunity. According to them, the allocative view, which is tied to opportunity recognition, perceives opportunities to exist when there is potential to redistribute resources for the betterment of some without making others worse. The allocative view therefore, relates to any possibility of putting resources to better use and opportunities arise when there is someone to make use of the imperfect distribution of resources/information (Mathews, 2016:7).

The discovery view, which is tied to opportunity discovery, suggests that entrepreneurial opportunities arise from information asymmetries with respect to the true value of resources and the resulting value of the combination of those resources into outputs. The creative view, which is tied to opportunity creation, suggests that entrepreneurs seek to maximize the utility functions of multiple stakeholders and that opportunities can only truly be identified ex-post (Cohen & Winn, 2007).

The origins of the market as an allocative process arise from the positivist rules of classical and neoclassical school models which assume that all market actors have access to all the relevant information needed for decision-making (Zivdar & Imanipour, 2017:732). Zivdar et al., (2017:732) argue that this assumption however, degrades decision-making processes as far as the use of mechanical and mathematical rules for optimization and downplays the importance of knowledge dispersion and uncertainty, making it impossible to analyse special decisions and actions of entrepreneurs.

Zivdar et al., (2017:732) further contend that models such as the model of strategic decision-making are attempts to contrast with the assumptions of perfect information and homogenous market actors in schools of classical and neoclassical economics. These patterns however, are largely dependent on rational assumptions, are therefore not extendable to all entrepreneurs because of differences in cognition, and decision making logics.

Ramoglou and Tsang (2016:410), based on the definition of entrepreneurial opportunity as the propensity of market demand to be actualized into profits through the introduction of novel products or services, advance the “ actualization approach ” which theorizes opportunities as unactualized propensities. The actualisation view can be seen as a middle ground between discovery and creation views in that their theory explains the subjectivities of the process of opportunity actualization while also maintaining a commitment to the objectivity of opportunities.

The actualisation view thus adds an additional perspective to the conception of opportunities. Under the discovery view, which is grounded on empiricism, entrepreneurs discover opportunities that pre-exist independently of entrepreneurs as empirically undiscovered entities. Under the creation view, which is grounded on constructivism, opportunities do not exist until they are created endogenously by entrepreneurs. Finally, under the actualisation, which is grounded on realism,

opportunities are propensities that exist independently of potential entrepreneurs, in the form of unmet or possible market demand that can be actualized into profits (Ramoglou & Tsang, 2016:410).

Foss et al., (2016:2), while applauding the actualisation view for its effort to reconcile the discovery and creation views, also criticise Ramoglou and Tsang (2016:410) for 'mudding the waters' and for neglecting two existing middle-ground perspectives of the effectuation/bricolage approach and the judgment-based view that are more straight forward and intuitive than the actualisation view.

Foss et al., (2016:3) note that although both the judgment and effectuation views deny the existence of opportunities exogenous to entrepreneurial action, these views do not imply radical subjectivism or social constructivism. Instead, these views see entrepreneurship as enabled and constrained by objective factors such as resource availability, technology, consumer preferences, and institutions that shape entrepreneurial imagination and ultimately determine success and failure.

Davidsson (2015:680) from his critical review of entrepreneurial opportunities, conceptualised a broad classification of three different views of opportunity which comprise of the discovery view, the creation view, and the evolving idiosyncrasy view. Under the discovery view, the entrepreneur and the opportunity are assumed to pre-date the entrepreneurial journey, have varying characteristics, and jointly shape the process and its outcomes. An opportunity is something objectively existing and favourable, although the entrepreneur cannot know *ex ante* whether what he is acting upon truly is an opportunity or not. The creation view is cast as an alternative or complement to the discovery view. Under the creation view, both the entrepreneur and the opportunity remain on central to the creation process.

Davidsson (2015:682) suggests that the third perspective based on the evolving idiosyncrasy view has a similar but slightly different take on the evolving, entrepreneur–contingent nature of the entrepreneurial process. Under this view, the opportunity is predominantly used to denote a subjective and unproven idea. This idea exists early in the process, but can change considerably during its course, and take on increasing "objectification" over time which makes the perspective reminiscent of the effectual processes.

Mainlea et al., (2014:105) provide a conceptualisation of opportunities based on innovation and arbitrage opportunities and opportunity discovery and opportunity creation. According to them, these represent different conceptualizations of opportunity-phenomena that are based on different views of entrepreneurship and have differentiating features.

Mainlea et al., (2014:105) claim that markets in a state of disequilibrium present arbitrage opportunities. The entrepreneur, in addressing the disparity between supply and demand, then

moves the market towards a state of equilibrium. In such cases, both supply and demand exist, but an entrepreneur needs to recognize the opportunity to put them together. Arbitrage opportunities arise from the failure of market mechanism resulting in market inefficiencies. Opportunities present themselves to alert individuals who perceive the market inefficiencies because of their skills in acquiring, interpreting and using disparate sources of market information.

The second dimension, opportunity discovery arises from exogenous shocks, such as industry or market changes or technological inventions which are beyond the influence of entrepreneurial action. Opportunities exist regardless of whether people are aware of their existence and opportunity discovery is realized through active, although not necessarily purposeful, search behavior. In opportunity discovery, resources are put to better use or new solutions or new needs, and the most suitable options for their realization are identified. Exploiting the opportunity entails risk, but risk can be estimated and allows for rational decision-making (Mainela, Puhakka & Servais, 2014:105).

Finally, Mainela et al., (2014:105) claim that opportunity creation appears as a continuous process and a flexible activity of creating meaning, sense-making and sense-giving in an ambiguous social context. Opportunity creation is actualized through enactment by means of human imagination and social interaction, and instead of being actively searched; the opportunities are endogenously formed in the unfolding of the everyday entrepreneurial practice and interactions between various actors. Opportunity creation is connected with true uncertainty where neither supply nor demand exists and the future is unknowable (Mainela, Puhakka & Servais, 2014:105).

3.6. ASSUMPTIONS OF THE DISCOVERY AND CREATION VIEWS

Notwithstanding attempts by researchers to provide some delineation for the opportunity construct through various views of opportunity, the two main views of opportunity, about which there is still an ongoing fundamental debate in entrepreneurship literature, is the discovery and creation viewpoints.

The basis of the debate stem from whether opportunities exist as an objective reality, existing before the entrepreneurial process starts and awaiting discovery by an alert individual, or whether they are constructed by the entrepreneur. The latter, creationist view argues that entrepreneurial opportunities cannot be known or anticipated in advance. Rather, they are created and refined through a process of continued trial and error (Mason & Harvey, 2013:1).

Mason et al., (2013:1) submit that the creation view has strong similarities with the theory of effectuation which posits the view that ends are not fixed and present in advance but are continually redefined depending on strategic partnerships and available resources. The result being that the opportunity is created as the residual of a dynamic and interactional process.

Foss et al., (2016) argue that the discovery view mistakenly implies that opportunities exist independent of human belief and action. The creation view rightly emphasizes human belief and action, but mistakenly implies that profit opportunities, once the entrepreneur has conceived or established them, somehow come into being. They agree with the view that entrepreneurship is a creative process but propose that what entrepreneurs create or attempt to create are not opportunities, but rather new firms, new products, or new markets.

According to the discovery viewpoint, the entrepreneurial process starts with the discovery of an opportunity, which is due in part to the pre-existing knowledge of the entrepreneur. The implication inherent in this viewpoint is that “perception comes before action” (Sanz-Velasco, 2006).

Opportunity discovery has its theoretical grounding in the cognitivist vision of information processing which relies on a pattern-like or algorithmic model. According to this viewpoint, “information shapes the entrepreneur’s representation of reality in a normative way; entrepreneurs compare their representations of the environment in order to shape the logic of their network. Information is explicit, codifiable and thus formal. Linking patterns of information from various sources forms the basis of innovation and new business opportunities” (Vaghely & Julien, 2010).

Opportunity creation, tied to the creation view on opportunity recognition, suggests that entrepreneurs seek to maximise the utility function of multiple stakeholders (Cohen & Winn, 2007). This viewpoint posits that opportunities are created in a process that is iterative and interactive, which in turn implies that initial perceptions of an opportunity are rudimentary and in need of development (Sanz-Velasco, 2006). Furthermore, this view posits that entrepreneurs act before they have a comprehensive perception of an opportunity in that they immediately turn their attention to enactment and effectuation (Sanz-Velasco, 2006).

Alvarez (2005) investigated the central of assumptions related to the discovery and creation view of opportunity recognition. A summary of key differences in the central assumptions of the discovery and the creation view are illustrated in Table 3.1.

From her investigation, Alvarez (2005) surmised that the discovery view operates on the assumptions that opportunities have an objective component that exist whether or not the entrepreneur recognises them. Opportunities are based on the specific attributes of the market and for the entrepreneurs to recognise an opportunity, they need to anticipate the kinds of opportunities that exist in that market.

In contrast, the creation view operates on the assumption that “opportunities are created through a series of decisions to exploit a potential opportunity”. An important distinction of the creation view is that it recognises that it is difficult to separate the *ex ante* and *ex post* theory of opportunities as opportunities can only really be identified *ex post* (Cohen & Winn, 2007).

Another difference between the discovery and creation views emanates from the role of the entrepreneur in the opportunity recognition process. The discovery view is associated with ‘entrepreneurial alertness’, which can be described as an “emotional state with a pre-disposition for action”. The discovery view suggests that entrepreneurs are alert to existing opportunities and are constantly scanning the environment for market imperfections (Alvarez, 2005).

The creation theory in turn suggests that entrepreneurship does not require differences in people but instead differences in decision-making under entrepreneurial conditions of uncertainty. In the creation view, the entrepreneur is not examined as an individual autonomous from the opportunity, but instead as the creator of the opportunity (Alvarez, 2005).

Finally, opportunity discovery theory is centred on the assumption that entrepreneurs act within a decision-making context that is characterised by risk; which implies that the probabilities of decision outcomes can be estimated using existing information (Alvarez & Barney, 2007).

Table 3.1: Central assumptions of discovery and creation theories of entrepreneurial action

	Discovery theory	Creation theory
Nature of opportunities	Opportunities exist independent of entrepreneurs (Exogenous)	Opportunities do not exist independent of entrepreneurs (Endogenous)
Philosophical grounding	Realist.	Evolutionary realist.
Nature of entrepreneurs	Differ in some important ways from non-entrepreneurs, ex ante.	May or may not differ from non-entrepreneurs, ex ante. Differences may emerge, ex post.
Nature of decision-making context	Associated with risk.	Associated with uncertainty.
Planning	Formal business planning	Little to none
Leadership	Expertise	Charismatic
Strategy	Pre-planned	Emergent
Path to competitive advantage	Speed, secrecy, entry barriers	Path creation process

Adapted from Alvarez and Barney, (2007); (Welter & Alvarez, 2015:1402)

On the contrary, opportunity creation theory is centred on the assumption that entrepreneurs act within a decision-making context that is characterised by uncertainty; which implies that the probabilities of decision-making outcomes cannot be estimated due to unknowable information. This is characteristic of industries that are highly dynamic (Hmieleski & Baron, 2008). In these settings, knowledge about market and industry structure cannot be used to anticipate opportunities (Hmieleski & Baron, 2008).

3.7. DISCOVERY AND CREATION IN TERMS OF MEANS & ENDS FRAMEWORK

A means and ends framework links known individual ends and the corresponding known and available means within which individual choice is being hypothesized. Within a given means-ends framework the action of an individual can be easily determined since it is an optimization problem. However, as Arentz et al., (2013:465) note, this does not tell us how means-ends frameworks are selected in the first place.

Aution et al., (2013:1351) claim that the opportunity discovery perspective suggests important insights into how an individual's exposure to external information influences opportunity recognition and evaluation and subsequently drives entrepreneurial action. They propose that given the way information relevant for the formation of opportunity beliefs is embedded in social structure, an individual's position within a social structure should matter for first-person opportunity beliefs and entrepreneurial action. Furthermore, they argue that the prevalent notion of opportunities taking the form of new means-ends relationships implies that to embark on entrepreneurial action, the individual needs to be exposed to information on both means and needs.

The discovery view articulates a theory of entrepreneurship in which discovery is the means of entrepreneurship and profit maximization is the only possible "end" but Essig (2015:228) argues that a limitation of discovery view is that one may not only discover a means-ends relationship but may also create a relationship between means and ends. In particular, they point to the theory of effectuation in which the ends are determined by the means as the process of entrepreneurship unfolds and new means-ends relationships are created.

Essig (2015:235) explains these differences as follows:

"The concept of effectuation differs from discovery in that the means are known and the ends unknown; the entrepreneur "discovers" previously unknown means for achieving a known end (profit maximization). In an effectual process, the entrepreneur creates the connection between the means and the most suitable ends. The means for effectual entrepreneurship originate with the entrepreneur herself: who she is, what she knows, and whom she knows, rather than with opportunities".

3.8. OPPORTUNITY: COMPONENTS AND ANTECEDENTS

In order to identify an opportunity, an actor must first develop a conjecture regarding the existence of an opportunity from information that they must make sense of and impose meaning upon (Sarasvathy, Dew, Velamuri & Venkataram, 2003).

According to Venkataraman and Sarasvathy (2001), an entrepreneurial opportunity consists of two categories – (i) beliefs about the future, and (ii) actions based on those beliefs. Thus, an entrepreneurial opportunity consists of a set of ideas, beliefs, and decision-actions.

Based on this categorisation and the preceding discussion, an entrepreneurial opportunity can be described as consisting of a:

- a) Supply-side;
- b) Demand-side;
- c) Beliefs; and
- d) Possible actions.

But since “opportunities are about the possibility to act” (Gregoire, Shepherd & Lambert, 2010), it is important to understand the supply-demand interplay in conjunction with the entrepreneur’s beliefs and how these beliefs mediate between possible actions.

Thus, an opportunity then can be viewed as having supply and demand components, and beliefs are the antecedents for possible actions.

3.9. SUPPLY-DEMAND COMPONENTS OF OPPORTUNITY

According to Eckhardt and Shane (2003), opportunities can be categorised according to their sources by the following ways:

- a) Differentiations between asymmetries in existing information between market participants, and opportunities that result from exogenous shocks of new information;
- b) Differentiations between supply- and demand-side opportunities;
- c) Differentiations between productivity-enhancing and rent-seeking opportunities; and
- d) Identification of the catalysts of change that generate the opportunities.

In terms of supply and demand, opportunities can be classified by whether the changes that generate them exist on the supply- or the demand-side. Supply-side opportunities tend to arise from changes in input or ways of organising production, processes, or products; while demand-side opportunities tend to arise from changes in customer preferences.

As pointed out by Eckhardt and Shane (2003), entrepreneurship literature has generally focused on supply-side changes and there is a lack of literature on demand-driven entrepreneurial opportunities.

From the various views posited on opportunity recognition, it is evident that the existence or non-existence of the supply-side and demand-sides of an opportunity are key determining factors in how the opportunity construct is beheld. This is reflected in Gregoire et al's., (2012:753) definition of the basic components of entrepreneurial opportunities which accordingly, include a demand side, a supply side, and an economic means for transactions to take place between both sides. When viewed from supply and demand, opportunities then concern the introduction of new and/or improved means of supply to better serve the needs of consumers in one or more markets (Wood, McKelvie & Haynie, 2014:252).

Wood et al., (2014:252) argues that since a priori value of new or improved means of supply is unknown, assessments of the profit potential of an opportunity are therefore subjective to the individual. This suggests that for entrepreneurs to act on an opportunity idea, they must believe that doing so will result in a desired end state, which suggests that opportunity beliefs are future focused "visions" of what might be accomplished if entrepreneurial action is taken.

Cohen et al., (2007) adopt a discovery perspective in suggesting that market imperfections are sources of opportunities. They argue that that while opportunities relating to efficiency imperfections may span each of the three distinctive views of entrepreneurial opportunity – opportunity recognition, discovery and creation, opportunities are likely to be recognised by combining known supply and demand elements of a market in more efficient ways.

Acs et al., (2016:35) contribute to the discussion on supply and demand through their research on novel entrepreneurship. Novel entrepreneurship is about introducing something into the market that does not exist. In other words, the demand and supply curve do not exist. They describe novel entrepreneurship to mean the activities necessary to create or carry on an enterprise where not all the markets are well established or clearly defined, and in which the relevant parts of the production function are not known. In such cases, not all of the markets exist or operate well and the entrepreneur must fill in for the market deficiencies.

Through their contribution on demand-side research, Priem et al., (2012:346) emphasises product markets as key sources of value creation and views consumer preferences as dynamic and sometimes latent. They stress that an important component of demand-side research which seeks to move focus away from factor markets and producers towards that of product markets and consumers, is that it attempts to explain and predict the decision-making of the individual that increases value creation within a value system (Priem, Li & Carr, 2012:346).

Priem et al., (2012:346) observe that current research in entrepreneurship has often focused on how information, and subsequent knowledge, is gained by entrepreneurs as they scan their potential market environments. In such circumstances, entrepreneurs are reactive to market signals and subsequent opportunities stem from these scanning activities. They propose that under

certain conditions, customers and markets are more active drivers of the opportunities that are identified and evaluated by entrepreneurs.

Santos et al., (2015:510), argue that through experience, entrepreneurs develop business opportunity prototypes which enable them to 'connect the dots' between seemingly unrelated environmental changes, and to recognise these emergent patterns as possible opportunities. Their study proposes that the features of a business opportunity prototype are better represented by a bi-dimensional model which reflects both viability and distinctiveness. These two dimensions of the business opportunity prototype are related to the supply-demand conceptualization of opportunities in that the viability of business opportunity is related to the supply side of opportunities, as it refers to a new product/service; and distinctiveness of business opportunity is related to the demand side, as it allows opening a new market and making a difference.

In other words, the degree of alignment between means of supply and target markets is related to the business opportunity viability and distinctiveness dimensions of the entrepreneur's business opportunity prototype. More specifically, they claim that the degree of means of supply of an opportunity is related to its viability; and the ability to cover a target market is related to the distinctiveness of an opportunity (Santos, Caetano, Baron & Curral, 2015:510).

3.10. SUPPLY-DEMAND PATHS

There is evidence to suggest that entrepreneurs act on supply-demand paths in order to appropriate value from an opportunity. For example, Jones and Pitelis (2015:309) suggest that in fast shifting environments, entrepreneurs act on their 'path dependent' and 'shaped' images to create demand and supply-side conditions, markets and supporting ecosystems, and it is through such paths that they are able to appropriate value and hence realise their vision.

Wood et al., (2014:252) utilise mental model theory logic for modeling opportunity beliefs. They conclude that opportunity-related information is cognitively processed in terms of what it means for the individual given the linkages and outcome predications the individual can make based on his/her knowledge, experiences, and desired outcomes and they point out that these factors have a certain path dependency and are unique to the individual.

Gregoire and Shepherd (2012:753) propose that opportunity beliefs take shape through cognitive efforts to make sense of potential "matches" between new means of supply and the markets in which these new means of supply can be introduced. They propose that differences in opportunity ideas result from differences in the manner in which entrepreneurs find structural alignment between supply and demand sides of the opportunity. This is because the human mind represents reality through mental models that not only identify individual units of information but also structural relationships between these units.

3.11. DISCUSSION

The importance of opportunity recognition to the entrepreneurial process is widely noted in the entrepreneurship literature (Wood & McKinley, 2010). Shepherd (2015) for example suggested that future contributions from entrepreneurial studies will come from viewing the entrepreneurial process as “one of generating and refining potential opportunities through building, engaging, and transforming communities of inquiry”.

Nevertheless, despite the extensive research directed towards opportunity recognition, there is still an ongoing debate about the nature and definition of opportunities (Shepherd, 2015). This is because much of the current discussion regarding the origins of opportunities focuses on the ontological and epistemological debate between the more widely adopted objectivist perspective and the lesser known constructivist perspective (Wood & McKinley, 2010).

The objectivist perspective, on the one hand, argues that opportunities are created independently of the entrepreneur and, thus, are available to all. Conversely, the constructivist perspective argues that opportunities are produced through a process of social construction and cannot exist apart from the entrepreneur (Wood & McKinley, 2010).

In other words, one view is that opportunities arise as objective artefacts waiting to be “discovered” by predisposed individuals; while a second view is that they arise out of the subjective interpretations and creative actions of these individuals (Grégoire, Barr & Shepherd, 2010).

A further distinction is provided Sarasvathy *et al.* (2003), which is a simple typology of opportunities that enable researchers to differentiate between opportunity discovery and opportunity creation in terms of the supply- and demand-sides of an opportunity.

According to them, opportunity discovery occurs when only one side of the opportunity exists – either the demand exists but the supply doesn't, or vice versa. In this case, the non-existent side has to be discovered before the match-up can be implemented.

Conversely, opportunity creation takes place when neither supply nor demand exists in an obvious manner and one or both sides of the market have to be created anew (Sarasvathy, Dew, Velamuri & Venkataram, 2003).

One conspicuous criticism that could be tabled against the literature on opportunity recognition is that there is still no clear understanding as to at which point in the entrepreneurial process opportunity recognition takes place. As pointed out by Dimov (2007a), “there is at present no agreed upon understanding, neither theoretical nor empirical, of what opportunity recognition entails”. In other words, is an idea separate from an opportunity, and where does one stop and where does the other begin?

Entrepreneurship literature supports the notion that entrepreneurial ideas are shaped and developed through an iterative process that requires knowledge and creativity (Dimov, 2007a), as well as an individual's beliefs (Shepherd, 2015).

Eckhardt and Shane (2003) claimed that opportunities are not businesses, business models, organisations or products. Rather, they are economic circumstances that require the creation and organisation of physical products or services in order to exploit the opportunity and profit from it. But, in order to profit from these economic circumstances, a person must first develop a conjecture that such an opportunity exists (Shane & Venkataraman, 2000).

This is an important differentiation as it lends itself to the view held in this research, and which is consistent with that expressed by Grégoire *et al.* (2010), that "opportunity recognition is about the formation of subjective beliefs that an opportunity exists".

It is commonly acknowledged that opportunities are uncertain *ex ante* and can only be determined *post hoc* (Shepherd, 2015). It is understood that the value of opportunity may never come to be realised if the opportunity is not exploited. However, that is not the focus of this research. Opportunity recognition in this research is viewed in terms of an entrepreneur's beliefs regarding the existence of an opportunity.

That is to say that the researcher is interested in the factors that mediate between an entrepreneur's conjecture of the 'perceived value of the opportunity' (Eckhardt & Shane, 2003) and his decision to exploit the opportunity.

Better explained, these mediating factors represent the stage between a conjecture of an idea – the ideation phase, and the decision to exploit that idea. An understanding of this mediating phase in the opportunity recognition process could result in the following benefits:

- a) Assist researchers understand differences in the decision-making of novice and expert entrepreneurs; and
- b) Explain strategies that entrepreneurs pursue in order to make sense of their environments.

Although this chapter has provided key insights into the various viewpoints on opportunity recognition, it should be noted that the current study does not make claims as to why some entrepreneurs recognise opportunities while others do not. Nor does it attempt to contribute to the argument of whether opportunities are created or discovered. Furthermore, Sarasvathy *et al.*'s (2003) typology of opportunities is useful in that it assists in conceptualisation of an entrepreneurial opportunity in terms of its supply and demand.

CHAPTER 4

ENTREPRENEURIAL DECISION MAKING

4.1. INTRODUCTION

Entrepreneurs are commonly faced with complex situations characterized by limited information and extreme uncertainty. In such settings, entrepreneurs cannot rely on historic trends, previously established norms, or direct information to guide decision making because ventures are new or entrepreneurs are pursuing novel ideas.

Mueller et al., (2016:457) suggest such situations suit an intuitive cognitive style. An intuitive cognitive style has its grounding in an open-ended approach, a reliance on holistic impressions, synthesis of information, and lateral as opposed to step-by-step reasoning. According to them, such an approach offers potential advantages in confronting these types of environments in comparison to an analytical style which favours a structured approach, working according to pre-existing rules, and using systematic methods and sequential reasoning.

This chapter builds on the assumption that uncertainty brought about by a dynamic and changing entrepreneurship environment, is a source of opportunities. It explores the decision-makings of expert and novice entrepreneurs in the context of such an environment in order to better understand differences in their decision-making about pursuing potential opportunities.

4.2. UNCERTAINTY

Engel et al., (2017:35) describe uncertainty as the “perceived inability to predict something accurately. In sum, uncertainty is ultimately concerned with the power of temporality in drawing a veil over the future, thereby concealing preferences as well as outcomes.

Petrakis et al., (2015) provide a view of uncertainty in terms of open and closed systems. According to them, closed systems are those that accept no influences from the external environment and all variables and the relationships among them are known, stable over time, and thus highly predictable. In contrast, open systems are those that accept environmental change and subsequently impose changes on the environment in the context of interaction through a process of continuous feedback. Open systems involve numerous variables and relationships, with the relationships between variables being particularly dynamic (Petrakis & Konstantakopoulou, 2015).

However, the most important feature of open systems, which strongly affects strategic decision, is that they are relatively long term, which causes high uncertainty and thus contributes to the failure of forecasts and predictive models (Petrakis & Konstantakopoulou, 2015).

Tushman and Nadler (1978) provide a perspective of uncertainty as the difference between information processed and the information required to complete a task. Thus, uncertainty results from an information gap. Another view of uncertainty in the context of decision-making outcomes, posited by Alvarez (2005), is that “decision-making settings are uncertain when the possible outcomes of a decision and the probabilities of those outcomes are not known, *ex ante*”. Thus, uncertainty can result from both the information gap that exists during execution of a task as well as the probable outcomes from completing the task.

4.3. UNCERTAINTY AND OPPORTUNITY RECOGNITION

McMullen and Shepherd (2003) claimed that because entrepreneurship is concerned with how new and appropriate ideas are implemented – whether it is through new firms, products or processes – and involve the entry into new markets or the reorganisation of entire industries, entrepreneurship is consistently represented by two primary elements: novelty and action.

Supported by the works of several prominent researchers, McMullen and Shepherd (2003) stated that the essence of entrepreneurship is judgement born out of uncertainty. They argued that entrepreneurship requires judgment because entrepreneurship cannot exist without action. That is, because action is always uncertain, the navigation of uncertainty mandates the exercising of judgment.

Moreover, because entrepreneurial action is action in regard to something new, or “novel action”, it possesses even greater uncertainty than routine actions, and therefore may necessitate even more judgment (McMullen & Shepherd, 2003). Judgment in turn is directed by one’s beliefs. Katz and Shepherd (2003) argued that in the context of action, the concepts of knowledge, information, and uncertainty congeal to create “belief” – “Whether someone acts depends upon their beliefs, and these beliefs are a function of their knowledge and uncertainty surrounding it”.

Shane and Venkataraman (2000) advocated that entrepreneurship requires that entrepreneurs hold different beliefs as this in turn causes them to make different conjectures about market factors. This is because if all potential entrepreneurs possessed the same entrepreneurial conjectures, they would compete to capture the same entrepreneurial profit, dividing it to the point that the incentive to pursue the opportunity would be eliminated (Shane & Venkataraman, 2000).

Grégoire *et al.* (2010) agreed with this and suggested that the first phase of entrepreneurial action concerns the formation of subjective beliefs that an opportunity exists. They built on the notion that in an *ex ante* uncertain world, individuals express their beliefs about specific opportunities in terms of the extent of their perceived certainty or uncertainty about whether an idea does indeed form an opportunity.

Dimov (2011) argued that an opportunity should simply be viewed as a metaphor, used to describe what entrepreneurs do. This is because in essence, an entrepreneurial opportunity represents the possibility for entrepreneurial action. Hence, in most general terms, individual intention and action involve a configuration of beliefs and desires, and understanding the formation of one's intention to act on a particular opportunity idea entails applying the belief-desire configuration to the idea and acknowledging its inherent uncertainty (Dimov, 2007b). Freel (2005) weighed in by claiming that uncertainty is no more an outcome of entrepreneurship nor is it a disincentive to entrepreneurship; but instead uncertainty is now accepted as a first principle – that is, as a cause, rather than a consequence of entrepreneurship.

The essence of Freel's (2005) argument is that knowledge imperfections of market participants create opportunities for profit through the introduction of novelty; and as such, bring about the conditions in which an entrepreneur may prosper. That is to say that there are opportunities in uncertainty (Hitt, Ireland, Camp & Sexton, 2001).

While on the one hand, market imperfections contribute to environmental degradation, they also provide significant opportunities for the creation of novel and innovation technologies (Cohen & Winn, 2007). If uncertainty is now accepted as a fact of economic life, then uncertainty should be considered an important antecedent of entrepreneurial opportunities.

4.4. PRODUCT-MARKET UNCERTAINTY

Entrepreneurs operating in markets that are characterised by a high degree of uncertainty, such as those brought about by rapid technological change, require new product development practices that manage uncertainty and maximise new product success (Mullins & Sutherland, 1998). Mullins and Sutherland (1998) defined rapidly changing markets as those in which new technologies result in innovations being brought to market with such frequency that they result in shifts to market structures. These novel products require consumer learning and induce behaviour changes in consumers (Mullins & Sutherland, 1998).

Mullins and Sutherland (1998), identified three levels of uncertainty associated with rapidly changing markets. The first deals with market uncertainty. That is the uncertainty associated with market opportunity that a new product offers. Market uncertainty arises from a lack of understanding of consumer needs and is particularly relevant in the case of new technologies.

The second level of uncertainty has to do with product uncertainty. That is the uncertainty associated with turning new technologies into a product or service that meets consumer needs. This uncertainty arises from the difficulty associated with translating technological advancements into product features that bring about consumer benefits.

The third level of uncertainty has to do with the allocation of financial resources. More specifically, it is the uncertainty associated with how much capital to invest in the pursuit of rapidly changing markets.

The uncertainty matrix, as depicted in table 4.1 below illustrates the different areas of uncertainty in terms of product-market alignment.

Table 4.1: Uncertainty matrix

	EXISTING PRODUCT	NEW PRODUCT
EXISTING MARKET		Product uncertainty
NEW MARKET	Market uncertainty	Product & market uncertainty

Source: Adapted from Ansoff (1957:113).

Market uncertainty is about the eventuality that a new technology-based application may meet neither the customer's expectations nor profitable market (Blanco, 2007). In their definition of market uncertainty, Autio, Dahlander and Frederiksen (2013:1348) incorporated both demand uncertainty and product uncertainty, where demand uncertainty concerns the underlying market demand while product uncertainty concerns the attractiveness of a given solution relative to other solutions in the marketplace.

Market uncertainty is of particular importance to technology entrepreneurship because of the link between market uncertainty and innovation novelty. New product introductions or innovations that are more novel demand more inputs or novelty of inputs, and are associated with greater market uncertainty (Tidd & Bessant, 2005).

Ciborra (1997) pointed out that the implementation of technology is punctuated by uncertainty – with unexpected outcomes, which often requires frequent adaptations and in some cases, a complete re-invention of the initial system.

Figure 4.1 provides a graphical illustration of the relationship between uncertainty and novelty. In her book, *Wellsprings of knowledge*, Barton (1995) described market alignment as the degree to which a product aligns with the needs of a targeted customer base. Figure 4.1 adapted from Barton (1995) provides a visualisation of new product development and market alignment relationship.

On the one end of the spectrum in Figure 4.1, is the known customer set. These customer needs are well understood by the product developer because the product developer's channels of information from the market are well established and with clearly identified sources (Barton, 1995).

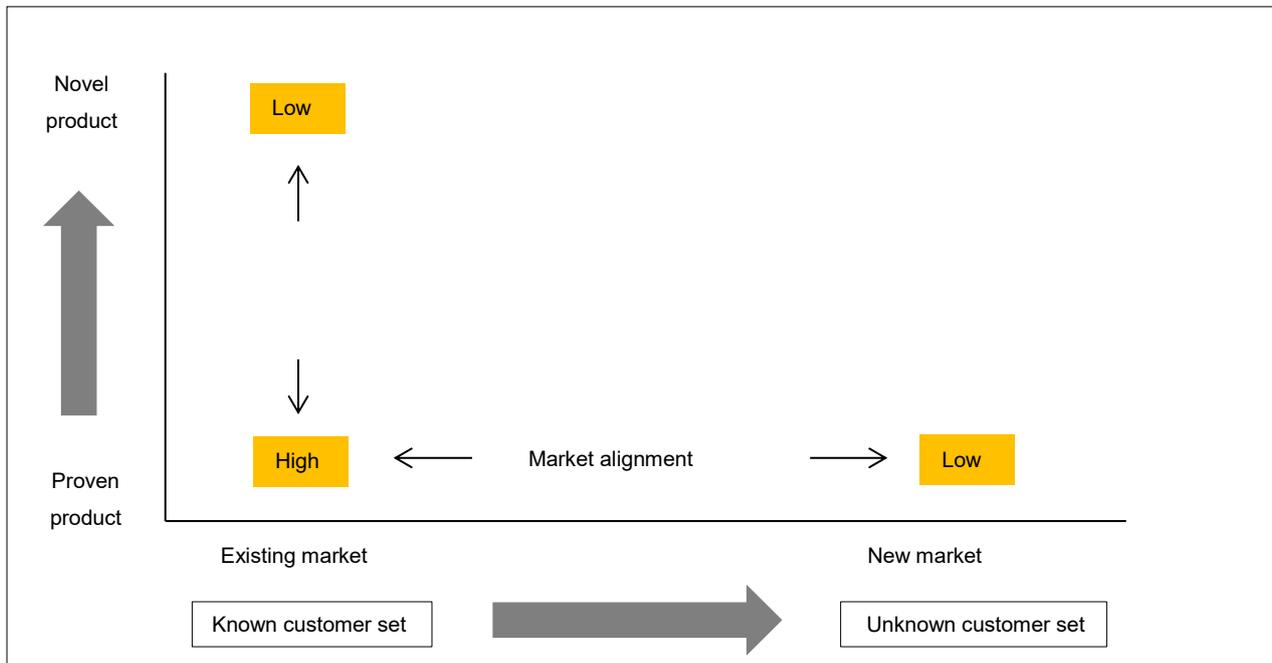


Figure 4.1: Product-Market alignment

Source: Adapted from (Barton, 1995).

Barton (1995) stated that as one progresses to the right, the market uncertainty increases, eventually culminating in the frontiers of new market creation. At this point new product developers cannot be certain they have even identified the correct set of users as they undertake design.

Hence, in order to manage uncertainty when designing a range of product lines, it is essential to import knowledge from the market in order to understand which product lines will meet current demand and which will anticipate future customer needs (Barton, 1995).

4.5. UNCERTAINTY AND RISK

Given that uncertainty is embedded in entrepreneurial activities that relate to new venture creation, it is important to consider how potential entrepreneurs evaluate third-person opportunities and overcome uncertainty. Current research on uncertainty in the context of entrepreneurial action has provided some insights into how entrepreneurs view uncertainty and how differences in the entrepreneur's propensity for uncertainty and risk affect their choices regarding potential new venture creation opportunities.

Kirkley (2016:151) suggests a model of the entrepreneurial decision making process for a new venture creation as taking place at three related levels or stages of analysis. These stages include the person analysis – that is the entrepreneur, environmental analysis and the strategic decision process on the best approach to enter the market. This implies that there are critical factors

throughout all three stages that need to be considered when contemplating a new venture (Kirkley, 2016:151).

Stated another way, there is risk and uncertainty associated with all three stages of analysis. For example, while some uncertainty may be removed when the entrepreneur clearly identifies a potential idea, there is still a degree of risk associated with creating a solution, and uncertainty connected with the best strategic approach (Kirkley, 2016:151).

Building on the established link between prior experience, expertise and opportunity recognition, Hsieh and Kelley (2016:297) researched differences in perceptions of risk and the innovativeness of opportunities relative to an entrepreneur's level of experience. Their results suggest that risk propensity may become more important in opportunity recognition when the entrepreneur has low prior experience. In other words, "the interaction effect of prior industry experience and risk taking indicates that one's inclination toward risk appears to be less important in the perceptions of innovativeness in highly experienced entrepreneurs. Nascent entrepreneurs that have less background experience may nonetheless pursue innovation through their willingness for risk taking".

Le Roux et al., (2006:51) conducted a study on the influence of risk perception and self-efficacy on the decisions to exploit a venture opportunity. Their findings suggest that people with higher levels of self-efficacy might perceive opportunities differently from those with lower levels.

Autio et al., (2013:1348) conducted a study on how an individual's exposure to external information regulates the evaluation of entrepreneurial opportunities and entrepreneurial action. Their research findings provide empirical evidence that suggest that reducing demand uncertainty is a central factor for triggering entrepreneurial action. Autio et al., (2013:1348) point out that mere exposure to third-person opportunities will not stimulate action if response uncertainty prevails.

One way to compare risk and uncertainty is in terms of recurring and non-recurring events. Petrakis et al., (2015) state that the concept of risk applies to events that recur with relative frequency and hence can be predicted with some accuracy. In this case, prior experience is thus critical to predictability. Conversely, uncertainty is associated with nonrecurring events, which cannot indicate the direction in which a situation will develop. As such, the eventual outcome of a decision in such a situation cannot be known *ex ante*, which means that prediction, and thus foresight, is not possible for such events (Schmidt, 2015:549).

4.6. ENTREPRENEURIAL DECISION-MAKING

A decision is the selection of some option from the consideration set by assessing the pairing of that option with some subset of possible outcomes. Decision makers select the option, or course of action, they believe is most likely to lead to a preferred outcome, least likely to lead to some unwanted outcome, or some combination of these (Packard, Clark & Klein, 2017). Decisions, in the end, depend on how the decision maker's perception of uncertainty; i.e., the openness or closedness of each set is subjectively determined (Packard, Clark & Klein, 2017).

There is a body of entrepreneurship literature that supports the view that strategic decision-making is a special case of decision-making under uncertainty (Hodgkinson, Bown, Maule, Glaister & Pearman, 1999). When opportunities are created endogenously by entrepreneurial action, the decision-making context of the entrepreneur in this case is either ambiguous or uncertain since the future has not yet evolved (Alvarez, Barney & Young, 2010).

Typically in this setting, the entrepreneur can make decisions by applying biases and heuristics. Alternatively, the entrepreneur can apply a second set of decision-making tools that do not require biases or heuristics (Alvarez, Barney & Young, 2010:). This process is (i) incremental, in that entrepreneurs make small decisions based on their current resources and capabilities; and (ii) it is iterative in that it involves making and remaking decisions until desired outcomes are achieved; and finally, this process is inductive in that data to evaluate the quality of decisions is collected after decisions are made (Alvarez, Barney & Young, 2010:).

4.7. DECISION-MAKING UNDER RISK

In situations of risk, the decision process is comparatively straightforward and analytical. While the specific outcome is unknown a priori, the likelihood of each outcome is known. Therefore, such processes can be reduced to mathematical optimizations (Packard, Clark & Klein, 2017).

Robinson et al., (2015:149) conducted a study in which they examined how risk perception is related to overconfidence and venture creation decisions. Their study found that the relationship between overconfidence and venture creation decision is partially mediated by risk perceptions. In other words, individuals that are more overconfident tend to perceive fewer risks, and are more inclined to decide to create a new venture relative to individuals that are less confident.

Robinson et al., (2015:149) claim that results for this mediated relationship provide explanations for why entrepreneurs who tend to be overconfident perceive their chances for success more favourably than objective reality warrants. Furthermore, evidence of their study provides support for the notion that entrepreneurs may not have a higher propensity for risk, but rather, they may not perceive the risk based on overestimations of their own success.

4.8. DECISION-MAKING UNDER UNCERTAINTY

As noted by Vermeulen and Curseu (2008), for some of our decisions we can estimate with relative certainty the probability of the outcomes associated with all the alternatives we consider; but for others, it is impossible to do so. Vermeulen and Curseu (2008) suggested that we use existing strategies or heuristics for some of our choices, but in others we search for additional information and even create new alternatives by combining that which we already know. Some choices therefore are based on routines triggered by repetitive stimuli. Others often involve the planning of actions in an uncertain and unpredictable future; these choices are notably labelled as 'strategic' (Vermeulen & Curseu, 2008).

According to Gustafsson (2009), most decision-making models suggest that making decisions in real life settings is a process of constructing and revising situation representations, as much as a process of evaluating the merits of potential courses of action. In his examination of the connection between a task's cognitive requirement and entrepreneurs' use of different cognitions, Gustafson (2009) arrived at the following conclusions:

- Low uncertainty situations, which are characterised by having information that is relevant and adequate time to make a decision, tend to lead towards rational (analytical) decisions. In entrepreneurial settings, low uncertainty is associated with opportunities when both supply and demand exist and are known.
- High uncertainty situations are characterised by situations where information is scarce or unreliable and the time available for making a decision is restricted. In such situations, adequate decisions tend to be made by non-rational techniques such as heuristics or intuitive judgments. In entrepreneurial settings, such conditions are associated with opportunities when either supply or demand is unknown or when neither is known or existent.

Cohen and Winn (2007) provided a valuable linkage between the research of Frank Knight (1964) and that of Sarasvathy *et al.* (2003); and in so doing, provided the basis for linking uncertainty and entrepreneurship.

According to Cohen and Winn (2007), the three types of uncertainty delineated by the work of Knight (1964), can be related to Sarasvathy *et al.*'s (2003) typology of entrepreneurial opportunities as follows:

- Opportunity recognition ensues when the distribution of future outcomes is known and probabilities can be calculated.
- Opportunity discovery ensues when the distribution of future outcomes exists but can only be identified over time through the process of trial and error.

- Opportunity creation ensues when the distribution of future outcomes is unknown and unknowable.

Packard et al., (Packard, Clark & Klein, 2017) claim that the entrepreneurial process can be seen as a series of micro-judgments by which entrepreneurs resolve uncertainty, transitioning from one state of uncertainty to another, until uncertainty is sufficiently resolved to make the decision to exploit.

In their study, Engel et al., (2014:12) used a situational framing approach to better understand how the same uncertain situation may be interpreted differently, thereby evoking different strategic responses. Findings from their research suggest that when approaching decision-problems entrepreneurs convert the information they face into meaningful pictures through the imposition of simplified categories. These salient characteristics of the opportunity frame provide the theoretical justification linking it to both entrepreneurial self-efficacy and effectuation. Simply put, when individuals feel confident about their entrepreneurial ability they are more likely to frame an uncertain environment as an opportunity and thus rely on effectual logic in their decisions (Engel, Dimitrova, Khapova & Elfring, 2014:12).

4.9. DECISION MAKING MODES: EFFECTUATION & CAUSATION

As noted by Gustafsson (2009), expert and novice entrepreneurs differ in their decision-making behaviour in entrepreneurial tasks. Being a skill that they have acquired over time, expert entrepreneurs are able to recognise the nature of the decision task and to a high extent, are able to match their decision-making techniques with the nature of the task. Gustafsson (2009) noted that expert entrepreneurs are likely to make use of the ample array of decision-making techniques: analysis, heuristics, and intuition and match their cognitions with the requirements of the task. Novice entrepreneurs in contrast are to a high extent prone to analytical decision-making, regardless of the nature of the decision task.

The two main decision-making modes in entrepreneurship literature are that of effectuation and causation.

4.10. EFFECTUAL DECISION-MAKING

Effectuation provides a theoretical framework that describes how expert entrepreneurs attempt to increase the resources available to accretes (Sarasvathy, Kumar, York & Bhagavatula, 2014:71), as well as lending insight into how entrepreneurs evaluate opportunities (Chandra, 2017:1).

Under the effectuation model, entrepreneurial decision making takes place in which the ends are determined by the means as the process of entrepreneurship unfolds and new means-ends relationships are created (Chandra, 2017:1). That is, decision about opportunities start with the

existing means where the entrepreneur asks how these can be transformed into products, organizations, markets and the like, by engaging stakeholder networks that help shape the means and goals (Chandra, 2017:1). As such, the theory of effectual thinking begins not from market equilibrium or market disequilibrium, but from market non-existence (Essig, 2015:227).

The effectual logic model is means-driven. The goal is vague and not fixed, but it is defined through interactions with the environment – it is path-dependent and stakeholder-dependent process. In other words, entrepreneurs do not analyse all of the clusters of opportunities available but instead create opportunities by considering available means and the courses of action possible (Kalinic, Sarasvathy & Forza, 2014:635).

Since effectuation consists of heuristics that embody non-predictive forecasting control as opposed to predictive tools, effectual heuristics are especially useful in situations of uncertainty and unpredictability as is the case in new venture creation. This is because effectuation uses means within the entrepreneur's control as a basis for action and does not require predictions of the future (Sarasvathy, Kumar, York & Bhagavatula, 2014:71). In other words, effectuation focuses on controlling uncertainty, rather than predicting or planning (Chandra, 2017:1).

Thus, the effectuation process is based on the logic of control instead of prediction. In other words, effectuation decision-making mode suggests that a truly uncertain situation cannot be solved by rational cause-based forecasting but instead through effectual logic in which there is an attempt to control the present through creating collaborative action (Makimurto-Koivumaa & Puhakka, 2013:1). Effectuation therefore can be seen as an effective problem-solving strategy that entrepreneurs use in situations where the future is highly uncertain, such as when the future cannot be predicted or estimated (Kalinic, Sarasvathy & Forza, 2014:635).

Proponents of effectuation submit that entrepreneurs create opportunities based on affordable loss principle rather than on maximization of expected returns. The implication being that commitment based on affordable loss calculations minimizes or eliminates reliance on predictive information (Kalinic, Sarasvathy & Forza, 2014:635). As such, entrepreneurs are able to create new ventures with relatively limited investment and taking limited risks (Kalinic, Sarasvathy & Forza, 2014:635).

4.11. CAUSAL DECISION-MAKING

In contrast to the effectuation model or mode of decision-making, causation has certain differentiating characteristics. Under this model, causal thinkers aim to maximize expected returns through careful prediction, planning and opportunity analysis (Chandra, 2017:1).

As Chandra (2017:1) explains, causal thinkers start with a goal and work backwards to find the means to achieve it. Typically a causal thinker would ask questions such as: what is my goal, how do I optimize outcomes, and which decision is less risky?™.

In other words, the causal logic model starts with clearly defining a goal to achieve and, consequently, they select the appropriate means or look to create new ones™. It is a goal-driven and resource dependent process where the opportunities are given and the challenge consists in finding them.

In causal logic, entrepreneurs estimate risk by basing their decisions on the information that is outside the decision maker's control while in effectual logic, entrepreneurs base their decisions on available means and affordable loss (Kalinic, Sarasvathy & Forza, 2014:635).

4.12. EFFECTUATION: MAIN PRINCIPLES

Sarasvathy et al., (2014:71) and Harms et al., (2012:95) explains the five main principles and the overall logic of effectuation as follows:

- Bird-in-hand;

Effectuation is means-driven. This principle emphasises that effectuation begins with a central actor - the entrepreneur who has three categories of means: identity, knowledge, and networks. Means-based logic is measured through constructs such as resource-based capabilities (who I am), the number of years of industry experience (what I know), and size and breadth of networks (whom I know) (Sarasvathy, Kumar, York & Bhagavatula, 2014:73).

- Affordable loss;

Expert entrepreneurs utilizing effectual strategies have been shown to focus on what they can afford to lose rather than on prediction of possible gains. By focusing on affordable loss, the need to predict future returns is eliminated, thus implying less time engaged in planning (Sarasvathy, Kumar, York & Bhagavatula, 2014:74). Stated another way, effectuators tend to make investments incrementally so if they fail, they would not put the existence of the venture at stake, while entrepreneurs that focus on causation seek instead to maximize expected returns (Harms & Schiele, 2012:95)™.

- Crazy quilt;

An effectual approach risks only resources that can be affordably lost; thus, it also drives partnerships as the central method to expand resources (Sarasvathy, Kumar, York & Bhagavatula, 2014:74). Effectuators flexibly exploit contingencies that arise as the new venture unfolds while

entrepreneurs that rely on causation, on the other hand, tend to exploit current capabilities and resources (Harms & Schiele, 2012:95).

- Lemonade;

An effectual approach leverages uncertainty by treating surprises as opportunities to control the newly emerging situation (Sarasvathy, Kumar, York & Bhagavatula, 2014:74). In effectuation, goals emerge in the course of the process, whereas in causation, goals are defined prior to decision-making (Harms & Schiele, 2012:95). In other words, causation has connotations of rational planning, whereas effectuation is associated with emergent strategies (Harms & Schiele, 2012:95).

- Pilot-in-the-plane.

The fifth principle emphasizes the role of human beings rather than trends in determining the shape of things to come. The pilot-in-the-plane principle is an explicit rejection of inevitable trends (Sarasvathy, Kumar, York & Bhagavatula, 2014:74).

Harms et al., (2012:95) state that when dealing with uncertainty, effectuators negotiate pre-commitments from stakeholders, thereby trying to “control an unpredictable future”. Entrepreneurs that rely on causation, on the other hand, deal with uncertainty by through business planning and competitive analysis.

Sarasvathy et al., (2014:75) explain that these five principles are enacted through two concurrent cycles: expanding means and converging goals. The expanding means cycle increases the resources available to the venture by increasing stakeholder membership in the effectual network; while the converging goals cycle accretes constraints on the venture that converge into specific goals that get embodied in an effectual artifact over time.

4.13. COMPARING EFFECTUATION AND CAUSATION

Packard et al., (2017) explain differences in the causal and effectuation decision-making modes in terms of absolute and creative uncertainty. According to them, in a causal approach, the entrepreneur first attempts to resolve the absolute uncertainty into creative uncertainty by addressing environmental uncertainty. That is, before the entrepreneur attempts to discover or create a solution to the entrepreneurial problem, the entrepreneur makes an initial judgment regarding the potential value of the opportunity by estimating the social importance of the recognized problem. A problem solution which is perceived to have a high potential value, may merit further investment of time, energy, and resources in seeking an economic solution. Thus, environmental uncertainty is first resolved in estimating the expected value, in effect closing the outcome set and leaving creative uncertainty to be resolved. Once the environmental uncertainty has been resolved, the entrepreneur must then focus efforts on the creative resolution of the

chosen problem with the resources available. This creative process would persist until a satisfactory solution is conceived, or the entrepreneur decides no economic solution exists, or conditions change such that the search is abandoned.

In contrast, Packard et al., (2017) claim that entrepreneurs using effectual reasoning seek to transform absolute into environmental uncertainty by first addressing creative uncertainty. In this case, the entrepreneur starts with a given set of resources and capabilities from which the entrepreneur determines possible uses through effectual processes of ideation. This approach permits higher levels of creativity and innovation as the entrepreneur is not constrained by a particular idea or problem to solve but by the resources available. This aligns with research on creative cognition, which suggests that resource constraints, rather than task constraints, lead to more novel ideas. After the entrepreneur has considered possible combinations and applications of available resources and capabilities to generate possible uses, the context changes to environmental uncertainty in which the entrepreneur judges possible outcomes as subjectively and imaginatively determined. At this point, the entrepreneur either selects one of these outcomes to pursue or returns to ideation to generate more ideas.

Makimurto-Koivumaa et al., (2013:1) claim that causation is effect dependent while effectuation is actor dependent. In causation the entrepreneur chooses the means on the basis of the characteristics of the effect, while in effectuation, the effects are chosen on the basis of the characteristics of the actor. Thus, the entrepreneur is leveraging the possible future by counting on people.

Mathews (2016:20) in turn, provides a view of effectuation and causation in terms of ends and effects. According to him, causation is understood as a problem-solving decision model that is based on the logic of prediction where ends/effects are predicated upon entrepreneur's knowledge of possible means. In contrast, effectuation is defined as a problem-solving decision model that is based on the logic of control where the entrepreneur decides in relation to what can be done given the available/possible means an imagined ends.

The key differences between effectuation and causation decision-making processes is explained by Harms et al., (2012:95) as follows: (i) Goals tend to be pre-defined in causation as opposed to effectuation where goals are viewed as emergent; (ii) decision parameters in causation include maximization of expected return, while in effectuation, decision parameters are based on affordable loss; (iii) causation decision making deals with uncertainty through planning while effectuation decision making involves pre-commitment and alliances; and finally (iv) while causation focuses on capabilities and resources, effectuation focuses on leveraging contingencies. A summary of these key characteristics is provided in table 4.2.

Table 4.2: Key characteristics of causation and effectuation decision modes

	Causation	Effectuation
Goals	Pre-defined	Emerging
Decision parameters	Maximization of expected return	Affordable loss
Uncertainty strategy	Business planning and competitive analysis	Pre-commitment and alliances
Exploitation	Capabilities and resources	Environmental contingencies

Source: (Harms & Schiele, 2012:95).

4.14. DISCUSSION

Entrepreneurs respond to and create change through their entrepreneurial actions, where entrepreneurial action is viewed as behaviour in response to a judgmental decision under uncertainty about a possible opportunity for profit. However, whether entrepreneurial action occurs depends on how much one must rely on one's judgment, which in turn, depends on the degree of uncertainty experienced in the decision of whether to act (McMullen & Shepherd, 2006).

Hence, the ability to function effectively and make decisions in uncertain environments is a crucial consideration in entrepreneurship. This is particularly relevant in the case of opportunity creation where the entrepreneur seeks to create a new market.

The opportunity creation perspective, which is centred on the assumption that entrepreneurs act within a decision-making context that is characterised by uncertainty (Hmieleski & Baron, 2008), argues that under conditions of uncertainty the attributes of an industry are either not knowable or changing in difficult to predict ways. As a result, in these settings, knowledge about industry structure cannot be used to anticipate opportunities (Alvarez, 2005).

Therefore, understanding the type of environments in which entrepreneurs operate and the context in which decisions are made, are important factors in understanding entrepreneurial behaviour associated with a problem situation.

It is important to note however, that the critical factor in the decision process is not the severity of the problem situation, but instead the individual's perception of the situation (Beratan, 2007). Butler, Doktor and Lins (2010) suggested that uncertain perception relates to the entrepreneur's

knowledge of the existence of a situation in which the values of the consequences of action and the probabilities of those consequences are not perfectly known.

CHAPTER 5

ENTREPRENEURIAL EXPERTISE

Entrepreneurship research suggests that a common method used by researchers to investigate the opportunity recognition processes of an entrepreneur is to compare how entrepreneurs at different levels of expertise go about identifying opportunities for potentially successful business opportunities.

This chapter sets out to dispel some of the uncertainty through an in-depth review of the theoretical frameworks, attributes and key constructs that extend existing theory and research on expertise.

The researcher discusses the key generalisations from expertise literature and examines their applicability to expertise research in entrepreneurship. The researcher has found that there is sufficient incongruity between these generalisations and the theories of entrepreneurship; and therefore advocates that a framework for entrepreneurial expertise should take into account the qualitatively different representation and organisation of an entrepreneur's knowledge and the cognitive processes involved in solving ill-defined problems in unstructured environments.

5.1. INTRODUCTION

Over the last five decades, extensive research has been conducted on expertise in formal, well-structured domains such as chess, physics and medicine. Common findings from these studies have then been extrapolated to make generalisations about expertise in other domains. Despite the extensive research that has been conducted on expertise in various domains, key issues on how to define expertise and therefore how to empirically test expertise in a domain still remain largely unanswered.

Furthermore, growing evidence points to the observation that the characteristics of expertise in one domain are not always generalisable to other domains. Not only is there a "lack of constancy in the correlates of expertise", "there appears to be no single 'expert way' to perform all tasks" (Holyoak, 1991).

Alexander (2003) suggested that rather than having past research superimposed upon a specific domain, the chasm between current understandings of expertise and practice can be bridged by models and theories that are drawn directly from experience in that domain. In education in particular, he argued that because of the complex, multi-faceted, and dynamic nature of formal schooling, it has been difficult to translate the findings of past expert-novice research into educational practice. Quite simply, he stated that "there is a character to academic domains that cannot be adequately captured in nonschool domains". To this end, he offered a model of domain learning as an alternative framework for studying expertise in education.

These observations suggest that a single, all-encompassing theoretical framework is unlikely to meet the requisites for generalising expertise across domains. One such domain is that of entrepreneurship where the lack of congruity in applying the expertise approach of Ericsson and colleagues, to the theories of entrepreneurship, has already been noted by Baron (2009).

A key assumption of the expertise approach is that expertise is dependent on continuous deliberate practise in that domain. However, Baron (2009) questioned whether it is possible to apply the concept of deliberate practise to entrepreneurship and to identify representative tasks that entrepreneurs engage in, that demonstrate deliberate practise and represent the acquisition of expertise.

In addition to the lack of congruity, most expertise research has been conducted in the contexts of stable, well-structured environments and well-defined problem-solving. Expertise research has failed to adequately examine the acquisition of expertise in the case of ill-defined problem-solving in unstructured environments, such as those that typify the type of environments in which entrepreneurial ventures operate.

Considering that the major thrust of most research in entrepreneurship has been to prove that entrepreneurs are different from non-entrepreneurs (Gartner, 1985), and considering that entrepreneurs generally operate in dynamic, unstructured environments, it would appear that research on the acquisition of expertise in the domain of entrepreneurship will provide unique challenges.

The next sections of this chapter set out to address some of these challenges by reviewing existing theoretical frameworks of expertise that generalise across various domains. The researcher identifies key constructs and attributes that consistently characterise and differentiate experts from novices. Then he examines the characteristics of entrepreneurial expertise and looks for congruity with these characteristics and existing expertise frameworks.

5.2. DESCRIBING AN EXPERT

A commonly cited definition of an expert is that of a “distinguished or brilliant journeyman highly regarded by peers, whose judgments are uncommonly accurate and reliable; whose performance shows consummate skill and economy of effort, and who can deal effectively with certain types of rare or ‘tough’ cases. Also, an expert is one who has special skills or knowledge derived from extensive experience with subdomains (Hoffman, 1998).

Two key characteristics are clear in Hoffman’s (1998) definition. First, this definition refers to specialised skills derived from extensive experience in a domain. Second, it refers to accurate,

reliable and efficient decision-making in uncommon and difficult situations. Expertise research arguably, has neglected to make a distinction between these two aspects.

The first aspect of this definition can be viewed as the technical aspect of expertise, namely the acquisition of skills from which superior performance is derived. Until now, this has been the definition of choice for many scholars as evident from the many studies that have chosen to define expertise in the context of specialised skill and superior performance in a given domain. For example, Ericsson and Smith (1991) proposed that researchers focus on superior performance in a domain as a measure of expertise. Expert performance is then defined as consistently superior performance on a specified set of representative tasks (Ericsson & Charness, 1994); and expertise is measured through the identification of well-defined representative tasks that can be administered under standardised conditions in the laboratory and altered to examine the effects of experimental manipulations (Ericsson, 1998).

The second aspect of Hoffman's (1998) definition can be viewed as a cognitive aspect of expertise, namely judgement and decision-making. Dreyfus and Dreyfus (2005) claimed that since expertise is based on the making of immediate, unreflective situational responses, the hallmark of expertise therefore, is intuitive judgement.

A distinction between the cognitive and technical aspects of expertise has been referred to in several studies. For instance, Chi, Feltovich and Glaser (1981) alluded to a distinction between skills and knowledge when they defined expertise as the possession of a large body of knowledge and procedural skill. Similarly, Scardamalia and Bereiter (1991) stated that expertise is a state of grace in which knowledge and skill make it possible for experts to accomplish things with ease.

As argued by Holyoak (1991), the diversity of expert learning and performance suggests that it is important to distinguish qualitatively different varieties of expertise. One such distinction is suggested by Sloboda's two tentative classes of expertise (Holyoak, 1991). Sloboda (1991) stated that an expert is someone who performs a task significantly better – by some specified criterion, than the majority of people. Under this definition, expertise then can be viewed as “the reliable attainment of specific goals within a specific domain”.

Sloboda (1991) provided an alternative definition, one that appears more suited to the domain of entrepreneurship, as “an expert is someone who can make an appropriate response to a situation than contains a degree of unpredictability”.

While the question of what constitutes an appropriate response is debatable, it is generally accepted that entrepreneurs often have to make decisions in highly complex and uncertain decision settings (Busenitz & Barney, 1997), which are characterised by scarce or unreliable information and limited time for making a decision. Prior research suggests that in such situations,

adequate decisions tend to be made by non-rational techniques such as heuristics or intuitive judgments (Gustafsson, 2009:).

Research on entrepreneurial decision-making indicates that entrepreneurs are likely to make appropriate response in these situations because they are more likely to utilise biases and heuristics in their decision-making (For example, Busenitz & Barney, 1997). It is contended that because entrepreneurs are prone to use heuristic-based decision logic, they are able to more quickly make sense out of uncertain and complex situations (Alvarez & Busenitz, 2001).

In this respect, the work done by Hatano and Inagaki (1986) on routine and adaptive expertise is notable. They suggested that adaptive expertise is more than just the acquisition of skills; it requires a deeper conceptual understanding as well.

Increasingly, scholars are arguing that in order to understand the acquisition of expertise in a domain, researchers need to focus on 'the dimension of knowledge' (Chi, Glaser & Rees, 1981). Chi *et al.* (1981) argued that expertise research should emphasise the differences in the knowledge structures of experts and novices; and Glaser (1984) confirmed that studies of high levels of competence support the recommendation that in order to understand expertise, it is necessary to investigate the characteristics and influence of organised knowledge structures that are acquired over long periods of time.

Thus, it would appear that a central tenet of expertise is the organisation and structure of experts' knowledge structures. This argument is supported by an overwhelming body of literature that suggests that expertise depends largely on the induction, retrieval, and instantiation of schematic knowledge structures (Holyoak, 1991).

An expert's knowledge consists of "both a cognitive element—the individual's viewpoints and beliefs, and a technical element—the individual's context specific skills and abilities" (Bradley, Paul & Seeman, 2006). The failure of past research to emphasise this distinction between cognitive expertise and technical expertise has led some scholars to call for the role of experts to be distinguished from other roles such as that of professionals, scientists and intellectuals (See Stehr & Grundmann, 2011).

Stehr and Grundmann (2011) argued that existing approaches to the study of expertise "tend to restrict the role of the expert to scientists or to conflate the roles of professionals with experts". Experts, they argued, "perform knowledge-based activities that mediate between the context of knowledge creation and application". The transfer and application of knowledge is an active process, and the reproduction of knowledge also often means the production of knowledge. Therefore, experts are creators of knowledge (Stehr & Grundmann, 2011). Alexander (2003)

agreed, claiming that not only do experts have broad and deep knowledge bases, they also contribute new knowledge to the domain.

Peter Dear (2004) claimed that an expert is one who knows things by virtue of being experienced in the relevant ways of the world. Thus according to Dear, expertise resembles ‘tacit knowledge’ (Stehr & Grundmann, 2011). Similarly, Hikins and Cherwitz (2011) hold the view that expertise is focused knowledge, that is, “knowledge of a narrow set of issues or problems”.

It is apparent that there are different kinds of expertise (Horn & Masunaga, 2006) and many different viewpoints on how expertise should be represented in a domain. Clearly then, expertise research “is benefited more by the development of a taxonomy of different types of mechanisms acquired through different types of learning and adaptation processes than by restricting the definition of expertise to a specific type of acquisition through learning” (Ericsson & Smith, 1991). In line with this sentiment, it can be argued that further ambiguity in expertise research may be avoided by making a distinction between cognitive expertise and technical expertise.

5.3. DEFINING EXPERTISE

A critical factor in determining research outputs on expertise is the context in which expertise is studied. Kennedy (1987) suggested four ways in which to define expertise, as set out in Table 5.1.

Table 5.1: Defining expertise

Expertise as a technical skill	This view on expertise derives from the specific tasks that an expert must perform. It is based on the assumptions that the constituent skills of the expert can be identified, that the skills can be transmitted to prospective practitioners and the skills can be appropriately drawn upon in practice.
Expertise as the application of theory or general principles	This approach is based on the assumption that professionals rely on theoretic or scientific principles to guide their problem-solving. Like the technical skills approach, it consists of prescriptions of what to do and these prescriptions derive from theory or in the case of the technical skill method, from the empirical investigation of practice.

Expertise as critical analysis	This approach is based on the assumption that the major task that the expert faces is to analyse situations. While still being prescriptive, it does not prescribe procedures for handling situations but rather, a paradigm for examining and interpreting situations. One criticism though, is that while it considers both situational analysis and decision-making, it fails to consider codified knowledge of the expert.
Expertise as deliberate action	Like critical analysis, this approach assumes that expertise constitutes the analysis of situations. Unlike critical analysis, however, this approach assumes that analysis occurs in the context of action and that there is an interactive relationship between analysis and action, such as that each influences the other. Successful deliberate action requires extensive experiences on which to draw from (domain knowledge); the ability to conduct mental experiments (schema); the ability to critically evaluate their outcomes (feedback); and the ability to revise one's definition of the situation if the results of the mental experiments are unsatisfactory (metacognition). "In addition, it requires a highly developed sense of purpose, for purpose is the criterion against which both ideas and actions are judged" (Kennedy, 1987).

5.4. COGNITIVE EXPERTISE

Due to the vastness and diversity of literature, it is useful to classify the research on expertise. At a cognitive level, expertise can be differentiated in terms of (i) its development, (ii) experts' knowledge structures, and (iii) experts' reasoning processes (Hoffman, 1998).

5.4.1. The development of expertise

Chi (2006) suggested that one approach to studying expertise is by differentiating between two types of expertise: absolute and relative. That is, an expert can be viewed either as absolute or as relative based on a continuum of development (Chi, 2006).

The absolute approach is based on the notion that experts are exceptional performers with innate talents (Ericsson & Charness, 1994). Expertise is then studied in the context of unique innate talent (Chi, 2006).

The relative approach is to study experts in comparison to novices. This approach assumes that expertise is a level of proficiency that novices can achieve. Because of this assumption, Chi (2006) argued that the definition for this contrastive approach can be more relative, in the sense that the

more knowledgeable group can be considered the 'experts', and in a generic sense, the less knowledgeable group can be considered the 'novices'.

One advantage of the relative approach "is that we can be a little less precise about how to define expertise since experts can be defined as relative to novices on a continuum" (Chi, 2006). In a relative approach, a goal is to understand how we can enable a less skilled or experienced individual to become more skilled (Chi, 2006).

Chi's (2006) model is based on the assumption that there is little difference in the capacities and reasoning of experts and non-experts, and differences in the performances of experts and non-experts are determined by the differences in the way their knowledge is represented, organised and structured.

This view of relative expertise is reflected in the staged theories of Dreyfus and Dreyfus (2005) and Schmidt and Boshuizen (1993) who suggested that the acquisition of skill and subsequent development of expertise occurs through progressive stages.

According to the Dreyfus and Dreyfus (2005) model, expertise develops through five stages: starting with a novice and progressing through to an advanced beginner, then to the attainment of competence and proficiency, and finally to becoming an expert. As an individual develops through the various stages, the individual exhibits qualitatively distinct features that are representative of that stage (Carol-Anne, Regehr, Mylopoulos & MacRae, 2007).

Schmidt and Boshuizen (1993) proposed a theory that describes expertise development as the progression through a series of consecutive phases, each of which is characterised by functionally different knowledge structures that underlie an individual's performance. This progression starts with the accumulation of causal knowledge, which through practical experience is transformed into knowledge structures, followed by the integration of theoretical and experiential knowledge, which in turn leads to the encapsulation of knowledge (Boshuizen & Schmidt, 1992).

The development of expertise can also be described as a progression from a quantitative, i.e. superficial and literal understanding of problems, to a more qualitative understanding, i.e. an articulated, conceptual, and principled understanding of problems (Hoffman, 1998). This distinction implies that development can involve both qualitative shifts and stabilisations in knowledge and performance (Hoffman, 1998).

5.4.2. Expert reasoning processes

Carey and Spelke (1998) argued that human reasoning is guided by a collection of domain-specific systems of knowledge, where each system is characterised by a set of core principles that define the entities covered by the domain and support reasoning about those entities. It has been

revealed in several different domains of expertise that a number of complex mental activities involving experts' reasoning depend on the experts' mental models or knowledge structures, and internal representations (Ericsson & Smith, 1991).

5.4.3. Forward versus backward reasoning

A significant qualitative difference between experts and novices lies in their solution paths (Chi, Glaser & Rees, 1981). While experts tend to retrieve a solution method, novices have to construct a representation of the task deliberately and generate a step-by-step solution (Ericsson & Smith, 1991). That is, experts utilise forward reasoning as part of the immediate comprehension of the task whereas novices employ backward reasoning (Ericsson & Smith, 1991).

Experts' use of forward reasoning has been demonstrated in physics. A study by Simon and Simon found that physics experts solve problems 'forward' from the given data to the goal while novices attempt to solve the problem in a 'backward' way from the goal by searching for appropriate data to satisfy each subgoal (Anzai, 1991).

The distinction between forward and backward reasoning has also been made in terms of heuristic search (forward) which is strongly associated with domain-specific knowledge and strong problem-solving methods, and means-end (backward) problem-solving, which is associated with weak problem-solving methods (Hunt, 1989).

Additionally, forward reasoning has been associated with Johnson-Laird's model for syllogistic reasoning (Hunt, 1989) and backward reasoning has been associated with hypothetico-deductive reasoning in the domain of medicine (Doody & McAteer, 2002).

In the absence of adequate domain knowledge, forward reasoning is highly error prone because there are no built checks in the legitimacy of the inferences. Hence, success in using forward reasoning is constrained by the environment since a great deal of domain-relevant knowledge is needed (Patel & Groen, 1991:94). While in contrast, backward reasoning is much slower and it makes heavy demands on working memory. As such, it is most likely to be used when domain knowledge is inadequate (Patel & Groen, 1991:94).

Despite the extensive research on the reasoning processes of experts and novices, Carol-Anne *et al.* (2007) argued that there continues to be difficulty in specifying the exact nature of experts' reasoning processes. This is largely because the broader construct underlying these reasoning processes remains largely ill-defined and they are often used interchangeably (Carol-Anne, Regehr, Mylopoulos & MacRae, 2007).

As noted by Carol-Anne *et al.* (2007), there is some uncertainty over the type of reasoning processes that experts and novices use. In medical expertise literature for instance, some studies

demonstrate that experts utilise forward reasoning in performing tasks in their domain of expertise (Doody & McAteer, 2002), while others have found that experts utilise both hypothetico-deductive reasoning and pattern recognition (Doody & McAteer, 2002).

In addition, studies have indicated that the use of a formal hypothetico-deductive reasoning did not distinguish successful from unsuccessful clinical problem-solving in medicine (Jensen, Gwyer, Shepard & Hack, 2000). Jensen, Gwyer, Shepard and Hack (2000) cited several studies that demonstrate that individuals with varying levels of expertise do not differ in the strategies that they use or in their depth of process, but rather that they differ in their recall of meaningful, selective knowledge.

In another study conducted by Profitt, Coley and Medin (2000), the researchers found that experts tend to use considerable domain-specific casual knowledge when solving induction problems in their domain of expertise. However, while Barnett and Koslowski (2002) found that experts engage in causal reasoning in general, they do also use alternative reasoning in the form of structured argumentation during the process of solving ill-defined problems.

This is in line with Profitt *et al.*'s. (2000) claim that both experts and novices have a variety of reasoning strategies at their disposal, which to some extent is domain specific. Such a belief is consistent with some other studies in which researchers have found that experts adapt their search strategies of the problem space to the constraints of the task at hand (Kimball & Holyoak, 2000).

5.4.4. Qualitative reasoning

Extending on the work of Glaser, McCormick (1999) claimed that it is already well understood in the field of problem-solving that experts attempt to solve problems by beginning to think about them in qualitative terms. According to him, qualitative reasoning, together with procedural knowledge, is an essential component of practical knowledge. That is, practical knowledge, which is usable knowledge, is qualitative and procedural in nature and context-specific (McCormick, 1999).

One form of qualitative reasoning is causal reasoning, which lies at the heart of diagnostic reasoning and explanation generation (Forbus, 1996). According to Reiser (1986), causal explanations appear to be a central component in comprehending real-world events. Individuals tend to use causal structures to interpret information (Plate, 2010) and to represent events in their memory (Reiser, 1986). That is to say, a memory representation for an experience is constructed using causal inferences and this representation is then connected to memory planning structures (Reiser, 1986).

5.4.5. Expert knowledge structures

A number of studies in cognitive psychology have clearly identified that in several different domains, skilled individuals have superior memory capacity (Chi, Glaser & Rees, 1981; Ericsson, 2008). A critical aspect of an expert's working memory though, is not the amount of information that is stored, but rather how information is stored and organised in long term memory (Ericsson & Charness, 1994).

5.4.5.1. Enhanced recall

Enhanced recall refers to the superior memory skills in recognising patterns that experts have in their domain of expertise (Patel & Groen, 1991). Many studies have found evidence in support of a monotonic relation between recall performance in a domain and expertise in that domain (Ericsson & Smith, 1991). That is to say that experts exhibit better recall of episodic information related to the expert domain (Kimball & Holyoak, 2000).

But while it has been found that high-knowledge subjects have better memory and encoding performance than low-knowledge individuals, this has mainly been attributed to the influence of knowledge in content areas rather than to the exercise of memory capabilities as such (Glaser, 1985). There is evidence that experts use retrieval structures in episodic processing, that is, the instantiation of schemas (Kimball & Holyoak, 2000).

In addition, while experts and novices may be equally competent in recalling specific domain-related information, experts are significantly better at relating these events in cause-effect sequences that relate to specific goals of the problem (Glaser, 1985).

5.4.5.2. Internal representations

While novices spend a good deal of time in search and general processing of information (Glaser, 1985), experts apply a qualitative analysis to the problem prior to the actual retrieval of a solution (Chi, Glaser & Rees, 1981). That is, before seeking a solution path, experts spend a great deal of time in analysing the problem qualitatively and developing a problem representation of it (Chi, 2006). As a result, experts generate representations that are conceptually richer and more organised than those of novices are (Hoffman, 1998).

Research suggests that novices' knowledge representations are organised around the physical properties or the literal objects and events that are explicit in a problem statement. In contrast, expert knowledge is organised around inferences about principles that are not apparent in the statement or surface presentation of the problem (Glaser, 1985).

In one example, Chi *et al.* (1981a) investigated the representation of physics problems in relation to the organisation of physics knowledge in experts and novices. Their research demonstrated that

experts and novices begin their problem representation with specifically different problem categories, and completion of the categories depends on the knowledge associated with the categories.

They found that while experts would initially abstract physics principles and then solve a problem representation by tying the surface features of the problem to deep principles (Glaser, 1999), novices, in contrast, would base their representation and approaches on the problem's literal features (Chi, Glaser & Rees, 1981).

Such differences were also seen in expert-novice learning. When comparing the learning of expert and novice nurses, Daley (1999) found that novice learning is contingent on concept formation and assimilation, while expert learning was identified as a constructivist process using active concept integration and self-initiated strategies.

One reason for this is that experts have more accurate self-monitoring skills because they have the ability to detect errors and the status of their own comprehension (Chi, 2006). In addition, experts are more opportunistic and use whatever sources of information are available while solving problems and they exhibit more opportunism in their usage of resources (Chi, 2006).

Boland, Singh, Salipante, Aram, Fay and Kanawattanachai (2001) provided evidence that different knowledge representations hold the potential to activate different schema types and thereby differentially influence subsequent decision-making. Schemata therefore, are the mechanism through which experience of a particular type of knowledge representation affects performance on a subsequent task (Boland Jr, Singh, Salipante, Aram, Fay & Kanawattanachai, 2001).

5.4.5.3. Knowledge structures

Empirical evidence has shown that the knowledge of experts differs from that of a novice in terms of organisation and extent (Hoffman, 1998). Expert knowledge is represented in the form of schemata (Glaser, 1985) or mental models, which represent abstract concepts and functional relations (Hoffman, 1998). Because abstract concepts are interrelated in meaningful ways, experts are able to draw more complex conceptual distinctions than novices can (Hoffman, 1998).

Experts' knowledge is also more usable than that of a novice because experts process information schematically and organise their knowledge to reach a higher level of both efficiency and accuracy (Lurigio & Carroll, 1985). Lurigio and Carroll (1985) found that experts have fewer but more detailed schemas than novices. Rather than simply adding schemas as they accumulated new experiences, experts seem to enrich a smaller number of useful schemas by weeding out useless stereotypes (Lurigio & Carroll, 1985). According to them, such schema modification was likely to occur in response to repeated incongruous information.

Much of the literature on the organisation and structure of expert knowledge stems from early work done by Chase and Simon. In the game of chess, which is an example of a semantically rich task domain in which successful performance calls for a specific knowledge as well as general problem-solving skill (Simon, 1979:363), Chase and Simon demonstrated that differences in ability and skill levels of chess players are “attributable to the experts’ storage of thousands of chunks (patterned clusters of pieces) in long-term memory” (Gobet & Simon, 1998).

Gobbo and Chi (1986) explored differences in the way knowledge is structured and used. From their exploratory research they concluded that (i) novices focus on explicit ‘surface-type’ features of concepts while experts tend to focus on the implicit or ‘deep-level’ concepts; (ii) expert knowledge is more structured than novices, that is, the knowledge of experts is more cohesive and integrated; and (iii) as a result of having more structured knowledge, experts are able to use knowledge in a more sophisticated and accessible way.

5.5. EXPERT-NOVICE GENERALISATIONS

From the work of Feltovich, Prietula and Ericsson (2006), Glaser (1999; 1985) and Holyoak (1991), an outline of the main generalisable characteristics of expertise and their theoretical mechanisms is provided below:

- Expertise increases steadily with practise. Experts continually develop competence as they accumulate experience in a domain. The level of competence attained may be limited by the environment and is governed by the level of complexity presented in the problem, i.e. people attain a level of competence in so far as is necessary to carry out a specific task or to solve a problem. Developing competence beyond this point is significantly more difficult.
- Expertise is highly domain-specific. An experts’ proficiency is very specific and is derived largely from the expert’s specialised knowledge of a domain. Because of the high level of proficiency required, elite performance in one domain does not transfer to other domains, even when the domains seem very similar.
- Experts perceive large, meaningful patterns in the course of their everyday activities. Pattern recognition, which takes on the character of ‘intuitions’, facilitates problem perception in a way that significantly reduces the role of memory search and cognitive processing. As result, experts are better than novices are in perceiving patterns in task-related cues.
- Experts’ problem-solving entails selective search of memory or the use of general problem-solving tactics. Because of their initial representations of problem statements and the highly integrated structure of their knowledge base, the solution path taken by experts is much faster than that of novices.

- Experts' knowledge is highly procedural and is strongly related to their knowledge of the goal structure of a problem. As such, experts are much more accurate in performing complex tasks and do so with greater ease than novices.
- Experts use self-regulatory processes to proficiently monitor their own problem-solving activities. In this regard, expertise is interconnected to learning as it requires specific goals and clear feedback during problem-solving.
- Expertise is based on the automatic elicitation of actions by conditions.
- Experts' proficiency can be routinised or adaptive.

5.6. THEORETICAL FRAMEWORKS OF EXPERTISE

This overview is derived largely from the work of Ericsson and Smith (1991) and Ericsson (2006) in which an extensive review of existing expertise frameworks was discussed. Five major theoretical frameworks are described which can be categorised according to inherited and acquired expertise frameworks, as reflected in Tables 5.2 and 5.3.

Table 5.2: Inherited expertise: constructs and theoretical framework

<i>Attribution</i>	<i>Construct</i>	<i>Theoretical framework</i>
General abilities	Intelligence Personality	Expert performance resulting from individual differences in mental capacities.
Specific abilities	Specific ability, e.g. music ability	

Source: (Ericsson & Smith, 1991; Ericsson, 2006).

Table 5.3: Acquired expertise: constructs and theoretical framework

<i>Attribution</i>	<i>Construct</i>	<i>Theoretical framework</i>
General learning and experience	General knowledge Cognitive strategies	Expert performance resulting from the extrapolation of everyday skill to extended experience. Expert performance resulting from the different representation and organisation of knowledge. Expert performance resulting from superior learning environments.
Domain-specific training and practise	Domain or task-specific knowledge	Expert performance based on reliably superior performance on representative tasks.

Source: (Ericsson & Smith, 1991; Ericsson, 2006).

5.6.1. Theory of expertise as innate mental capabilities

One framework for studying expertise revolves around individual differences in mental capacities or innate talent (Ericsson, 2006). This framework is based on the traditional belief that superior

performance in a domain is attained by those individuals that have a unique, qualitative attribute, which is commonly known as innate talent (Ericsson & Charness, 1994).

It is often assumed that exceptional performance reflects some varying balance between training and experience on the one hand, and capacities and talent on the other (Ericsson & Lehmann, 1996). However, research on expert performance strongly indicates that exceptional performance in almost any domain is not due to innate talent (Baron, 2009; Ericsson, 2004).

Ericsson and Smith (1991) found that, with a few exceptions, inherited characteristics were unable to explain the superior or exceptional performance of experts in most domains. In addition, Ericsson and Charness (1994) found that the central mechanisms mediating the superior performance of experts are acquired. As such, a major limiting factor in attaining expert performance then is the acquisition of relevant knowledge and skills (Ericsson & Charness, 1994).

Following the original expertise approach of de Groot (1978), Chase and Simon (1973) and Newell and Simon (1972), several theoretical frameworks have subsequently been proposed for studying expertise that can be generalised across different domains.

5.6.2. Theory of expertise as extended experience

A second general framework for studying expertise is based on the extrapolation of everyday skill to extended experience. This framework is based on the assumption that the same learning mechanisms that are utilised in the acquisition of everyday skills can be extended to the acquisition of higher levels of skills and expertise. According to this framework, the acquisition of high levels of skills is a natural consequence of extended experience in the domains of expertise (Ericsson, 2006).

5.6.2.1. Experience

The relationship between acquired skills and experience is not as straightforward as suggested. Research has demonstrated that differences between expert and novice performance is related to the individual's ability to combine knowledge with experience (Jensen, Shepard & Hack, 1990). In addition, individuals learn and develop knowledge through experience; therefore experience is a requisite for expertise (Ericsson, 2004; Jensen, Gwyer, Shepard & Hack, 2000).

Extensive experience in a domain, however, does not invariably lead to expert levels of achievement. In some domains it has been found that performance does not improve as a function of years of professional experience. Furthermore, once an individual reaches an acceptable level of skill, more experience does not, by itself lead to an improvement in performance (Ericsson, 2008).

Bradley *et al.* (1999) argued that experience alone is not an indicator of expertise. Other factors, such as cognitive ability must be present to correctly structure the knowledge that is gained through experience. In addition, Barnett and Koslowski (2002) argued that experience should be examined in the context of ill-defined problem-solving in order to fully understand its effect on ability.

5.6.2.2. Mastery of domain

A second factor that has relevance to the theory of expertise as extended experience is the length of experience required in order to be viewed as an expert. Studies of expertise reinforce the view that at least a decade of experience is required in most domains in order for an individual to be considered as an expert (e.g. Charness, Tuffiash, Krampe, Reingold & Vasyukova, 2005; Jensen *et al.*, 1990).

5.6.3. Theory of expertise as qualitatively different representation and organisation of knowledge

A third framework focuses on expertise as qualitatively different representation and organisation of knowledge. This approach has used social acclamation, extensive experience (typically over ten years) and domain specific knowledge as methods for the identification and study of experts (Ericsson, 2006).

This framework proposes that experts have domain-specific knowledge that is highly organised, conceptually integrated (Glaser, 1999), and more cohesive than that of novices (Gobbo & Chi, 1986). This appears to account for their capacities for rapid pattern recognition and categorisation (Glaser, 1999) and enables them to use their knowledge in a more sophisticated and accessible way (Gobbo & Chi, 1986).

Since the possession of accessible and usable knowledge is seen to be a major component of expertise (Glaser, 1985; Jensen, Gwyer, Shepard & Hack, 2000), differences in the performance of experts and novices therefore can be explained by the differences in extent and organisation of their schema (Gaglio & Winter, 2009).

Several studies have attempted to sharpen the focus on the dichotomy in knowledge between experts and novices (Chi, Glaser & Rees, 1981; Chi, Feltovich & Glaser, 1981; Glaser, 1984; Glaser, 1999; Glaser, 1985; Gobbo & Chi, 1986). Results from these and other studies provide evidence that the knowledge structures of experts play a critical role in their decision-making (Gaglio & Katz, 2001) and performance (Glaser, 1999).

Two general characteristics of this framework to which differences in ability and performance in a particular domain can be attributed are the following:

- Experts have highly integrated and specialised knowledge structures that are structured for retrieval, pattern recognition, and inferencing. This in turn drives their reasoning and lies behind many of the salient features of their performance (Glaser, 1999).
- There are strong interactions between the knowledge structures and cognitive processes of experts. These cognitive processes ensure that experts possess rapid access to, and efficient utilisation of an organised body of conceptual and procedural knowledge (Glaser, 1985).

5.6.4. Theory of expertise resulting from superior learning environments

The fourth framework views expertise as elite achievement resulting from superior learning environments. This framework focuses on objective achievement in a domain as the basis for identifying and studying experts (Ericsson, 2006).

5.6.5. Theory of expertise as reliably superior performance on representative tasks

Finally, an expertise approach proposed by Ericsson, Smith and colleagues, promotes the notion that expertise is characterised by the demonstration of superior performance within a specific domain of activity. This approach is based on the assumption that acquisition of expert performance requires engagement in deliberate practise and that continued deliberate practise is necessary for maintenance of many types of professional performance (Ericsson, 2004).

5.7. CONTEXTUAL CONSIDERATIONS

5.7.1. Performance measures

A distinguishing and limiting feature of the expertise approach is the requirement that in order to research expertise, it is necessary to design a collection of standardised tasks that capture the relevant aspects of superior performance in a domain. These tasks then need to be demonstrated and reliably reproduced under laboratory conditions (Ericsson & Smith, 1991).

However, Ericsson and Smith (1991) have noted that “the design of standardised tasks to capture real-life expert performance is difficult” since “there are few instances of real-life expertise in which superior performance can be demonstrated under relatively standardised conditions”. If, however, a researcher wishes to reproduce expert performance under standardised conditions, then one should give preference to domains where there are accepted measures of performance (Ericsson & Smith, 1991).

5.7.2. Deliberate practise

According to Ericsson and Charness (1994), expert performance could be attributed to the unique structure of the mechanisms acquired in expert performance or through a measure of deliberate practise maintained through adulthood or both.

Deliberate practise is practise that is highly focused on attaining improved performance with respect to task-related skills (Baron, 2009). Deliberate practise has been found to be critical in the acquisition of expertise in such domains as chess (e.g., Charness, Tuffiash, Krampe, Reingold & Vasyukova, 2005), medicine, music, and different types of sports (see, Ericsson, 2004).

The central thesis of deliberate practise is that expert performance is predominantly mediated by acquired complex skills and physiological adaptations, which allow experts to circumvent basic limits on working memory and sequential processing (Ericsson & Charness, 1994). Thus, in order to attain exceptional performance, an individual must undergo a very long period of active learning during which they refine and improve their skill (Ericsson & Charness, 1994).

The key characteristics of deliberate practise are that individuals must (i) be given a task with a well-defined goal; (ii) be motivated; (iii) be provided with feedback; and (iv) be given ample opportunities for repetition and gradual refinements of their performance (Ericsson, 2008).

5.7.3. Automaticity

It has been found that within 50 hours of repeatedly performing a task, a certain level of automaticity sets in (Ericsson, 2008). An individual's performance adapts to the typical situational demands and they start to lose conscious control over aspects of their behaviour. At this point, additional experience does not refine the structure of the mediating mechanisms, and consequently, the amount of accumulated experience will not be related to higher levels of performance (Ericsson, 2008). Experts, however, counteract automaticity by developing increasingly complex mental representations so as to attain higher levels of control of their performance (Ericsson, 2008).

5.7.4. Self-monitoring

The ability to observe and, if necessary, reshape one's performance is essential for the development of expertise (Glaser, 1999). This has been recognised in the case of deliberate practise where they serve the dual purpose of mediating performance and playing a role in the continued improvement of performance (Ericsson & Lehmann, 1996). Feedback, in particular internal feedback, is necessary for the development of conceptual knowledge (Hatano & Inagaki, 1986). While external feedback serves only as a cue for interpretation, internal feedback is brought about by reorganising knowledge (Hatano & Inagaki, 1986). Feedback mechanisms drive learning

and are important for the modification of skills especially in systems that involve built in randomness (Hatano & Inagaki, 1986).

5.8. EVOLVING THEORETICAL FRAMEWORKS

Theories of expertise have developed from first generation studies that focused on understanding expertise as serial problem-solving that could be applied across a wide range of domains, to second generation studies, which demonstrated that individuals move through a developmental continuum in which they progress from novice to expert (Daley, 1999).

Holyoak (1991) argued that due to several empirical inconsistencies and theoretical anomalies of expertise, a third generation of theories may be necessary. He cited several bodies of research that have shown that one or more of the generalisations of expertise are not always only applicable in specific domains.

For instance, it has been observed that in some domains, expertise can be decoupled from memory performance and in others, from pattern perception. Furthermore, studies have shown that experts' search strategies are extremely varied and can involve switching between strategies based on the task requirements (Holyoak, 1991).

It has also been shown that in the case of ill-defined problems, the routine application of available skills is insufficient to solve the problem. In such cases, experts are required to work at the edge of their competence, and they engage in more problem-solving and work harder at assigned tasks than novices do (Holyoak, 1991).

In addition, there is evidence that expertise does indeed transfer to novel problems (Holyoak, 1991). However, for expertise to transfer to novel problems, experience must include substantive variability (Barnett & Koslowski, 2002).

In addition, although performances on many tasks improves with practise, Holyoak (1991) states that exceptions to this are quite common when complex tasks are involved. Furthermore, if regular activities in a domain do not offer the opportunity for accurate and preferably immediate feedback for corrective repetitions, then improvements in performance with additional experience would not be expected (Ericsson & Charness, 1994).

5.9. EVOLVING PARADIGM OF SYMBOLIC CONNECTIONISM

In response to these anomalies, Holyoak (1991) suggested an evolving paradigm of symbolic connectionism. This paradigm is based on the integration of theoretical ideas drawn from symbolic models and connectionist models.

Another developing framework of expertise is offered by the broader, triarchic perspective of Wagner and Sternberg, which posits that success in life is determined by one's analytic, creative and practical abilities (Cianciolo, Matthew, Sternberg & Wagner, 2006). The primary constructs of this evolving framework are practical intelligence and tacit knowledge.

5.9.1. Practical intelligence

Practical intelligence is defined as the ability to perform successfully in a naturalistic setting and it aids an individual in determining adaptive solutions to ill-defined problems (Cianciolo, Grigorenko, Jarvin, Gil, Drebot & Sternberg, 2006). Much of the literature on practical intelligence is based on the work of Wagner and Sternberg who stated that the hallmark of practical intelligence is the acquisition and use of tacit knowledge (Wagner, 1987). Therefore, practical intelligence can be viewed as developing expertise and tacit knowledge is viewed as its manifest indicator (Cianciolo, Grigorenko, Jarvin, Gil, Drebot & Sternberg, 2006).

5.9.2. Tacit knowledge

The concept of tacit knowledge stems from the work of Michael Polanyi (1966) who famously noted that "we can know more than we can tell". Tacit knowledge, which is commonly expressed in everyday terms such as "professional intuition" and "common sense", stems from the idea that much of the knowledge that is relevant to competent performance is not openly expressed or readily stated (Hedlund, Forsythe, Horvath, Williams, Snook & Sternberg, 2003). In other words, "tacit knowledge operates on an internal action that we are quite incapable of controlling or even feeling in itself" (Polanyi, 1966).

Research on expertise in various domains supports the notion that much of the knowledge associated with successful performance is tacit (Hedlund, Forsythe, Horvath, Williams, Snook & Sternberg, 2003). Substantial research in this respect has been conducted by Sternberg and colleagues who found that tacit knowledge distinguishes among more and less successful individuals in several domains (Cianciolo, Grigorenko, Jarvin, Gil, Drebot & Sternberg, 2006; Hedlund, Forsythe, Horvath, Williams, Snook & Sternberg, 2003).

Tacit knowledge, however, is difficult to articulate and encode (Bradley, Paul & Seeman, 2006), which has prompted some scholars to question whether it's possible for experts to verbally express the knowledge and methods that control their generation of contextually-based intuitive actions in complex situations (e.g., Ericsson, 2006).

But Bradley *et al.* (2006) argued that indirect techniques, which usually place the expert in a problem situation, could be used to accurately elicit tacit knowledge. A second approach is to elicit the underlying memory content and organisation of the expert. This approach attempts to recreate

the cognitive map (e.g. objects and relationships) used by the expert in solving a particular problem (Bradley, Paul & Seeman, 2006).

5.9.3. Intuition

One perspective on expertise is that the progression from novice to expert can be viewed as an enduring and long-term learning process that inherently generates intuitive capabilities (Harteis & Billett, 2013). Such intuitive capabilities have been noted in the problem representation of physics experts (e.g., Chi, Feltovich & Glaser, 1981) and in the perception of patterns in everyday activities (e.g., Glaser, 1985).

Intuition has long been viewed as an important component of effective human performance in expertise (Harteis & Billett, 2013). Evidence of this was demonstrated in King and Clark's (2002) study in which they found that experts use intuition in their decision-making much more skilfully and effectively than novices do. They attributed the experts' skilful use of judgement to the depth of their experiential knowledge base.

Intuition, it is claimed, is founded on tacit or implicit knowledge and is based on complex cognitive patterns (Harteis & Billett, 2013). This has been noted by Jensen *et al.* (2000) who found in some medical specialities, expert clinicians used intuition in their information gathering, i.e. they sought and responded to cues and patterns as they gathered data.

5.10. ROUTINE VERSUS ADAPTIVE EXPERTISE

Building on the works of Piaget, Hatano and Inagaki (1986) added another perspective to the literature on expertise development by differentiating between adaptive and routine expertise. According to the authors, adaptive expertise is when an individual progresses from having only procedural knowledge to acquiring conceptual knowledge as well. Mental models to run mental simulations, and thus to make predictions or explain unfamiliar situations beyond an individual's past experience, can be regarded as a form of conceptual knowledge (Hatano & Inagaki, 1986).

An adaptive expert is one who not only performs procedural skill efficiently but also modifies their skills in the process (Hatano & Inagaki, 1986). Adaptive experts therefore, have a deeper conceptual understanding of the domain than routine experts have. They possess not just 'know-how' and 'know-what' but they also possess 'know-why' (Kimball & Holyoak, 2000).

In contrast to adaptive experts, people become routine experts, when in the process of solving problems they merely learn to perform a skill faster and more accurately without enriching their conceptual knowledge. Such people become automated in their routine and fail to introduce any modifications in their skills (Hatano & Inagaki, 1986).

“Routine experts are outstanding in terms of speed, accuracy, and automaticity of performance”, and are still viewed as experts since “their procedural skills are highly effective in solving everyday problems in a stable environment” but, these experts lack flexibility and adaptability to new problems that is evident in adaptive experts (Hatano & Inagaki, 1986). Routine expertise develops when the “system that the procedural skill deals with is highly standardised or contains no built in randomness” (Hatano & Inagaki, 1986).

Thus, a critical factor in the progression from routine expertise to adaptive expertise, is the ability to transfer learning to novel tasks (Kimball & Holyoak, 2000) and the development of a deeper conceptual understanding of the target domain (Holyoak, 1991).

Support for Hatano and Inagaki’s (1986) assertion of skill modification is provided by Hoffman (1998) who noted that experts are adept at performing tasks with which they are familiar. However, when there is a disruption of their familiar tasks or poorly structured problems are presented, experts are unable to form meaningful representations, which in turn lead to disruption of proficiency and a decline in their superior performance (Glaser, 1999; Hoffman, 1998).

It has been suggested that experts need to cultivate reasoning flexibility (Hoffman, 1998). Reasoning flexibility counteracts performance decline by enabling experts “to form multiple alternative interpretations or representations of problems; and an increased ability to revise old strategies and create new ones as problem solving proceeds” (Hoffman, 1998).

5.11. ENTREPRENEURIAL EXPERTISE

The entrepreneurial environment could be described as a dynamic, unstructured environment. Glaser (1985) contended that generalisations made about expertise could be biased because of the highly structured domains in which expertise has been studied. These generalisations have painted a picture of expertise that has failed to take into account the competence that experts demonstrate when they work at the frontiers of knowledge in domains that are unfamiliar or not well structured (Glaser, 1999).

Thus, entrepreneurial expertise needs to take into consideration the context of the environment in which the entrepreneur operates.

5.11.1. Linking expertise to entrepreneurship

One of the central tenets of entrepreneurship is opportunity recognition (Lumpkin & Lichtenstein, 2005). The recognition of an opportunity is an effort to make sense of signals of change so as to form beliefs regarding a course of action that exploits this change for net benefits (Grégoire, Barr & Shepherd, 2010). It is an iterative process, which involves the conversion of information to knowledge (Lumpkin & Lichtenstein, 2005).

Since knowledge can be described as “the capacity to act”, knowledge creates opportunities for action (Stehr, 2001); and newly discovered knowledge expands our opportunities to take action (Stehr & Grundmann, 2011). Therefore, items of knowledge possess political qualities, and since new items of knowledge create asymmetries of information, the opportunities to take action are unequally distributed within society (Stehr & Grundmann, 2011).

Thus, it would appear that a central tenet of opportunity recognition is the ability to convert information into new knowledge that creates opportunities for action.

5.11.2. Characteristics of entrepreneurial expertise

According to a seminal study by Shane and Venkataraman, the two broad categories of factors that influence the recognition of opportunities are the possession of the necessary information to identify an opportunity and the cognitive properties required to exploit an opportunity (Mitchel, Busenitz, Lant, McDougal, Morse & Smith, 2002). Support for this assertion has been demonstrated in numerous studies that highlight prior knowledge and knowledge structures as being pivotal to the recognition of opportunities.

5.11.2.1. Prior knowledge

The acquisition of new knowledge from experience makes little sense without assuming some prior knowledge within which the new experience is interpreted (Vosniadou & Brewer, 1987). The importance of prior knowledge in learning (Vosniadou & Brewer, 1987) and in the discovery of entrepreneurial opportunities (Haynie, Shepherd & Patzelt, 2012), has been demonstrated by a substantial body of literature.

For instance, evidence suggests that opportunity recognition is closely linked to the amount and kind of information that individuals possess (Baron & Ward, 2004). Studies conducted by Shane (2000) found evidence that an entrepreneur will discover only those opportunities related to their prior knowledge. As a result of cognitive limits and specialisation of knowledge, not all people are likely to recognise the same entrepreneurial opportunities (Shane, 2000).

Shepherd and DeTienne (2004) found that individuals with higher prior knowledge identified more opportunities and opportunities with a higher degree of innovativeness. These findings demonstrate that an individual's prior knowledge directs the interpretation of information and, that idiosyncrasies in individuals' prior knowledge lead each to interpret information differently (Gaglio & Winter, 2009).

It is fair to comment that an entrepreneur's prior knowledge and experience play a critical role in his ability to identify and exploit entrepreneurial opportunities (Arentz, Sautet & Storr, 2013:461; Hsieh & Kelley, 2016:297). Several studies have found that individuals with more prior experience

are more adept at opportunity recognition than entrepreneurs with little or no prior experience (Li, Wang & Liang, 2015:1576).

For example, consistent with the empirical evidence offered in her research, Balacchino (2013) in her doctoral research found that experienced entrepreneurs are more proficient than novices at identifying opportunities. In line with their theory on structural alignment, Gregoire et al's., (2012:763) argue that when developing beliefs about opportunity ideas, individuals with greater prior knowledge likely rely more heavily on structural similarity than individuals with less prior knowledge.

In particular, prior experience and knowledge has been strongly linked to the opportunity discovery view but there has been a lack of research on its role in opportunity creation. According to Arentz et al., (2013:464), the entrepreneurial discovery process can be conceived as involving at least the following four steps: (i) unnoticed entrepreneurial profit opportunities exist, (ii) entrepreneurs discover unexploited opportunities, (iii) entrepreneurs exploit the discovered opportunity, and (iv) entrepreneurs develop heuristics and accumulate knowledge about opportunity discovery.

Under the opportunity discovery view, undiscovered opportunities exist because knowledge is dispersed and the future is unknowable and because individuals neither have perfect knowledge nor do they share the same knowledge. In other words prior knowledge is heterogeneous across individuals (Arentz, Sautet & Storr, 2013:464).

Hajizadeh et al., (2016:63), in an attempt to shed light on opportunity recognition, investigated the role of prior knowledge and cognitive characteristics of entrepreneurial alertness and learning in the entrepreneurial opportunities recognition process. Their findings confirmed that prior knowledge has significant impact on entrepreneurial alertness and learning. Furthermore, they found that both entrepreneurial alertness and learning partially mediated the relationship between prior knowledge and opportunity recognition.

In their study on the role of entrepreneurial experience, alertness and prior knowledge on opportunity recognition, Li et al., (2015:1575), showed that entrepreneurial alertness significantly and directly predicted opportunity recognition, whereas prior knowledge significantly and indirectly affected opportunity recognition through its impact on entrepreneurial alertness.

Gruber et al., (2013:280) argue that the entrepreneur's level of technological expertise is a key factor in the type of market opportunity set that the entrepreneur will identify. They point out that the greater their level of expertise, the better the technological capabilities that these entrepreneurs can deploy in adapting their technological resources to address customer needs in a broader variety of different market domains.

Gruber et al., (2013:280) stress that initial strategic choices are limited prior to the start of a new venture. In terms of their argument, a key limiting factor in the number of opportunities that the entrepreneur identifies is the degree to which the entrepreneur has acquired prior experience and expertise.

Shepherd et al., (2015:11) acknowledge this in their review of the literature on entrepreneurial decision making where they noted that a key factor influencing opportunity decisions is the heterogeneity of entrepreneurs' knowledge and experiences, and these differences have an impact on the entrepreneurial decision to internalize or externalize opportunity-exploitation decisions.

In a study on business failure, Mueller et al., (2016:476) identified that the possession of expert opportunity prototypes and an intuitive cognitive style where the important cognitive tools which help individuals make sense of a failure experience such that these experiences facilitate the use of structural alignment processes in opportunity identification.

5.11.2.2. Cognitive properties

Hodgkinson *et al.*'s (1999) research on strategic cognition and decision-making under uncertainty found that literature on this domain could be attributed to two complementary streams of research. The first can be assigned to literature on heuristics and biases, while the second can be assigned to literature on cognitive maps or mental models.

Literature on heuristics and biases views the individual as a "limited-capacity information processor faced with complex informational cues at various stages of the decision-making process. It is argued that in order to render the world manageable, strategic decision-makers employ a variety of heuristics (or 'rules of thumb') which enable them to cope with a complex and uncertain business world by making a number of simplifying assumptions which reduce the burden of information processing" (Hodgkinson, Bown, Maule, Glaister & Pearman, 1999).

The second draws on the field of cognitive science. "This stream of work is predicated on the assumption that actors construct a simplified working model of reality (a 'mental model') which in turn acts as a basis for strategic decision making" (Hodgkinson, Bown, Maule, Glaister & Pearman, 1999).

5.11.2.3. Mental models

Much of entrepreneurial cognition literature has been devoted to proving that entrepreneurs possess knowledge structures that are different from other individuals (Baron & Ward, 2004). Empirical studies have provided evidence that entrepreneurs do indeed develop unique knowledge structures through their experiences.

Baron and Ensley (2006) found that entrepreneurs with extensive experience from repeated business ventures have more clearly defined and richer cognitive frameworks than novice or first-time entrepreneurs have. The authors suggested that entrepreneurs recognise opportunities through the cognitive process of pattern recognition and attribute this to the possession of knowledge structures known as prototypes and exemplars that serve as templates for directing pattern recognition.

Gaglio and Katz (2001) proposed that entrepreneurs possess entrepreneurial alertness schema or knowledge frameworks, which assist them to be alert to opportunities. Their proposition builds on Kirzner's work, which asserts that the mental representations and interpretations of entrepreneurs are driven by a distinctive set of perceptual and cognitive processing skills that differentiate entrepreneurs from other actors (Gaglio & Katz, 2001).

Mitchell *et al.* (2002) found that entrepreneurs made better business choices than non-entrepreneurs because they possess better developed and richer cognitive frameworks. According to them, entrepreneurs possess expert scripts, which enable them to use information significantly better than non-entrepreneurs. A script is a cognitive mechanism that comprises the key elements in a decision situation and the likely ordering of events (Krueger & Mellani, 2010). Mitchell *et al.*'s (2002b) findings suggest that entrepreneurs are experts in the entrepreneurial domain because they develop unique knowledge structures and process information differently from non-entrepreneurs.

Research by Grégoire *et al.* (2010) provided evidence that an important factor in opportunity recognition process is the sense-making of new information using the cognitive process of structural alignment and cause-effect relationships and problems in the market. These findings are supported by research which suggests that it is not the weighting placed on information, but the way that information is organised in an individual's mental model and the number of connections made with other mental models, which matter the most (Gaglio & Katz, 2001; Gaglio & Winter, 2009).

5.11.2.4. Biases and heuristics

The decision to start a new venture involves risk, creativity, and conviction on the part of entrepreneurs (Forbes, 1999). It is widely recognised that many opportunities emerge out of environmental shifts and changes where the established way of doing things is no longer as effective (Mitchell, Busenitz, Bird, et al., 2007). Such environments are characterised by high levels of uncertainty and time pressure (Baron, 1998), and by definition are new, complex, and unpredictable (Baron, 2000). In these nonlinear dynamic and rapidly changing systems, a host of independent and interrelated parts interact and produce outcomes that are very difficult to predict (Groves, Vance & Choi, 2011).

Because entrepreneurial businesses typically operate in unsettled industries or unsettled segments of stable industries (Hill & Levenhagen, 1995), entrepreneurs often face challenging contextual demands which impair the feasibility of long-range planning (Groves, Vance & Choi, 2011) and overload the entrepreneur's information processing capacity (Baron, 2000). In these situations, entrepreneurs are less than rational in their reasoning and decision-making (Baron, 1998; Busenitz & Barney, 1997), and biases and heuristics may provide an effective way to approximate the appropriate decision (Busenitz & Barney, 1997).

Busenitz and Barney (1997) presented empirical evidence that suggests that there are substantial differences in the decision-making behaviour of entrepreneurs and that of managers in large organisations. The authors found that entrepreneurs are more likely to utilise biases and heuristics in strategic decision-making.

5.12. DISCUSSION

Research on expertise suggests that in general, significant differences exist between experts and novices. The principal assertion of theory on expertise is that experts and novices differ in the way they process information and structure knowledge.

In summary, the following are the notable differences between experts and novices:

- Experts encode and retrieve information from long-term memory differently than novices do.
- The knowledge structures held in memory are better organised and more easily accessed.
- Knowledge structures of experts are also useful in that they match situations to responses. That is, the knowledge structures of experts contain appropriate actions or behaviours that correspond to the problem representation. Novices typically do not have this advantage (Lord & Maher, 1993).

Simon and Chase proposed the general theory of expertise, which was based on the human-information processing theory of Newell and Simon; and which developed the idea that experts are cognitively different – specifically in terms of information processing (Mitchell, Mitchell & Mitchell, 2009).

Hence, it is fair to view expertise in association with information processing theory. More specifically, in Lord and Maher's (1993) models of information processing, expert models represent a third type of information processing. According to this model, expertise supplements simple information processing.

A key assumption of the limited-capacity information processing model is that people rely on heuristics or general knowledge structures to process information. On the other hand, the key

assumption of the expert model is that people rely on very well organised or highly developed knowledge structures characteristic of a specific content domain. In other words, an expert is someone with a large knowledge base in a particular context or a particular task.

In the context of entrepreneurship research, studies on entrepreneurial cognition provide compelling evidence that the acquisition of expertise in the domain of entrepreneurship is dependent on prior knowledge accumulated from extensive experience, and on the organisation and structure of knowledge in entrepreneurs' knowledge structures (Baron & Ensley, 2006; Gaglio & Katz, 2001; Grégoire, Barr & Shepherd, 2010; Mitchell, Busenitz, Bird, et al., 2007).

From these observations, the researcher concludes that the study of expertise in the domain of entrepreneurship is better served by a theoretical framework that takes into account the qualitatively different representation and organisation of entrepreneurs' knowledge and the cognitive processes involved in solving ill-defined problems in unstructured environments.

Dreyfus and Dreyfus (2005) provided support for this when they argued that expertise cannot be captured in rule-based expert systems, since expertise is based on the making of immediate, unreflective situational responses. In line with Dreyfus and Dreyfus's (2005) view that adaptive expertise is "the ability to use knowledge and experience in a domain to learn in unanticipated situations" (Martin, Rayne, Kemp, Hart & Diller, 2005), the researcher suggests that the hallmark of entrepreneurial expertise is decision-making that directs entrepreneurial actions in the context of unstructured environments.

CHAPTER 6

RESEARCH METHODOLOGY

6.1. INTRODUCTION

This study was designed as an exploratory study, using in-depth, semi-structured interviews to collect data, which was then submitted to an interpretive analysis. In this respect, the study followed a qualitative approach.

Data analysis is guided by a grounded theory method, which aids the researcher to draw out decision-making processes of expert and novice entrepreneurs. The grounded theory method is supported by cognitive mapping technique, which provides the researcher with a means to “think out relationships among concepts even more clearly by putting the concepts in a graphical format” (Babbie, 2008).

The current study aimed to progress theory on opportunity recognition by building upon the existing empirical work on opportunity recognition. To that end, the researcher used the multi-methodology of a grounded theory approach supported by cognitive mapping because these methods provide researchers with a means to portray the entrepreneurs’ perceptions, that is, their personal theories about how they view opportunities. In addition, these methods provide the researcher with an approach for examining qualitative data, which allows for the systematic development of theoretical themes or hypotheses about the phenomena under study (Franco & Lord, 2011).

The cognitive mapping technique was used to elicit the participants’ series of operative hypotheses about what factors (core constructs) they construe as being important during the recognition of a potential business opportunity. The main motivation for using cognitive mapping technique stemmed from the potential to depict the subjective meanings participants attributed to their opportunity recognition experiences and to understand how these subjective meanings fit into larger patterns of interaction within which opportunity recognition is embedded. As a supportive technique to grounded theory approach, cognitive mapping assisted the researcher in identifying conceptual categories and their interrelations.

The main motivation for adopting grounded theory stemmed from its value for theory generation about complex social processes. More particularly, a grounded theory approach was adopted in this study because of the lack of empirically validated theory on how supply and demand interactions influence opportunity recognition of entrepreneurs. Grounded theory is a theory generation method that assists researchers to derive emerging ‘grounded’ concepts from the data (Franco & Lord, 2011) which was used in this study as the basic building blocks in growing a theoretical understanding of opportunity recognition.

6.2. CONSTRUCTIVISM

The current study has its grounding in constructivism, which has its roots in the inquiry paradigm. Constructivism rests more in a 'belief system' than science and is often referred to as a paradigm (Guba & Lincoln, 1989). Although it is commonly referred to as constructivism, it has many other names including interpretive and hermeneutic (Guba & Lincoln, 1989).

According to Bodner (1986), attempts to answer the primary epistemology question of how we come to know what we know, can be answered through a single philosophy that knowledge is constructed in the mind of the learner. This view of constructivism is based on the works of Piaget who argued that knowledge is constructed as an individual strives to organise their experiences in terms of pre-existing mental structures or schemes (Bodner, 1986).

A constructivist perspective accepts that there are multiple discoverable realities, which are socially and empirically based, intangible mental constructions of individuals. From a constructivist's perspective, truth is a construction that refers to a particular belief system held in a particular context; as such, knowledge that is elicited and created depends on the interaction of the researcher and respondent (Carson, Gilmore, Perry & Gronhaug, 2001).

A constructivist perspective assumes that humans construct knowledge structures that continue to evolve and the acquisition of new knowledge forces a change in how the information content is organised and structured (Krueger Jr, 2007b). A constructivist perspective therefore offers explanations on how structures evolve as well as specifying the mechanisms individuals use in order to confront and resolve discrepancies and contradictions in their constructed knowledge base (Krueger Jr, 2007b). Krueger (2007b) argued that prior knowledge, assumptions, and beliefs could prove problematic and even dysfunctional, if not confronted in a constructive manner.

The researcher has adopted a constructivist perspective for comparing the cognitions of expert and novice entrepreneurs. Constructivism is well suited for the study of entrepreneurial cognitions since cognitive structures and cognitive processes are constantly evolving and changing over time and therefore, cognitions are viewed as ways of constructing and utilising knowledge (Swan, 1997).

The implication of this perspective is that cognitions are underpinned by particular methodological assumptions and that cognitions can be understood by using methodologies that describe and identify their component parts, which is possible with some of the cognitive mapping techniques (Swan, 1997).

Support for this declaration is provided by Kinchin, Hay and Adams (2000) who noted that cognitive mapping is conventionally linked to a constructivist viewpoint on information processing

which is based on the notion that individuals construct and reconstruct the meaning of events and objects that they observe. That is, they create rather than discover knowledge.

One limitation of taking a strong constructivist position to study cognition is that this “approach focuses on a subjective mind, suggesting what we see is a product of the mind and therefore makes no sense to talk about a reality that exists somehow outside the mind” (Swan, 1997). However, Grégoire *et al.* (2011) argued against this by stating that although the study of cognition emphasises mental representations, this focus implies more than the adoption of a subjectivist epistemology.

6.3. QUALITATIVE RESEARCH

Qualitative studies are usually exploratory in nature and they are suited for hypothesis generating rather than hypothesis testing (Corbin & Strauss, 2008:25). A distinction between qualitative and quantitative research can be made in terms of the analysis and coding of data. While quantitative research entails statistical analysis of numerically coded data, qualitative research follows an interpretive analysis of data coded as text (Axinn & Pearce, 2006).

Qualitative research can also be differentiated from quantitative research in terms of the researcher’s epistemological and ontological assumptions (Krauss, 2005). Qualitative research is based on the belief that reality presents a social construction. The qualitative researcher therefore, investigates the processes of construction and negotiation of meaning instead of reality as it is. In qualitative research, meanings are believed to be “mediator” between social structures and their actors.

In other words, actors use meanings in everyday social interactions to give meaning to social reality in which they participate. Therefore, for qualitative research to be successful, it is necessary for the researcher to understand the meaning that actors ascribe to phenomena and to approach them from the perspective of social actor.

Qualitative research accepts that there is no single truth or absolute reality; and it is widely accepted within this qualitative paradigm that the researcher is an inextricable part of the research endeavour (Mantzoukas, 2004). Notably then, qualitative research reintroduces what objectivism paradigm of quantitative research has always sought to leave out, namely properties of the observer within the description of their observations (Larochelle, Bednarz & Garrison, 1998).

6.4. KNOWLEDGE ELICITATION TECHNIQUES

There are several techniques that could be used to elicit the knowledge of experts. Three of the more commonly used techniques are discussed below.

6.4.1. Interview method

The interview remains the most common technique for collecting data in qualitative research (King, 2004) and is the most frequently employed of all knowledge elicitation techniques (Cooke, 1994). Interview methods can take the form of structured interviews and unstructured interviews.

Table 6.1: Knowledge elicitation techniques

Knowledge category	Knowledge elicitation technique
Procedural	Protocol analysis Interviews
Declarative	Repertory grid Multi-dimensional scaling Interviews
Semantic	Card sorting Multi-dimensional scaling Repertory grid Interviews

Source: Adapted from Moody, Will and Blanton, (1996).

The advantage of the interview method over other knowledge elicitation techniques is its effectiveness in eliciting various knowledge categories of participants. Table 6.1, adapted from Moody *et al.* (1996), presents an overview of which knowledge elicitation techniques are recommended for eliciting the different knowledge categories. It can be noted in this table that the interview method is the only method that is effective in eliciting knowledge of a participant in the various knowledge categories shown.

6.4.2. Laddering

Laddering is a probing technique that assists the researcher to construct a well-defined structured representation of the domain in collaboration with the expert (Burton, Shadbolt, Rugg & Hedgecock, 1990). Laddering is commonly used in conjunction with the interview method to explore the inter-relations between constructs and to develop constructs to abstract the core category (Pudelko, 2014).

6.4.3. Verbal protocols

Several researchers have recommended the use of the verbal protocols technique for eliciting the cognitions or thought processes of entrepreneurs. The researchers tested this technique on two expert entrepreneurs and discovered that the verbal protocol technique was not suitable for this study as it produced a very poor response rate.

When asked to ‘verbalise’ his thought, the first expert entrepreneur identified five concepts. The second entrepreneur showed extreme discomfort with this method and didn’t verbalise his thoughts despite several attempts by the researcher to prompt him to do so. Eventually, the researcher stopped this process and resorted to a qualitative interview in which the expert entrepreneur freely expressed his thoughts.

The verbal protocol technique appeared to be complicated and it would have been a limiting factor in this research. Therefore, given the demanding nature of the verbal protocol procedure (Grégoire, Barr & Shepherd, 2010) and the poor response rate from the research pilot study, the researcher decided against using this technique and opted rather for qualitative interviewing.

6.5. RESEARCH DESIGNS IN ENTREPRENEURSHIP RESEARCH

A review of the entrepreneurship literature indicates that scholars have adopted a variety of research designs in order to answer their research questions. Some of these research designs as utilised by entrepreneurship scholars in their various facets of entrepreneurship studies are illustrated in Table 6.2.

Table 6.2: Research designs in cognitive entrepreneurship

Authors	Construct	Methods
Sarasvathy, Simon and Lave (1998)	Effectuation	Verbal protocols Cluster and content analysis
Grégoire <i>et al.</i> (2010)	Structural alignment	Verbal protocols Content analysis
Baron and Ensley (2006) Baron (2006)	Pattern recognition	Interviews Content analysis
Shane (2000)	Prior knowledge	Case study
Carsrud <i>et al.</i> (2009)	Sense-making	Cognitive mapping
Jenkins and Johnson (2003:895)	Entrepreneurial intentions	Interviews Cognitive mapping
De Koning and Muzyka (1999)	Socio-cognitive opportunity development	Comparative case study

Source: Author.

6.6. THEORY DEVELOPMENT

Theory development starts off with the elucidation of concepts. A concept therefore, can be defined as a general idea in our heads about a variable, which has a part to play in our theories about the phenomenon being studied. When you start putting words to the concept and defining what it means, then you construct its meaning within the framework of your theory and within the

wider context of other relevant theories. At this point, the concept is no longer a vague idea and is now a construct.

As used in social sciences research, a construct is an idea specifically invented for theory-building purposes. A construct combines simpler concepts especially when an idea is least observable and most complex to measure (Cooper, Folta & Woo, 1995).

Hence, theory development can be understood as the development of a structured framework consisting of interrelated ideas, which attempt to explain some aspect of the real world. In developing theoretical constructs, the researcher will have to develop their own theories or apply the theories known to them in a new and creative way (Auerbach & Silverstein, 2003).

Auerbach and Silverstein (2003) suggested that how a researcher uses the literature of their field in developing theoretical constructs falls on a continuum, which can be described as follows:

- At one extreme of the continuum, the researcher is unable to use too much prior research literature because relatively little is known about their sample. It could also be because prior research is either biased or simply incorrect about the experiences of the participants.
- In the middle of the continuum, the researcher does not have a definite body of literature in mind at the start of their data analysis. However, as the researcher analyses the data, they begin to recognise how theories in the literature can be used to make sense of the themes evolving out of the data. In this case the researcher uses the literature to develop the study's theoretical constructs.
- At the other extreme of the continuum, the researcher begins the research knowing which literature and theoretical constructs they intend to apply to their data. In this case, the researcher uses the data to elaborate, refine, or validate theories in the literature.

6.7. GROUNDED THEORY

The roots of grounded theory can be traced back to a movement known as symbolic interactionism. Symbolic interactionism is both a theory of human behaviour and an approach to enquiry about human conduct and group behaviour, a principal tenet of which is that humans come to understand collective social definitions through the socialisation process (Goulding, 2002).

The notion of meaning and its influence on social behaviour is the central and critical idea in the symbolic interactionist position. According to this position, humans' interaction with the world is mediated through their processes of meaning making and interpretation (Locke, 2001).

The main points emanating from the symbolic interactionism position are firstly, people interpret the meaning of objects in the world and then act upon those interpretations; that is to say that

meanings inform and guide action. Secondly, meaning arises from social interaction – communication between and among individuals – and not from the object. In other words, meaning arises from the social interactions people have with others in their world. Finally, meaning is handled in and modified through an ongoing interpretive process (Locke, 2001).

Lacey and Luff (2001) suggested that it is probably more appropriate to view grounded theory as an approach to research as a whole that can use a range of different methods. However, as they noted, researchers frequently use the analysis procedures outlined in grounded theory without taking on board the whole methodological approach to research design.

While this is sometimes common practice amongst researchers, they do run the risk of 'remodelling grounded theory', the resulting effect of which is a downgrading and eroding of the grounded theory goal of conceptual theory (Glaser & Holton, 2007).

Glaser and Holton (2007) strongly argued for differentiating grounded theory from qualitative data analysis. Accordingly to this argument, the explicit goal in the case of qualitative data analysis is that of description. Grounded theory on the other hand is more concerned with producing inductive theory about a substantive area through the systematic generation of a set of integrated conceptual hypotheses (Glaser & Holton, 2007).

As such, this process of generating theory from data means that most hypotheses and concepts not only come from the data, but are systematically worked out in relation to the data during the course of the research (Glaser & Holton, 2007). In short, grounded theory is a conceptual theory generating methodology (Glaser & Holton, 2007) and not a descriptive method, the product of which is transcending abstraction, not accurate description (Glaser, 2007).

Fendt and Sachs (2008), however, argued that the very strengths of the grounded theory method run the risk of being undermined – and thus the quality of such research impaired – by an overly orthodox application of its rigorous objectification procedures. They offered some pragmatic remedial suggestions by calling for the continuing use of the grounded theory method in some of its newer forms.

Grounded theory methods are a set of flexible analytic guidelines, which allow researchers to build inductive middle-range theories through successive levels of data analysis and conceptual development (Charmaz, 2005). The fundamental aim of the grounded theory method is to assist the researcher to discover theory, which is derived from data by systematically gathering and analysing the data through the research process (Corbin & Strauss, 2008; Glaser & Strauss, 1967).

Although it is commonly used by researchers to mean a specific mode of analysis, grounded theory refers both to a method of inquiry and to the product of inquiry. This is because a grounded theorist develops integrated sets of theoretical concepts through synthesis and interpretation and through showing processual relationships (Charmaz, 2005).

In grounded theory, data collection, analysis and eventual theory stand in close relationship to each other (Corbin & Strauss, 2008). Starting with observations rather than hypotheses, grounded theory seeks to discover patterns and develop theory from the ground up (Babbie, 2008). It is viewed as a process of research wherein most hypotheses and concepts not only come from the data, but they are systematically worked out in relation to the data during the course of the research (Glaser & Strauss, 1967).

Although it is prescriptive in terms of the principles by which to conduct grounded theory research, grounded theory allows the researcher some leeway in bringing creativity and individuality to the study. This is implicit in Corbin and Strauss's (2008) recommendation that researchers should not focus solely on the procedures presented in their book and apply them in a rote manner. Instead, as they state:

"We want readers to understand what we say, to understand why they are using certain activities, and to do so flexibly and creatively. We want them to acquire a way of thinking about data and the world in which they live. We want them to question, to be able to easily move from what they see and hear and to raise that to the level of the abstract, and then to turn around again and move back to the data level".

"We want them to learn to think comparatively and in terms of properties and dimensions so that they can easily see what is the same and what is different. The importance of this methodology is that it provides a sense of vision, where it is that the analyst wants to go with the research. The techniques and procedures (method), on the other hand, furnish the means for bringing that vision into reality".

6.8. KEY FEATURES OF THE GROUNDED THEORY METHOD

The grounded theory method is differentiated from qualitative data analysis by certain key distinctive features.

6.8.1. Conceptualisation

"Grounded theory is a conceptual method, not a descriptive method" (Glaser & Holton, 2007). Holton (2007) pointed out that grounded theory is not about the accuracy of descriptive units, nor is it an act of interpreting meaning as ascribed by the participants in a study. Rather, grounded theory is an act of conceptual abstraction since it entails developing increasingly abstract ideas about

participants' meanings and seeking specific data to find and refine the emerging conceptual categories (Charmaz, 2005).

A researcher using the grounded theory method must be able to offer a conceptually abstract explanation for a latent pattern of behaviour in the social setting under study. That is, the researcher must be able to explain what is happening in a social setting and not just merely describe it (Holton, 2007).

It is the ability to abstract data to a conceptual level that theoretically explains rather than describes behaviour, which is one of the major differentiating features of classic grounded theory method. The researcher must be able to abstract the conceptual idea from empirical indicators without the burden of descriptive detail; and this ongoing process of analysing and conceptual mapping continues until the researcher is satisfied that a useful theory has emerged (Holton, 2007).

Essentially, in adopting a grounded theory method, the researcher ensures that theoretical accounts of a problem domain emerge from available data and therefore stay firmly grounded in the available data (Pidgeon, Turner & Blockley, 1991), so that the product of data analysis is transcending abstraction and not accurate description (Glaser & Holton, 2007).

6.8.2. Constant comparative method

Comparative analysis in grounded theory is similar to other general methods used in social science research. Like other general methods, comparative analysis can be used for social units of any size. When used as a strategic method for generating theory, Glaser and Strauss (1967) assigned the method its fullest generality for use on social units of any size and range.

Whatever unit of data that the researchers begin coding in grounded theory, they are obliged to use constant comparative methods to establish analytic distinctions and thus make comparisons at each level of analytic work. This process starts off by comparing incidents with incidents to find similarities and differences (Charmaz, 2006).

However, comparative analysis in grounded theory extends beyond just "comparing incident to incident to classify them", to what Corbin and Strauss (2008) referred to as theoretical comparisons. The purpose of theoretical comparisons is to stimulate the researcher's thinking about properties and dimensions, as well as to direct theoretical sampling (Corbin & Strauss, 2008).

Comparative analysis can be used to generate two basic types of theory, namely (i) substantive, and (ii) formal theory. Both theories exist on distinguishable levels of generality, which differ only in terms of degrees (Glaser & Strauss, 1967). By substantive theory, Glaser and Strauss (1967) referred to theory that is developed for a substantive or empirical area of sociological inquiry; while

by formal theory, they referred to theory that is developed for a formal or conceptual area of sociological area of inquiry.

In contrast, a search and analysis of grounded theory papers in entrepreneurship has led Makela and Turcan (2007) to conclude that the outcome of today's research is often 'idiosyncratic theory'. Although one goal of research is to raise the level of generality, any field of research does require substantive theory that, if well elaborated, can make building blocks of formal theory, i.e. theory of a higher level of generality. In this way, the final contributions of substantive theory do not remain idiosyncratic (Makela & Turcan, 2007).

6.8.3. Coding

Coding entails classifying or categorising individual pieces of data and is the key process in the analysis of qualitative social research data (Babbie, 2008). Because coding assists the researcher to derive the intrinsic meanings in participants' transcripts (Miles & Huberman, 1994), it should be viewed as more than just rephrasing the words in interviewees' statements but rather about deriving their meanings

A key feature of the grounded theory method is the coding process, which involves more than simply categorising chunks of text (Babbie, 2008). In the grounded theory method, coding gets the analyst off the empirical level by fracturing the data that is then conceptually grouped into codes that become the theory that explains what is happening in the data. As such, a code gives the researcher a condensed, abstract view with scope of the data that includes otherwise seemingly disparate phenomena (Glaser & Holton, 2007).

Concepts are the basic units of analysis, which when grounded in the reality of the data, give grounded theory its theory-observation congruence (Corbin & Strauss, 1990). Importantly, with the grounded theory method, the researcher works with conceptualisations of data and not the actual data per se (Corbin & Strauss, 1990).

6.8.4. Theoretical sampling

Theoretical sampling, which is the process of data collection for generating theory, is another differentiating feature of the grounded theory method. With theoretical sampling, the researcher jointly collects, codes and analyses the data before deciding what to collect next and where to collect it from (Glaser & Strauss, 1967).

Hence, the processes of data collection and analysis are interrelated processes (Corbin & Strauss, 1990) which are controlled by the emerging theory, whether or not it is substantive or formal theory (Glaser & Strauss, 1967).

6.9. APPROACHES TO THE GROUNDED THEORY METHOD

Although the grounded theory method has taken on several variations (Mills, Bonner & Francis, 2006), it is generally accepted that the main approaches to the grounded theory method originate from the work of Glaser (1967), Corbin and Strauss (1990; 2008), and that of Charmaz (2005; 2006). As Mills *et al.* (2006) pointed out, the grounded theory method has evolved from the classic Glaser and Strauss (1967) original text to what can be viewed as a methodological spiral, with the variations of grounded theory that exist on the spiral reflective of the epistemological underpinnings of the researcher.

Some differences in the coding process between the original Glaser and Strauss (1967) works and the Corbin and Strauss literature are illustrated in Table 6.3 below. Glaser and Strauss (1967) originally described two levels of coding with the researcher coding first into as many categories as possible and then integrating the categories (Heath & Cowley, 2004:150). Corbin and Strauss (1967) moved away from this initial position to a paradigm model of theory construction which is a specified framework of coding to produce a linear model of causes, intervening conditions, and consequences that explain the phenomenon, context, actions and interactions (Heath & Cowley, 2004:150).

Charmaz (2005) proposed the constructivist grounded theory approach as spinoff approach to traditional grounded theory. She argued that to develop a grounded theory that advances social inquiry in the 21st century, it is necessary to build upon its constructionist elements rather than objective leanings.

Table 6.3: Comparison of data analysis in grounded theory methods

Coding stages	Strauss and Corbin	Glaser
Initial coding	Open coding	Substantive code
Intermediate phase	Axial coding	Continuous with previous phase
Final development	Selective coding	Theoretical

Source: Heath and Cowley, (2004:150).

A constructivist approach still adopts grounded theory guidelines as tools, but it does not subscribe to the objectivist, positivist assumptions of its earlier foundations. Charmaz (2005:509) advocated that such an approach “does not assume that data simply awaits discovery in an external world or that methodological procedures will correct limited world views of the studied world. Nor does it assume that impartial observers enter the research scene without an interpretive frame of reference”.

As Charmaz (2005:509) noted, no qualitative method rests on pure induction. The questions we ask of the empirical world frame what we know of it. Therefore, we share in constructing what we define as data. As such, “our theoretical analysis are interpretive renderings of reality, not objective reporting’s of it” (Charmaz, 2005:510).

Remenyi (2013) however suggested that every person does grounded theory in their own way, and therefore the researcher should use grounded theory in a way that fits the research. That is, it should be used in a way that answers the study’s research question.

Remenyi (2013) suggested three variations in the application of the grounded theory method. These three variations are detailed as follows:

- Method one: Collect evidence through the study of events or incidents. Record the evidence in as much detail as possible while at the same time keep the comparison mode active. Read and reflect on the evidence and look for categories, themes and concepts. Create a transcript of meeting and discussions with informants.
- Method two: Identify categories and code the transcripts while noting their theoretical implications through the use of memos. From the coding, create concepts and elucidate their properties. The data should be put through more intensive scrutiny, compared, and analysed.
- Method three: The third variation uses both qualitative and quantitative evidence. Triangulation is important in this variation and each case should be tentatively resolved before the next case begins. The sample should be from four to ten cases and will require appropriate knowledge informants. Theoretical sampling is required whereby the data collection is controlled by the emerging theory, i.e. snowballing.

6.10. COGNITIVE MAPPING

The interchangeable use of the term cognitive maps to indicate techniques for mapping cognitive structures, as well as synonyms for underlying cognitive structures such as schema and scripts, has led to much confusion as to its meaning. In the context of this study, the term cognitive mapping is used to indicate the output of the mapping technique, while cognitive map or maps is used to indicate cognitive structures.

Swan (1997) made the distinction between cognitive maps and cognitive mapping evidently clear when he argued that cognitive maps revealed using mapping techniques is not the same as underlying psychological schema or cognitive maps. While cognitive maps can be viewed as internally represented schemas or mental models for particular problem-solving domains that are learnt and encoded as a result of an individual’s interaction with the environment, cognitive

mapping, in contrast, describes a set of techniques that have been used to identify subjective beliefs which are then portrayed externally (Swan, 1997).

Kinchin *et al.* (2000) argued that since the construction of cognitive mapping is intended to reveal the experiences, beliefs and understandings of the map's author, the ability to construct mapping then illustrates two essential properties of understanding, which are (i) the representation of ideas, and (ii) the organisation of ideas.

Cognitive mappings as sense-making tools therefore can yield significant insights into how entrepreneurs view their world and translate that into either successful or unsuccessful new ventures (Carsrud & Brannback, 2009).

6.10.1. Cognitive mapping techniques and functions

According to Huff (1990:630), cognitive mapping as research tools can be utilised in the following different forms:

1. Cognitive mappings that assess attention, association, and importance of concepts;
2. Cognitive mappings that reveal dimensions of categories and cognitive taxonomies;
3. Cognitive mappings that illustrate influence, causality, and system dynamics;
4. Cognitive mappings that show structure of argument and conclusions; and
5. Cognitive mappings that specify schemas, frames, and perceptual codes.

Cognitive mappings may hold many types of relationships among concepts, such as proximity, similarity, cause-effect, category, and contiguity (Swan, 1997). While many of the mapping techniques used in management research address only the cause-effect relations among concepts, Swan (1997) criticised this approach for capturing only part of an individual's total belief system.

Citing the accredited works of various scholars in the field of cognitive mapping research, Swan (1997) catalogued the various different cognitive mapping techniques, which researchers can use.

These are as follows:

- Content analysis to reveal key concepts and themes in text;
- Repertory grid techniques and factor analysis which are used to identify dimensions for individuals that underlie the concepts they use in problem-solving domains;
- Systematic coding of causal relationships as used in the analysis of documents;
- Matrices and matrix-multiplication techniques which are used to examine causal relationships among key concepts;

- Computer software to produce models of concept meanings and causal relationships such as Decision Explorer™;
- The Self-Q technique which comprises interviews in which the participants question themselves in order to expose concepts and relationships;
- Techniques for mapping arguments used in decision-making; and
- Semiotic analysis, which is a technique that draws out hidden meanings and underlying beliefs from surface manifestations of narrative text.

In the current study, the mapping technique used combined elements of some of the techniques listed above. More particularly, the cognitive mapping technique was used to reveal and visually illustrate key concepts and themes in each participant's transcripts so as to produce a composite group mapping which revealed the interrelations between categories and the emergence of new theory on entrepreneurial opportunity recognition.

6.11. PERSONAL CONSTRUCT THEORY

The theoretical foundation for cognitive mapping techniques comes from Kelly's (1955) Personal Construct Theory, according to which, people's understanding of their worlds is a direct function of the organisation and content of their 'personal construct systems' (Carsrud, Brännback, Nordberg & Renko, 2009). These complex and often idiosyncratic systems of constructs, which are developed over the lifetime of an individual, are the 'matrix of meaning' through which they filter their experiences, define their personal realities, and act in the world (Caputi, Heather & Lindal, 2006).

Personal construct theory is a theory about the personal theories of each individual (Gross, 2009) because each individual construes the world in which they live both systematically and uniquely to that individual (Hines, 2000). That is, each individual construes hypotheses about the world, which takes the form of constructs. These hypotheses represent our attempts to interpret events and they are put to the test every time we act (Gross, 2009).

The personal construct theory was posited on the belief that individuals act like scientists, continuously striving to make sense of their world and their place within it. This implies that the unique principle that governs human behaviour is the need for meaning, which includes the need to make sense of the world, which individuals attain through the development of constructions or theories of themselves and their world. These constructs change through experience events, which confirm or disconfirm previous predictions that individuals make based on their existing construct system (Cassell & Symon G., 2004).

The personal construct theory posits that constructs are the primary mechanism that individuals use to organise, simplify, and interpret the mass of stimuli that constantly confronts them. Constructs are “organised into systems of meaning which individuals use to develop theories about the environment, to make predictions and guide action” (Reger & Huff, 1993).

Since the personal construct theory is predicated on the belief that individuals act on their perceptions of the objective world filtered through their constructive system (Reger & Huff, 1993), a cognitive mapping that is developed on the basis of the personal construct theory can be viewed as a representative of the personal construct system of an individual as it represents the beliefs, values, embedded expertise, and knowledge structures of that individual (Carsrud & Brannback, 2009).

Reger and Huff (1993) maintained that the individual does not passively perceive the environment; rather the individual actively construes or attaches meaning to perceptions. Therefore, a cognitive mapping that seeks to map the construct system of an individual as it relates to a particular issue, should capture the idiosyncratic ways of seeing the world for the particular person (Eden & Ackermann, 2004).

The basic tenets of the personal construct theory, which provide the rationale for cognitive mapping techniques such as repertory grids and causal mapping (Cassell & Symon G., 2004), can be surmised as follows:

- Man attempts to make sense of his world through contrast and similarity, that is, meaning in the context of action derives from relativism.
- Man seeks to explain his world.
- Man seeks to understand the significance of his world by organising concepts hierarchically so that some constructs are superordinate to others (Eden & Ackerman, 1998).

6.12. GROUNDED THEORY AND COGNITIVE MAPPING

This study used interviews to elicit and examine the idiosyncratic sense-making of expert and novice entrepreneurs. Thereafter, the researcher utilised a grounded theory approach together with a cognitive mapping technique to explore emergent themes in the data. The use of cognitive mapping and grounded theory methods were found to be highly complementary methods and the combination of cognitive mapping and grounded theory was viewed as an effective means of providing rigour to the study.

The growing use of grounded theory and cognitive mapping as complementary methods has been observed in several studies. A review of the literature revealed several different variations of the multi-methodology of grounded theory and cognitive mapping.

For example, Franco and Lord (2011) used grounded theory and cognitive mapping to evaluate the perceived impact of mixing methods for group budgetary decisions. In the first step of their data analysis, Franco and Lord (2011) used a cognitive mapping technique to break down and code data into meaningful discrete parts. Using a grounded theory approach, groups of coded data are clustered and labelled in a first-order analysis, which is followed by a second-order of analysis in which data is developed into a higher level of abstraction.

Hardman and Paucar-Caceres (2011) utilised grounded theory and cognitive mapping as a soft systems methodology-based framework for evaluating managed learning environments. In their study, Hardman and Paucar-Caceres (2011) elicited individual cognitive mappings, which were first combined to create a composite group mapping. Thereafter, data was analysed to find categories that could be collapsed to form high level categories and lower level sub-categories. Since the authors were not interested in theory building, data analysis was informed only by the axial coding stage of grounded theory.

In their study, Kjaergaard and Jensen (2014) used grounded theory and cognitive mapping to represent and share users' interpretations of technology. The cognitive mapping technique was used in their study as a tool for eliciting statements from participants in order to obtain their subjective meanings and interpretations of the situation. Cognitive mappings were drawn up during the interview and interview transcripts were coded using a grounded theory approach.

Hines (2000) also used the multi-methods of grounded theory and cognitive mapping to evaluate the qualitative methods for conducting research into entrepreneurial decision-making. In his examination of the future corporate strategy of a group of managers, Hines (2000) adopted a grounded theory approach to explore emergent themes and to interpret the cognitive maps that were elicited from the interview with the managers. In his study, grounded theory was utilised as a supporting method to cognitive mapping.

In another study, Baskerville *et al.* (2000) combined grounded theory and cognitive mapping in a qualitative research project that explored the impact of enterprise resource planning on organisational knowledge. In their approach, the grounded theory methodology of Strauss and Corbin was used as an intermediate aid in analysis of the cognitive maps.

As is common with qualitative research, Baskerville *et al.* (2000) discovered that the large quantity of data generated from the interviews was difficult to interpret without an initial storyline to help distinguish the relevant concepts and links from those that were less relevant to a particular theory. In their approach, audio-tape transcriptions of the interviews were examined using grounded theory analysis to identify the core category that formed the basis for an initial storyline. The storyline was then used as a 'seed' theory for the cognitive map analysis.

Their grounded theory analysis was supported with analytical software, Atlas.ti, which permits concepts in the qualitative data to be interpretively assigned into categories. Thereafter, Baskerville *et al.* (2000) used a cognitive mapping tool to develop the core category storyline by iteratively testing various causal links between the categories until “saturation” was reached. Saturation according to their method occurred at “the point where new iterations produced little change to any causal relationships between the categories, especially the core category” (Baskerville, Pawlowski & McLean, 2000).

Baskerville *et al.* (2000) described this multi-method as a staged research approach. The first stage involved collection of the data. In the second stage, analysis using the grounded theory method was conducted on a sample of the data and a satisfactory theory was discovered. In the third stage, “an interpretive analysis of the complete cognitive map was used to validate this theory by logically “proving” that this theory satisfactorily explained the set of the empirical concepts with no unexplained contradictions” (Baskerville, Pawlowski & McLean, 2000).

In this research study, the researcher used cognitive mapping as an intermediate method to analyse the data (E.g., Baskerville, Pawlowski & McLean, 2000), as well as a supporting method to grounded theory in generating theory (E.g., McKay & Marshall, 2005). However, unlike the Baskerville *et al.* (2000) staged approach of collecting data in the first stage and analysing it in the second stage, in this study and as per grounded theory method, data collection and analysis took place simultaneously.

6.13. GROUNDED THEORY AND COGNITIVE MAPPING IN ENTREPRENEURSHIP RESEARCH

The grounded theory method has been used in several entrepreneurship studies. For instance, Gemmell *et al.* (2012) demonstrated its effective use to generate theory on the socio-cognitive processes of entrepreneurial ideation. According to them, the investigation of entrepreneurial ideation is best served through the use of qualitative research methods.

In a study of entrepreneurial persistence in depleted and constrained environments, Baker and Nelson (2005) used the grounded theory method to demonstrate how firms engage in bricolage and how bricolage drives the “enactment of resources environments that are idiosyncratic to the firm”.

6.14. SAMPLE

As per Mitchell and Shepherd (2010), the researcher sought entrepreneurs in technology-related industries that had started up or were in the process of starting up a high-growth technology venture. Petersen and Ahmad (2007) define high-growth companies as businesses with average annualised growth greater than 20% per annum, over a three year period where growth can be

measured by the number of employees or by turnover. Because of the fast-changing nature of technology, entrepreneurs in technology-related industries are frequently required to make decisions about new or changing opportunities.

High-growth firms appear to possess unique characteristics that differentiate them from other firms. For instance, Brannback, Kiviluoto, Carsrud and Östermark (2010) cited several studies which suggest that high-growth firms differ from non-high-growth firms in how they look at market expansion, how they structurally organise their businesses and in the experience and human capital of the founders.

6.15. DATA COLLECTION TOOLS

The researcher utilised the interview method to collect data from expert and novice entrepreneurs. The research sample totalled nine entrepreneurs of which five included novice entrepreneurs and four were expert entrepreneurs.

The novice and expert entrepreneurs were presented with a business case study on social commerce and asked to identify a potential business opportunity that they would consider worth pursuing. As per interpretivist methodologies, the interviews were semi-structured. Since the interviews were designed to discover in-depth insights, the interviews had virtually no structure or direction placed on them by the researcher since the main aim was to explore the internal reality of the respondent (Carson, Gilmore, Perry & Gronhaug, 2001).

By presenting the entrepreneurs with a business case, the researcher was able to provide both sets of entrepreneurs with a generic platform from which they developed ideas for a potential business opportunity.

Each interview lasted approximately an hour and was conducted at the entrepreneur's place of business or at a venue of the entrepreneur's choice. In total, the nine interviews produced 110 pages of transcriptions.

Similar to the study by Kirkley (2016:151), this exploratory nature of this study presumed no prior knowledge of the specific factors used by entrepreneurs to make decisions about new venture creation, other than those focused primarily on the individual, the environment within which they operate and the goal of establishing the new venture itself.

The researcher decided that the best way to solicit data for the study was to engage the sample of entrepreneurs in an open-ended conversation loosely guided by a broadly defined notion of how to recognise an opportunity for a start-up business. Since each interview was coded and transcribed before the next interview was conducted with entrepreneurs in the same group, this approach

allowed for a larger discussion on the topic and the opportunity to further refine the questions that would be used in the interviews that followed (Kirkley, 2016:151).

The semi-structured interviews were based on three open-ended questions which were posed to the entrepreneurs after they had read through the business case study. These questions acted as an aide memoire to focus the conversations held with the sample on the topic of entrepreneurial decision-making (Kirkley, 2016:151). As the interviews progressed and concepts and categories began to form, these initial open-ended questions became more refined in order to elicit the entrepreneur's knowledge around the emerging theory.

6.16. SAMPLE SELECTION CRITERIA

The substantive area, in which this research took place and for which the research findings have relevance, was the technology sector. Key stakeholders involved in new venture creation in the technology participated in the in-depth, individual interviews to explore their thinking and beliefs of opportunity recognition.

More specifically, the research sample for this study consisted of two groups representing novice and expert entrepreneurs. The search for entrepreneurs was non-random and for each group, different criteria were used for selection purposes.

Novice entrepreneurs were chosen from the cohorts of entrepreneurs who applied to a business accelerator that supported entrepreneurs to start up information and communication technology businesses. Expert entrepreneurs were chosen from business networks and from scanning entrepreneurship magazines and other entrepreneurship media platforms.

The main focus in exploring the decision-making of expert and novice entrepreneurs was not to illustrate differences between the respective groups but rather to make a contribution to the research on how entrepreneurs can move through a developmental continuum in which they progress from novice to expert.

6.16.1. Expert entrepreneurs

Expert entrepreneurs were selected on the basis of the following criteria:

- Having started one or more successful businesses.
- Has been or had been in business for more than ten years.
- The entrepreneur must have obtained a level of success. The researcher viewed success in terms of company exit or company valuation, and in this case placed a stipulation of company valuation, revenues or funds raised of minimum ZAR100 million.

- The entrepreneurs should have received some form of validation from peers. Two sources were used for this purpose, namely (i) LinkedIn, the business-orientated professional networking platform; and (ii) Entrepreneur magazine, the entrepreneurship and small business management magazine
- The entrepreneur needed to have started up or be in a high-growth technology-based business.

6.16.2. Novice entrepreneurs

The criteria for a novice entrepreneur were as follows:

- The entrepreneur was in the process of starting up their first business.
- The entrepreneur had to be looking to start up a high-growth technology-based business.

6.17. SAMPLE SIZE

The sample for this study comprised of a total of nine entrepreneurs, consisting of five novice entrepreneurs and four expert entrepreneurs.

An analysis of the two groups revealed that the entrepreneurs chosen for this study were well representative of the required criteria as set forth in this study. For example, it was found that the expert entrepreneurs that took part in this study had an average 18 years of business experience, which far exceeded the required ten years of business experience. Furthermore, each expert entrepreneur had on average started up seven business ventures, and each had experienced a minimum of two successful exits. Finally, three of the four expert entrepreneurs were recognised as leading entrepreneurs by the Entrepreneur Magazine, which in recent years had featured them on the cover page of their magazine.

In addition, most other studies that have made comparisons between expert and novice entrepreneurs have used business management students (MBAs) as their representative sample of inexperienced novice entrepreneurs. One criticism that can be levelled against such samples is that these samples are based on the assumption that some of the business students would go on to start up their own business ventures.

In contrast, because the sample of novice entrepreneurs in this study were chosen from cohorts of entrepreneurs who applied to a business accelerator which supported entrepreneurs to start up their businesses, these entrepreneurs were already in the process of starting up a business and as such were in their year one of acquiring business experience.

It is worth emphasising at this point that because of the demanding nature of the methodology utilised in this study, studies of this nature “tend to trade large sample sizes that would warrant

statistical validity for methodological strategies that emphasize the internal, construct, and external validity of the observations” (Grégoire, Barr & Shepherd, 2010).

As such, this study’s sample size of nine entrepreneurs is consistent with that of other studies that have utilised grounded theory and cognitive mapping techniques in management studies, as indicated in Table 6.4 below.

In addition, several other studies on cognitive entrepreneurship have used sample sizes that are similar to that used in this study. For instance, in their study on how entrepreneurs perceive and manage risks, Sarasvathy *et al.* (1998) compared the problem-solving techniques of entrepreneurs to bankers. Their sample of eight participants consisted of four entrepreneurs and four bankers.

Table 6.4: Sample sizes in comparative studies

<i>Authors</i>	<i>Research focus</i>	<i>Sample size</i>
Santos, Curral & Caetano (2010)	Entrepreneurship	16 subjects (6 novice, 5 would-be and 7 trainee entrepreneurs)
De Berranger, Tucker & Jones (2001)	Entrepreneurship	8 subjects (8 Change agents)
Petersen & Vredenburg (2009)	Management	18 subjects (9 managers and 9 analysts)
Ojastu, Chiu & Olsen (2011)	Entrepreneurship	9 subjects (9 entrepreneurs)
Xiang & Formica (2007:1202)	Management	15 subjects (8 female and 7 male corporate executives)

Source: Author.

The practice of comparing expert entrepreneurs to novice entrepreneurs has been utilised widely in entrepreneurship research as well as in other disciplines. In cognitive entrepreneurship literature, some of the significant contributions to this domain have been derived from such designs. An outline of these studies is presented in Table 6.5, which highlights three significant theoretical contributions in entrepreneurship literature that have been made by comparing expert and novice entrepreneurs. These studies, in particular the theory of effectuation and structural alignment, are very relevant to the current study and provides validation for the procedure used in the research design of comparing expert and novice entrepreneurs in order to explore variances in their new venture creation decision making.

Table 6.5: Entrepreneurial expert-novice comparisons

<i>Authors</i>	<i>Research contribution</i>
Grégoire <i>et al.</i> (2010)	Structural alignment
Dew <i>et al.</i> (2009)	Effectual logic
Baron & Ensley (2006)	Pattern recognition

Source: Author.

In their study, which emphasised the use of hypothetical exercises and behavioural experiments, Grégoire *et al.* (2010) selected a sample of nine entrepreneurs consisting of five entrepreneurs – four male and one female– who had experience in the life sciences industry; and four entrepreneurs – two male and two female – who had experience in the marketing service industry. They presented each participant with a short description of a new technology that had been offered for licensing and was already exploited in niche markets. Because the technology was fairly new in the marketplace, the entrepreneurs had little knowledge of the technology and were free to apply the technology in a market that deemed relevant. The researchers then recorded participants' think-aloud verbalisations as they sought to identify opportunities for the technologies.

In the second stage of their experiment, Grégoire *et al.* (2010) selected a sample consisting of six experienced entrepreneurs with engineering backgrounds and 24 business PhD students with little engineering knowledge who were considered to be novices at the task of recognising opportunities for new technologies. Comparisons between these two groups allowed the researchers to observe whether opportunity recognition beliefs are influenced by participant's experiential knowledge of the task of recognising opportunities for new technologies.

In support of the theory that entrepreneurial experts frame decisions using an effectual logic, Dew *et al.* (2009) compared the 'think aloud' protocols of expert entrepreneurs, founders of multiple companies with over 15 years of experience and proven superior performance, to that of MBA students who were considered to be novice entrepreneurs.

Baron and Ensley (2006) assessed and compared the opportunity prototypes of experienced and novice entrepreneurs. In their sample, 82 percent of the experienced entrepreneurs were male, while 18 percent were female. Their average age was 39 years with an age range from 22 to 54 years old. Seventy-four percent of the novice (first-time) entrepreneurs were male, while 26 percent were female. Their average age was 31 years with an age range of from 21 to 44 years.

In all of these studies, samples consisted of participants who differed in terms of industry expertise, gender, and age. The beliefs and decision-making of participants were compared on the basis of whether they were experienced entrepreneurs or were novices with no experience. That is to say

that the one common factor that formed the basis for comparing entrepreneurs was the content and extent of their domain knowledge.

The growing literature on entrepreneurial cognition, which suggests that theories developed in expert – novice studies can potentially illuminate important aspects of the entrepreneurial process, including how experienced entrepreneurs acquire useful cognitive frameworks that enable them to become experts over time (Dew, Read, Sarasvathy & Wiltbank, 2009). Since this study's objective is to contribute to the growing literature of entrepreneurial cognition, the researcher also utilised similar sample criteria for selecting and comparing expert and novice entrepreneurs.

As per the grounded theory method, the researcher performed theoretical sampling which can be described as theory led sampling. Theoretical sampling to reach theoretical saturation which is the point where there is no need to collect more data. Theoretical sampling is sampling for theory construction, not for representativeness of given population (Urquhart & Fernandez, 2013:224) with the result that the sample that the researcher ends up with could be a complete un-representative sampling (Pudelko, 2014).

Since grounded theory studies are not generalising, the researcher does not need to have a sample that represents every age group, academic qualification, etc. With theoretical sampling, the researcher does not look for representativeness but rather chooses a sample that is most likely to answer the research questions of the study and provide data to develop new theory. As such, the sample may be a very untypical one (Pudelko, 2014).

6.18. CODING SCHEME

The researcher was interested in exploring key factors that expert and novice entrepreneurs considered important in terms of opportunity recognition and what role these factors played in influencing the expert and novice entrepreneurs' decisions regarding the opportunities that they would chose to pursue. These factors provided the researcher with key insights into the manner in which expert and novice entrepreneurs perceive potential business opportunities.

In keeping with this study's categorisation of opportunity recognition, the researcher was also interested in exploring supply- and demand-sides of an opportunity during an opportunity recognition process.

Additionally, the researcher wanted to explore the type of supply-demand combinations that expert and novice entrepreneurs looked to create when they considered a potentially viable business idea. The researcher therefore sought out interaction-related factors that affected the supply-demand interplay.

The researcher developed a coding scheme for this purpose, which was consistent with coding schemes utilised in studies of a similar nature, for example Grégoire *et al.* (2010) and Sarasvathy (1998). The coding scheme allowed for the transcriptions to be analysed on the basis of the following:

1. Perception coding: Perception or evaluation of the business scenario presented to the novice and expert entrepreneurs. The researcher wanted to establish a context for exploring how entrepreneurs evaluated the business case and identified business opportunities that appeared viable to them.
2. Supply-side coding: Identification of the supply-side of the opportunity (Product). The researcher looked for concepts describing supply-side opportunities and the number of supply-side opportunities identified.
3. Demand-side coding: Identification of the demand-side of the opportunity (Market). The researcher looked for concepts describing demand-side opportunities and the number of demand-side opportunities identified.
4. Interaction coding: Identification of interactions between the supply- and demand-sides of the opportunity. The researcher looked for concepts that indicated an intention to bring about a 'state of change'. For example, the researcher looked at concepts that described activities such as execution issues and resource acquisition.

A summary of the analytical coding categories is presented in Table 6.6.

Table 6.6: Analytical categories for coding

Analytical categories	Sub-category	Coding
Perception	Evaluation Search Scanning	Concepts that described activities or processes around scanning and search for opportunities, including key influencers of opportunity recognition.
Demand-side	Market Consumer Customer	Concepts that described activities or processes pertaining to market opportunities.
Supply-side	Product technology	Concepts that described activities or processes pertaining to product opportunities.
Interactions	Distribution channels / Resource analysis	Concepts that described activities or processes pertaining to linkages between the supply- and demand-sides of the opportunity. The researcher examined how entrepreneurs established links between the supply- and demand-side of the opportunity and the different types of links that each group were able to establish.

Source: Author.

As per grounded theory methods, the data was fractured and incidents and events were coded into open codes. Open codes underwent a second level of coding to create categories from which theoretical constructs were sought. Since the researcher was interested in determining how expert and novice entrepreneurs solved the supply-demand linking problem, the researcher examined the individual and aggregated cognitive mappings of the novice and expert entrepreneurs for categories that indicated linkages between the supply and demand-sides of the opportunity.

The process of coding in this study followed that used by Franco and Lord (2011), who in their study carried out two levels of coding. First, they broke down the data into meaningful discrete parts and coded these by following standard mapping guidelines. Next, they grouped the coded data into clusters, which were assigned a 'category label' based on the meaning the coded data evoked when examined comparatively and in context (Franco & Lord, 2011).

The second order analysis, which Franco and Lord (2011) conducted in parallel with the first-order analysis, was to identify the ontological relationships between the categories (Ojastu, Chiu & Olsen, 2011). With the Franco and Lord (2011) technique, the first-order analysis sought to stay with the data and let the data 'speak for itself'; the second-order analysis sought to develop a higher level of abstraction. This was achieved by conceptualising interrelations between the various clusters of material and "aggregating the material into broader and interrelated analytical categories or 'themes' to provide a theoretical framework for organising the emergent findings" (Franco & Lord, 2011).

Following this analysis framework, each interview resulted in a cognitive mapping that revealed the participant's perceptions of opportunities that they recognised as potentially viable business ventures. These cognitive mappings in turn were consolidated to form a composite cognitive mapping, which formed the basis for the discussion presented in this paper.

Similar to De Berranger *et al.* (2001), the individual cognitive mappings that were constructed from each analysis served as a visuospatial representation of the structure and content of that individual's belief system. They do not, nor were they intended to show 'cause and effect' relationships as is commonly the case (De Berranger, Tucker & Jones, 2001).

CHAPTER 7

DATA ANALYSIS

7.1. ANALYSIS OF NOVICE INTERVIEWS

The data analysis of interviews took place immediately after the interview with each novice entrepreneur. Each interview was transcribed and coded. Coding commenced with the allocation of open codes as per the coding scheme that the researcher had developed, and the open codes were grouped into categories. These were then assigned to a cognitive mapping process to visually display the core categories and evolving interrelations. Categories indicated the characteristics of the conceptual unit while interlinking concepts indicated the relationships between these categories.

An outline of the application of the coding scheme to the participants' transcriptions is provided in Table 7.1. Interviews were 'fractured' into incidents, which are indicated in Table 7.1 as participant's comments. These incidents were then coded into open codes or concepts, which were grouped into categories based on their properties. As with grounded theory approach, the researcher made notes or memos during the coding to process.

This process captures the essence of the analysis approach adopted in this research, that being that 'analysis is interpretative' and the role of the researcher in analysing, searching for and allocating meaning to the events under scrutiny, cannot be omitted in this process (Pidgeon, Turner & Blockley, 1991).

It is important to note that the sections in this chapter dealing with the novice entrepreneurs and the expert entrepreneurs who were interviewed, comprise information about the entrepreneurs (both novice and expert) interspersed with general facts/truths about novice and expert entrepreneurs.

7.1.1. Novice entrepreneur 1

The first novice entrepreneur, referred to as Novice 1, was a 24-year-old male who had qualified with a Bachelor of Science Honours in Information Technology. At the time of the interview, the entrepreneur was completing a Master's Degree in Human Computer Interaction.

The researcher started the coding and theorising process with the transcripts of Novice 1. The researcher found the initial coding stage to be particularly demanding and challenging. Following on Charmaz's (2006) advice, the researcher did not try to force preconceived ideas or theories onto the data but instead followed leads in the data while also remaining open to whatever theoretical possibilities he discerned in the data.

Table 7.1: Example of coding and concept development as applied to the transcripts of Novice 1

ANALYTICAL CATEGORY	CONCEPT	PARTICIPANT'S COMMENTS	RESEARCHER'S MEMOS
Demand-side	Social communication trends	"Well it's what the majority of the people are doing and its growth"	Trend analysis is important for predicting future consumer demand.
	Consumer trends	"So I think if people begin to use it in a business sense and it becomes trendy then everybody else will use it"	The entrepreneur views trend analysis as the main factor for predicting consumer behaviour.
	Known market	"More so that there is a market"	The entrepreneur looks to leverage off an existing consumer base.
Supply-Demand Interaction	Behaviour transitions	"[...] the development in or the transition in how people do or come to do business"	Transitions in consumer behaviour create opportunities for the development of new or novel products.
	Trend capitalisation	"So like the idea is that you can use social media to capitalise on that"	The entrepreneur seeks to benefit or profit from a trend by predicting future consumer behaviour and demand.
Supply-side	Product development	"So it's not a formal way of businesses doing business. I think if you find a way to formalise it or so on, it could work".	The entrepreneur seeks to create a product that would entrench consumer behaviour.
		"Again the trend, I think if the trend catches on, it will definitely work"	Trend progression is an important factor in directing product development

Source: Author.

The initial coding proceeded with the researcher attempting to see actions in each segment of data rather than applying pre-existing categories to the data. The researcher sought out repetitions and looked for 'unusual terms or common words used in unusual ways' (Bernard, 2011). In addition, the researcher turned to the literature on occasions where he found strong concepts that already have established analytic meanings.

The researcher went through several coding iterations during the process of theory building. This is to be expected and is in line with the call that theories created must be iteratively contrasted and compared with the data, especially against negative or contradictory cases (Luna-Reyes & Andersen, 2003).

As noted by Lacey and Luff (2001), the process of doing grounded theory analysis does not take place in linear stages; rather the process is cumulative and can involve frequent revisiting of data in the light of the new analytical ideas that emerge as data collection and analysis progress. Hence, it is recommended that initial codes be viewed as provisional so that the researcher remains open to other analytic possibilities and creates codes that best fit the data on hand (Charmaz, 2006).

This was very much the case in this study where the researcher discovered that he had to revisit and reword some of his initial codes so as to improve their fit, which in part denotes the degree to which the codes capture and condense meanings and actions (Charmaz, 2006).

It is also suggested in grounded theory analysis that the researcher presents direct quotes from respondents. For instance, Bernard (2011) suggested that the researcher choose segments of text – verbatim quotes from respondents – as exemplars of concepts and theories or as exemplars of exceptions to the proposed theories. Therefore, the researcher did on occasion choose to quote verbatim quotes from respondents' transcripts.

When Novice 1 was asked about his views of the business case that was presented to him, he immediately identified an opportunity that could be created from an emerging social trend which could eventually change the way in which businesses engage potential consumers as well as other businesses. In his opinion, the way that consumers interact with each other through social or consumer-driven networks, represents an opportunity for a business venture.

The researcher noted this in his memos of the novice's transcripts. More specifically, the researcher recorded that social networks have become the main consumer engagement platform and that changes in the manner in which consumers communicate with each other could lead to changes in consumer engagement methods.

Throughout his interview, Novice 1 placed significant emphasis on the importance of analysing current and future consumer, business and social trends. Because Novice 1's evaluation mainly revolved around analysing emerging and future trends and how these trends influence consumer behaviour, it was concluded from this that trend analysis is a significant factor in Novice 1's opportunity recognition process.

Figure 7.1, which depicts Novice 1's cognitive mapping of the business case study, highlights the key concepts and categories that have emerged out of Novice 1's evaluation of the business case. From Novice 1's cognitive mapping, it is evident that the key factor in Novice 1's evaluation of the business case study revolves around identifying and analysing current and future trends.

On the basis of this process, the researcher settled on research interests in trend analysis and consumer behaviour which recurred in Novice 1 transcripts and which are evidently deemed important by the novice.

These form the basis on the first provisional categories that were then compared to other incidents in the first novice's interview. As is necessary in grounded theory analysis, the researcher also compared these categories to incidents in the transcripts of the remaining novices as well as with those of the expert's transcripts.

- Trend analysis

The main sub-categories in trend analysis were consumer trends and social communication trends. A key factor for the researcher in allocating trend analysis to category level was not the trend itself but rather the impact of changing consumer trends. The researcher noted in a memo that consumer trends are indicative of changing consumer behaviour. The impact of these changing trends are that it is likely to lead to changes in the manner in which consumers communicate which in turn impacts business models as businesses need to adapt to these changes.

For the novice, trend analysis facilitated the process of opportunity identification and evaluation. According to Novice 1, the ability to identify emerging trends is important for several reasons. For one, trend identification aided him in identifying a consumer market or consumer segment that was sufficiently large enough to develop a suitable product for. Trend analysis also aided the entrepreneur in identifying new consumer behaviours, which in turn signified future growth potential.

When Novice 1 was asked why a consumer trend is important to opportunity recognition, he explained that it is indicative of what most of the people are doing and it is indicative of future market growth.

- Consumer behaviour

The second category, consumer behaviour, subsumed the sub-categories of changes in consumer behaviour and changes in consumer communication methods. The primary rationale behind the identification of current and future trends is that it assists the entrepreneur in making a prediction about the characteristics of consumer behaviour and future market demand.

In addition to changes in consumer behaviour, are changes in the manner through which consumers tend to communicate with each other. Such trends are important to the novice entrepreneur as they direct the entrepreneur to a possible market entry channel. In particular, the novice looked for an entry point using consumer-driven networks. This was recorded in the mapping of the novice as the category: existing consumer channel, which was later subsumed into the main category of known markets.

The novice remarked that it is important that there is a market for a business idea. Having an existing market is essential for both the success and the sustainability of a business. Novice 1 noted that the size of a market is important only to the extent to which it relates to the size of the existing consumer base. Thus, the identification of a market or market segment is directly related to consumer-driven networks, that is, the novice looks for an existing consumer base. Novice 1 stressed the need to engage consumers through the consumer channels that they were already using. Since an existing consumer channel already had a high user frequency and was therefore already an established channel, this in turn made it easier for consumer acquisition.

The main categories of trend analysis and consumer behaviour lead to an important relational category of behaviour transitions. Hence, while trend analysis also indicates future business and consumer practices, Novice 1 also indicated that it is important to identify future trends because future trends signal transitions in consumer behaviour. Transitions in consumer behaviour in turn, create opportunities for entrepreneurs.

Thus, transitional practice brought about by future trends is an important link between consumer behaviour and new product development. Novice 1 claimed that opportunities for the development of a new product or novel innovation fosters from transitions in consumer behaviour or business practices.

From the cognitive mapping of Novice 1, it is evident that the novice entrepreneur evaluation or perception of a business opportunity revolves around analysing trends. Trend analysis for a novice entrepreneur is important because it assists the entrepreneur to understand consumer behaviour changes and transitions that could potentially lead to business opportunities.

Hence, one of the main reasons for needing to understand changes in consumer trends is so that the entrepreneurs could understand how these changes would lead to opportunities for new product development. Through the examination of consumer trends, the novice also identified a potential market segment that he could target.

The researcher noted in a memo that consumer acquisition is a possible category label because of its importance in connecting consumer trends to consumer markets. At this point, the researcher conjectured that consumer acquisition could potentially become an important relational category because of the relationship between the identification of consumer trends and the novice's strategy for acquiring potential users. It was evident to the researcher that the novice placed particular emphasis on understanding the changing business environment and how these changes could benefit him in some way. The novice noted that the ability of a consumer to make decisions around their preferences is shifting in the favour of the consumer.

- New product development

The researcher further noted that the trend analysis category is important for product development as it leads to the creation of new or novel products. Hence, trend analysis is important in that it interconnects with both the demand-side (market) and the supply-side (product) of an opportunity. The researcher noted that the novice entrepreneur paid significant attention to product development. In particular, the novice sought to identify inefficiencies in business processes and then attempts to identify opportunities for developing new products that could become part of mainstream business practices.

From the first novice's transcript, the researcher had already managed to elucidate key concepts from which he began theorising about how this group of entrepreneurs made decisions about potential business opportunities.

The researcher theorised that the identification of trends and existing consumer markets by the novice entrepreneur could be seen under the broader context of the competitive environment. The researcher noted that the novice is aware of the competitive environment and conducts an analysis of the business environment to determine how he can utilise changes in the environment to his advantage. He is aware of his limitations to compete on an equal footing with larger companies and devises a strategy for market entry, which plays to his strengths.

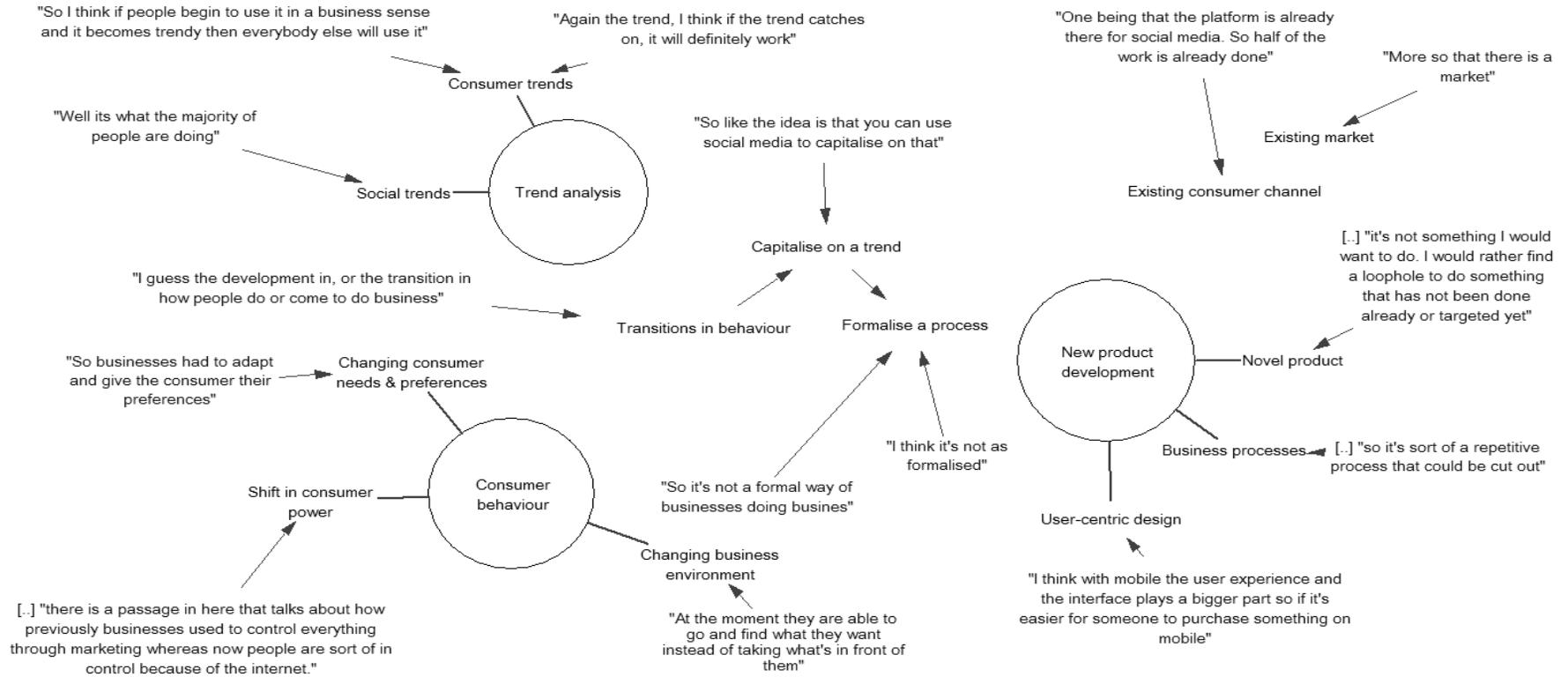


Figure 7.1: Cognitive mapping of novice 1

7.1.2. Novice entrepreneur 2

The second novice entrepreneur was a 26-year-old male that was working for an online company and was interested in starting up his own business in the online space.

At the start of Novice 2's interview, the researcher immediately noted a similarity with the manner in which Novice 1 had approached his interview. In comparing the two novices, the researcher noted that both novice entrepreneurs began their evaluation of the business case study with an analysis of emergent consumer and business trends. Furthermore, trend analysis featured prominently throughout the course of the interview.

Through the constant comparisons of incidents to incident in Novice 2's transcripts, as well as the constant comparisons of incidents in each of the novice's transcripts, the researcher was able to further entrench and develop the category of trend analysis as an important category in the opportunity recognition process of a novice entrepreneur.

For example, both novice entrepreneurs attempted to identify emerging trends that would create an opportunity for the development of new products. Once an emerging business trend had been identified, the novice then identified one or more new products that they could develop in order to meet increased market demand emanating from the emerging trend.

As an example, Novice 2 identified two principle opportunities for the development of new products. Novice 2's principle business opportunity stemmed from the perceived increase in consumer demand that was expected to develop from an emerging trend on future business practices.

Because changes in the business environment can lead to opportunities for new product and services, Novice 2 examined how he could position himself in the marketplace so as to exploit opportunities arising from these trends. In other words, the novice, without fully realising it, was developing a strategy for market entry that was related to him taking a position in a specific market.

Hence, it would appear that novice entrepreneurs view changes in the business environment as one of the primary drivers of opportunities for new product development.

As an example, the researcher found that trend analysis is integral to (i) the identification of new product development, and (ii) the identification of changing consumer needs and preferences. For the novice entrepreneur, market identification stemmed mainly from the recognition of an increase in market demand for specific new products as a result of an emerging trend, as indicated by Novice 2's statement:

“It was a trend that made me see that there is a market, because the trend made me see that there was a need”.

- Trend capitalisation

Novice entrepreneurs conduct trend analysis as part of their opportunity identification process so as to find ways through which they could benefit from a trend. Thus, trend analysis creates a linkage between new product development and consumer demand or need.

This process, which entails analysing consumer behaviour stemming from a trend in order to find an unmet consumer need, has been coded as ‘trend capitalisation’, which refers to the process of benefitting or profiting from a trend. Trend capitalisation introduces an important supply-demand linking concept in that it provides a link between the identification of an opportunity and the market-sides of an opportunity.

As noted by Eckhardt and Shane (2003), changes in demand are important as these changes can generate opportunities. Customer preferences can influence the allocation of resources because producers need to respond to the preferences and purchasing habits of consumers. “Thus, demand changes from exogenous shifts in culture, perception, tastes, or mood can open up opportunities”.

Trend capitalisation encapsulates the processes that an entrepreneur utilises in order to exploit a trend by making demand forecasts so as to obtain market share for new product development. Novice 2 stated: *“I did look at the quantity and the volume of the demand and possible market share that you can even grab”*.

While much of the novice entrepreneurs’ opportunity identification revolved around trend analysis for product development, other important concepts that surfaced from Novice 2’s transcripts were those of adaptability and uncertainty. One way in which the novice entrepreneur deals with uncertainty is through prediction. For example, the novice attempts to predict consumer behaviour and in this way capitalises on a trend.

Since the novice entrepreneur lacks the prior experience of an expert entrepreneur, novice entrepreneurs have to deal with significantly more uncertainty that comes from bringing a new product to market. Novice 2 explained:

“I think it’s always better to be an entrepreneur or have a start up in something that you have background in already. It’s much easier”.

Elaborating on this statement, he went on to explain:

“[...] because you have much greater relevance of what is going on, you not entering a completely new market. Because if you do not have background you are the same as the customer you want to approach, you are making something that you (are) not really sure about”.

Because of the lack of prior knowledge, the novice entrepreneur attempts to compensate for and overcome uncertainty through adaptability and learnings. When asked if he would pursue a business idea even though he had no domain knowledge for that particular industry, Novice 2 stated:

“It depends, if it’s a bit more hands on, then maybe it’s very important that you have a background. But if it’s something that you can learn quickly and adapt to, then it’s not”.

In addition, since novice entrepreneurs generally lack prior market experience, they are more likely to attempt entering an existing market rather than a new market. That is to say that a novice entrepreneur seeks out an existing consumer market and then attempts to find a consumer channel with high user frequency which can provide them with a consumer base through which they can penetrate the existing market. Hence, the novice entrepreneur seeks out known markets where possible, as evident in Novice 2’s statement:

“So going where customers spend most of their time will be a solution”.

- Market entry

Another important category that was explicated from Novice 2’s transcriptions is that of existing consumer channel. The novice entrepreneur seeks out a consumer channel that could be utilised for distributing his product the market. Because of the frequent users and ease of use of consumer-driven networks, novice entrepreneurs generally consider these networks as the primary channel for consumer acquisition and business linkages.

When considering the development or execution of a business idea, novices place significant emphasis on resource efficiency. In particular, they consider how to maximise their available resources and how to use consumer channels such as social networks as an inexpensive and readily available channel for customer acquisition. It was evident that when identifying an opportunity that they would consider acting on, both Novice 1 and 2 didn’t consider business fundamentals as important.

That is, the entrepreneur places little or no emphasis on key business fundamentals necessary for operating and managing a business such as profitability. Novice 2 stated:

“Look I am not familiar in how intensive it is in maintaining and the cost involved – if it’s profitable or not, I’m not too sure”.

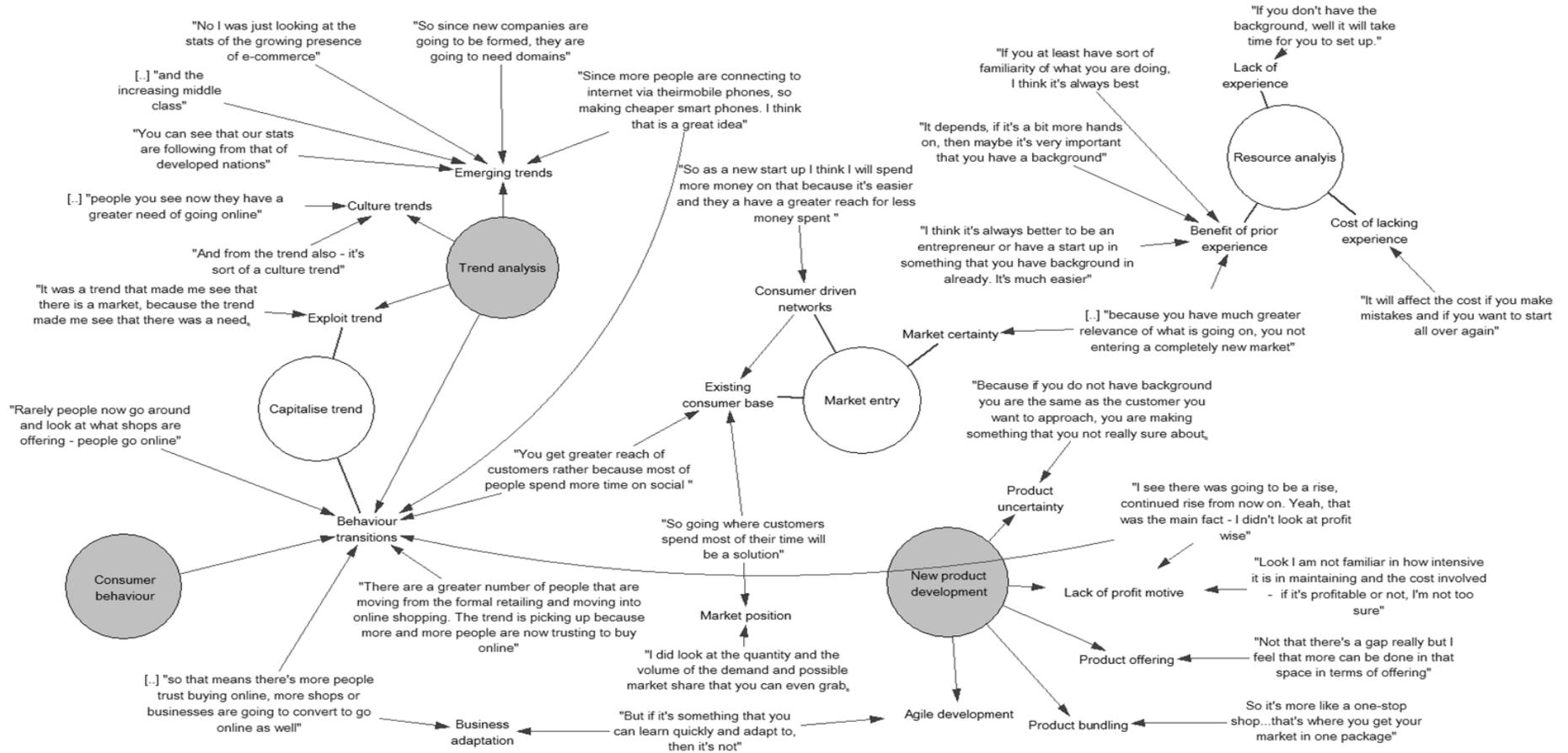


Figure 7.2: Cognitive mapping of Novice 2

7.1.3. Novice entrepreneur 3

Novice 3 was a 24-year-old male who at the time of interviewing was interning at a creative agency while at the same time completing his post-graduate studies in software development.

As became clear with Novices 1 and 2, the key influencers governing the creation of opportunities for the novice entrepreneur are consumer behaviour and trend analysis. The novice evaluates the business environment to identify current and future trends and then examines how best to exploit that trend. That is, the novice evaluates the business environment by first examining consumer trends before he decides on new product development.

The object of analysing trends was to identify how an emerging trend would impact the current business environment. From the comparisons of incidents in the transcripts of each of the novice entrepreneurs, the researcher designated trend analysis as a core category which is densely developed and which is most persistent in all on the novices' transcripts.

By first examining trends or change indicators, the entrepreneur is able to ascertain the type of product innovation that is likely to succeed by solving a consumer problem. Novice 3 explained his reasoning behind this with the following example:

“Let’s say for example I was stuck, I was standing at the bank of a river and the river is flowing and there was a boat but the boat is withering away slowly right; and there is a log but the log isn’t withering away at all. In fact, there are more logs being added. I would then leave the boat and make something with the logs and move with that because I would go on the boat that’s withering away but along the way it’s going to sink”.

- Trend trajectory

Emanating from the category of trend analysis is the category of trend trajectory, which relates to activities of the entrepreneur in determining how a trend transmits to a potential business opportunity. Trend trajectory links the categories of trend analysis and market entry and subsumes the subcategories of harness trends and market entry planning.

The category trend trajectory developed from the observation that once the novice identifies a trend, they then look at how best to exploit that trend so as to create a business opportunity out of it. In this regard, Novice 3’s statement was: *“It’s abstract - like I wouldn’t know what the idea is but I’m thinking how to harness this irrelevant of what the idea really is”*. When asked to elaborate on this, Novice 3 explained:

“For example like I saw that there was a big push for the social network and just using the web itself and the fact that the web is growing, so immediately the first thing I thought about of how can I harness that”.

This category is linked to the developing category of behaviour transitions. In comparing incidents in the transcripts of all three novice entrepreneurs, the researcher noted that all three novices focus their opportunity recognition activities on being able to predict a trend that they can capitalise or harness to their benefit.

In other words, the novice entrepreneurs attempt to predict transitions in behaviour arising from emerging consumer or social trends and to develop a new product that will meet a new consumer need or preference. In this way, the entrepreneur is able to exploit or harness that emerging trend.

- Market entry

The creation of a competitive advantage, in many respects has to do with a firm’s positioning in the market and the identification of the customer segment in which that the firm wants to be.

The identification of consumer trends is an important process in the opportunity creation process because trend analysis assists the novice to make market-positioning choices that will allow them to exploit an emerging trend. For example, Novice 3 claimed that:

“If they are already accustomed to buy online, their children themselves will be accustomed to buy online. So therefore in the future, when I’m looking ahead in the business and I see myself where I want (to be). That place where I wanted to be is where people are operating in the mobile platform – online, because that’s what is growing”.

This theme of making choices of market position based on known consumer bases is one that resonates with the previous two novice entrepreneurs as well. Novice entrepreneurs generally do not go looking for new markets; instead they want to position their products where there are larger consumer bases and frequent users. Novice entrepreneurs tend to seek out known or existing market segments so that they are better able to understand their needs and thereby develop products and services to satisfy those needs. This was explicated through comparisons of incidents in the novices’ transcripts as illustrated in Table 7.2.

Generally, when bringing a new or novel product into the market, it is important to consider the target market segment and their preferences for adopting or using a particular channel. Consumer-driven networks provide a captive market, which the novice looks to exploit. Because consumers are already engaging with social media on a daily basis, novice entrepreneurs do not attempt to identify a new market for a potential business opportunity but rather look at how they can use the

existing consumer base to their advantage. Novice 3 explained that consumer-driven media provide an important consumer channel

“[...] because of the way that it is being implemented in people’s lives – the way that they are choosing to use it”.

Table 7.2: Novice transcript comparisons for consumer-driven platform

Novice comparisons	Transcripts
Novice 1	“More so that there is a market”. “One being that the platform is already there [...] so half of the work is already done”.
Novice 2	“So going where customers spend most of their time will be a solution”.
Novice 3	[...] “whatever my idea is (I) just to have to be able to use that platform seeing that people is accessing it so much, that’s why I will use it ”. [...] “So if I can identify that thing, then essentially the market already exists then”.
Novice 4	“You would probably have an idea that the trend is there, but then you if want to do something with the trend you need to consider can I do this in this environment”.

Source: Author.

Chesbrough and Rosenbloom (2002) stated that a market focus is required during the product development process in order to know what product attributes to target in development, and how to define and configure the product offering for the market. This is because the adoption of new products by consumers depends to a large extent on the product attributes and the consumers’ perceptions of those attributes (Morrison & Roberts, 1998).

- Behaviour perpetuation

A core factor in the novice’s identification of opportunities is the observation of changing consumer behaviour as related to an emerging trend. The novice contemplates how to create a novel business opportunity that will perpetuate consumer behaviour arising from that trend. As Novice 3 explained:

“The first thing that I think about is whatever idea I get irrelevant to what it is [...] it would have a social implication to it, in other words something that has some type of drama that people like”.

Perpetuation in this regard, can be described as the act of continuing an activity without interruption. By seeking to develop a product that perpetuates a certain consumer behaviour, the novice entrepreneur is ensuring that they eliminate the uncertainty around consumer adoption as well as ensuring that the product fits seamlessly with current consumer behaviour. Novice 3

explained that he looks for: *“Yes, some types of controversy but you use it in such a way with the idea that I have so I can perpetuate how that people want to look at it”*.

By finding a way to perpetuate consumer behaviour on consumer-driven networks, the novice is able to link an opportunity with an existing market and use an existing consumer channel to enter that market. Novice 3 commented that it is important to develop a product that makes life easier for the consumer and explained:

“People who want something to make their life easier - like you just want something that would make your life to be easier or simpler; or to do something for you that you would rather not do. So if I can identify that thing, then essentially the market already exists then”.

Thus, the novice entrepreneur seeks to develop new products that perpetuate consumer behaviour, which thereby ensures market entry into an existing market segment.

- Resource analysis

In addition to identifying changing environments, the novice is concerned with the resource that they have and need in order to act on a potential opportunity. From Novice 2’s transcripts, it is evident that the novice is aware of his lack of experience and the potential cost of lacking relevant business experience. Novice 3 expanded on this by directly relating his capabilities and knowledge to the analysis of resources required to act on an opportunity.

Based on the analysis of the mappings of the novice entrepreneurs, it materialised that key factors in the entrepreneur’s decision-making stemmed from an analysis of the environment to determine emerging changes and how these impact consumer behaviour. From this, the entrepreneur develops a strategy for market entry based on their resource constraints and capabilities.

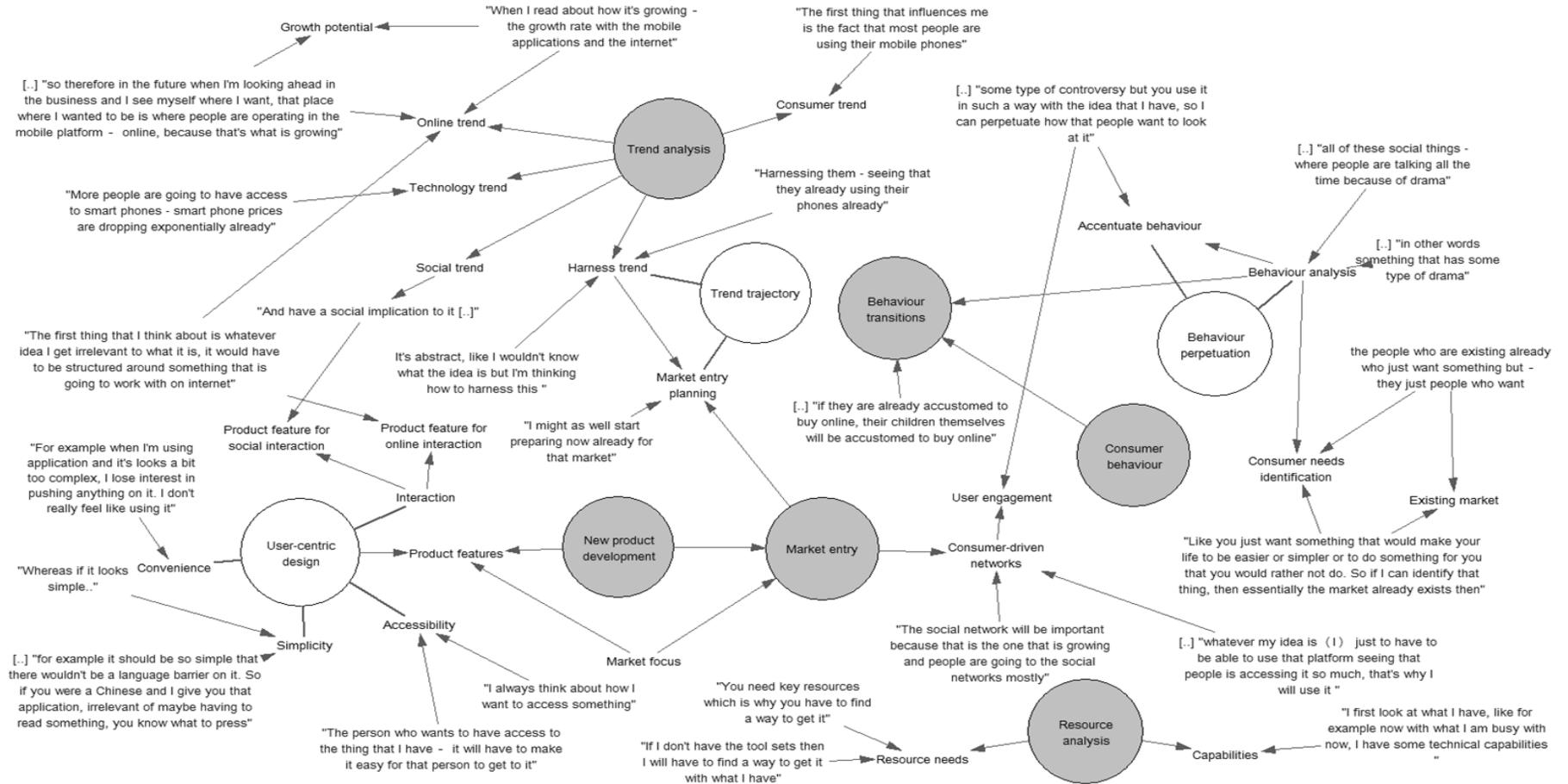


Figure 7.3: Cognitive mapping of novice 3

7.1.4. Novice entrepreneur 4

Novice 4 was a 26-year-old male who had a diploma in computer science and at the time of his interview, he was interested in starting up a health technology business.

From the analysis and comparisons of the three novices, the researcher was able to develop a framework that began to explain how these entrepreneurs developed supply-demand combinations for a business opportunity. At this point in the analysis, the researcher was particularly interested in expanding on the categories of behaviour perpetuation, trend trajectory and user-centric product design.

In comparing the transcripts of Novice 4 to those of the previous participants, the researcher found that Novice 4 continued the tradition of identifying opportunities from understanding emerging trends. Novice 4 advocated the need to understand consumer buying, especially those needs arising from emerging buying patterns. The purpose of this is to assist the entrepreneur in developing a product that would perpetuate the process of engaging consumers via consumer-driven platforms. As the novice explained: *“they need a solution - an intelligent solution that can connect the two dots”*.

According to Novice 4, the introduction of new consumer channels such as consumer-driven networks has made it easier to obtain market traction for a new product. This is primarily because now, *“people determine the best locations”*.

Novice 4 claimed that consumer interaction previously was restricted to brick and mortar locations but now with online channels, it is easier to deploy a product via these consumer-driven channels in order to obtain market traction. As noted by Novice 4:

“[...] our consumers are here – most of them are here, so therefore it makes it more feasible and easier for us to get traction in this specific area instead of just pin pointing out some areas that we might think are good for us”.

While an online platform *“makes a deployment of these ideas and everything much easier”*, market traction is dependent on obtaining consumer orientation. That is, consumer orientation occurs when there is a degree of alignment between the product deployment and a consumer buying channel.

Online consumer channels bring additional advantages in that they assist a product developer to gauge consumer preferences and to make real-time response to these preferences. As noted by the Novice 4:

“[...] because consumers now have choice and it’s now easier for them to say I don’t want this, I don’t want that, the company can respond almost immediately to the consumers choice”.

Thus, the ability of a business to interact quickly with the consumer has significant benefit as indicated by the Novice 4’s statement “[...] *you can quickly add stuff and remove stuff as per the consumers’ interaction with you that are immediate*”.

- Consumer engagement

The novice entrepreneur seeks out the most efficient ways to engage the consumer. The consumer engagement concept centres on specific interactive consumer experiences. It is generally referenced in terms of marketing with its theoretical foundation in the expanded domain of relational marketing (Brodie, Ilic, Juric & Hollebeek, 2013).

In this study, consumer engagement denotes a key category linking the supply-side and the demand-side of opportunity recognition. The main characteristics of consumer engagement are consumer interactions and consumer needs and preferences.

Consumer engagement entails assessing consumer preferences, interacting with the consumer and responding to consumer choices and to orientate your product offering to align with the consumer channel that your consumer segment is using most frequently.

Consumer engagement is an important factor in new product development. Hoyer, Chandy, Dorotic, Krafft and Singh (2010) recognise that successful new product development depends on a deep understanding of consumer needs and product development efforts that meet those needs. They noted that the inability to adequately assess and fulfil consumer needs is often a key reason for new product failure. By involving consumers more actively in the new product development process, new product can be co-created with consumers, thereby increasing the likelihood of new product success (Hoyer, Chandy, Dorotic, Krafft & Singh, 2010).

- Relational orientation

Novice 4 emphasised the importance of adopting a strategy that orientates itself toward the consumer. Such a strategy can be an effective method for turning a relational orientation into a transaction orientation. As Novice 4 stated:

“So social is important as far as you can deliver an idea or strategy on social that’s not always about serving people on social because people are not there always to buy stuff but if you can blend in the social within a person’s day to day activities and

everything, then the person is more likely to interact with you and buy something from you”.

In addition, such a strategy is important for maintaining good public relations with the consumer as indicated by Novice 4's claim: *“Social is important also as your customer relations because people are on social”*. Thus, the novice entrepreneur is likely to adopt a relational strategy with the consumer as the most efficient means to deploy a new product. A relational orientation focuses on the relations between the consumer and the product.

A relational orientation does not focus solely on the attributes of a product or the characteristics of a consumer segment, but rather its focus is on the nature of the relationship between the consumer and the product. As such, a relational strategy depends on having a consumer orientation that ensures constant consumer engagement and the ability to respond to consumer preferences.

Another factor in the entrepreneur's strategy for obtaining a relational orientation is to consider their capabilities or competences and the resource requirement necessary to implement an idea. A relational strategy also makes it easier to obtain alignment with product development and the consumer perpetuation process. The entrepreneur makes decisions that attempt to find alignment with the internal and external domains and alignment with a relational orientation strategy for engaging the consumer.

Thus, novice entrepreneurs look at trends or change indicators to assist them in perceiving and identifying opportunities. They then conduct a situational analysis to determine resource requirements and match this against their capabilities and competencies. This is clear in Novice 4's statement:

“You would probably have an idea that the trend is there, but then you if want to do something with the trend you need to consider can I do this in this environment”.

A relational orientation is generally believed to foster stronger relationships with consumers (Macintosh, 2007). In other words, a relational orientation is a way to form a linkage between the supply-side and demand-side of a business opportunity.

Sheth and Shah (2003) examined customer relationship formation in terms of a relational exchange orientation. They noted that exchange participants in a relational exchange are expected to derive complex, personal noneconomic gains, and communication takes place through social exchange. In other words, relational partners are involved in a complex network of operational and social dependence (Sheth & Shah, 2003). Thus, a relational exchange orientation has both

economic and social elements and it is an orientation that has a strong strategic emphasis (Sheth & Shah, 2003).

7.1.5. Novice entrepreneur 5

Novice 5 was a 26-year-old male who had a degree in information technology. Novice 5 commenced the interview by emphasising the need for companies to integrate their brick and mortar stores with their online platforms. Online platforms are important for any business because as Novice 5 noted: *“It gives the consumer the power to actually make the correct choice”*.

- Consumer empowerment

In comparing the transcripts of Novice 5 with the previous novices, the researcher found that like the novice entrepreneurs before him, Novice 5 reiterated the importance of understanding consumer behaviour developing out of consumer trends. Novice 5 explained that the today's consumer is significantly more empowered than those of the past are since consumers now have access to product information via their social networks. In other words, today's consumers have greater input in the products being developed to cater for their needs. As Novice 5 stated, *“now it's not about the brands! It's not about what the brands can communicate. It's about us the customer, the consumer. We sort of have a voice now”*.

This view of Novice 5 reflects the view of many organisations, being that this is now the era of the empowered consumer who lives in an information-rich and connected world. Hoyer *et al.* (2010) spoke about how the advent of technology has brought about consumer 'empowerment' in today's market. Essentially they claimed that consumers have significantly more access to information, and the ability to communicate with other consumers, which has given them a sense of 'empowerment'.

One important outcome of this increased consumer empowerment is that consumers now want to play a greater role in the process of value creation. This process, known as co-creation, is considered as an important manifestation of consumer engagement behaviour and it is increasingly vital in the area of new product development (Hoyer, Chandy, Dorotic, Krafft & Singh, 2010).

Consumer empowerment, which subsumes the concepts consumer power, shift in power and more consumer choice, is an important category because it expands on the theme of change that resonates throughout the transcripts of the novice entrepreneurs. It was quite clear to the researcher that the novice entrepreneur views change as a key factor in new product development.

- Market understanding

Another important category that was developed from the transcripts of the novice entrepreneurs is that of market understanding. As Mullins and Sutherland (1998) explained, market understanding demands efforts that are directed towards the understanding and identification of consumer wants

and needs, as well as market size, likely competitive conditions and likely future revenue generation.

Novice 5 acknowledged that understanding consumer needs and preferences is critical. Consumers want choice in order to make informed decisions, as per Novice 5's claim:

“They like to compare things. They want to see this product and that product; they want to see and compare before they make a real purchase”.

Consumers also want referrals to come from family and friends rather than from unknown sources *“What I have noticed now is that people want convenience, they want options - they want referrals from friends and their families”*. According to this novice, consumers are more likely to purchase a particular brand's products if they get a recommendation from a family member or friend, rather than from a company's marketing campaigns.

Novice 5 emphasised the importance of understanding consumer needs and wants when it comes to the development or supply of products. He explained that he would provide consumers with products that match their needs. In other words, Novice 5 is interested in providing consumers with products that are aligned to preferences. This is reflected in his statement:

“I want to sell a product because it's needed; because they want the product, because the product works for them - they need it! That's the kind of a product I'm talking about”.

- Consumer-centric product

In essence, new product development is characterised by processes that are intended, in part, to address the critical issues of market understanding. These processes incorporate strategic planning – including opportunity identification, idea generation, evaluation, product development and commercialisation (Mullins & Sutherland, 1998).

When discussing new product development, the entrepreneur emphasises the need for product relevancy. That relates to the question of whether the user possesses the necessary intellect or skill to use the product being developed. Novice 5 commented:

“I look at the relevance of the thing that if I do this, is it relevant? Are these people capable? Is the skill there for them actually to use this or possess or actually get benefits from what I am developing”?

New product innovations can be viewed in terms of agents of change. That is, novel innovation is likely to bring about a change in consumer behaviour. Novice 5 noted this in his comment: *“basically you are going to transform how people use things”*.

Novice 5 explained that product development has to be alignment with a consumer need or preference because it is the consumer who will determine whether your product is successful or not.

- Known and unknown markets

Novice 5 differentiated between known and unknown markets and market segments. Known markets refer to markets that already exist and do not need to be created. Because the market is known, consumer behaviour and preferences can be forecast. As commented by Novice 5: *“I mean these people, we know exactly where they are. We just have to be where they are”*.

Thus, according to Novice 5, in the case where the market is known, that is, there is an existing consumer base for the product being developed, it is important for the product to be made accessible to the consumer. As Novice 5 explained,

“Put whatever product you have in front of the people like, where there is a pool of people”.

Novice 5 stated that the market is unknown when the entrepreneur is developing a novel product, one that is new to the market. In these cases the entrepreneur does not have market statistics because it is likely that the novel product will result in the creation of a new market. Novice 5 stated:

“But there is a problem, so if there is a problem somehow, there should be a market; and if your product, your solution solves whatever problems very well, then I think it will eventually create its own market”.

7.2. ANALYSIS OF NOVICE ENTREPRENEURS' COMPOSITE COGNITIVE MAPPINGS

The data analysis of novice transcripts elucidated several key constructs from the novice entrepreneur interviews, which have been discussed with relevance to the emerging theoretical construct. The main constructs from the individual novice entrepreneurs' cognitive mappings were combined to produce a composite cognitive mapping. The novice entrepreneurs' composite highlights the theme that has emerged from amalgamating the individual mappings. These are illustrated in Figure 8.6 below.

7.2.1. Change indicators

Novice entrepreneurs perceive opportunities by analysing emerging trends. They look to exploit a trend by creating novel products that will cater for an identified change in consumer behaviour arising out of an emerging trend. In other words, novice entrepreneurs seek out change indicators when perceiving potential business opportunities.

7.2.2. Product innovation-driven

The researcher's data analysis indicates that novice entrepreneurs examine consumer behaviour to discover a customer segment that they want to cater for. The novice entrepreneur then focuses their efforts on creating an opportunity for that consumer segment.

The market environment that a new product is launched into has bearing on the type of innovation necessary for success. Often, new firms entering highly dynamic unstructured new markets are required to do so with novel or radically altered products (Honig, 2004).

From his examination of product launch literature, Benedetto (1999) noted that the two broad categories of decision-making in a new product launch are strategic and tactical launch decisions. Strategic decisions are concerned with product and market issues, that is, decisions around product innovation and target market segments (Benedetto, 1999).

7.2.3. Supply-demand linkages

The novice transcriptions revealed that novice entrepreneurs attempt to establish some level of alignment between the product being developed and the consumer channel that would be used for distribution of the product.

Literature on consumer behaviour and marketing suggests that while consumer choice models may provide insights into a consumer's adoption or use of a particular channel, it is more important to consider consumer and product-channel interactions in which the characteristic of the product and consumers' motivation have influence on the channel that is considered (Jo Black, Lockett, Ennew, Winklhofer & McKechnie, 2002).

In this regard, Morrison and Roberts (1998) emphasised the significance of establishing product channel interactions, particularly with regard to new channels for distribution of consumer products. They stated that while consumer preference for the distribution channel is important, its influence is secondary to the degree of congruence between the product and the distribution channel when evaluating the factors influencing a consumer's decision to adopt a channel for a purchase.

The novice attempts to maintain consumer engagement by using consumer channels that allow for the perpetuation of consumer behaviour. Perpetuation generally implies continuation or prolongation. Parrish (2010) introduced the concept of resource perpetuation to explain sustainability-driven entrepreneurship.

According to Parrish (2010), conventional entrepreneurship is based on the notion of resource exploitation. That is, resources are used in a manner that ensures maximum financial return in the shortest possible time. In contrast, sustainability-driven entrepreneurship is based on the notion that revenue streams are produced through the perpetuation of resources, which means that a sustainability-driven business uses its resources in a manner that enhances and maintains the quality of their functioning for the longest time possible.

Applying that logic to behaviour perpetuation suggests that a product or a product channel needs to enhance and maintain the quality of a consumer's behaviour for the longest time possible in order to perpetuate that behaviour. More specifically, the novice entrepreneur attempts to obtain congruence between attributes of the product and the product channel used for distribution in order to perpetuate particular consumer behaviour.

7.2.4. Consumer engagement

By definition, since novice entrepreneurs have not been involved in any previous business ventures, they would have limited knowledge and expertise in taking a product to market. Marketing as a strategy involves several processes including market segmentation, targeting of prospective consumers and the positioning of products and services so that they are focused on appropriate consumer groups (Stokes, 2000).

These processes for the novice entrepreneurs, involve significant uncertainty. By understanding consumer behaviour and gaining insights into new consumer behaviours, novice entrepreneurs can to some extent manage some of the uncertainty related to the 'go to market' process.

Stokes (2000), in his examination of entrepreneurial marketing, noted that entrepreneurs tend to target markets through 'bottom-up' self-selection and recommendations of customers and other influence groups. This process is in contrast to the traditional 'top-down' marketing that is conceived as a deliberate, planned process that assumes careful identification of consumer needs

happens through formal market research. This process in turn leads to structured development of new products and services in response to those needs (Stokes, 2000).

Evidence suggests that entrepreneurs practising 'bottom-up' consumer targeting begin by servicing the needs of a few consumers and then expanding the consumer base gradually as experience and resources allow (Stokes, 2000). This is noted from the interview transcripts in which one novice entrepreneur commented:

"Niche is very important, without a niche there is no business. What are you doing this for; for whom? It has to be up to the market".

In addition, as another novice entrepreneur mentioned:

"First, is there enough market for this business. That's what I basically look at first like, a niche market"; and "I want this niche market, I want this particular market - I put a focus on that".

The advantage of a 'bottom-up' consumer targeting over traditional 'top-down' process is that it requires fewer resources, and is more flexible and adaptable to implement (Stokes, 2000). This befits the novice entrepreneur who has fewer or more limited resources to work with, than an expert entrepreneur.

7.2.5. Consumer orientation

A key element of the novice entrepreneur's opportunity recognition process is that the novice attempts to compensate for lack of prior knowledge and for lack of resources – financial and human resources, by adopting a consumer or market orientation when bringing a new or novel product to market.

The analysis of the novice transcripts and the emerging constructs suggests that the novice entrepreneur seeks to create or supply a product that finds orientation with the consumer needs and preferences. From this it is apparent that the novice entrepreneur can adopt a market or consumer orientation. Product innovation then in the context of a consumer orientation implies that products are created with attributes that are meant to integrate with consumer needs.

Organisational and management literature suggests that a consumer focus encompasses orientating the activities of a business in order to satisfy consumer needs and preferences (Ruekert, 1992). It is important because, as pointed out by Gatignon and Xuereb (1997), a consumer orientation emphasises the identification of possible markets when determining the appropriate commercial applications for a technological breakthrough.

Additionally, a consumer orientation helps the firm better understand the market's technical issues and provides an evaluation of possible market segments and of their growth rate (Gatignon & Xuereb, 1997). Leading scholars in marketing literature agree that a market orientation is fundamentally an adaptive capability by which an organisation responds to changes in the market environment (Atuahene-Gima & Ko, 2001).

Atuahene-Gima and Ko (2001) stated that a market orientation describes the orientation of an organisation towards collecting, disseminating, and responding to market intelligence in order to better serve customer needs; which in turn engenders product innovation behaviours that focus on understanding the articulated needs of customers.

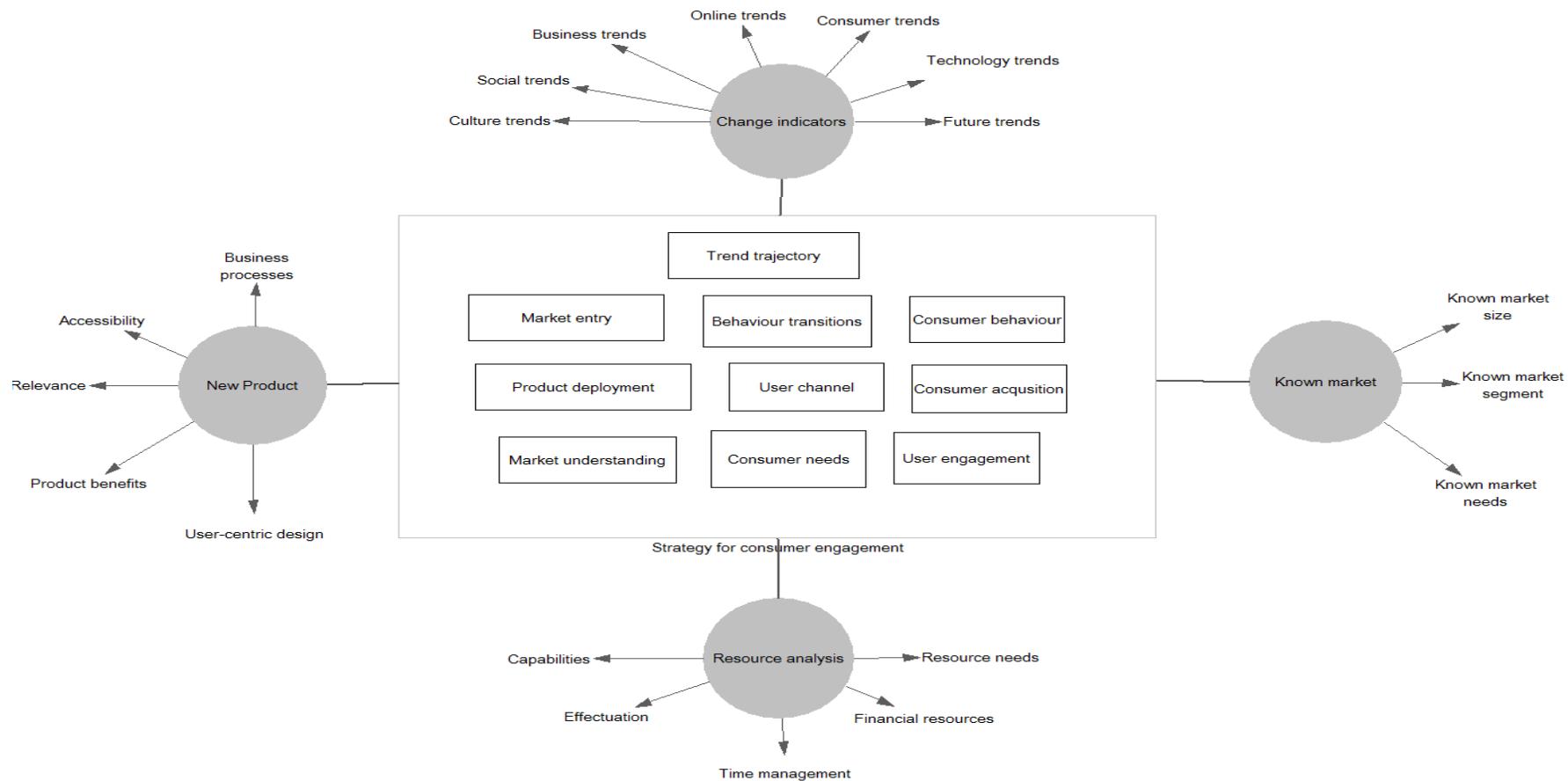


Figure 7.6: Composite cognitive mappings of novice entrepreneurs

The starting point of a market orientation is intelligence generation, otherwise known as market intelligence (Kohli & Jaworski, 1990). Market intelligence relates to information generation about consumers' needs and preferences, including an analysis of the exogenous factors that influence those needs and preferences (Kohli & Jaworski, 1990).

According to Kohli and Jaworski (1990), the three core 'pillars' of market orientation are (i) consumer focus, (ii) coordinated marketing, and (iii) profitability, of which the central element is consumer focus. Harrison-Walker (2001) conceptualised market orientation as consisting of two components: a customer orientation and a competition orientation. However, since competitive strategy is synonymous with the term strategic orientation, Harrison-Walker's (2001) conceptualisation of market orientation can be viewed as consisting of a consumer orientation and a strategic orientation.

Ruekert (1992) offered a view on market orientation from the perspective of strategy development and execution. Ruekert (1992) defined market orientation as the degree to which a business collects and uses information about consumers; develops a strategy to meet consumer needs and wants; and implements the strategy by being responsive to consumers' needs and wants.

In other words, a market orientation can be viewed as the degree to which there is alignment between consumer orientation, the development of a consumer-focused strategy, and the ability to execute and implement a consumer-focused strategy.

7.3. ANALYSIS OF EXPERT INTERVIEWS

The sample of experts consisted of successful entrepreneurs who had more than ten years of business experience and who had experienced one or more business exits.

7.3.1. Expert entrepreneur 1

The first expert entrepreneur, a 40-year-old male, started his first business when he was ten years old. Since then, he has founded more than ten business ventures, four of which turned out to be successful exits.

Charmaz (2006) suggested that researchers remain open to exploring whatever theoretical possibilities they can discern in the data and their initial coding should to the degree possible, stick closely to the data. The researcher should strive to see actions in each segment of data rather than applying pre-existing categories to the data, and where possible, code data as actions.

As with the first novice entrepreneur, several initial codes from the transcripts of the first expert entrepreneur stood out. These codes in turn directed the researcher to the areas that were explored during subsequent data collection. As with the constant comparative method embodied in

the grounded theory methodology, the incidents discussed in the first interview were then compared with the codes for the second expert entrepreneur and so forth until saturation was reached.

In comparing the expert entrepreneur to the novice entrepreneur, the researcher noted that unlike the novice entrepreneurs, the first expert entrepreneur commenced his evaluation of the business case study by first attempting to obtain a holistic overview of the environment. Expert 1 started off by stating: *“Well let’s start with the big picture over here”*.

This process of first obtaining a holistic overview and viewing opportunities as composing part of a broader system was reaffirmed later in the interview when Expert 1 stated:

“So reading through this, from the big picture, basically this article is saying [...]”.

- Critical analysis

The researcher noted that the expert had a more focused approach to opportunity identification than that of the novice. This was based on the expert’s insights of the business case. The expert began in a very structured manner, first providing a holistic overview of the business case and then focussing his insights on where the challenges and opportunities were evident. The novice entrepreneur in contrast, did not follow any particular structure in his explanations of the business case.

For instance, even though the expert started off by obtaining a holistic overview of the business case, he used both comparative analysis and categorisation to distil through the various opportunities so that he could critically analyse an opportunity to understand where the inherent business challenges as well as the “positives and negatives” of the opportunity reside.

Hunter (2014) offered a perspective of critical thinking as that which embodies reflection and practicality. According to him, critical thinking entails thinking about a situation at several different levels with the objective of coming up with reasonable and practical decisions about what to do and how to do it.

Because experts have wide-ranging business experiences, they tend to be a lot more critical about business opportunities. As Expert 1 acknowledged:

“I think the hard thing for me is that because I have experienced all of this already, I am a lot more critical about what will work and what wouldn’t”.

The expert thinks critically about the various opportunities because it assists the entrepreneur in understanding the type of execution challenges that exist for each potential business opportunity. In this regard, Expert 1 reflected,

“I think a lot of people look at this and go wow there are so many unbelievable opportunities. I think because I understand every one of these businesses that are mentioned here so well, I know how difficult it is to launch those types of businesses”.

It is evident from the statements by Expert 1 that a hallmark of expertise is the ability to analyse a potential opportunity in relation to the challenges involved in executing that opportunity. The experts identify opportunities by first understanding where the execution challenges for the opportunity reside and then they consider the different possibilities for overcoming these challenges so as to make a success of the opportunity.

In other words, the expert views an opportunity in relation to the challenges prevalent in the opportunity. In some cases, the opportunity arises from understanding how to overcome the perceived execution challenges. This is supported by Expert 1’s statement:

“I am thinking to myself, I already know how difficult it is to penetrate China, different language, etc.; how can I make money out of that opportunity?”

Hence, although ideas for a business venture are directed from an identification of market size, the opportunity arises from an understanding of the business and market entry challenges involved in executing a particular opportunity. The expert is constantly assessing various business models to ascertain which model would work in a particular market. Expert 1 explained:

“So even though I was appreciating that there is unbelievable opportunity and the same thing with Brazil, both of these places don’t really speak English, they got different culture, and so it has to be a different type of business model to be able to monetise that”.

- Prior experience

The ability to critically analyse opportunities mainly emanates from the possession of prior knowledge. The possession of prior knowledge is an important factor in an expert’s ability to identify not just an opportunity, but also the challenges that are associated with that type of opportunity.

The importance of prior experience is clearly highlighted in entrepreneurship literature where several empirical studies have provided support for a positive relationship between prior knowledge and opportunity recognition (Dimov, 2007a).

For instance, King and Tucci (2002:186) noted that while some researchers argue that experience with existing markets causes managers to miss market entry opportunities, there is support in the literature that prior experience with market entry can reduce the cost of identifying future profit opportunities by reducing search costs.

Thus, while the primary factor influencing Expert 1's pursuit of opportunities is the market opportunity, prior experience is important as it assists the expert in differentiating between opportunities and provides him with an understanding of where the inherent execution challenges are. This is indicated in Expert 1's statement:

“But I think what works over here for me is that not only is there market size, but I have background experience. So that makes it a lot more interesting and appealing. Because I understand in terms of the big potential market, what could and can't work”.

As noted by George and Bock (2012), experience and expertise form the primary contextual elements in addressing novel opportunities. Hence, domain knowledge is an important factor in opportunity recognition.

However, where there is uncertainty about the knowledge domains from which potentially useful information may emerge, knowledge diversity rather than domain-specific knowledge may be more beneficial to an individual. Cohen and Levinthal (1990) suggested that a diverse background provides a more robust basis for learning because it increases the prospect that incoming information will relate to what is already known. Furthermore, knowledge diversity also facilitates the innovative process by enabling an individual to make novel associations and linkages (Cohen & Levinthal, 1990).

- **Categorisation**

Expert 1 broke down the business case into categories of opportunities as he proceeded to identify and differentiate between the various business opportunities that were evident to him. He used several different criteria to differentiate between opportunities, including differentiation on the basis of business models and market segments. Once he had filtered through the various opportunities, the expert then evaluated which opportunities had the most favourable potential for generating revenue and deriving a profit from.

The researcher noted that that the expert entrepreneur used a process of categorisation to differentiate between different opportunities; implying that expert entrepreneurs make extensive use of category structures.

Category structures have been found to be particularly germane in understanding the accumulation of knowledge and their use to differentiate between objects is well documented in literature (Alba & Hutchinson, 1987). Categorisation starts off with basic level categories, which are the first categorical structures that are learnt in a given domain. Increased domain familiarity results in an individual's ability to categorise objects at levels above and below that of the basic level (Alba & Hutchinson, 1987).

Categorisation below the basic level simply means finer discriminations can be made with greater reliability; while the ability to categorise above the basic level occurs as expertise increases in a domain and there is a shift to categorisation from 'surface structure' to 'deep structure' categories (Alba & Hutchinson, 1987).

Alba and Hutchinson (1987) suggested that, when their need is general, the development of categories above the basic level should permit experts to consider a more heterogeneous set of alternatives than do novices. Conversely, when their need is relatively specific, the development of categories below the basic level should permit experts to consider a more homogeneous set of alternatives than do novices.

Research conducted on experts and novices in various domains has shown that experts tend to categorise problems in terms of principles or functions while novices form categories based on superficial features (Hoffman, 2014). Furthermore, research on expertise suggests that "categories are important to knowledge representations because they enable generalisations to be made about category members and because they facilitate search through a knowledge base by grouping facts" (Hoffman, 2014).

Thus, categorisation plays an important role in the expert's interpretation of opportunities. As Thomas, Clark and Gioia (1993) pointed out "interpretation involves the development or application of ways of comprehending the meaning of information; it entails the fitting of information into some structure for understanding and action".

It is worth mentioning that categorisation is equally important in strategic decision-making. According to Thomas *et al.* (1993), "meanings attached to strategic issues are often the result of the categories that decision makers use". This is because, "when decision makers use particular labels to describe a given issue, the labels initiate a categorization process that affects the subsequent cognitions and motivations of the decision makers" (Thomas, Clark & Gioia, 1993).

- Business fundamentals

Another notable difference when comparing the novice entrepreneur to that of the expert, is that while the novice entrepreneur attempts to identify a business opportunity for a novel product

through the analysis of change indicators, the novice places little to no emphasis on important business fundamentals. The expert on the other hand, places significant emphasis on the size of the market and the exit potential of the business opportunity.

Another key concept of opportunity that was elucidated from the experts' transcripts was that of value creation. Value creation is largely related to the size of the venture. That is, once experts identify that there is an opportunity based on market size, they use their prior experience to distil the various opportunities. After settling on a particular opportunity, they then look to see how they can create value for this opportunity.

Experts also have an exit strategy in mind and growth strategy for building the venture to a size that will make it attractive for purchasers. Hence, one factor that determines whether an expert decides to pursue an opportunity is the market size of the opportunity because this determines the venture size and exit strategy. As Expert 1 reflected:

“[...] and if you are going to create value, you want to do it in an industry where there is big potential to make money”.

The experts examine an opportunity in terms of the resources that they would need to commit to make that opportunity successful. Resources in this respect refers to both financial resources and time. Expert 1 claimed that:

“So there is a certain level that if we are going to be putting a year or two of our lives into something, we want there to be a potential market size opportunity at the end of it. And so I think it is important to look at that”.

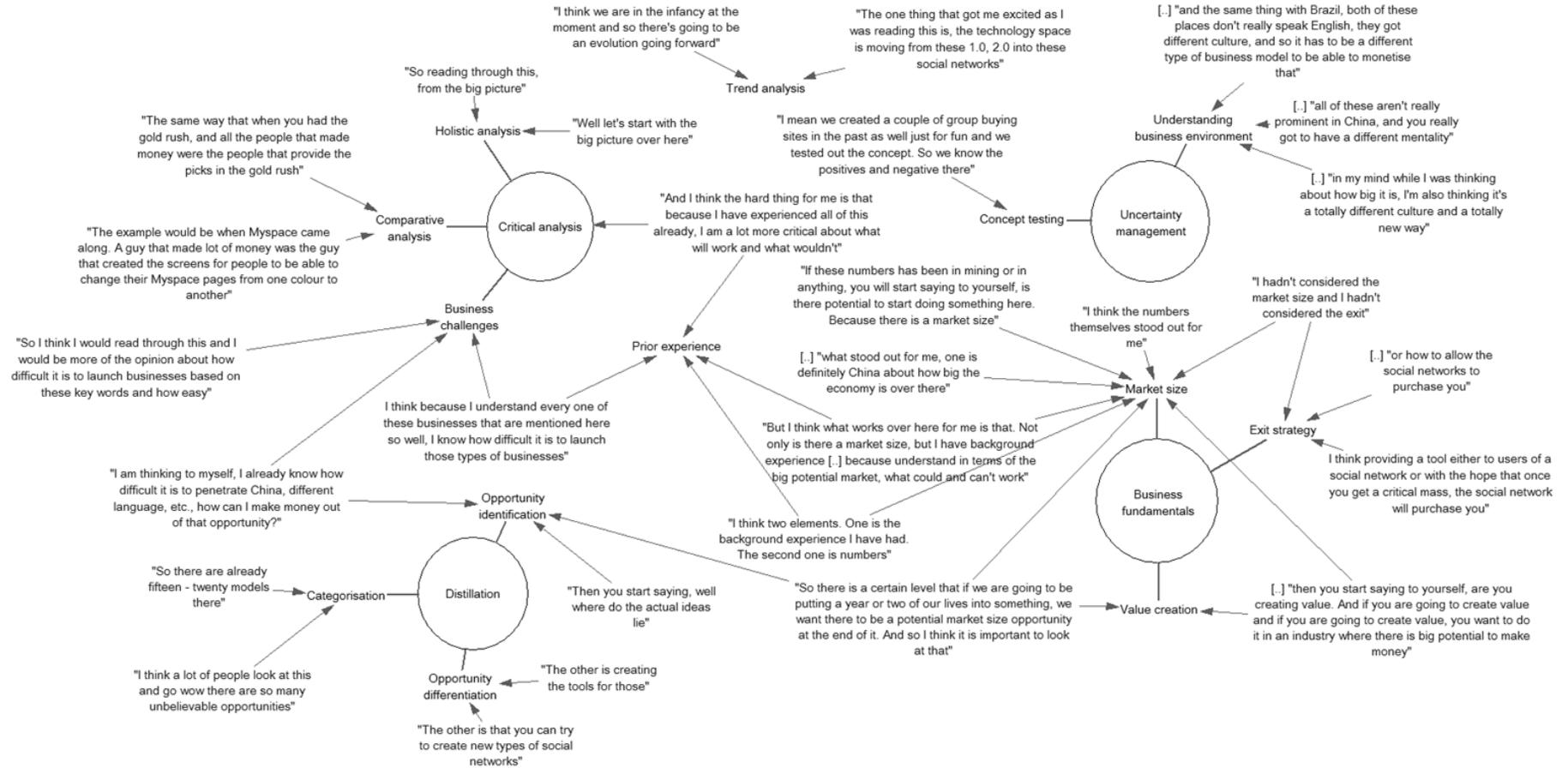


Figure 7.7: Cognitive mapping of Expert 1

7.3.2. Expert entrepreneur 2

Expert entrepreneur 2 was a 36-year-old male who started his first business when he was 19 years old. In total, Expert 2 was involved in four business ventures of which he had liquidated one business and successfully exited another.

In comparing the first and second entrepreneurs, the researcher noted that both experts started off by scanning the business environment so as to obtain a holistic overview and generate a central hypothesis about the business case. This is reflected in Expert 2's statement: "*So this is painting a backdrop of a massive industry - a massive change in the way people are approaching business*".

As with the first expert, a key factor in the expert's analysis of the business case was to be able to identify where the inherent business challenges existed for a potential business opportunity. Once the expert had critically analysed the business environment, he then proceeded to filter potential opportunities in order to clearly differentiate between different categories of opportunities and business models.

- Distillation

The process of 'breaking down' the business case study into different opportunities, markets and business models has been termed as distillation. Distillation subsumes the sub-categories of opportunity differentiation and categorisation and it is an important factor in opportunity identification.

Distillation assists the expert in identifying and differentiating between various opportunities. It is thus through distillation that the expert attempts to find a 'fit' with the mental model or cognitive template that they have for business success and for opportunity recognition. That is, the expert constructs a simplified working model of reality – a 'mental model', which in turn acts as a basis for their strategic decision-making (Hodgkinson, Bown, Maule, Glaister & Pearman, 1999).

Thus, distillation can be explained in terms of cognitive science as a cognitive simplification process. Cognitive simplification is a process that an individual utilises to 'structure' the world into a more manageable form (Pellegrino & Carbo, 2001). When faced with an uncertain and ambiguous situation, cognitive simplification through the use of mental models is a particularly useful process that allows an individual to apply structure to a situation they are considering (Pellegrino & Carbo, 2001).

As Expert 2 explained:

“It’s about trying to distil the idea and the concept quite clearly, you know. It’s about asking the simple questions that need to be answered and you need to be brutally honest about when you have the idea”.

While experts are dependent on a basic formula for opportunity recognition, they are unable to fully articulate the different components of the business formula that they use to distil opportunities, which indicates a strong tacit component that is evident in other domains of expert research.

Once the expert identifies a market opportunity, they then look to obtain a fit between the opportunity and their perceptions. Opportunity fit in the context of this study refers to the fit between the opportunity and the expert’s schema or cognitive template for business success. Opportunity fit is attained through filters that mediate between the opportunity and the expert’s cognitive map for business success.

In the case of Expert 1, the mediating factor for attaining opportunity fit is ‘opportunity challenges’, that is an understanding of the challenges involved in executing on a particular opportunity. This understanding is mainly guided by the possession of prior knowledge in that particular sector. Therefore, in the case of the first expert, his filters developed from mainly understanding the challenges involved in executing a potential business opportunity. With the second expert, his filters derived from the application of the business formula that he used to assess the opportunity for potential of success.

- Business filters

Although the expert begins the opportunity identification process by analysing an opportunity from a holistic perspective, important resources available to the expert are the rules and principles they have accumulated through years of entrepreneurial experience. Thus, once an expert has obtained an overview of the situation, they then revert to basic business rules and principles that have been accumulated with experience as a key filtering system in their identification of opportunities. This is evidenced in Expert 2’s statement:

“I have always been a firm believer in that it doesn’t matter what you do so long as you focus and do that thing properly; and you use the same rules in that environment”.

It is apparent that one of the central techniques in the opportunity recognition process of the expert is the application of a simple set of basic rules or principles, which the expert then utilises as a basis for making decisions about the identified business opportunity.

Expert 2 reiterated:

“I think success is very much about focussing on the simple principles of the opportunity”.

The ability of an expert to develop these basic rules is linked to the expert’s prior experience in a domain. Expert 2 stated: *“And you know, you hit your head and you make mistakes and so you start to evolve parts of this formula in the puzzle and it just suddenly clicked one day, and I thought gee you know; I understand now what it’s all about”*. Hence, prior experience assists the expert to quickly view an opportunity from the perspective of the necessary business fundamentals.

At the core of the expert’s business rules are success and value creation. In other words, the expert’s business rules are strongly aligned to basic business fundamentals for success. For instance, Expert 2 indicated that one of the basic rules or principles of a business is that it has to make money. If it is not profitable, the business is likely to fail. Hence, one of the factors that the expert uses in his basic principles is that of profitability. As Expert 2 stated:

“A business must have a profit motive otherwise it’s not running on the right principles even if you chose that profitability to be 2 % or breakeven”.

The expert entrepreneur therefore has an opportunity filtering system that can be described as a formula for business success. In other words, the expert filters potential business opportunities on the basis of finding alignment with the key fundamentals for business success. Key properties of this business formula for success are value creation, profitability and business health.

7.3.3. Expert entrepreneur 3

Expert entrepreneur 3 was a 36-year-old male who had been involved in nine start-up businesses. He had one acquisition that had to be turned around and ‘taken to the next level’; and at the time of the interview, he was in the process of exiting his current business.

- Cognitive filtering

A developing theme in this research is that expert entrepreneurs appraise potential opportunities through a process of filtration. Further evidence of this is provided by Expert 3 who stated early on in the interview that:

“I see these ideas through a filter that’s applicable only to me and I guess our lives and if the ideas don’t meet the filter, then I’m not interested”.

Beratan (2007) suggested that in order to cope with complexity, an individual requires the ability to strategically filter the sizeable quantity of available information, and then integrate the key information into some sort of implicit or explicit predictive model. He described this ability as strategic filtering.

Cognitive filtering is about finding a ‘fit’ with a specific model that the entrepreneur has of an opportunity, as reflected in Expert 3’s statement, which also displays the idiosyncratic nature of the opportunity recognition process and confirms what researchers have already established, which is that opportunities look different to different people (George & Bock, 2012).

Expert 3 indicated that he constantly generates ideas for new businesses and is fascinated by people and ideas. McGrath and MacMillan (2000) noted that serial entrepreneurs constantly seek new opportunities, which they claim is one of the defining characteristics of serial entrepreneurs.

Before an entrepreneur can exploit the value inherent in their product or service offering, they first need to identify at least one market domain in which their offering meets customer demand. Since technologies are configurable to serve a variety of different markets, it is possible for a technology entrepreneur to identify multiple market opportunities before they choose to enter a market (Gruber, MacMillan & Thompson, 2008).

McGrath and MacMillan (2000) suggested that serial entrepreneurs have cognitive frameworks which they term opportunity registers. It is these opportunity registers against which a serial entrepreneur assesses each opportunity. Gruber *et al.* (2008) extended on this view by providing evidence that serial entrepreneurs construct a larger choice-set of market opportunities than novices do.

The obvious benefit of identifying multiple market domains is that the entrepreneur would be able to generate a choice set of opportunities before market entry and therefore they would be able to select the most favourable market conditions for new firm creation (Gruber, MacMillan & Thompson, 2008).

Hence, before deciding on a potential opportunity, expert entrepreneurs construct multiple business opportunities which they then critically evaluate through a process of filtering. In this regard, Expert 3 stated, *“I have to force myself to be critical of opportunities and I will be honest that I am, and I don’t do it intentionally, but I’m definitely less critical if the idea is mine and that’s not a good thing”*. Once an idea has passed through the expert’s filters as determined by the expert’s model of opportunity, only then would the idea be considered as a potentially viable opportunity.

From the transcripts of the experts, the researcher noted that the expert entrepreneur screens potential business opportunities against a ‘template’ for success that the expert has developed over years of business experience. This ‘template’ has been referred to by the experts in a variety of expressions such as business filters, rules or principles, and business formulas.

From Figure 8.10 it is apparent that the expert critically analyses the business environment as he distils or filters through potential business opportunities. Unlike the novice, the expert desires certain outcomes from a business opportunity and utilises a set of rules or business formula for arriving at these outcomes.

As evidence of this, some of the extracts from Expert 3’s transcripts illustrate his utilisation of a business ‘template’ for distilling opportunities:

“So I have certain filters like often a business that seems good enough for someone is not good for me because it can’t be big enough”.

“If I’m going to start a lifestyle business, they have to meet these rules or get as close as possible”

“[...] but actually I think her ideas are good but, they just don’t fit my rules”.

As with previous experts, the researcher noted that Expert 3 places significant emphasis on understanding the business challenges involved in a potential opportunity or industry. The identification of business challenges is aligned with both opportunity identification as well as opportunity execution.

The application of the expert’s business rules or formula for success is aligned with the expert’s desired outcomes. For instance, Expert 3 commented:

“There’s not a lot market there so you’re not going to create a big business there so it hits my not filter [...] but it never going to be a big business so that’s, because the market isn’t there”.

The main factor in the expert’s formula for success is that the potential opportunity should meet the business fundamentals of profitability, value creation, and scale. That is to say that the market size for a potential opportunity should be large enough for the business to scale.

A key desired outcome for the expert is value creation. For the expert, any potential business opportunity must make ‘business sense’ in that it must generate revenues and profits, it must be able to scale to become a big business and it must at some point, be able to exit.

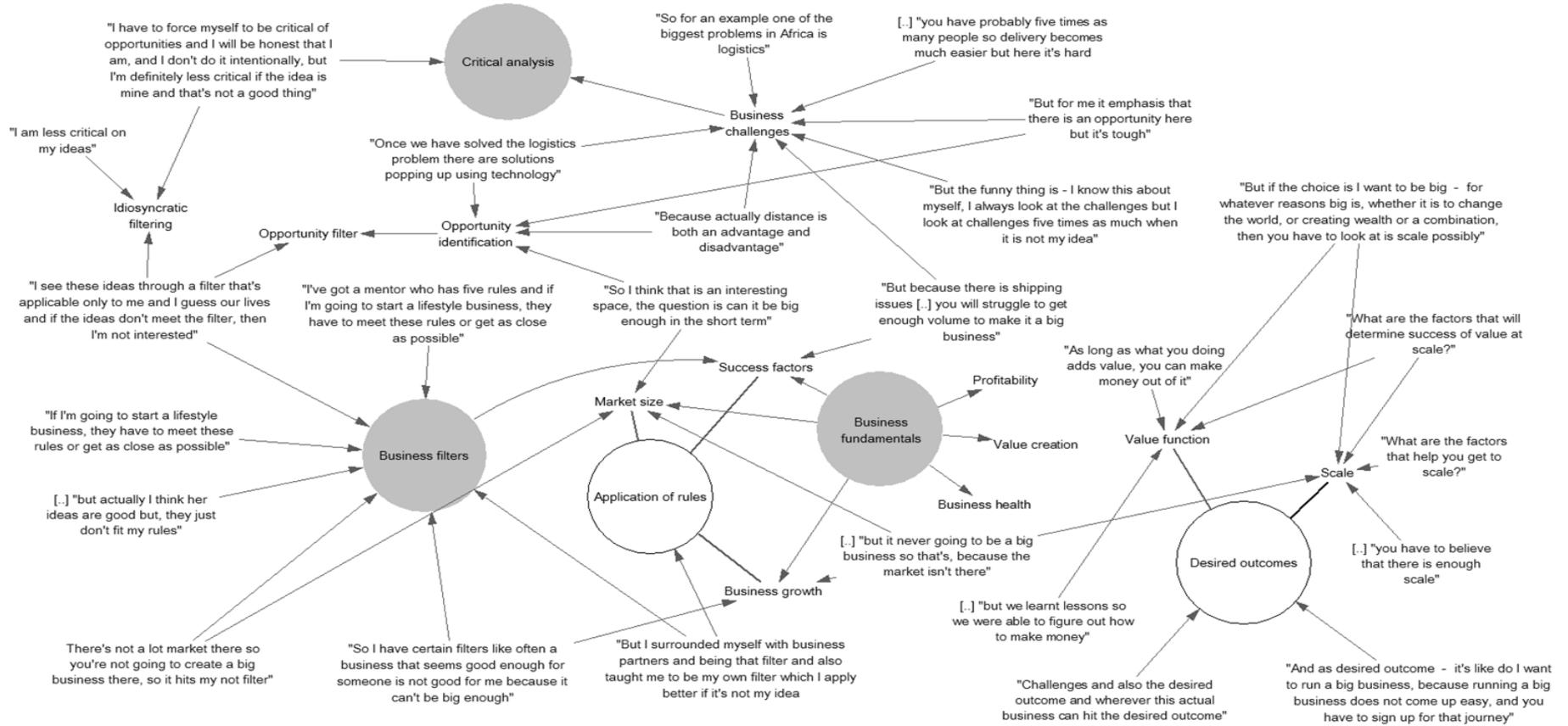


Figure 7.9: Cognitive mapping of Expert 3

7.3.4. Expert entrepreneur 4

Expert entrepreneur 4, a 56-year-old male, started his first business at the age of 28. At the time of this interview, he had been involved in five business ventures of which he had already exited two. He exited his first business for 52 million (ZAR) in 2010. Due to a confidentiality contract, he could not specify the exact amount of his second exit but the exit was well over 100 million (ZAR).

- Strategic decision rules

In comparing incidents from the previous experts with that of Expert 4, the researcher concluded that the application of the expert's template or formula for success is closely linked to his strategy for market entry. This is evident from the manner in which Expert 4 commenced his interview, which was by examining the business case from a strategy perspective. He indicated early on:

"I am not sure whether you are familiar with the red ocean and the blue ocean scenarios. I think what we have now is a fairly red ocean so you will have to come up with something that is quite unique".

A common thread in the analysis of the experts' transcriptions is that expert entrepreneurs view opportunities through filters, which essentially are a basic set of business rules or principles for success. In developing this construct, the researcher found that the application of these business rules or principles takes place from a strategy point of view. That is to say that the expert examines a potential opportunity from the perspective of finding an alignment with the opportunity and the business environment.

Further evidence that the expert applies basic rules when evaluating an opportunity is provided by Expert 4's statement: "*My golden rule is always that if you cannot compete in a category, create a new category*". Hence, Expert 4 applies strategic rules to analyse the competitive space, as indicated by his statement: "*I think that the current space now is so crowded, you will have to think long and hard to come up with a brilliant idea*".

No matter what type of opportunity the expert decides to act upon, a fundamental strategic rule to the expert's decision-making is that the opportunity must result in a business that will be profitable or will be able to generate revenue. In other words, the opportunity must create utility for the entrepreneur. Utility outcome is thus a key driving factor in the recognition of opportunities for expert entrepreneurs.

This rule resonated throughout the interview with Expert 4, as well as in the incidents of the previous experts. For example, Expert 4 stated on one occasion that: "*It must make absolute business sense and it must have the potential to generate money*"; while on another occasion he claimed: "*You have to make money and it has to be self-sustainable*".

Hence, even when identifying an opportunity that entails creating the supply- and/or the demand-side of an opportunity, a central theme is that of profitability and sustainability, as indicated by Expert 4's comments:

"I like new stuff; I like to shape a new environment, a new category if I can. Obviously, it must be profitable".

- Product innovation

Expert entrepreneurs do not attempt to compete in an over-crowded market; instead, they look to create a new market by working toward creating an opportunity. Entrepreneurship literature refers to opportunity creation as when "neither supply nor demand exists in an obvious manner and one or both have to be created" (Sarasvathy, Dew, Velamuri & Venkataram, 2003). This is evident from Expert 4's reiteration:

"I think a business needs to first establish whether there is a real market opportunity and sometimes it's not always a need that exists. Sometimes you have to create a need".

A key factor in Expert 4's opportunity creation is to develop an innovative product that leads to market disruptions. Expert 4 stated: "*The disruptiveness for me is something that is very, very attractive*". The researcher however, noted that the expert makes decisions about opportunity creation in terms of strategy.

The link between strategic thinking and opportunity creation is reflected in Expert 4's statement:

"I think once again, disruptiveness is almost synonymous with Blue Ocean ventures [...], I mean the chance that you will find a disruptive technology in a Red Ocean is fairly small I think. It's normally Blue Ocean stuff that causes disruptiveness".

- Situational discriminations

Although opportunity creation involves significant uncertainty, the researcher found that the expert entrepreneur has a strategy for bringing an innovative product to a new market. This strategy involves reducing and managing uncertainty, as reflected in Expert 4's statement:

"[...] But obviously, get rid of the fluff; make it as digestible as possible. In other words, take all the uncertainty that you can get rid of".

Dreyfus and Dreyfus (2005) maintained that the ability to make more subtle and refined discriminations is what distinguishes the expert from the non-expert. They referred to this ability to differentiate between various opportunities and situational aspects as situational discriminations.

Through prior experience in a variety of situations that appear similar with respect to plan or perspective, the expert has learnt to distinguish between situations requiring different tactical decisions.

Dreyfus and Dreyfus (2005) attributed situational discriminations to the expert's ability to gradually decompose a class of situations into subclasses, each of which requires a specific response. This in turn, allows the immediate intuitive situational response that is characteristic of expertise. An example of this is noted in Expert 4's statement:

“So get rid of all the fluff and then you end up with these and the uncertainties and there I relied on ‘gut-feel’”.

One factor impacting situational discriminations is an individual's information processing capabilities. Complex situations involve a number of elements that have different information-processing requirements (Hayes & Allinson, 1998). Furthermore, in addition to different information-processing requirements, the various types of situations prevalent in an ever-changing environment are likely to make different information-processing demands on an individual.

Therefore, individuals who process information in ways that fail to recognise important changes in their situation, may fail to modify the way they use their skills and knowledge (Hayes & Allinson, 1998). As an example, Hayes and Allinson (1998) differentiated between analysts who adopt a sequential, step-by-step approach to processing information and intuitives who adopt a global perspective, and emphasise synthesis and the simultaneous integration of many inputs.

Sampling for this study concluded at expert 4 and novice 5. In a grounded theory study, theoretical sampling and theoretical saturation together determine the sample size. Theoretical sampling is used to select new research participants who are likely to refine the emerging theory. Sampling stops when the researcher has reached theoretical saturation and there is no new information surfacing from the participant's narrative (Auerbach & Silverstein, 2003).

As explained by Auerbach et al., (2003), you stop increasing your sample when each new group of participants tells you the same story that previous groups have told. Another way of saying this is that you continue interviewing more participants as long as you are learning new information about your research concerns. When you reach the point where you are hearing the same information over again, you have a large enough sample. At this point, new samples will not contribute anything more to your theory and the study has reached theoretical saturation (Auerbach & Silverstein, 2003).

In this study, theoretical saturation was achieved with the novice group when the researcher noted that novice 5 had nothing new to add the study. His transcripts, while providing insights into new

product development and the understanding of consumer needs, added nothing more towards explicating the novice entrepreneurs' decision-making modes or the supply-demand paths that novice entrepreneurs instituted during opportunity conceptualisation.

In terms of expert group, sampling stopped at expert 4 because the researcher had reached the point where he had sufficient information for advancing the emerging theory. The researcher realised that theoretical saturation had been reached when expert 4's transcripts largely confirmed the key constructs in the emerging theory that was derived from the analysis of the previous experts' transcripts.

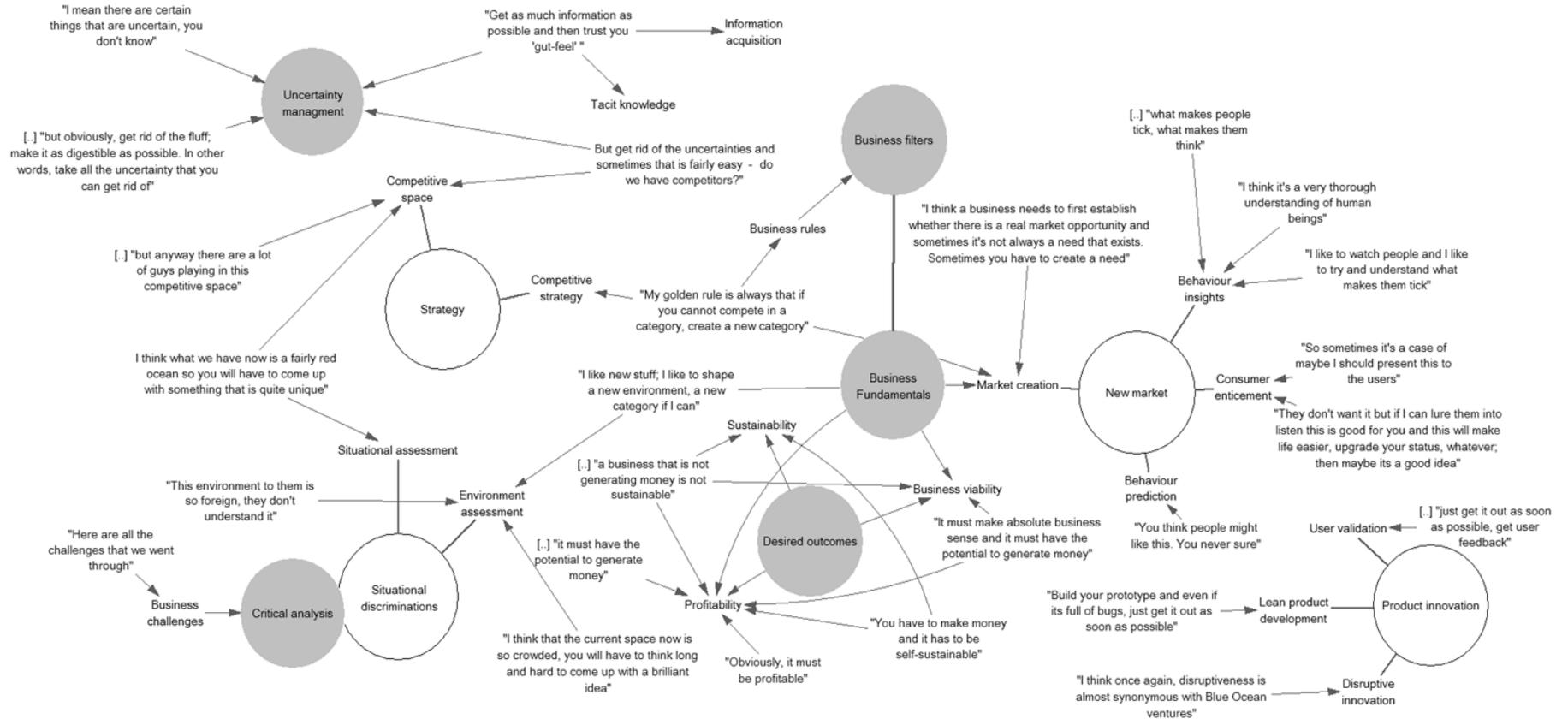


Figure 7.10: Cognitive mapping of Expert 4

7.4. ANALYSIS OF EXPERT ENTREPRENEURS' COMPOSITE COGNITIVE MAPPINGS

The expert entrepreneur uses several techniques to identify opportunities for a potential business venture.

7.4.1. Situational analysis

From the comparisons of incidents, the researcher developed the key categories of critical analysis, business challenges, and environment assessment. These categories were subsumed to form the category of situational analysis. The process of situational analysis could be described as follows:

The expert entrepreneur surveys the business environment so as to obtain a holistic overview from which to establish a central theme or hypothesis from the information provided. Through critical analysis the expert quickly assesses of the business situation in terms of the different opportunities presented.

The expert makes extensive use of prior business experience and market knowledge as a filtration system through which they distil opportunities that appear viable to them. A key factor when evaluating opportunities is the business challenges involved in executing that opportunity. The expert asks questions such as: What are the business challenges? How difficult would it be to enter the market with that opportunity? What is the size of the market?

Hence, it is evident that prior experience plays a key role in the distillation and identification of market opportunities.

The expert conducts a situational analysis through holistic and critical reasoning during the identification of opportunities, which indicates that these are important processes in the expert's arsenal of techniques used for solving complex problems. Thus, it appears that the expert attempts to impose structure when analysing a given problem to build a representation of it.

Taconis, Ferguson-Hessler and Broekkamp (2001) provided a view of problem-solving as the interdependence between cognitive activities or strategies and knowledge, since problem-solving depends on cognitive activities, strategies, and domain knowledge. These processes can be explained as a systematic search for information, organising the result, and completing the picture with elements of knowledge (Taconis, Ferguson-Hessler & Broekkamp, 2001).

An essential process that the expert utilises to distil through opportunities is that of categorisation. Categorisation assists the expert to differentiate opportunities on the basis of different business models, geographies, market sizes, etc. As an example, Expert 1 in his analyses of the business case stated: *“so there are already fifteen – twenty [business] models there”*.

Once the expert identifies an opportunity, they compare how similar opportunities have been exploited in other market domains. That is, the expert uses a process of product comparisons to obtain a better understanding of how to exploit that particular opportunity in their target market.

7.4.2. Cognitive filters

The central factors in experts' supply-demand interactions are the use of cognitive filters, which the expert has developed through their years of prior experience. That is to say that through prior experience, the expert has developed specific decision rules that the expert then applies to the evaluation of future opportunities.

7.4.2.1. Prior experience

The analysis of the expert's transcripts provides further evidence of the importance of prior experience in identifying potentially successful business opportunities. Experts constantly look to apply experiential knowledge that they have acquired over the course of their lifetime, and are more likely to pursue a business opportunity and experiment with ideas when they are able to apply their prior knowledge to the evaluation and execution of the business opportunity. Expert 2 claimed:

“Anyway, so that's just it - I get involved in these wacky things because I've been through it. I have been through the process”.

This link between an entrepreneur's prior knowledge and the use of a mental model or schema to identify opportunities was noted by Puhakka (2007). According to Puhakka (2007), an entrepreneur should first have knowledge structures of a domain similar to that of the opportunity. Then, when the entrepreneur perceives information of the business situation, it is done so from the point of view of these knowledge-structures. The entrepreneur then tries to connect this new information with the existing information and through this process, aims at creating a new view of the situation. Finally, the entrepreneur considers and reflects on this mental map and tries to find links that could propose that there is a business opportunity.

That is, an expert's prior knowledge enables them to acquire a better understanding of execution challenges and resource requirements which enables them to obtain an all-encompassing 'fit' between the supply- and demand-sides of the opportunity.

7.4.2.2. Decision-rules

The supply-demand interactions of an opportunity are largely driven by basic business rules or principles against which the expert entrepreneur appraises each potential opportunity. The expert distils an opportunity in order to evaluate the different aspects of that opportunity. That is, the

expert entrepreneur distils an opportunity into its constituent parts of supply and demand in an attempt to obtain a suitable fit between the different components of the opportunity.

Hence, the expert uses their prior experience and business knowledge as a basis for distilling opportunities and then looks for an opportunity fit for the filtered opportunities by assessing the opportunity against a 'template' for opportunity that they have developed over their years of experience. The implication is that expert entrepreneurs' opportunity recognition is essentially guided by cognitive filters to make the most of the utility potential of a business opportunity.

7.4.3. Utility outcomes

A key factor in the expert's evaluation of an opportunity is the benefits or utility that the expert can derive from that opportunity. In this regard, market identification plays an important role. Market identification is important for predicting market growth and the scalability potential of an opportunity. This is evident in Expert 1's statement:

"[...] and the numbers don't have to be around technology. If these numbers has been in mining or in anything, you will start saying to yourself, is there potential to start doing something here because there is a market size".

Expert 1 went on to state:

"So there is a certain level that if we are going to be putting a year or two of our lives into something, we want there to be a potential market size opportunity at the end of it".

Chesbrough and Rosenbloom (2002) suggested that the identification of a market is a vital factor in order to define the "architecture of the revenues". Nevertheless, selecting a market and constructing a value proposition for that market involves managing significant complexity and ambiguity (Chesbrough & Rosenbloom, 2002).

Greve's (1998) research provides a link between managerial cognitions and the adoption of new market positions. While this research examined market position from an organisational perspective, it is useful in explaining the importance of market identification from an individual's perspective as well.

Greve (1998) found that a manager's adoption of a market position is linked to a relevance heuristic – that is information is processed on the basis of the perceived relevance to a manager's strategic situation. According to Greve (1998), market positions are very consequential as they determine a firm's competitive environment. New entrants can choose different market positions by

providing a product tailored to one group of consumers; and in this way, market positions allow a new entrant to enter a market with less competition and thereby gain a competitive position.

Adopting a completely new market position, however, creates a great deal of uncertainty because at least initially, decisions have to be made with little or untested information, and as a result there is little basis for determining the resource base and how to use it. In the case of relatively new and still underpopulated market positions, some information useful for evaluating the resource base is available from the earliest adopters, but the competition is still not intense (Greve, 1998).

The important factors in terms of utility outcomes are value creation and profitability. If a business opportunity results in creating value for its users and for the entrepreneur, then it is likely to be successful. Success in this respect is aligned to generating revenues and profits for the entrepreneur, which in turn ensures that the business stays healthy and will be self-sustainable.

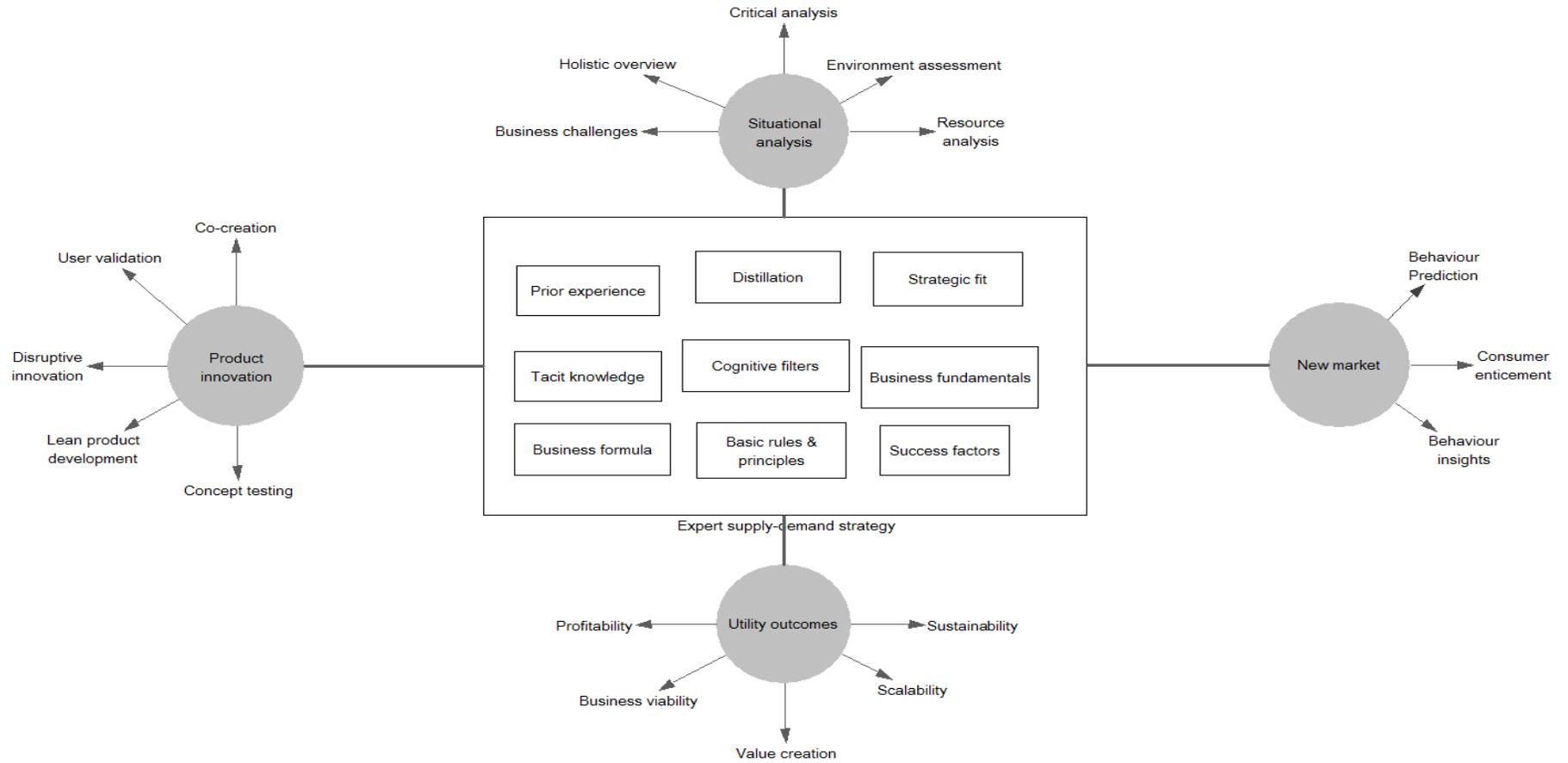


Figure 7.11: Composite cognitive mapping of expert entrepreneurs

7.5. SUMMARY OF KEY DIFFERENCES BETWEEN EXPERT AND NOVICE ENTREPRENEURS

The composite cognitive mappings of the expert and novice entrepreneurs revealed key differences between the two groups in their perception and identification of opportunities. Using the coding scheme developed for analysis purposes, the two groups of entrepreneurs were compared in terms of their perceptions of the supply-side and the demand-side of an opportunity and in terms of their strategies for developing supply-demand combinations.

Kirkley (2016:151) conducted a study on the factors that influence entrepreneurial decision-making in new venture creation. His findings indicate that decision-making is influenced by four main factors: (i) novelty of the idea, (ii) market demand, (iii) acquired experience, and (iv) need/problem identification.

In line with Kirkley's (2016:151) research, the current study finds similar decision factors particular with regard to novelty, prior experience and market demand. The current study's findings indicate that novice entrepreneurs tend to place significant emphasis on novelty of the idea while expert entrepreneurs place more emphasis on using their prior experience and expertise to their benefit and whether there is sufficient market size and demand. For the expert entrepreneurs, absence of sufficient market demand was deemed to be crucial to their decisions on starting a business. As expected, past experience was key decision-making factor (Kirkley, 2016:151).

Novice entrepreneurs consider bringing an innovative idea to market more important than whether there is market demand for the opportunity. The novice is generally not interested in mere improvements to existing products but rather on ideas that are substantially different from what is currently available and in some cases the idea needs to be significantly disruptive (Kirkley, 2016:151).

7.5.1. Key points on novice entrepreneurs

Novice entrepreneurs place a lot of emphasis on analysis emerging consumer, business and social trends in order to ascertain how to position their business ventures so as to harness or exploit a trend.

Novice entrepreneurs examine consumer trends and behaviour in an attempt to discover an opportunity arising out of these trends. The novice then attempts to exploit changes in consumer behaviour through the creation of a new product that will lead to a perpetuation of the identified consumer behaviour. In particular, novice entrepreneurs attempt to perpetuate consumer trends through consumer-driven networks because consumer-driven networks already have an existing consumer base.

Generally, the novices do not attempt to identify new markets but rather look at where a consumer base already exists. That is, novice entrepreneurs put a lot of emphasis on existing consumer channels, which provide a means for them to get market traction with their limited resources and with minimal cost outlay.

Novices look at what resources they have and how they can get their product to market via existing consumer channels and with their limited resources. They are also keen to limit the downside of a potential opportunity. Thus, to some extent, novice entrepreneurs make use of effectuation processes in that they pursue adequately satisfactory opportunities without investing more resources than they can afford to lose (Dew, Read, Sarasvathy & Wiltbank, 2009).

Hence, this study has found that the novice entrepreneur is likely to engage in effectual framing when analysing the opportunity problem space. This finding is almost anomalous to previous entrepreneurship research, which indicates that expert decision-making is based on the use of effectual logic (Sarasvathy, Dew, Read & Wiltbank, 2007). However, it should be noted that even in their research, Sarasvathy *et al.* (2007) did observe that not all of the expert entrepreneurs use effectuation processes and that some novice entrepreneurs also use effectual processes, albeit to a limited extent.

As a summary, this study has found that the key factors for novice entrepreneurs when they perceive and identify opportunities are changes in consumer behaviour and consumer engagement through consumer-driven networks, which are networks or supply chains that cater to the needs of the consumer.

7.5.2. Key points on expert entrepreneurs

An analysis of the composite cognitive mapping of expert entrepreneurs indicates that expert entrepreneurs are a lot more critical in their analyses of the business environment for potential opportunities. They assess opportunities holistically and distil potential opportunities to identify the opportunity that they would most likely pursue on the basis of their prior market knowledge, challenges involved in executing that opportunity and whether it fits their fundamental business principles.

Experts apply basic business principles to a business idea. They are not constrained by a lack of resources; so instead, they look at the size of the market and how they can apply basic business principles to that market in order to get a product to market. Experts place a lot of emphasis on understanding the challenges involved in getting an opportunity off the ground.

The expert entrepreneur places considerable emphasis on first determining whether there is a big enough market for that opportunity. That is, they first identify the demand-side of an opportunity

and then they look to create the supply-side or identify existing solutions in other markets that can be replicated in the target market.

They distil through potential ideas using their prior experience to determine which opportunities will work and which will not work in that market. They use business comparisons to see how the similar opportunities have been exploited by companies in different markets and then look to replicate the business model in their own markets. Specifically, the experts use comparative analysis to identify business models that can be replicated.

Through these processes, expert entrepreneurs are able to establish a link between an identified opportunity and the market. Expert entrepreneurs only look to pursue an opportunity if they can establish clear linkages between the supply- and demand-sides of an opportunity in terms of the execution of the opportunity.

7.5.3. Entrepreneurial decision-making modes

Statements from the expert and novice entrepreneurs were analysed for indications of effectuation and causation decision-making modes. The analysis was guided by the framework used by Maine et al., (2015:53).

The decisions of both cohorts of entrepreneurs were analysed in order to determine their respective decision-making modes that they employed when conceptualising opportunities for new venture creation. From the analyses, the researcher found that expert and novice entrepreneurs are likely to utilise both effectual framing and causal logic in the process of conceptualising opportunities. These findings are in alignment with recent studies such as Maine et al.,(2015:53) and Engel et al., (2014:12).

The research findings indicate that novice entrepreneurs routinely switch between causation to effectuation decision-making modes during the conceptualisation of opportunities for new venture creation.

The environment and more specifically changing trends in the market have been considered an important source of opportunities" (Riquelme, 2013:249). All novice entrepreneurs indicated that the prediction of trends was a key influencing factor in their recognition of potential market opportunities. The novice entrepreneur uses prediction as a strategy for problem identification and determining customer needs. This use of causation logic was observed with all the novice entrepreneurs in the research sample.

Novice entrepreneurs however switch to effectual framing with respect to their predisposition toward risk and resources. The principle of affordable loss is one of pursuing adequately satisfactory opportunities without investing more resources than stakeholders can afford to lose.

The focus here is on limiting downside potential” (Dew, Read, Sarasvathy & Wiltbank, 2009). This principle of affordable loss was observed with novice entrepreneurs.

Another aspect of effectual framing is that it is means-orientated. In other words, in effectual framing, “goals emerged by imagining courses of action based on given means” (Dew, Read, Sarasvathy & Wiltbank, 2009). The researcher noted that the novice entrepreneur analyses the resource requirements for acting on an opportunity during the process of finding a suitable supply-demand combination for an opportunity.

However, since novice entrepreneurs typically tend to have limited resources, it is important that they gain the maximum benefit from whatever skills, time and finances they invest in a business idea – that is in the resources that they invest in executing an opportunity. The novice entrepreneur looks to maximise the return they will get from their available resources, which indicates that novice entrepreneurs use a causation decision making when considering their capabilities and resources.

The expert entrepreneur tends to use effectual logic extensively during the conceptualisation of opportunities for new venture creation. It is only when considering the commitment of resources towards achieving certain goals, do expert entrepreneurs switch to causation decision-making mode. Although there is no evidence that expert entrepreneurs have predetermined goals, the research findings indicate that expert entrepreneurs do seek to achieve certain outcomes from any business opportunity in which they commit their time, skills, and finances.

Table 7.3: Novice decision-making modes

Decision	Statement	Decision principle	Decision mode
Novice 2	<p>"I first look at what I have"</p> <p>"I'm going to do it, if I am capable of doing it"</p>	Exploiting current capabilities & resources	Causation
Novice 4	[..] you as a founder, or someone who has a couple of partners must maximise what you have so that if the idea does not turn up to be so great you have not lost that much in your capital injection.	Affordable loss	Effectuation
Novice 3	It was a trend that made me see that there is a market, because the trend made me see that there was a need.	Prediction	Causation
Novice 4	[..] but then you if want to do something with the trend you need to consider can I do this in this environment.	Prediction / Exploiting current capabilities / Constraints on means	Causation & Effectuation
Novice 5	[..] you put it in the market and you just test	Exploiting contingencies through experimentation	Effectuation

Novice 2	<p>“You need key resources which is why you have to find a way to get it”</p> <p>“But I found what is powerful to get to those things is networking”</p> <p>[..] “it’s not so much so of what you know but more like who you know, how can that person help you with what you want to do”</p> <p>“So then I will want to harness lots of social networks”</p> <p>“If I don’t have the tool sets then I will have to find a way to get it with what I have - you will always have something to get something”</p>	Constraints on means / Expanding means	Effectuation
Novice 5	<p>You have to consider like ‘sort of’ calculate the risks.</p> <p>You have to calculate so that you are on a safe side, so that you don’t lose - more or less like putting all your eggs in one basket</p>	Affordable loss	Effectuation
Novice 4	<p>So that’s first thing and the other thing is how easy it is to build what you are trying to build</p>	Constraints on means	Effectuation

Source: Author

Table 7.4: Expert decision-making modes

Decision	Statement	Decision principle	Decision mode
Expert 1	<p>“So, I think I would read through this and I would be more of the opinion about how difficult it is to launch businesses”.</p> <p>“I know how difficult it is to launch those types of businesses”</p>	Challenges Contingencies	/ Effectuation
Expert 3	“I always look at the challenges”	Challenges Contingencies	/
Expert 1	[..] “we tested out the concept, so we know the positives and negative there”	Experimentation	Effectuation
Expert 3	So the first step is identifying if there is opportunity then if you can, go through the motion of testing your idea		
Expert 4	<p>“So somethings you can work out fairly accurately but it’s all based on guesstimates”</p> <p>“But once again human behaviour is so unpredictable. As I said what works for one doesn’t work for others - so a lot of guesstimates”</p>	Control unpredictability	Effectuation
Expert 1	“I think that I have gone through small businesses before in small industries and it probably wouldn’t be of interest to me now actually putting my time and effort in”	Means Resource	/ Effectuation

Expert 2	<p>“My problem at the moment is time and trying to find the right people to work with because you can’t do anything without the right people around you”</p> <p>“And for me that’s a limiting factor for an entrepreneur is actually having the right people that can understand your vision and what you trying to roll out”</p>	allocation		
Expert 1	<p>“So there is a certain level that if we are going to be putting a year or two of our lives into something, we want there to be a potential market size opportunity at the end of it”.</p> <p>“If we get (<i>company name removed</i>) up to 5, 10, 15 million users, are we going to be worth a USD \$100 million, a billion dollars? We wouldn’t be interested in building it if we knew that in 2 years’ time we would be able to sell it for USD \$5 Million.</p>	Goals / Utility		Causation
Expert 2	<p>“A business must have a profit motive otherwise it’s not running on the right principles”</p>			
Expert 3	<p>[..] “often a business that seems good enough for someone is not good for me because it can’t be big enough”.</p> <p>“But if it’s going to be a headache business and a headache comes with those kind commitments, then it must be a big enough business that justifies a headache”.</p> <p>[..] “ and also the desired outcome and wherever this actual business can hit the desired outcome”</p> <p>“There’s not a lot market there so you’re not going to create a big business there so it hits my not filter”</p>			
Expert 4	<p>It must make absolute business sense and it must have the potential to generate money.</p>	Goals / Utility		Causation

Source: Author

7.5.4. Supply-demand alignment

This research has found that both expert and novice entrepreneurs attempt to find a fit or alignment between the supply-side and demand-side of the opportunity but they use different techniques in order to achieve this. In this study, an opportunity fit is the process of establishing a supply-demand path that will most likely result in the success of that opportunity.

Mitchell *et al.* (2000:974) referred to opportunity fit when they discussed ability-opportunity fit scripts which according to them, is a script that expert entrepreneurs have which enables them to see ways in which a customer and venture value can be created in new combinations of people, materials, or products. A more compelling argument for the concept of fit comes from the research of Gregoire, Barr and Shepherd (2010) who proposed a model of opportunity recognition as a cognitive process of structural alignment. Their research indicated that different kinds of mental connections play different roles in the process of recognising opportunities, with different consequences. They suggested that at its most fundamental level, structural alignment is a cognitive tool that people use to compare things – and to draw implications from the comparison.

It would appear that much of the process of obtaining a fit or alignment between the supply- and demand-sides of an opportunity has to do with managing uncertainty inherent in an opportunity.

Experts depend heavily of prior knowledge and use their prior knowledge to identify potential business opportunities. They identify market domains and then distil through opportunities in order to find the opportunity that will mostly likely provide an alignment with their desired outcomes.

Experts first obtain a holistic overview to identify a central theme. They critically analyse and distil opportunities to identify a primary opportunity. The expert distils through ideas using prior experience and the application of a basic set of rules or business formulas to determine which idea they will pursue. That is, the expert starts off analysing the demand-side of the opportunity and identifies a market opportunity by first looking at the size of the market.

Prior experience provides the expert entrepreneur with market knowledge and assists them in understanding challenges and constraints. They then attempt to obtain an opportunity fit for the business idea. An opportunity fit is best described as an alignment between the supply- and demand-sides of the opportunity that satisfies the expert's formula for success.

Hence, expert entrepreneurs consider and evaluate opportunities in association to their past experience, i.e. in terms of what they know. They distil possible ideas through the application of their knowledge in order to find a business opportunity that they can link to the identified market. To some extent, business opportunities are largely shaped and driven by their past experience.

Expert entrepreneurs first look for a large market and then attempt to create an opportunity that can link to that market. For existing markets, experts use prior experience, business model replications and constant comparisons to find an opportunity fit. For new markets, experts utilise product innovations to create a market or consumer category.

In contrast, the researcher found that novice entrepreneurs identify current and emerging trends and consumer online behaviour and then look to harness these trends to position themselves in the market. They don't identify markets but rather look to harness trends to identify an opportunity and then look to consumer-driven networks to provide the consumer base for the opportunity.

The novice entrepreneur thus starts off by analysing the supply-side of the opportunity. They don't place much importance on the demand-side and in many cases do not even consider the demand-side of the opportunity.

When they do consider the market, novices more often look for existing markets. That is, they look at consumer behaviour to steer them towards where they can find a captive consumer market. They consider consumer trends in this market and then attempt to harness these trends by perpetuating consumer behaviour and thereby obtain opportunity fit with the supply- and demand-sides of the opportunity.

Novice entrepreneurs look to emerging trends and attempt to create an opportunity that will perpetuate consumer behaviour around that trend. They look for an existing consumer base and attempt to adopt a market position for that market segment.

Novice entrepreneurs look to harness trends from which they create opportunities. They don't look for new markets but rather look to create novel opportunities for existing markets. They look to consumer networks for a captive market and find a way to perpetuate consumer behaviour on consumer-driven networks in order to link the idea to the market.

Novices create novel opportunities by looking at ways in which they can perpetuate consumer behaviour. They analyse consumer trends and look to harness trends in order to adopt a market position. Furthermore, they look to consumer-driven networks to provide them with their markets because this is where consumers are frequently found.

7.5.5. Supply-demand paths

Entrepreneurs operating in uncertain and unstructured environments have to manage with "decision processes that have not been encountered in quite the same form and for which no predetermined and explicit set of ordered responses exists" to them (Mintzberg, Raisinghani & Theoret, 1976). There is support that decision-making in such environments is strategic in nature. As posited by Mintzberg *et al.* (1976), a central feature of strategic decisions is their lack of

structure, which is largely attributed to the uncertainty and ambiguity inherent in the complexity of strategic problems (Schwenk, 1984).

Thus, strategy that takes place within the framework of a largely unpredictable environment fits more closely with the notion of strategic thinking. According to Liedtka (1998), strategic thinking is built on the foundation of a systems or holistic perspective, which understands the different parts of a system and the interconnectedness between these parts. That is to say that strategic thinkers possess a mental model of the complete end-to-end system of value creation. Furthermore, strategic thinking is hypothesis-driven. In other words, the generation and testing of a hypothesis are central activities in strategic thinking which is both creative and critical in nature. Finally, strategic thinkers tend to be opportunistic in that they are open to alternate strategies that may be better suited to the changing environment.

As remarked by Mintzberg *et al.* (1976), strategic simply means “important in terms of the actions taken, the resources committed, or the precedents set”. Strategic thinking therefore implies decisions made about and in the context of the action to be taken and resources to be committed and entrepreneurial strategy, therefore, has to do with attaining alignment between supply and demand domain and with the arrangement and deployment of resources to attain that alignment.

A second finding of this study develops from the concept of strategic configuration, which is the process through which expert and novice entrepreneurs appear to manage uncertainty associated with the opportunity recognition process.

This study advances the viewpoint of the entrepreneur as a strategic actor, and builds on the statements of Fayolle (2007) who suggested that entrepreneurial behaviour depends on the perceived instantaneous strategic configuration of the entrepreneur. That is to say that entrepreneurs look for coherence and harmony between their aspirations, the state of the environment and their capacities, skills and internal resources. Their perceived instantaneous strategic configuration, which is their decision/action matrix, influences their decisions and actions (Fayolle, 2007).

Hence, in terms of this study, a strategic configuration entails obtaining alignment between the entrepreneur’s strategy for establishing a suitable supply-demand combination and the arrangement and deployment of resources to attain that combination. Strategic configuration during opportunity recognition thus entails determining your human resource skills and available resources and then establishing the most suitable strategy for attaining product-market alignment.

Entrepreneurs develop strategies to manage supply-demand uncertainty. They seek to align the supply- and demand-sides of the opportunity in terms of the inherent uncertainty but there must congruence between these strategies that in turn are then aligned to the expected utility of the

opportunity as in the case of the expert group, or to the means of the entrepreneur as is the case with the novice group.

The findings from this study argue that expert and novice entrepreneurs adopt two very different generic strategies when considering a business opportunity. Furthermore, while both expert and novice entrepreneurs perceive opportunities in terms of supply-demand alignment, they differ in their strategic configurations.

Expert entrepreneurs organise their strategies on the basis of congruent relationships with their desired outcomes, while novice entrepreneurs organise their strategies on the basis of congruent relationships with capabilities. More specifically, expert entrepreneurs organise their supply-demand strategy into a congruent relationship with their desired utility. In this respect, the expert's prior experience is a key driving factor in their strategy. Novice entrepreneurs, on the other hand, organise their supply-demand strategy into a congruent relationship with their available resources and capabilities.

7.5.5.1. Expert supply-demand configuration

Expert entrepreneurs' opportunity identification follows a demand-driven model. Experts attempt to obtain congruence in terms of known business principles and supply-demand paths.

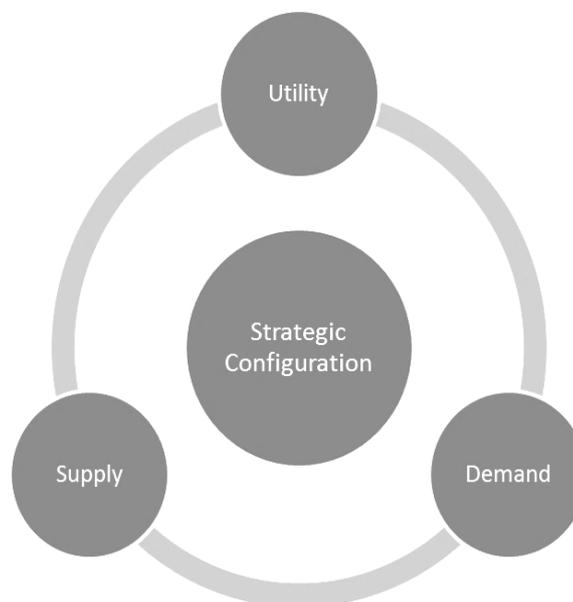


Figure 7.12: Expert supply-demand configuration

Source: Author.

That is, expert strategic configuration signifies a strategy for attaining alignment with the supply-demand path that attains congruence with the expert's desired outputs as determined by their 'cognitive filters' for success.

7.5.5.2. Novice supply-demand configuration

Novice entrepreneurs' opportunity identification follows a supply-driven model. Novices attempt to obtain congruence in terms of resources and capabilities and supply-demand alignment.

Novice strategic configuration particularly signifies a strategy for attaining alignment with the supply-demand path that attains congruence with the novice's capabilities and resource availability.

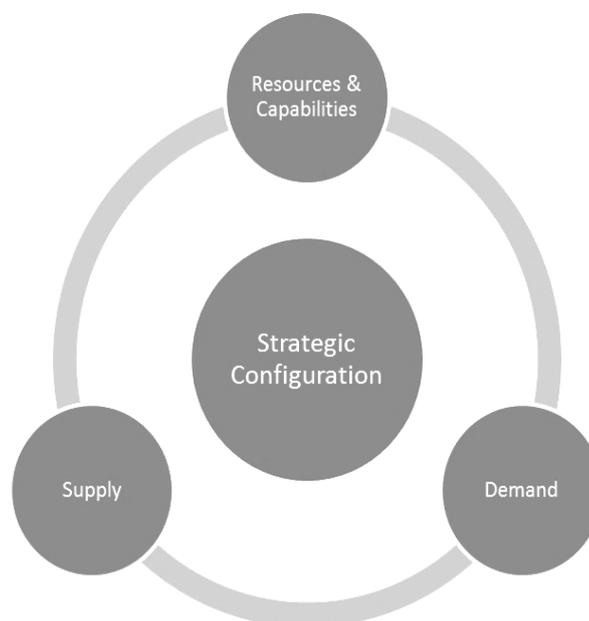


Figure 7.13: Novice supply-demand configuration

Source: Author.

7.5.6. Cognitive decision rules

The main research finding of this study is that expert entrepreneurs resort to cognitive decision rules developed through years of prior experience, which aids the entrepreneurs in making choices in creating a supply-demand configuration for new venture creation. As such, this research highlights the significant role of cognition in opportunity conceptualisation and posits that cognition is an important mediator between the decision maker's subjective (internal) environment and the external environment.

The use of cognitive rules act as filters in assisting the entrepreneur in making decision choices that reduce or mitigate some of the uncertainty inherent in new venture creation opportunities, particularly with respect to novel products and / or new markets.

There is evidence from recent research which supports the notion of cognitive filter or rules. For example, Riquelme' (2013:249) study on entrepreneurs in the service industry yielded results that indicate that entrepreneurs who discover opportunities organize prior knowledge and information related to their field in a manner that is easily accessible to them.

In addition to effectuation and causation, Chandra (2017:1) suggests that rule-based reasoning offers entrepreneurship research a third decision-making model. Entrepreneurs need a structured way to think about the new information and cognitive science research suggests individuals make use of 'rule-based' thinking to systematically frame decision problems (Wood & Williams, 2014:573).

Chandra (2017:1) argues that rule-based reasoning offer such an approach in that it relies on rules so as to reduce uncertainty and to assess opportunities against specific criteria to help decide if an opportunity is exploitable. Rules, therefore serve as "analytical knowledge structures" to make logical inferences.

Wood et al. (2014:573) propose that entrepreneurs use rule-based thinking to systematically integrate rule content regarding opportunity novelty, resource efficiency, and the worst-case scenario as they discern opportunity attractiveness. Findings from their study provide preliminary evidence that entrepreneurs use specific rules and knowledge resources in their opportunity evaluations and those applications occur within a rule-based framework that provides structure to entrepreneurs' judgments.

Conceptualising entrepreneurial opportunities as complex considerations of supply and demand, Wood et al., (2014:573) note that entrepreneurs tend to develop opportunity templates around at least three broad categories of rule content. The first rule category relate to demand-side considerations, e.g. windows of opportunity. The second rule category relate to supply-side considerations, e.g. resources. The final rule category involves the entrepreneur's personal considerations, e.g. goals and consequences such as risk or return.

Wood et al., (2014:573) state that the content in rule-based opportunity evaluation encompasses both supply-side and demand-side issues as entrepreneurs strive to introduce new means–ends relationships. Hence, they state that the evaluation an opportunity requires one to determine the extent to which bringing supply-side and demand-side considerations together is consistent with rule templates regarding the profit potential and personal consequences if the opportunity is pursued.

7.5.7. Summary of key differences between expert and novice entrepreneurs

It is fair to say that the entrepreneur's decisions about a potential entrepreneurial opportunity are influenced by the entrepreneur's close environment since opportunities are linked to a given environment or a market and in many ways, the entrepreneur reflects the characteristics of time and the place in which they operate and evolve (Fayolle, 2007).

In an active and evolving environment, it is expected that at various points in time the entrepreneurs will have different perceptions of the environment, which in turn will affect their decision to act on an opportunity (Fayolle, 2007). However, differences in interpretations of the same situations are not necessarily due to differences in the perceived quality of the information that individuals receive, but to the different meanings that a given piece of information may induce. In other words, perception and interpretation are in turn guided by the mental representations that individuals develop of the particular domain (Dimov, 2007b).

Prior research has indicated that experts and novices differ in their cognitive representations of particular problems, and such differences imply different abilities to form new knowledge associations and thus achieve novel interpretations (Dimov, 2007b). Differences in expert and novice problem representations find support with Chi *et al.*'s (1981) research, which demonstrated that experts and novices begin their problem representation with specific different problem categories, and completion of the categories depends on the knowledge associated with the categories.

Some findings of this study support previous entrepreneurship research, which indicated that expert entrepreneurs' images of opportunity are based on profitability and feasibility, while novice entrepreneurs' images are based on novelty and uniqueness (Mitchell & Shepherd, 2010). For example, Baron and Ensley (2006), who examined the cognitive frameworks of expert and novice entrepreneurs, found that the opportunity recognition of novice entrepreneurs was more focused on the dimensions of newness, novelty, and superior new products or services. Expert entrepreneurs on the other hand focus more attention than novice entrepreneurs do on factors and dimensions closely related to the success of the new venture in that they look to convert identified opportunities into realised financial gains.

In other words, novice entrepreneurs are more likely to pursue a strategy for developing innovative, novel products while expert entrepreneurs are more likely to pursue a strategy for obtaining business viability and profitability.

Furthermore, experts perceive opportunities from an integrated and holistic perspective that is informed by clearly defined and measurable strategies, while novices lack a coherent strategy for managing internal and external uncertainties. These findings on expert entrepreneurs are

supported by the literature of expertise. For instance, researchers have found that experts are inclined to apply a qualitative analysis to the problem prior to the actual retrieval of a solution and that experts spend a great deal of time in analysing the problem qualitatively and developing a problem representation of it (Chi, Feltovich & Glaser, 1981; Choo, 2006).

Novice entrepreneurs spend a great deal of time analysing trends. They look to harness a trend by taking a new market position that will exploit that trend. They look to create novel opportunities that will exploit a trend. Because they lack experience in a market, novice entrepreneurs look to manage market uncertainty through consumer engagement methods. They manage product uncertainty and novelty by analysing trends and change indicators.

On the other hand, the strength of expert entrepreneurs lies in their prior experience and knowledge of specific markets. For the expert, uncertainty is more likely to reside in the novelty of the product and less in market uncertainty. Experts tend to analyse opportunities in terms of action required to implement an opportunity.

This study's findings indicate that expert entrepreneurs tend to place more emphasis on the demand-side of an opportunity. In other words, experts tend to favour market strategies. A marketing strategy is a statement of the target market, market positioning, and marketing mix (Benedetto, 1999), and is in essence a response to evolving market changes (Knight, 2000).

In contrast, novice entrepreneurs place more emphasis on the supply-side of an opportunity, that is, on product innovation. In general, the pursuit of a product innovation strategy emphasises the creation of distinctive products for niche markets, of which a critical aspect is the development of products that meet specific consumer needs (Knight, 2000).

Finally, while novice entrepreneurs tend to follow a strategy to efficiently manage resources and competencies, expert entrepreneurs follow a strategy that is focused on maximising utility and profitability.

Hence, while this study indicates that expert and novice entrepreneurs tend to make decisions about an opportunity based on an ideal supply-demand combination for an opportunity, significant differences exist between expert and novice entrepreneurs' supply-demand combination of opportunity.

The main differences between expert and novice groups of entrepreneurs are summarised as follows:

- Comparisons of incidents between the novices and between the experts, as well as between novices and expert have indicated that all entrepreneurs apply some form of situational analysis in their perception of a potential business opportunity. For instance, novice entrepreneurs' situational analysis are more narrowly focused on emerging trends while expert entrepreneurs' situational analysis are first broadly focussed in that it takes on the form of holistic analysis before the expert entrepreneur then focuses narrowly through a critical analysis.
- Novice entrepreneurs use effectuation and causation decision-making modes and switch between both the modes during their decision-making about new venture opportunities. Experts mainly use effectuation decision making but resort to causation decision-making mode when considering the commitment of their resources to exploit the opportunity.
- A noted difference between expert and novice entrepreneurs is that novice entrepreneurs evaluate opportunities from a supply-side perspective, that is, in terms of new product development. Expert entrepreneurs on the other hand, evaluate opportunities from a demand-side perspective, that is, in terms of the challenges to market entry, as well as the market size and the scalability potential for the business opportunity.
- Experts seek a supply-demand fit that finds alignment with their desired outcomes which is to create utility for the entrepreneur; while novice entrepreneurs seek a supply-demand fit that finds alignment with their available resources and capabilities.
- Novice entrepreneurs are constrained by limited resources and a lack of prior experience. Hence, their supply-demand interactions are mainly driven by the need to compensate for their lack of resources and market knowledge.
- Experts appear to think about opportunities in terms finding alignment between supply- and demand-sides of an opportunity that satisfies their cognitive rules for achieving a desired outcome.

A summary of these key differences between expert and novice entrepreneurs is presented in Table 7.5.

Table 7.5: Key differences between expert and novice entrepreneurs

	EXPERT	NOVICE
Overview	Demand-driven process established on a fit between market demand and desired utility.	Supply-driven process established on a fit between new product development and consumer behavior.
Perception	Holistic overview.	Trends analysis.
Decision-making mode	Effectuation & causation	Causation & effectuation
Supply-side	Replication of existing products.	Development of novel products.
Demand-side	Identification of new markets.	Identification of existing markets.
Activity focus	Analysis of business challenges and constraints.	Analysis of resource requirements.
Strategic configuration	Supply-demand paths that align with entrepreneurs' desired outcomes.	Supply-demand paths that align with the entrepreneurs' capabilities
Expertise	Cognitive decision rules	

Source: Author.

CHAPTER 8

DISCUSSION AND RECOMMENDATIONS

8.1. CENTRAL CONCLUSIONS OF THE STUDY

The main focus of this study was to contribute towards a greater understanding on the opportunity recognition process, particularly with regard to decision-making contexts characterised by uncertainty. Empirical evidence was collected by exploring the opportunity recognition processes of two groups of entrepreneurs, both of which were characterised by distinctly different levels of experience. While both groups started off with a situational analysis of the decision environment, a distinct difference was found between the lesser experienced novice group and the more experienced expert group of entrepreneurs.

While it is expected that expert entrepreneurs would have certain advantages over novice entrepreneurs due to their prior experience, a key finding of the current study is that prior experience moderates decision-making by enabling expert entrepreneurs to revert to simplified decision rules to manage uncertain decision contexts. These rules fulfil a strategic function during opportunity recognition in that they assist the entrepreneurs to reduce or mitigate uncertainty associated with the supply- and demand-sides of an opportunity.

From the evidence of this study, the researcher is able to posit a theory of entrepreneurial opportunity recognition in uncertain decision contexts as a process of satisficing decision-making. The principle of satisficing derives from the work of Herbert Simon (Simon, 1956; Simon, 1959) who suggested an approach to explaining choice that is more cognisant of human cognitive limitations than rational choice theory (Schwartz, Ward, Monterosso, Lyubomirsky, White & Lehman, 2002).

A key factor in this theory of decision-making is that satisficing theory takes the limitations of the decision-maker and the complexity of the environment as central concerns (Simon, 1959). As Simon (1959) explained:

“The classical theory is a theory of a man choosing among fixed and known alternatives, to each of which is attached known consequences. But when perception and cognition intervene between the decision-maker and his objective environment, this model no longer proves adequate. We need a description of the choice process that recognizes that alternatives are not given but must be sought; and a description that takes into account the arduous task of determining what consequences will follow on each alternative”.

Byron (2004) provided an explanation of satisficing as “not as an alternative to optimizing as a model of rationality but rather as an alternative to local optimising as a strategy for pursuing global optima”. Accordingly, satisficing has two dimensions, one of which is value function. Whereas rational choice is directed at maximising expected utility, satisficing means you use a simplified valuation function instead of assigning utilities to every possibility. In other words, satisficing means that the individual chooses a course of action that is guaranteed to be satisfactory (Byron, 2004).

The second dimension is that of simplification which appears in Simon’s satisficing rule itself. According to that rule, rationality requires an agent first to identify the set of all satisfactory outcomes of the choice situation, and then to choose an alternative of which all outcomes are in the set of satisfactory outcomes. More briefly, it is rational to choose any action that guarantees a satisfactory outcome (Byron, 2004).

The theory of satisficing stems from the failure of maximising frameworks to take into account uncertainty and routinised behaviour in the scope of human decision-making (Van Witteloostuijn, 1988). That is to say that the presumed goal of maximisation is virtually always unrealisable in real life, due both to the complexity of the human environment and the limitations of human information processing (Schwartz, Ward, Monterosso, Lyubomirsky, White & Lehman, 2002).

The argument for satisficing as the theory of entrepreneurial decision-making is set out as follows:

8.2. APPLICATION OF SATISFICING THEORY TO NEW VENTURE CREATION

In new venture creation, an essential component of taking a new product to market, particularly when the market attributes are unknown, is the process known as validated learning (Reis, 2011). Due to the high level of uncertainty associated with creating a new venture, entrepreneurs start by developing a product that has as few features as necessary in order to test customer interest for the product.

Expert 4 explains this as follows:

“Build your prototype and even if it’s full of bugs, just get it out as soon as possible, get user feedback and then you start rolling out marketing that’s fairly straight forward and those sort of things”

Because this process involves frequent iterations of the product, entrepreneurs do not attempt to optimise their decisions but rather make satisficing decisions in order to test as many variations of the product as possible. Once they find a good enough product, they then move onto the next stage of business development.

This process is ongoing and each stage of new venture development involves frequent experiments to test out components of the opportunity. During this process, the entrepreneur does not have pre-defined alternatives or these are not necessarily known to the entrepreneur at that point in time. As a result, the entrepreneur has to settle on a good enough choice so that he can continue building his startup. As such, the entrepreneur seeks out a suitably economical solution – that a solution that is good enough, rather than an optimal solution. This is noted in the expert entrepreneur's statement:

"I will launch something; obviously it would need to be useable and not too bugging. It's a fine balance between I know it's not finished, but it's got not too many bugs but it works – it's not perfect".

Dew et al., (2015:143) explain this process in terms of situated entrepreneurial cognition. According to them "instead of generating a mental model of the problem-solving requirement, storing it and then manipulating it, we turn the problem into a visual task where we physically manipulate the object itself until we 'see' what works.

This is note as per the expert entrepreneur statement:

"And then it's almost like, it's like an iterative loop. Launch it and check what happens".

Dew et al., (2015:143) explains that we therefore tune down the demands for a full-blown cognitive representation of problem situations in favor of the more economical solution of using the 'world as its own model' and the 'world as an outside memory'. Thus, our flow of thoughts depends on repeated environmental interactions rather than on producing a cognitive model within which we step back, observe, assess and plan our actions".

Gregoire et al., (2015:125) argue that the entrepreneurial process is inherently recursive in nature and driven by rules of action and interaction which are largely cognitive and affective in nature. During this process momentary positional information is processed to formulate action, the consequences of which define new positional information, which in turns informs new action, etc. They submit that in terms of a simplifying software metaphor, these rules can be seen as a programme that converts inputs to outputs, and which takes the output of each stage as the input for the next stage.

The process of new venture creation requires that the entrepreneurs go through several phases of iterations and then make decisions on whether to proceed or to 'pivot' the product. Such conditions require that the entrepreneurs make decisions quickly with

minimal amount of information at his or her disposal. In such situations, maximizing decision-making is not always an option and the entrepreneurs have to make a decision that is 'good enough' to move forward.

As explained by the expert entrepreneur:

"You launch, it's almost like a space ship – as you busy launching, you still building it on the inside and it goes up and up and you building and changing".

Hence, satisficing decision making is vital in new venture creation where decisions are quickly made and tried without great analyses because in such situations, the causal logics of the affecting elements cannot be known in advance (Makimurto-Koivumaa & Puhakka, 2013:1)

8.2.1. Satisficing theory in terms of suitable means

One tenet of satisficing decision-making is its emphasis on suitable means. That is to say that a satisficing conception of rationality will permit the suitable means to be good enough (Chun, 2015:224). Under satisficing decision-making, a satisfiers usually sets an aspiration level and simply tries to find any choice that attains or exceeds that level. This is in contrast to a maximizing conception which requires that the "suitable means" to be the best and therefore, maximizers try to make an optimal decision among all feasible choices (Chun, 2015:224).

In satisficing approach, the actor sets lower bounds for the various objectives that, if attained, will be satisfactory, or 'good enough', and then seeks a solution that will exceed these bounds (Husain & Dutta, 2013). One strategy for achieving this is to reduce objectives into sub-objectives. For example, Marsh (2013:197) suggests that in complex environments, a notable decision-making strategy would be reducing the goal to a series of sub-goals as agents are prone to identify with sub-goals: that is, "the searching for a good enough action rather than an optimal one". Another way is to view objectives in terms of the pursuit of major and minor attributes as suggested by Chun (2015:224) who in his decision model assumed that the decision-maker has a major attribute that must be "optimized" and minor attributes that must be "satisficed".

8.2.2. Satisficing theory in terms of predetermined alternatives

Entrepreneurial decision-making follows an open-ended path. This is because ends are not precise nor are they perfect and decisions are not based on pre-defined or pre-determined paths in order to achieve pre-determined ends. Optimization is impossible where decision problems do not involve choosing between a pre-specified set of alternatives, since it logically entails a problem of infinite regress as regards the question of how far to keep searching for better solutions (Earl, 2013:278). In simple terms, Earl (2013:278) states that anyone who seriously tries

to work out an optimal solution to an open-ended problem will find that it “drives them crazy” and they are eventually forced to cut the process off by selecting an option that they can at least categorize as satisfactory.

Maximisation suggests the application of a cost-benefit analysis to one’s decisions. That is an agent conducts a cost benefit analysis and chooses the option that gives her or him the maximum benefit for the lowest cost. Satisficing decision making is more suitable for situations where decisions are made without a cost-benefit analysis. As Earl (2013:278) points out, satisficing models show how choices can be made without a pre-defined set of alternatives and without somehow assuming that the decision maker can judge the marginal costs and benefits of further search.

8.2.3. Satisficing and effectuation theory

Satisficing is an effective decision-making strategy and an alternative to optimisation in situations where there are multiple and competing objectives (Husain & Dutta, 2013). Satisficing therefore, much like effectuation is most useful where traditional notions of optimality break down or simply do not apply (Wiltbank, Sarasvathy, Dew & Read, 2016).

As suggested in earlier paragraphs, satisficing is a decision-making strategy which attempts to satisfy outcome requirements rather than outcome quality. Similarly, effectuation strategies leverage elements within the control of entrepreneurs and their stakeholders to co-create the future, which effectively allows them to eventually achieve control over outcomes (Wiltbank, Sarasvathy, Dew & Read, 2016).

Effectuation theory of entrepreneurial decision-making suggests that ends are determined by the means as the process of entrepreneurship unfolds and new means-ends relationships are created. In other words, the entrepreneur creates the connection between the means and the most suitable ends (Essig, 2015:227). A theory of satisficing decision-making proposes that satisficing decision-making permits decision-makers to match suitable means with aspirations levels for attaining their desired outcomes or ends.

8.3. RECOMMENDATIONS

Satisficing decision-making has implication not just for the entrepreneur, but also for key ecosystem stakeholders. A key stakeholder in the entrepreneurship ecosystem is the end-user or consumer.

Priem et al., (2012:346) state that consumers’ heterogeneity of demand contributes to differences in decision making and judgments. They acknowledge that the implication of this heterogeneity means firstly that different consumer groups can have different demand characteristics. Second,

it means that a single consumer can exhibit different demand characteristics over time, and finally, a consumer's demands and preferences may sometimes be latent: that is, consumers have bounded foreknowledge of their own needs (Priem, Li & Carr, 2012:346).

The implication of this is that when entrepreneurs adopt a demand-side focus in new venture creation, decision-making should be directed at satisfying different needs and has to consider that the consumer may also apply satisficing decision making with respect to the product offering. As noted by Priem et al., (2012:346), "the focal point is the marketplace, and the firm is considered as an organization created to satisfy diverse market demands.

Other key stakeholders in the entrepreneurship ecosystem are angel investors and venture capitalists who play a prominent role in providing the resources required to bring an opportunity idea to market (Bruton, Filatotchev, Chahine, & Wright, 2010). These investors not only provide vital capital, but also bring valuable knowledge, experience and networks to ventures that they fund. Evidence suggests that these investors play an increasingly important role by filling funding and logistic gaps for entrepreneurs (Le Roux & Pretorius, 2015:85).

Williams et al., (2015:218) suggest that investors hold unique knowledge and experience, and therefore the opportunity images they develop may be different from those of entrepreneurs. They note that if these opportunity images rest on rule-based reasoning, the implication is that some degree of congruence likely must be achieved between the rules investors use to discern the attractiveness of the opportunity under consideration.

A key consideration in making investments in a new venture is the inherent uncertainty associated with bringing an idea to market. Angel investors in particular, face cases in which uncertainty is so extreme that it qualifies as unknowable, because as pointed out by Huang et al., (2015:634), they decide on investments in ideas for markets that often do not yet exist, and propose products and services that have no precedent for whether they will work. Since angel investors have to decide among uncertain solutions to a market, while simultaneously grappling with inherent uncertainty about the services, products, and markets themselves (Huang & Pearce, 2015:634), angel investors, much like entrepreneurs, need to make decisions where there is both inherent supply-side and demand-side uncertainty.

Research suggests that angel investors have clear objectives of achieving extraordinarily profitable investments rather than seeking to maximize return on each investment, and they tend to rely on a combination of expertise-based intuition and formal analysis in making investment decisions (Huang & Pearce, 2015:634).

This suggests that angel investors, like entrepreneurs also resort to satisficing decision-making in situations characterised by extreme uncertainty, as is the case in new venture creation.

8.4. LIMITATIONS

A study of this nature is not without its limitations. Grounded theory studies in general do not encompass large sample sizes. Typically, with grounded theory research, samples tend to be small and non-random as the sample size is dictated by theoretical saturation and not on randomness.

The grounded theory approach involves the use of purposive sampling methods to recruit participants, which involves recruiting participants with differing experiences of the phenomenon so as to explore multiple dimensions of the social processes under study. It is the concept or the experience under study that is the unit of analysis; and given that an individual person can generate hundreds or thousands of concepts, large samples are not necessarily needed to generate rich data sets (Starks & Trinidad, 2007).

While it is not always possible to predict the size of sample required in order to saturate a given theory, typical grounded theory studies report sample sizes ranging from 10 to 60 persons (Starks & Trinidad, 2007). The grounded theory method, however, has been utilised for samples as small as one (For example, Fendt & Sachs, 2008).

In this respect, grounded theory studies are comparable to ethnography studies. Because ethnography studies generally relate to the detailed examination of the nature of particular social phenomena in a very small number of settings, it is not unusual for ethnographic research to be conducted in just one social system (Locke, 2001).

Regardless of this, the strengths of the grounded theory approach are said to lie in its depth of inquiry and its unimpaired interplay between theory and empirical data (Fendt & Sachs, 2008).

Furthermore, although grounded theory permits an understanding of the dynamics of particular situations that can lead to new theoretical approaches that represent, as a rule, empirically valid hypotheses or theories (Fendt & Sachs, 2008), most grounded theories are substantive theories in that they seek to address delimited problems in specific substantive areas (Charmaz, 2006).

It is necessary to also emphasise some of the key points on qualitative research. Firstly, because of the large amount of time and effort involved in such studies, qualitative researchers cannot usually study very large sample of participants. Secondly, the interpretivist approach in qualitative research does not make any claims of 'truth' or generalisability (Soklaridis, 2009).

Since the qualitative researcher is actively involved in the data collection and analysis, the notion of the researcher being separate from the subject of research is neither desirable nor possible. Therefore, it is likely that the qualitative researcher might inadvertently bias the results of the study (Soklaridis, 2009).

As such, one limitation to the study concerns the generalisability of its results. Although some characteristics of the sample in this research make them representative of the broader population of expert and novice entrepreneurs, the conclusions presented in this study do not claim to be generalisable.

This exploratory study was designed to communicate theory rather than to directly generalise results to a broader population, and as with other grounded theory research (For example, Fendt & Sachs, 2008), this study generalises “theoretically, rather than empirically”. In so doing, this study provides valuable insights into opportunity recognition, which could prove useful to other researchers engaging in entrepreneurship research in somewhat similar settings.

In addition, as is the case in all grounded theory development (For example, Baker & Nelson, 2005), additional work is required to test the concepts and relationships that have been theorised in this study.

Another of the study’s limitations could be attributed to the fact that the study has limited geographic diversity. It should be noted that this work is exploratory, and the researcher relied on intensive study of a non-representative sample of firms. Nevertheless, the dynamic and evolving environment of high-growth, technology start-ups was particularly appropriate for detailed observations of decision-making situations, which are characterised by uncertainty.

8.5. DISCUSSION

A key difference between the two decision making modes is that effectuation puts emphasis on using means at the immediate disposal of the entrepreneur to achieve imagined ends while causation relies on predicting the future and pre-determining commercialisation goals (Maine, Soh & Dos Santos, 2015:53).

The study finds that novice entrepreneurs tend to alternate between causation and effectuation decision-making modes. Novice entrepreneurs start opportunity recognition process by using causation decision mode. Novices tend to use predictive strategy for market entry decisions in that they look to predict trends and thereby reduce the uncertainty associated with market entry. Novice entrepreneurs switch to effectuation mode in that they use an affordable loss strategy in assessing resource allocation. Since novices are working with limited resources, they are primarily concerned with how much can they afford to lose when creating a new business venture.

The findings of the current study support that of Maine et al., (2015:53), in detecting that entrepreneurs adopt different decision-making modes as they respond to their evolving environment, such that entrepreneurs can shift from one mode to the next. Consistent with their

findings, this study finds that the interplay between the environment and entrepreneurial decision-making modes describes when and how entrepreneurs adapt their responses and actions, and the moderating role of external constraints explains the shift between the two decision-making modes.

The current study shows that novice entrepreneurs are more likely to use causation mode for conceptualising potential opportunities but then they switch to effectuation mode when evaluating their available means as well as possible constraints for executing a potential opportunity. In this respect, a recent study by Engel et al., (2014:12) may provide an explanation this. Engel et al., (2014:12) suggests that while their findings are consistent with prior research showing that novice entrepreneurs mostly use predictive logic in an attempt to foresee future events, they point to the critical role of entrepreneurship self-efficacy, regardless of either actual ability or experience, in propelling novices away from their default response and switching to effectual logic.

Expert entrepreneurs on the other hand apply various effectuation principles to their decision making and they seek to reduce the uncertainty associated with market entry through the use of satisficing decision rules.

A key finding of the current study is that the novice entrepreneur uses causation mode when considering market entry opportunities. In other words, causation mode is used for demand-side analysis. The novice then switches to effectuation mode when considering resources and capabilities necessary for creating their product. In other words, effectuation mode is used during supply-side analysis.

Key findings of the current study indicate that novice entrepreneurs create supply-driven paths built around alignment between new product development and consumer behavior, while expert entrepreneurs create demand-driven paths built around alignment between markets and desired utility. Thus, these two findings provide support for the theory of effectuation in that they indicate that novice opportunity conceptualization paths are supply-driven and novice entrepreneurs use effectuation mode during their supply-side analysis. In other words, novice entrepreneurs seek to bring a new product to an existing market. In such cases, greater uncertainty resides on the supply side which is why the novice resorts to effectuation mode for their supply-side analysis.

Expert entrepreneurs on the other hand use effectuation decision-making mode for both supply-side and demand-side analysis. Based on the empirical findings, this study argues that in situations characterised by uncertainty and ambiguity, expert entrepreneurs revert to cognitive simplifying processes in order to make decisions about potentially successful business ventures. In other words, expert entrepreneurs utilise simplifying mental models to make sense of information or situational activities in highly uncertain environments.

Current effectuation literature explains how entrepreneurs use suitable means during opportunity creation but it does not explain the path that entrepreneurs use to in order to achieve suitable ends. This study adds to the literature on effectuation and causation by finding that expert entrepreneurs use satisficing decision making that follow 'satisficing' rules in order to achieve suitable ends.

Effectuation suggests that entrepreneurs' new venture decisions starts with suitable means with imagined ends. This research finds evidence that indicates that expert entrepreneurs make opportunity creation decisions also with suitable ends in mind. This research finds that expert entrepreneurs make strategic choices that are focused on the utility that they can create for themselves out of a particular business idea. That is, expert entrepreneurs' decisions are based on achieving certain desirable outcomes.

Because the expert entrepreneurs in this research sample were all successful entrepreneurs, which were one of the criteria for classifying them as an expert, they were more focussed on the utility derived from the commitment of their resources – both human and financial resources. Expert entrepreneurs however, do not seek to maximise utility, but rather make satisficing decisions that to some extent, mitigates uncertainty and allows the entrepreneur to explore alternative pathways until he finds one that is good enough for him to expropriate value.

This study builds on the works of Sarasvathy and colleagues by explaining how expert entrepreneurs strive to achieve suitable rather than imagined goals through satisficing decision making when faced with uncertain decision-making contexts. This leads the researcher to posit the following:

Proposition 1: Opportunity recognition occurs through uncertainty-mitigating paths that are mediated by the expert entrepreneur's satisficing decision-making.

The findings of this study indicate that expert entrepreneurs attempt to identify a suitable supply-demand combination of the business opportunities on the basis of their established business rules and principles for opportunity recognition. If the opportunity attains a fit with these rules, then the expert entrepreneur is more likely to allocate resources towards enacting that business venture.

On the basis of the key findings of this study, the researcher posits a theory of entrepreneurial decision-making in the context of uncertainty, as one that can be premised on a theory of satisficing.

The argument for a theory of satisficing evolve from the main conclusions of this study, which show that expert entrepreneurs make strategic decision choices about entrepreneurial opportunities on the basis of the business fundamentals as well as the perceived value of the

opportunity. They focus on attaining alignment between the supply- and demand-sides of an opportunity and they seek to manage inherent uncertainty by reverting to established business rules and principles. Since expert entrepreneurs seek to frame decision choices in uncertain environments as a set of 'rule of thumb' solutions, it is postulated that expert entrepreneurs use satisficing principles or rules as approximating mechanisms in their decision-making about entrepreneurial opportunities.

Key arguments of the current study are that entrepreneurs operate in environments that are inherently complex and are characterised by uncertainty and ambiguity. In these situations, the more general logic of optimal decision-making, based on the application of well-defined preferences to a known opportunity set, is severely limited (Sarasvathy & Dew, 2005). Furthermore, in modern behavioural economics it has been acknowledged that the assumption of complete information that characterises rational choice theory is implausible (Schwartz, Ward, Monterosso, Lyubomirsky, White & Lehman, 2002).

This study argues that due to the complex nature of entrepreneurship, and the unstructured environment in which entrepreneurial start-ups operate, entrepreneurs should attempt to satisfice rather than maximise their decision choices.

While previous studies have found that the knowledge structures of experts play a critical role in their decision-making (Gaglio & Katz, 2001), the particular mechanisms through which these knowledge structures contribute to decision-making are not clearly articulated in the literature.

The findings of this research make a valuable contribution in this regard in providing evidence that expert entrepreneurs frame decisions about opportunities in unstructured environments in terms of satisficing rules. While both expert and novice entrepreneurs adopt strategies to mitigate uncertainty in opportunity recognition, differences do exist between the two groups of entrepreneurs in that expert entrepreneurs construct a simplified working model of the opportunity in order to make satisficing decisions in uncertain environments.

Hence, a fundamental contribution of this study stems from its progression of a theory of entrepreneurial decision-making, namely that of satisficing. Furthermore, through its conceptual exploration of the role of the decision-making situations in the recognition of entrepreneurial opportunities, this study offers a theoretical foundation for introducing the construct of entrepreneurial satisficing into the entrepreneurship domain.

As evidenced in this study, although both groups of entrepreneurs were given the same business case study to analyse, the expert entrepreneurs showed that they are more likely to develop a strategy for managing uncertainty prevalent in a potential opportunity because they are able to utilise satisficing decision rules, which they have developed through prior business experience.

While this study was conducted in the technology sector, the researcher proposes that the findings are likely to be applicable to new venture creation decisions in other sectors that are characterised by a high degree of uncertainty and rapid change. For instance, in a study on international entrepreneurial opportunities, Chandra (2017:1) found that all the entrepreneurs in his study employed 'simple rules' to evaluate early-stage international entrepreneurship opportunities.

Kalinic et al., (2014:635) cites studies from the international entrepreneurship literature where entrepreneurs apply satisfying decisions in that they frequently take a limited number of alternatives into consideration and adopt an 'acceptable level of decision making as opposed to maximisation behaviour'.

Satisficing decision-making is likely to occur in sectors in which there is a high degree of uncertainty. As an example, in their study, Maine et al., (2015:53) examine biotechnology venture creation as it provided an especially appropriate context for their investigation as biotechnology entrepreneurs operate under challenging conditions, with sustained levels of high technology and market uncertainty during clinical development.

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