

**EXPLORING HOW
ENTREPRENEURS MAKE
DECISIONS ON THE GROWTH OF
THEIR BUSINESS:
A COGNITIVE PERSPECTIVE**

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A thesis submitted in partial fulfilment of
the requirements for the degree of
Doctor of Philosophy

**FACULTY OF BUSINESS AND LAW
DE MONTFORT UNIVERSITY**

September 2019

Declaration

To the best of my knowledge I confirm that the work in this thesis is my original work undertaken for the degree of Doctor of Philosophy at the Department of Management and Enterprise, De Montfort University. I confirm that no material of this thesis has been submitted for any award of any other degree or qualification at any other university. I also declare that parts of this thesis have been submitted for publications and conferences.

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Publications and Conferences

Evans, M. (2019) *Conversations across the table: Team decision-making*, Institute of Small Business & Entrepreneurship (ISBE) Conference forthcoming, Newcastle, November 13-15th 2019

Evans, M. (2019) Exploring decision-making: an information processing perspective, in Higgins, D., Jones, P. and McGowan, P. (eds) *Creating Entrepreneurial Space: Talking through Multi-voices, Reflections on Emerging Debates*, Bingley, Emerald Publishing, pp45-71

Evans, M. (2018) *Making Decisions for Small Business Growth: A Cognitive Style Approach*, ISBE Conference, Birmingham, November 8-9th 2018

Evans, M. (2018) *Learning by doing: using experience to develop expertise*, Organisational Learning, Knowledge and Capabilities (OLKC) Conference, Liverpool, April 25-27th 2018

Evans, M. (2017) *Developing cognitive versatility: Thinking it through*, ISBE Conference, Belfast, November 8-9th 2017. Nominated for award in Entrepreneurial Practitioner Learning Track

Evans, M. (2016) *Exploring how Entrepreneurs make Decisions on Growth: A Cognitive Perspective*, ISBE Conference, Paris, October 27-28th 2016. Nominated for award in Entrepreneurial Practitioner Learning Track

Acknowledgements

To all my family, friends and work colleagues who have provided encouragement and support along my journey.

A special thank you to my supervisors, Dr Martin Beckinsale and Dr Stefania Romano who have guided me through this doctoral thesis.

Abstract

The purpose of this study was to explore how entrepreneurs, who are past the start-up stage of business, evaluate and make decisions on growth opportunities. Small business growth is a complex, dynamic and episodic phenomenon and prior research on firm growth has emphasised cross-sectional approaches, rather than view growth as a dynamic process over time. Understanding small business entrepreneurs' cognition and behaviours when making opportunity-related decisions will show how growth decisions are made.

It is still unclear what cognitive styles and knowledge structures entrepreneurs use to process and frame information for opportunity-related decision-making. A closer look at opportunity evaluation, decision-making and entrepreneurial cognition revealed fragmentation, research gaps and areas for future research recommended by key scholars. As a consequence of this, an integrated process approach was taken using these three research streams. Specifically, a cognitive style lens, as a complex construct with multiple dimensions was used for viewing opportunity-related decisions, an approach missing from the opportunity evaluation literature. Additionally, the study was conceptually underpinned by dual process theory, the cognitive experiential self-theory or CEST.

A longitudinal, concurrent triangulation design was used to explore the decision-making process over five time points in a two-year period. A mixed methods approach supported the pragmatic paradigm for an exploratory study. A multiple-case strategy used a sample of 11 small manufacturing entrepreneurs, from novice to mature, with 3-30 years' experience as owner-manager. Data was collected at each time point using semi-structured interviews and two style assessments, the CoSI and REI. Quantitative data was analysed using descriptive statistics and thematic analysis for the qualitative data. Combining interviews and psychometric questionnaires for triangulation produced robust findings. Data was used to construct cognitive maps and cognitive complexity for insight.

Findings showed entrepreneurs were high on more than one style and switched between styles according to context, demonstrating styles were orthogonal. A unique finding was a synthesised, versatile style observed as a 'mirror effect' between the analytical and intuitive styles. Novices developed a more intuitive style over time, contingent with experience. A developing link in the novices' mental structures showed how past experience increased cognitive complexity and connectivity. A further unique finding showed the central concept 'Thinks it through' in the decision process as a structural conduit or "Hub" for both analytical and intuitive processing. Analysis suggested that cognitive complexity mediated the relationship between creative and experiential information styles and successful opportunity-related decision-making effectiveness.

These unique findings show opportunity-related decisions as a dynamic, time-based process. The time-based model provided a framework for future opportunity evaluation research as a contribution to theory. Likewise, a dual process and information processing perspective has offered an alternative structure for examining opportunity evaluation. Finally, a teaching model was developed to improve metacognitive thinking and connectivity for decision-making effectiveness as a contribution to practice.

Chapter 1: Introduction

*“Whenever you see a successful business, someone once made a courageous decision.”
Peter F. Drucker (1909-2000)*

Both scholars and practitioners agree that decision-making is an important activity at any stage of the entrepreneurial process, one that is necessary for day-to-day actions and essential for the development and growth of the business. Entrepreneurs regularly make decisions; these may be straightforward operational decisions, but also strategic decisions about future opportunities for growth. In the context of small business, the entrepreneur is usually the owner-manager and highest shareholder and carries a greater weight in the decision-making process. Since identifying opportunities is a key process in entrepreneurship (Shane and Venkataraman, 2000) and necessary for taking the business forward, any opportunity-related decisions will have significant outcomes for future progression and growth.

This study explores how entrepreneurs make decisions in the context of evaluating future business opportunities for growth. Any small business entrepreneur who has survived venture creation faces the next challenge to grow and sustain their business. This can be a difficult task, as the small business environment is uncertain, complex and ambiguous (Dutta and Thornhill, 2008; Zivdar et al., 2017) and where the window of opportunity can be limited and highly competitive (Miozzo and DeVito, 2016). Prior research has suggested that the personal characteristics of entrepreneurs are important factors for venture creation (Storey, 1994) and in shaping performance and growth (Hansen and Hamilton, 2011), but much research after this stage has identified potential macro-socioeconomic factors that influence growth (Jin and Kirsch, 2015), rather than focus on how ventures grow (Gilbert et al., 2006; McKelvie and Wiklund, 2010). Importantly, the micro-level processes by which individuals assess these opportunities as desirable or feasible are influenced by, or influence macro-level conditions (Jin and Kirsch, 2015). Thus, the interaction between the entrepreneur and the macro-environment results in new opportunities that are created or discovered as a result of processing new information, or as acquiring knowledge for developing expertise. Centre stage to this entrepreneurial process is decision-making as a key cognitive activity for growth.

Wright and Stigliani (2013) argued that prior research on firm growth has emphasised cross-sectional approaches and failed to recognise the dynamic states of growth over time. Furthermore a “shift in emphasis beyond the firm level to include the entrepreneurial level” (Wright and Stigliani, 2013, p4) was needed, as decisions about growth were made by entrepreneurs, not the firm. Similarly, as noted by Shepherd et al. (2014, p7), prior research mainly takes a static viewpoint (for example, Busenitz et al., 2003; Pech and Cameron, 2006; Maine et al., 2015; Farsi et al., 2016), which “largely ignores the possibility that entrepreneurs’ opportunity-related decision policies can change over time” (Shepherd et al., 2014, p7).

This motivated the researcher to question the need for a change towards fine grained theorising (Shepherd et al., 2009) by embracing recent developments in entrepreneurship research, taking a dual process, cognitive and contextual approach (Clarysse et al., 2011; Randolph-Seng et al., 2015; Fletcher and Selden, 2016). In addition, a longitudinal study would examine the dynamics of decision-making by exploring changes to the entrepreneurs’ cognitions and experiences and illustrate how these impact on their opportunity-related decisions over time. Hence, this exploratory study will show how cognitive factors play an important role in this process and help to bridge the gap between academic and practitioners’ understanding of how such growth decisions are made. Furthermore, supporting existing businesses who have growth potential may bring more long-term benefits to the economy than a focus on venture creation or high growth firms (Wright and Stigliani, 2013). It is interesting to note that current practice initiatives are undertaking a critical assessment of high growth support (Henley, 2018) with recommendations for a focus on episodic growth seen in small business. Nevertheless, the variation of small business performance and the different aspirations and capabilities of the entrepreneur means practitioner support must be targeted carefully.

Thus, a key aim of this explorative study is to provide teaching material that will assist decision-making effectiveness for growth, moving beyond the venture creation and start-up stages, in order to provide support for businesses who have negotiated and survived this process. This is important, as growth is needed for business sustainability and

economic stability. If up to 70% of new businesses fail with 10 years and around 25% fail within the first year (Shane 2008), this exemplifies the importance of managing growth correctly (Jin and Kirsch, 2015). It is the researcher's belief that instead of leaving the small business entrepreneur to make his own journey based on episodic growth, understanding how entrepreneurs make growth decisions beyond the opportunity recognition and start-up phases (Wright and Stigliani, 2013) will contribute to the entrepreneurial growth research agenda.

It is considered that the most profitable businesses are those who grow their businesses at a slow, steady rate over a long period (Blackburn et al., 2013). This study posits that a focus on these slower growth firms and the development of appropriate support programmes for these would help policy and practitioners assist small businesses to achieve faster growth, as well as understand how they manage and shape their own performance for future growth. Hence, exploring the underlying cognitive mechanisms and behaviours that mobilise entrepreneurial action and value creation (Muñoz and Cohen, 2017) will contribute towards building on current understanding of the cognitive processes of entrepreneurship. Understanding these determinants for slower growth firms could then be used to determine more effective support programmes for small business entrepreneurs to achieve faster rates of growth (Blackburn et al., 2013)

Cognitive research in entrepreneurship has mostly emphasised the how, when and why questions, focusing on the “development transformation, use of mental representations and other cognitive constructs and how, when and why these elements influence and are influenced by human action” (Wright and Stigliani, 2013, p8). Although substantial knowledge continues to be added to the field (Grégoire et al., 2011; Wright and Stigliani, 2013), the relationship between mind, environment and action (Fiske and Taylor, 2017) is still unclear. This is significant because the interplay between the cognitive preferences and mental frameworks that influence opportunity-related decisions will have implications for predetermining future strategic goals and growth. Furthermore, understanding how people construct and process information they receive from the environment is needed if cognitive processes are to be used to explain entrepreneurial behaviour and decision-making (Grégoire et al., 2015).

Taking an information processing perspective is key to achieving this study's aim and objectives and provides a framework for understanding the way entrepreneurs use information for opportunity-related decision-making. Conceptually, there is now improved understanding how entrepreneurs process information and that a rational decision-making model, which encourages goal setting and assessment of all alternatives is no longer representative of current thinking. Furthermore, the field of opportunity identification, and in particular opportunity evaluation, shows that the cognitive dynamics and decision-making frameworks that entrepreneurs use to evaluate opportunities are still under researched (Wood and Williams, 2014). In addition to this, the opportunity evaluation stage has frequently been "glossed over" in prior research (Wood and McKelvie, 2015, p257). As all opportunities, whether discovered or created by entrepreneurs are evaluated prior to exploitation, how entrepreneurs process information may shape a growth decision. Whether an intuitive or analytical processing mode is more positive for opportunity-related decision-making is a key question for research. As noted by Wright and Stigliani (2013, p8), despite a plethora of entrepreneurial cognition research, there is still limited understanding on what particular cognitive processes or styles entrepreneurs rely on when making decisions for growth.

Thus, entrepreneurial decision-making is still "a big picture that has some missing or incomplete parts" (Shepherd et al., 2014, p28). As a consequence of research conversations and recommendations noted in the literature review, a holistic approach is taken for this exploratory study. In order to view the bigger picture, gaps and recommendations from three perspectives in the entrepreneurship literature, namely opportunity evaluation, decision-making and entrepreneurial cognition are integrated to produce an overarching mental representation approach. This provides a suitable framework for exploring the complex and subjective nature of human behaviour and how entrepreneurial cognitions develop and change in response to internal and external influences that impacts on opportunity-related decisions.

How entrepreneurs make these decisions for growth is explored within the opportunity evaluation stage, as a "critical bridge between recognition and exploitation" (Wood and

McKelvie, 2015, p258). This decision was made in response to Wood and William's (2014) proposal that opportunity evaluation represents a first-person, temporal process, based on the "interface between individuals and circumstances as they discern the personal meaning of information sets" (p576). The use of mental templates and a cognitive style lens provides a window into the way the entrepreneurs think through and process information and an alternative methodology to the rule-based thinking framework suggested by Williams and Wood (2015). Findings from this study will determine the relationship between information processing modes and opportunity-related decision-making and allow in-depth exploration how the cognitive complexity of entrepreneurs influences the way entrepreneurs make these decisions (Iederan et al., 2009). This allows relationships to be assessed within and across perspectives for exploratory and explanatory ability and theory building (Wiklund et al., 2009) and how entrepreneurs develop and structure their cognitive models for evaluating potential growth opportunities.

Thus, this exploratory study takes a cognitive perspective in order to determine how entrepreneurs make decisions on growth that will embrace conceptual developments in cognitive theory and link conversations between different research perspectives (Shepherd et al., 2014). Adopting an integrated process approach over a period of two years will contribute theoretically to advancing understanding of entrepreneurial cognitive processes, depict changes in the deep cognitive structures (Krueger, 2007) of entrepreneurs over time as the evaluation process unfolds and provide an alternative information-processing framework for future research. Additionally, the development of a teaching framework for improving decision-making effectiveness crosses the boundary from academic theory to practitioner delivery and provides impact and added value for small business support initiatives.

The three perspectives, opportunity evaluation, decision-making and entrepreneurial cognition are introduced next in more detail. After this, the motivation and purpose of the study is discussed, followed by the research aims, objectives and intended outcomes.

1.1 Opportunity and the entrepreneurial process

A commonly cited definition by Shane and Venkataraman (2000, p218) defines entrepreneurship as “the scholarly examination of how, by whom, and with what effects opportunities to create future goods and services are discovered, evaluated and exploited”. An entrepreneur can also be broadly be regarded as a founder of a new business through innovation (Schumpeter, 1934). These definitions infer that entrepreneurship is a process and that entrepreneurs are creative, innovative information processors seeking to grow their business. Theories of entrepreneurship (Kirzner, 1973, 1997; Shane and Venkataraman, 2000; McMullen and Shepherd, 2006) have acknowledged the processes of opportunity discovery, evaluation and exploitation (Shane and Venkataraman, 2000) as an integral part of the entrepreneurship process. As such, opportunities may elicit feasible and desirable courses of intentional action (Shepherd et al., 2007). Growth outcomes from opportunities may also provide employment as a result of new products and services (Audretsch et al., 2002).

The notion of opportunity as a core process of entrepreneurship has led to a well-developed research stream on opportunity identification (for example, Corbett, 2005; Baron, 2006; Casson, 2007; Haynie et al., 2009; Hulbert et al., 2013; Wood et al., 2014; George et al., 2016; Hajizadeh and Zali, 2016; Kuckertz et al., 2017). There is a growing debate in the entrepreneurship literature whether opportunities are recognised or created (Maine et al., 2015), which has polarized between two different theoretical perspectives: opportunities that exist in the market place, waiting to be discovered, recognised and exploited by entrepreneurs (Shane and Venkataraman, 2000) or opportunities that are created through an emergent and iterative process, frequently in an uncertain or ambiguous environment (Alvarez and Barney, 2007; Vaghely and Julien, 2010). These two viewpoints have implications for theory building and have led to different models of opportunity identification, based on assumptions drawn from a range of different disciplines and different philosophical perspectives (Vaghely and Julien, 2010).

The lack of agreement amongst researchers has meant that a comprehensive model of the opportunity process is still missing, with research focusing more on the identification and

exploitation stages and considerably less on the evaluation stage (Wood and McKelvie, 2015). The integrated perspective and exploratory nature of the research study over a period of two years will provide an insightful, bigger picture how these decisions are made. This will add to the growing bank of opportunity evaluation research and decision-making frameworks that entrepreneurs use to judge a potential opportunity.

1.1.1 Opportunity evaluation

Opportunity evaluation cannot be construed as a simple task of weighing up the pros and cons of potential opportunities and actions, but as a complex, metacognitive activity determining and assessing outcomes from interpreting information and decision-making. Prior research has covered a wide range of conceptual themes and empirical studies that address this, for example, risk (Keh et al., 2002), decision heuristics (Bryant, 2007), resources (Haynie et al., 2009), information processing (Vaghely and Julien, 2010), metacognition and intentions (Urban, 2012), exposure to external information (Autio et al., 2013) rule-based decision making (Wood and Williams, 2014) or international opportunity (Chandra, 2017). Yet despite this opportunity evaluation research to date is relatively fragmented (Wood and McKelvie, 2015) and poorly represented in the entrepreneurial process.

This may be due to the fact that entrepreneurs bring different experiences and cognitive preferences (such as cognitive styles) to the decision process (Maine et al., 2015). Evaluation is highly likely to involve dynamic, time-dependent interplay between the perceived opportunity, the environment, the decision-making process and the context of each decision made by the entrepreneur (Maine et al., 2015). Hence a longitudinal approach will provide greater insight into such interplay and build on current understanding of cognitive processes (Shepherd et al., 2014, p7).

A focus on the opportunity evaluation stage in the entrepreneurial process will address an under researched area and imbalance identified by Wood and McKelvie (2015). Prior research has examined three distinct phases; opportunity recognition, evaluation and exploitation (Shane and Venkataraman, 2000; Ardichvili et al., 2003; Wood and

Williams, 2014). In contrast to the exploitation phase, evaluation is viewed by some scholars as a personal, first-person assessment (Wood and Williams, 2014), where “the notion that opportunity evaluation happens in the minds of entrepreneurs and involves interpreting circumstances in order to decide what can be achieved within those circumstances” (Wood and McKelvie, 2015, p262). Thus, consistent with findings from empirical studies, this study has assumed opportunity evaluation to be a cognitive process that unfolds as individuals process information and arrive at their decision, using their mental models and experience to help them determine the feasibility and attractiveness of the perceived opportunity (Grégoire et al., 2015; Wood and McKelvie, 2015).

1.1.2 Decision-making and a longitudinal approach

Whilst the literature on entrepreneurial decision-making portrays a variety of approaches and viewpoints, decision-making is frequently viewed as taking place in uncertain and challenging contexts (Shepherd et al., 2014). Examining this further, Shepherd et al. (2014, p7) suggest that taking a static viewpoint did not shed any light on how change influenced decision-making and recommended a temporal approach for future research. As opportunity-related decisions are seldom an immediate response to a perceived opportunity, time is necessary for the intentional act to unfold for action. The evaluation of an opportunity in terms of a desirable and feasible end state (McMullen and Shepherd, 2006) is not only a cognitive process, but a dynamic and temporal one.

However, prior research has focused more on cross-sectional designs (Keh et al., 2002; Haynie et al., 2009) with only a few empirical studies as qualitative or longitudinal studies (for example, Andresen et al., 2014; Maine et al., 2015; Chandra, 2017). There is now a call for more longitudinal perspectives for understanding the dynamics of the entrepreneurship process (Cools and Van den Broeck, 2008; McMullen and Dimov, 2013; Wright and Stigliani, 2013; Barbosa, 2014; Cools et al., 2014; Shepherd et al., 2014; Grégoire et al., 2015; Randolph-Seng et al., 2015; Wood and McKelvie, 2015). Research must also reflect the current trend of taking a microfoundations approach to decision-making (Barney and Felin, 2013).

Longitudinal studies in the opportunity evaluation literature are scarce (Chandra, 2017). In view of this gap, a repeated measure design over five time points was used to explore how the mental representations of entrepreneurs changed over time, in order to observe the dynamics associated with opportunity-related decisions. This approach was used to capture any long-term individual changes and to facilitate the discovery of relationships between the three perspectives that were not a result of controlled contextual variables. In addition, using a mixture of experience (novice, intermediate and mature entrepreneurs), facilitated a more fine-grained examination how entrepreneurs use their experience and knowledge to make opportunity-related decisions, as variance of behaviour and knowledge has already been shown to effect opportunity identification (Ardichvili, 2003; Corbett, 2005).

1.1.3 An entrepreneurial cognitive perspective

Primarily, this research study takes a cognitive perspective, viewing entrepreneurial cognition as knowledge structures (Mitchell et al., 2002) and cognitive processes (Baron, 2006; Baron and Ensley, 2006). Entrepreneurial thinking is “central to understanding both entrepreneurs and entrepreneurship” (Krueger, 2007, p107). As a result of this the entrepreneurial cognition literature is dominated by a large body of research based on scripts, self-efficacy, cognitive styles and heuristics (Sánchez et al., 2011), where opportunities are evaluated more favourably when using prior knowledge (Haynie et al., 2009). Additionally, there is a plethora of literature on entrepreneurial decision heuristics, frequently used when evaluating opportunities (for example, Busenitz and Barney, 1997; Simon and Shrader, 2012; Arend et al., 2016). Novice entrepreneurs have been shown to use less heuristics in their decision-making process compared to experts (Hammond et al., 1987). All in all, the entrepreneurial cognition literature is diverse and prolific.

Important to this study is the notion of decision-making as an intentional act, which can be influenced by endogenous factors, such as personal characteristics and beliefs and exogenous factors, such as situational influences (Sánchez, 2012, p28). Rather than exploring the role of specific cognitive variables in the decision process, this study has taken a holistic approach to the antecedents of intention by focusing on the cognitive

micro differences of entrepreneurs in the context of their decision environment, with particular emphasis how this process unfolds over time. This line of exploration points to the study of deep knowledge structures and beliefs of the entrepreneur (Krueger, 2007; Wood et al., 2014), which are analysed using cognitive mapping techniques. A growing body of research has highlighted the role of prior experience and the importance of expert schemas for developing business opportunities (Grégoire et al., 2011; Sánchez et al., 2011). This study's findings have provided unique cognitive insights into the opportunity-related decision process.

Cognitive map analysis showed differences in information processing between novices and mature entrepreneurs and the development of expert information as domain expertise acquired from previous experience. Experienced entrepreneurs used expertise or tacit knowledge in their decision-making process, shown by their ability to recognize patterns and draw on rich mental schemas (Klein, 2015). According to information processing theory, this is acquired through deliberate practice (Dane et al., 2012; Dijkstra et al., 2013; Harteis and Billett, 2013) which has implications for learning and practitioner support.

The use of CEST as a dual process theoretical model provided a more balanced perspective (Sadler-Smith and Shefy, 2004), that is, the ability to switch between information processing styles as needed (Hodgkinson and Clarke, 2007). Hodgkinson and Sadler-Smith (2018) have urged researchers to reconsider theoretical conceptions that have previously dominated existing research domains, noting one of these areas is the “interplay between intuition and analysis in reasoning, judgment, decision-making and social cognition” (Hodgkinson and Sadler-Smith, 2018, p474). Consistent with dual process theory, intuition is a key cognitive process, where a versatile cognitive approach demonstrating high levels of intuition and analysis used together mediates the relationship between experience and opportunity identification (Baldacchino, 2013). Findings from this study indicated that this was similar for the opportunity evaluation stage.

Cognitive interplay assumes intuition and analysis as separate and distinct constructs, thus allowing both styles to work together, rather than as opposites along a continuum. The former conceptualisation has prompted a typology of styles (Hodgkinson and Clarke,

2007; Hodgkinson et al., 2009; Sadler-Smith 2009, Akinci and Sadler-Smith, 2013; Armstrong et al., 2012a; Cools et al., 2014), whereby one can operate as a highly intuitive and analytical, cognitively versatile individual. This versatility was first noted by Louis and Sutton (1991, p57), as a “switching of cognitive gears” and has brought to prominence the importance of intuition in decision-making and how it may be operationalised in practice.

1.1.3.1 An information processing perspective

This study takes an information processing perspective for decision-making to show how entrepreneurs gather and process information in different ways, known as cognitive style (Sadler-Smith and Shefy, 2004; Armstrong et al., 2012b; Lee Ross, 2014). Cognitive style has been empirically studied from many different perspectives (for example, Brigham et al., 2007; Armstrong and Hird, 2009; Hodgkinson et al., 2009; Groves et al., 2011; Cools et al., 2012; Akinci and Sadler-Smith, 2013; Lee-Ross, 2014) and conceptually reviewed (Kozhevnikov, 2007; Armstrong et al., 2012a; Cools et al., 2014, Kozhevnikov et al., 2014). Notwithstanding, cognitive styles have also been shown to influence entrepreneurial intentions (Krueger and Kickul, 2006), generating multiple pathways to entrepreneurial intent. In addition, Sadler-Smith and Shefy (2004) have argued that because the business environment is complex, the more typical rational-intuitive way of processing information needed for successful performance may not be appropriate. Taken together, the use of a cognitive style lens as a window into entrepreneurial thinking is deemed an appropriate method for exploring the relationship between style and opportunity-related decisions.

Traditionally, style focus has been on bipolar differences between analytical and intuitive thinking (Cools and Van Den Broeck, 2007), but according to Kozhevnikov et al. (2014), advances in cognitive neuroscience (Smith and DeCoster 2000; Sadler-Smith, 2016; Hodgkinson and Sadler-Smith, 2018; Bendall et al., 2019) have highlighted the notion of styles as orthogonal dimensions. Similarly, human cognition is now considered as a dual cognitive process (Epstein, 1994; Epstein et al., 1996; Epstein and Pacini, 1999; Sadler-Smith, 2004). This dual process conceptualisation addresses a key debate in the entrepreneurial cognition literature. Thus, a parallel-competitive dual process model,

known as CEST, is adopted for this study, consistent with growing evidence from neuroscientific developments (Hodgkinson and Sadler-Smith, 2018; Bendall et al., 2019), and the operation of dual process theories as two different yet complementary systems (Julmi, 2019).

1.2 Motivation and purpose of the study

The initial motivation for this study came from reading an academic journal by Wright and Stigliani (2013) on entrepreneurship and growth. Future research recommended by these authors highlighted an interesting research gap, focusing on the micro foundations of growth and addressing the ‘how’ and ‘why’ questions beyond opportunity recognition and the start-up phase. Alongside a professional interest in cognitive psychology from prior teaching and training, and in particular, an interest in cognitive styles and cognitions, led the researcher to consider how small business training and development programmes could be improved to address the heterogeneous nature of entrepreneurs, rather than the ‘one size fits all’ generic programmes that had been the researcher’s own experience in business.

It is intended that the results from this study will be used to develop training support material for practitioners and educators, to help entrepreneurs improve their decision-making skills and metacognitive abilities through appropriate practice and feedback. It is also intended that this material will be commercially suitable for business education, such as coaching and mentoring programmes. Additionally, the results will assist entrepreneurs and policy makers to understand the cognitive processes associated with opportunity-related decisions. This will contribute to promoting and developing growth and sustainability of businesses past the start-up stage.

There are several lines of enquiry that have underpinned the purpose of this study. Firstly, empirical research has highlighted opportunity identification as a key entrepreneurship process, which has received considerable attention in the extant literature (Grégoire et al., 2011). Additionally, opportunity evaluation has become a focus of interest in entrepreneurship where evaluation is a “critical bridge” between identification and

exploitation (Wood and McKelvie, 2015, p273). Hence the purpose of this study is to explore this 'bridge' in real business situations, in order "to describe opportunity evaluation as an iterative process that unfolds over time" (Wood and McKelvie, 2015, p273).

Secondly, taking a mental model representation is seen as a valuable approach for moving the opportunity evaluation research forward (Wood and McKelvie, 2015), as it illustrates the structural formation of entrepreneurial thinking as an information process moving from perception through to action. This also addresses an area of cognitive psychological interest for the researcher. A cognitive perspective will provide insight into an individual's mental model whether the opportunity is "attractive to me" (Haynie et al., 2009, p338) as a first-person, mental representation of the feasibility of the opportunity (Williams and Wood, 2015).

Thirdly, cognitive style has not been used as a lens for viewing the evaluation process, identified as a gap in the extant literature. Taking an information process approach involves the thinking and feeling dynamics associated with cognitive processes and behaviour and how information is retrieved or constructed from memory (Grégoire et al., 2015). Additionally, the exploration of intuitive processing and cognitive versatility plays in opportunity evaluation is also relevant, as a possible, alternative structure to Williams and Wood's (2015) empirical study on rule-based reasoning. As there appears to be a move towards the idea that individual differences, such as cognitive style, moderates the influence of rules that individuals use for developing images of the opportunity and evaluating its feasibility (Wood and McKelvie, 2015), this is an important area for future exploration. Creative and intuitive processes, such as the "trusting gut heuristic" (Bryant, 2007, p742) may illustrate that although a rule-based approach is more consistent with prior research (Williams and Wood, 2015), other potential structures must be explored to gain further insight into the process of opportunity evaluation (Williams and Wood, 2015). This research study aims to contribute to this field.

Finally, according to Ardichvili et al., (2003, p121), qualitative in-depth case studies, content analysis and cognitive mapping techniques are needed to provide a more detailed

insight into the process. They state that successful opportunity identification is influenced by alertness, prior knowledge, social networks, personality traits and is a cyclical, iterative process. This means that it is important to consider the environment in which these opportunity-related decisions take place in order to capture the complete picture.

In conclusion, the purpose of this study is to explore how entrepreneurs evaluate and make decisions on potential growth opportunities. The rationale for an integrated approach is based on a review of three research streams from the entrepreneurial literature that have identified gaps and common recommendations from prior research, so when combined into an overarching framework provide novel insights, as well as addressing the fragmentation caused by specialisation (Barbosa, 2014). Integrating these conversations between the themes of opportunity evaluation, decision-making and entrepreneurial cognition will result in a richer, more detailed picture of opportunity-related decision-making. These gaps are summarised in the next section.

1.3 Identifying research gaps

First, research on entrepreneurship places considerable emphasis on firm growth as the primary indicator of business success (Davidsson et al., 2010; Clarysse et al., 2011) and as a necessary requirement for increased profitability (Davidsson et al., 2010). According to Wright and Stigliani (2013, p4) a “shift in emphasis beyond the firm to include the entrepreneur level” is needed by “examining the micro foundations in terms of the entrepreneurs’ cognitive processes and experience”. Hence, understanding the entrepreneurs’ core beliefs and thoughts on growth, as well as the cognitive styles and knowledge structures they use to process information and make decisions on the growth of their business is a fundamental question to ask and one that is not fully explored (Wright and Stigliani, 2013). Hence the key to a growth minded entrepreneur is not only their ability to manage the growing business but to make decisions on opportunities that will provide future growth after venture creation. As a consequence of this, there is need to “engage in a deeper understanding of the cognitive styles that entrepreneurs rely on” when making decisions (Wright and Stigliani, 2013, p8). This is echoed by Armstrong et al. (2012a, p253) who note that future studies must “embrace more complex models in

which cognitive styles and environmental factors are taken into account”. This points towards taking an information processing approach for future studies.

Second, there is a developing body of knowledge on the cognitive processes associated with opportunity evaluation (Wood and McKelvie, 2015). A study of these cognitive dynamics is needed show what happens as the opportunity evaluation process unfolds (Wood and McKelvie, 2015, p269). However, evaluating an opportunity is based on the view that entrepreneurship is a multiphase process (Shane, 2000) and according to Wood and McKelvie, (2015, p269), frequently “glossed over”. The shift in importance of cognitive dynamics in opportunity evaluation, from third to first person emphasis is also needed to avoid further confusion and blurred boundaries between stages (Wood and McKelvie, 2015).

Third, Barbosa (2014, p389) proposed that entrepreneurship research should be revisited from a decision-making point of view, particularly “decisions relating to the entrepreneurial process”, based on the questions: *who, when, where, what, why, how* and *what for* as observed phenomena, but not as a preconceived theory that is applied to entrepreneurial settings. Thus, taking this approach requires understanding how information is gathered, framed and organised (Shepherd et al., 2014).

Finally, echoing a similar argument made by Wood and McKelvie (2015), the review of entrepreneurial decision-making literature by Shepherd et al. (2014) noted that fragmentation in the literature has made it difficult to determine exactly how individuals make key decisions in the entrepreneurial process. Moreover, they also stated that future research should explore the role of time in decisions in relation to entrepreneurial opportunity, with regards to “changes in opportunity related evaluations and decisions over time” (p7). Collectively, these scholars recommend that a longitudinal approach is necessary to advance understanding in the field. Thus, integrating the commonalities between these conversations and research gaps has resulted in the research aim and objectives discussed in the next section.

1.4 Research aim and objectives

The aim of this study is to explore how entrepreneurs evaluate decisions on growth opportunities after venture creation, to examine how this process unfolds from an information processing perspective and to determine factors that influence this process over time. This addresses research recommendations made by key authors in the field of entrepreneurship: the cognitive styles entrepreneurs rely on when making opportunity-related growth decisions (Wright and Stigliani, 2013, p8), the role that time plays in opportunity-related decision-making (Shepherd et al., 2014, p7), opportunity evaluation as a process rather than a static event (Wood and McKelvie, 2015, p595), individual self-focused cognition as a holistic approach to assist understanding the specific factors that underpin first person opportunity beliefs (Wood and McKelvie, 2015, p271) and an examination of the process dynamics from the inside (Grégoire et al., 2015).

The proposed research question is: *“How do entrepreneurs make decisions when evaluating business growth opportunities and what internal and external factors influence their decision-making process?”*

From this research question the study’s objectives were determined:

1. To explore the information processing styles that entrepreneurs use over a two-year period in order to determine factors that influence their opportunity-related decisions.
2. To explore how cognitive versatility is used in the decision-making process by examining how entrepreneurs adapt their preferred cognitive style contingent with context.
3. To compare and contrast differences in the thought processes between novice and mature entrepreneurs, to determine the relationship between style, versatility and prior experience.
4. To examine the mental representations used by entrepreneurs as they evaluate an opportunity, from initial decision through to final decision and to visually represent their thinking process using concept mapping techniques.

5. To develop a theoretical model for the process of opportunity evaluation and opportunity-related decisions that considers the iterative, dynamic and temporal nature of the subject matter.
6. To develop a teaching framework for opportunity-related decision-making, that will assist practitioners and educators help small business entrepreneurs understand and improve their decision-making effectiveness and cognitive complexity.

1.5 Intended contributions to literature

This research study will contribute to the entrepreneurship literature as follows:

First, as the opportunity process flows from recognition to exploitation (Wood and McKelvie, 2015), this research study contributes to the entrepreneurship literature by examining the decision process in the opportunity evaluation stage. Taking a mental model perspective will provide a comprehensive picture how these frameworks adapt and adjust as the entrepreneur moves through the centre stage of the entrepreneurial process (Wood and Williams, 2014; Wood and McKelvie, 2015).

Second, several studies have addressed style in the opportunity process (Barbosa et al., 2007; Brigham et al., 2007; Armstrong and Hird, 2009; Kickul et al., 2009; Randerson et al., 2016) but none have examined style in the opportunity evaluation literature. Taking an information processing perspective will add towards understanding how different ways of information processing may lead to different behaviours (Armstrong and Hird, 2009) by examining the relationship between style and opportunity evaluation. The use of a dual process framework and measurement instruments that are compatible with this perspective contribute to the debate between bipolar and multidimensional styles (Kozhevnikov, 2007). In addressing this debate, the study will provide further empirical evidence of cognitive versatility and throw light on how this develops over time. This is an important contribution to the cognition literature, as it focuses on the interaction between both information processing modes as individuals move through the entrepreneurial process.

Third, entrepreneurial decision-making is a well-researched but highly fragmented construct, particularly regarding how entrepreneurs make key decisions in the entrepreneurial process (Shepherd et al., 2014). Findings from this study will show the iterative nature of opportunity-related decisions which can be used for theory development in the evaluation stage of the entrepreneurial process. This will illustrate the salient concepts that are associated with this stage and thus contribute towards a more overarching theory for small business growth.

Finally, according to Shepherd et al. (2014), opportunity-based decision research has mostly taken a static perspective and ignored how potential evaluations and decisions change over time. In support of this, Cools and Van den Broeck (2008) have noted that more longitudinal, qualitative work is needed to explore cognitive style and small business growth. In particular, longitudinal studies involving changes in both cognitive states and knowledge bases are needed to provide insights into how the opportunities mature (Ardichvili et al., 2003) and ‘fine tune’ how these cognitive representations may evolve (Grégoire et al., 2015). This study’s longitudinal design will address these recommendations.

1.6 Overview of the thesis

The thesis commences with this chapter as the Introduction, followed by Chapter 2 as the Literature Review. This examines the research question and objectives, from a conceptual and empirical viewpoint, based on studies associated with entrepreneurial cognition and opportunity-related decisions for growth. This was achieved by using a systematic search of peer reviewed journals, based on three entrepreneurial themes: opportunity evaluation, decision-making and entrepreneurial cognition. An integrated perspective is proposed as a result of the review of the relevant literature.

Secondly, Chapter 3 outlines the development of the conceptual framework. A dual process theoretical cognitive perspective (Epstein et al., 1996; Pacini and Epstein, 1999; Hodkinson and Sadler-Smith, 2018) of the entrepreneurial decision process is taken as the framework for this study. The conceptual model focuses on the individual cognitions

of the entrepreneur as the unit of analysis in the context of opportunity evaluation and decision-making. Based on CEST (Epstein et al., 1996; Pacini and Epstein, 1999), the model includes the construct of cognitive style and the synthesis of both analytical and intuitive processing for a versatile, cognitive style (Sadler-Smith, 2009). The conceptual framework includes intuition-as expertise (Sadler Smith and Burke-Smalley, 2015) and several key influences in the external environment.

Thirdly, Chapter 4 provides detailed information about the research design, data collection techniques and analysis methods used to answer the research question. The research study is located within a pragmatist paradigm, using an exploratory multiple-case study strategy based on a concurrent mixed methods design. The shortcomings of past research justify the mixed methods as a two-year, repeated measures longitudinal approach. Data was collected using semi-structured interviews and cognitive style self-report psychometric instruments. The study has five time points for data collection. Qualitative analysis includes thematic analysis, cognitive mapping techniques and the quantitative analysis of style assessments used for triangulation. The chapter highlights the methodological issues and limitations encountered and discusses issues of ethical practice, validity and reliability.

Fourthly, the findings of this research are presented in Chapters 5. Transcripts were thematically analysed based on two themes; how analytical and intuitive styles were used in the entrepreneur's cognitive process and the factors that influenced decisions during opportunity evaluation. The concept of cognitive versatility was analysed. Cognitive mapping techniques illustrated the mental representations of each entrepreneur as they engaged in opportunity-related decisions. Cognitive complexity was explored to determine differences between entrepreneurs and the decision situation. Findings showed that the arrangement of concepts in the mental maps were contingent with experience. The development of new pathways over time, represented as links between previously unrelated concepts supported the development of versatility and intuitive expertise. A proposed model illustrates the iterative, staged process of opportunity-related decisions.

Chapter 6 discusses the findings of the study on opportunity evaluation, decision-making and entrepreneurial cognition. The chapter highlights the key contributions made by this

study and outlines their implications for practitioners and for the development of future theory. It then describes the study's strengths and limitations, and makes recommendations for future research.

Finally, Chapter 7 concludes with a summary of the research findings, their implication for theory and practice and a final reflection on the thesis.

1.7 Chapter summary

This chapter has explained the purpose of the research study and provided a brief overview of the integrated approach. It presents an outline of the three themes: opportunity evaluation, decision-making and entrepreneurial cognition. It has summarised current understanding and background information about the subject area. The chapter has defined the research question and objectives, identified the research gaps and explained the rationale for longitudinal approach. Finally, the chapter has highlighted the potential outcomes that the study has identified and provides a brief summary of the structure of the thesis. The next chapter will describe the process of the literature review and provide an in-depth discussion of each theme.

Chapter 2: Literature Review

“The answers you get from literature depend on the questions you pose”.
Margaret Atwood, Canadian novelist (1939-)

2.1 Introduction

Businesses past venture creation stage sooner or later have to make decisions whether or not to grow their business, so this can be the first important strategic decision that an entrepreneur makes after the start-up stage (Gilbert et al., 2006). As such, these opportunity-related decisions are the ‘mind in the middle’ between the identification and exploitation stages of the entrepreneurial process (Grégoire et al., 2015; Wood and McKelvie, 2015). Since entrepreneurial activity “occurs through the thoughts and actions of people” (Shane, 2012, p17), this underlines the importance of taking a cognitive perspective for the research study.

The chapter presents an overview of the current literature based on entrepreneurial opportunity evaluation, decision-making and entrepreneurial cognition. The purpose of this chapter is to provide a review of literature that addresses the research question, from a conceptual and empirical viewpoint. This will aid development of a theoretical framework and a critique of key studies that have investigated opportunity-related decisions from a cognitive perspective. The review will demonstrate that despite a plethora of literature on entrepreneurial cognition and decision-making, the cognitive processes that entrepreneurs use for opportunity-related decisions are still underexplored and poorly understood. Exactly how these decisions are made and the cognitive styles that are used has been identified as a gap in literature by Wright and Stigliani (2013).

The search began with reading published review papers, limited to peer reviewed journals, covering the three themes, opportunity evaluation, decision-making and entrepreneurial cognition. The rationale for this approach was based on the premise that to fully understand how entrepreneurs think through and make decisions on growth, a bigger picture model (Wiklund et al., 2009, p351) and a holistic view of the literature (Wood and McKelvie, 2015, p271) would provide a more detailed insight how these

decisions are made. This approach has reconciled and integrated various strengths from prior research and gaps identified from the literature review.

The literature review provided a detailed search of relevant journal articles of all three streams, to clarify and support this approach. In accordance with recommendations from these three streams, a longitudinal approach supported the temporal nature of opportunity-related decisions. Echoing Wood and McKelvie's (2015, p273) notion where evaluation is regarded as a "one shot event", a longitudinal approach would reflect the dynamic and interactive nature of the cognitive processes of individual entrepreneurs as they evaluate an opportunity. This would facilitate understanding on what shapes and influences opportunity-related decisions and the interplay between mind, environment and action (Wright and Stigliani, 2013). Furthermore, a multimethod approach using triangulated data may lead to more robust findings (Wood and McKelvie, 2015, p273).

The chapter is constructed as follows. Firstly, the literature search is described and core articles identified. Secondly, a critique of the literature from each stream is presented. Thirdly, the integrated approach is explained with reference to examples from the psychology and entrepreneurship literature. Finally, a summary of key issues, identified gaps and recommendations from the literature review are noted.

2.2 The literature search: a systematic review

Initially, Wright and Stigliani's (2013) journal article provided the starting point for the literature search on three key themes, opportunity evaluation, decision-making and entrepreneurial cognition. Using a review process similar to that used by Wood and McKelvie (2015, p258) in their review of the opportunity evaluation literature, three online data bases were accessed to locate relevant journal articles. These were EBSCO host, ProQuest ABI/Inform and Scopus. These databases provided access to full text, peer reviewed business journals and other sources, covering a wide range of literature and subject areas related to business and economics, psychology, entrepreneurship and cognition.

The review began with a systematic search of different combinations of eight search strings limiters for scholarly peer reviewed journals, EBSCO Business Source Complete, ProQuest's ABI/Inform and Scopus, published between 2007 and 2017. These databases provided a selection of journal articles for initial review across the domains of entrepreneurship, organisational management and psychology, representing a diverse range of published empirical and reviewed journal articles across the three literature streams. The search was limited to peer-review journals as representative of the field.

The period 2007 – 2017 was chosen to cover a decade of literature in the three streams, specifically to reflect a more contemporary approach seen in the cognitive entrepreneurship literature and an increasing interest in the opportunity evaluation literature. Shane and Venkatraman's (2000) seminal article on entrepreneurship that proposed three sequential stages (opportunity identification, evaluation and exploitation) was not used as a starting point, as there were already many existing citations and references made to this in the literature review period. Instead, the starting point of 2007 was chosen as this addressed a key review article by Kozhevnikov (2007) of the move towards a multi-dimensional framework in the cognitive style literature, the development of the Cognitive Style Indicator by Cools and Van den Broeck (2007) and the importance of entrepreneurial thinking in the entrepreneurial cognition literature (Krueger, 2007). This period of time also represented some key articles by scholars in the field of entrepreneurial cognition, advocating the use of dual process theory for empirical research (Hodgkinson 2009; Armstrong et al., 2012a; Sadler-Smith and Burke Smalley, 2015). The end of year 2017 was chosen to complete the review to coincide with completion of the research's data collection. Notwithstanding, the researcher has continually reviewed the three streams for any advances in the field during 2018-2019 and updated the literature review accordingly.

For all three databases the strategy outlined by Short et al. (2010) and Wood and McKelvie (2015) was adopted. The search comprised of keywords using EITHER/AND limiters across a range that did not specify any particular journal, in order to capture relevant articles that existed across the psychology, organisational management and entrepreneurship publications. Results of this search are shown in table 2.1. As adopted

by Cools et al. (2014), the psychology search was specifically limited to cognitive style in the context of entrepreneurship, business management and dual process theory, as a pure psychology review was outside the scope of this study.

Search terms (Published date 2007-2017)	No of articles found
Entrepreneurship AND opportunity evaluation	57
Entrepreneurship AND decision-making	82
Entrepreneurship AND cognition	258
Entrepreneurship AND cognitive style	58
Cognitive style	417
Entrepreneurship AND decision-making AND cognition	58
Entrepreneurship AND decision-making AND cognitive style	10
Entrepreneurship AND decision-making AND opportunity evaluation	22
Total	962

Table 2. 1 Results of initial search using limiters across databases

In total, 962 articles were located based on the initial search across the three themes. Duplication of any publications found across these data bases were removed, as both the decision-making and opportunity identification themes had generated some degree of overlap with the cognitive perspective. This provided a bank of journal articles for the next stage.

The second stage of the search excluded articles considered not relevant, following Wood and McKelvie’s (2015, p259) review strategy, if they “did not focus on opportunity evaluation and decision-making in a meaningful way, or did not consider the cognitive aspects of evaluation in some way”. In addition to this, special attention was paid to articles that specifically mentioned cognitive style to ensure that the style approach was relevant for entrepreneurship rather than just pure psychology. The exclusion selection was manually undertaken to ensure the appropriate content was relevant and that nothing was missed. This was achieved by reading the journal abstracts first to assess relevance and then the whole article if the content was deemed uncertain. A final list of journal articles was cross checked for duplication. The result of this search identified 171 articles across the three research streams from 2007-2017.

These journal articles were then thoroughly read and both methodology and relevant contributions noted. From these 57 were selected as core articles for this study, listed in Appendix 1. Additionally, 12 other key articles, pre-2007 from the reference lists and added to the list. Several books were included, considered important for theory and conceptual content. Twenty-two empirical studies are highlighted with a ** for high importance as core text. These core articles provided either a literature review on the subject area or were based on empirical research and findings. Four journal articles from 2018-2019 were added to this list post data collection.

In summary the literature review identified and critically reviewed both empirical and conceptual journal articles across three themes, adopting a narrative process before finally synthesizing contributions and gaps that addressed different aspects of the phenomenon. These three themes were opportunity evaluation, decision-making and entrepreneurial cognition. The literature review indicated gaps in the three streams that were combined for an integrated approach to the research question (Wiklund et al., 2009). In addition, the review showed that to advance the field conceptually and to overcome the fragmentation in literature, new approaches were required, as empirical studies were still scarce for the study subject area.

2.3 The intention to grow

The commencement of the entrepreneurial process begins with the entrepreneur's intention to create and start a business. The concept of intentionality is theoretically based in psychology, where attitudes, behavioural control and social norms of an individual are the antecedents to behaviour and where intentions are regarded as the best predictor of planned behaviour (Krueger and Kickul, 2006). As Douglas (2013) posited, entrepreneurs who have a predisposition for growth can be identified whether they will be independent (lifestyle) or growth oriented, depending on their abilities, attitudes and means available to the individual. Hence growth is unlikely to occur without the necessary resources and skills, even if the business owner has positive growth intentions (Penrose, 1959; Wiklund and Shepherd, 2003) or is without a suitable opportunity (Stenholm, 2011). Thus, intentionality is critically linked to entrepreneurship.

This places the focus on the individual as a unit of analysis. The intentional literature has mostly identified individuals who have the potential to become entrepreneurs and who intend to create a new venture (Drnovosek and Erikson, 2005). Notably, there are only a few studies which have explored the growth intentions of entrepreneurs in existing, established businesses or studies of growth intentions over a period of time (for example, Dutta and Thornhill, 2008, 2014). As such, the decision to start a business will be quite different from the decision-making process associated with growth after creation. Hence this study has focused on opportunity-related decisions made by entrepreneurs who are past the start-up stage of business, to extend understanding of the cognitive relationship between the entrepreneur and growth of small firms.

2.3.1 Growing a business

Small business growth is seldom a linear process, reflecting the unstable, competitive environment in which businesses develop (Sadler-Smith and Shefy, 2004). According to Wiklund and Shepherd (2003), unless the small business owner-manager has a propensity for growth, it is unlikely that the business will develop further. Research has studied the potential changes of intentions over time in a competitive environment (Krueger and Kickul, 2006; Dutta and Thornhill, 2008), made comparisons between cognitive style and entrepreneurial action for both new and mature businesses (Armstrong and Hird, 2009) or aspirations and motivations towards growth and development (Wiklund and Shepherd, 2003). Overall the growth intention literature has covered a broad range of concepts resulting in a well-developed research stream, which shows the intention to grow as an antecedent for growth and a driver for entrepreneurial action (Krueger et al., 2000; Krueger and Kickul, 2006; Wood et al., 2014). Hence, as growth intentions are also an antecedent to opportunity beliefs, intention is necessary for the opportunity to be identified, evaluated and exploited.

Identification of growth intentions and the antecedent causes of these is a well-researched stream in the entrepreneurship literature (for example, Krueger et al., 2000; Krueger and Kickul, 2006; Delmar and Wiklund, 2008; Douglas, 2013; Dutta and Thornhill, 2014;

Hermens et al., 2015; Girotolopoulos et al., 2017), but much of this research focuses on venture creation or early stage entrepreneurs. This may be due to the fact that by taking an entrepreneurial process perspective, looking at growth intentions beyond the start-up stage is not deemed critical, as the growth process has already begun, and with intention, is likely to continue. As stated previously, Wood et al. (2014, p261) argued that willingness to pursue an opportunity is an intentional act. Additionally, Levie and Autio's (2013, p5) meta-analysis on growth and growth intentions confirmed that growth intentions directly affect subsequent growth and that "growth intentions do matter". Furthermore, they emphasise that "growth intentions are a consequence of individual characteristics and more weakly affected by environmental effects" (Levie and Autio, 2013, p25). This indicates the importance of the entrepreneur as an individual unit of analysis in growth studies.

Nevertheless, as small business growth frequently takes place in an uncertain environment, growth cannot be assumed to continue in the same way, nor with the same intention after venture creation. Even if the entrepreneur has every intention to grow his businesses, the decision may not be subject to the same factors and influences that have been identified at venture creation stage. Accordingly, few studies explore growth intentions post venture creation and in particular, over time. For example, Dutta and Thornhill's (2008) study on the growth intentions of entrepreneurs over a five-year period has provided some interesting results, which are reviewed later.

2.3.2 Capturing the phenomenon of growth in small business

Literature acknowledges that growth is a complex and extremely well researched concept, but is prone to interruptions and setbacks in the field, which are often not considered (Garnsey et al., 2006). A major criticism of growth literature is the assumption that growth is an expected outcome, used as a measure of performance and business success, where inconsistencies and incompatibility of methodology, measures and models may not be applicable for entrepreneurs in small business. This can be problematic when growth is viewed as a process, due to the stochastic nature of growth and in particular for small businesses, who are susceptible to changes in the market and frequently without

resources needed to cope with stochastic patterns. This puts extra pressure on making opportunity decisions, given the risk, resourcing and investments that may be needed. One of the practical challenges facing small business is the unpredictability of the market and the potential of making an unwise or costly decision mistake, which can have dire consequences on profitability and cash flow.

Wright and Stigliani (2013) note that there is lack of understanding on the cognitive processes that shows how an entrepreneur makes decisions on growth and that this is missing from the growth literature. Supported by Clarysse et al. (2011) and Iacobucci and Rosa (2010), they argue that growth decisions by entrepreneurs have been neglected. Similarly, growth stage studies have been criticised for lacking conceptual and empirical alignment between the models, along with a confusing array of processes and phases (Garnsey et al., 2006). Taken together, these criticisms suggest that future research must explore the underlying cognitive processes (Leitch et al., 2010) so that the entrepreneur's decision whether or not to grow is understood for future contribution towards theory building (Wright and Stigliani, 2013). These criticisms have led to a call for more longitudinal research in the growth literature to support this understanding (McMullen and Dimov, 2013).

Another important consideration is that the analysis of the determinants of growth and the antecedents of intentionality have been complicated by the fact that an overarching model of small firm growth is missing (Dobbs and Hamilton, 2007). Considerable empirical work on growth has been based on cross sectional, linear models (McMullen and Dimov, 2013) and growth stages (Blackburn et al., 2013). According to Wiklund et al. (2009, p352), the fragmentation of literature has developed many different theoretical perspectives, whereby an integrated, bigger picture model is now needed. Likewise, the absence of a unifying theory has contributed towards fragmentation and a lack of understanding of growth in small businesses (Dobbs and Hamilton, 2007). Small business entrepreneurs must be regarded as a very different category of decision makers compared to managers in larger organisations (Curşeu et al., 2008).

2.4. Debating the nature of entrepreneurship as a process

Viewing entrepreneurship as a process identified two broad approaches seen in the entrepreneurship literature: engaging in technological innovation (Schumpeter, 1942) or being alert to opportunities for business creation (Kirzner, 1997). A Schumpeterian approach, according to Audretsch (2012) regards entrepreneurs as change agents in the economic system through innovative activity and who are motivated to prove themselves better than others (Casson, 2014, p10). Alternatively, Kirzner (1997) views entrepreneurship as seeking opportunities and exploiting these, using the concept of entrepreneurial alertness as a “distinctive psychology” (Casson, 2014, p10).

Both the Schumpeterian and Kirznerian viewpoints address opportunity recognition (Hulbert et al., 2015; George et al., 2016) and view entrepreneurship as a journey (McMullen and Dimov, 2013). Opportunity plays an important part in entrepreneurship theory (Sarasvathy, 2008; Alvarez and Barney, 2007; Foss and Klein, 2012; Casson, 2014). Conceptual foundations proposed by Schumpeter (1942) and Kirzner (1997) provide a framework for opportunity perception and identification in the literature. According to McMullen and Shepherd (2006, p132) entrepreneurship theory has traditionally taken two viewpoints; how the economic system functions depending on the pursuit of opportunities by an entrepreneur or how individual entrepreneurs act, that is, taking a system level or an individual level approach. Additionally, opportunity identification can be conceptualised as both a discovery and creation process where opportunity could be described by either approach (Alvarez and Barney, 2007; Vaghley and Julien, 2010). This means a process approach (Shane and Venkataraman, 2000; Baron, 2007; Gielnik et al., 2012; Moroz and Hindle, 2012) suggests opportunity identification will be constantly changing and evolving. Opportunities are thus formulated and processed (McMullen and Dimov, 2013), according to conditions of uncertainty and judgment for deciding “between alternative courses of action that take place in an uncertain future” (McMullen and Shepherd, 2006, p134).

McMullen and Shepherd (2006, p140) argue that the process from perception to action is based on the belief that a technological change represents a third person opportunity (as an attention stage), which triggers a decision-making process for evaluating the

opportunity as a first-person process. Their conceptual model (see figure 2.1) shows the importance of knowledge and motivation for entrepreneurial action and provides a visual explanation of the change from third to first person assessment of the opportunity. This transition is critical for opportunity evaluation.

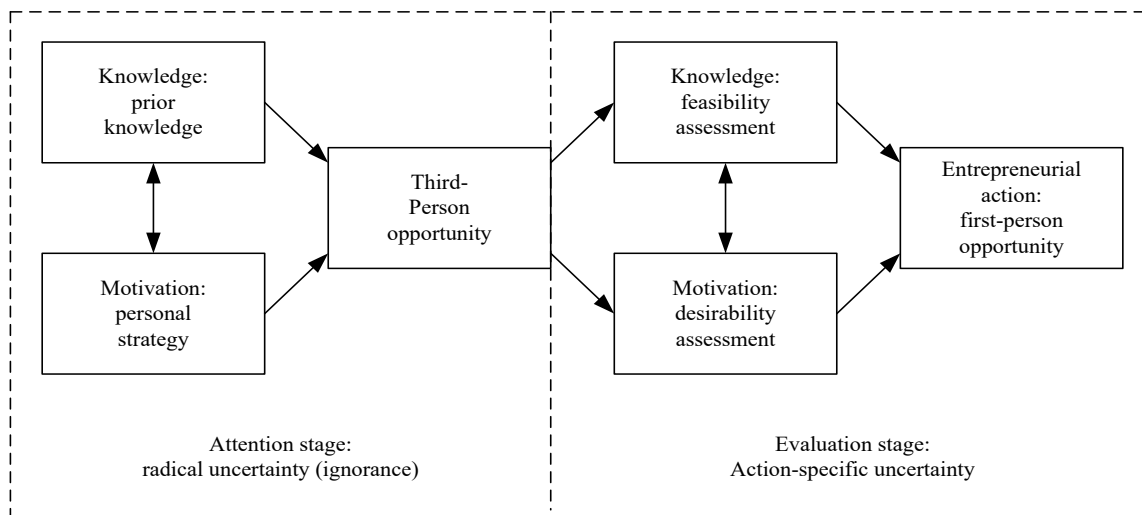


Figure 2. 1 A conceptual model for entrepreneurial action (McMullen and Shepherd, 2006, p140)

However, Zividar et al. (2017, p241) argues that much of the extant research on entrepreneurial decision-making has not adopted a process approach. The literature review indicated that research on the entrepreneurship process has focused on three main areas; opportunity identification, resource acquisition and business strategy, where opportunity identification is considered key to the entrepreneurship process and has been well researched in the entrepreneurship literature (Venkataraman, 1997; McMullen and Shepherd, 2006; Shane and Venkataraman, 2000; Grégoire et al., 2015). Hence a more commonly used theoretical framework for studying entrepreneurship is based on the nexus of the individual and opportunity, as proposed by Shane (2003), shown in figure 2.2. In this model the framework has unified and considered relationships between all the parts of the process, based on a series three stages; existence of opportunities, discovery and exploitation (Moroz and Hindle, 2012). Moreover, it includes the effects of an individual's attributes and the environment, thus acknowledging both internal and

external influences as part of the entrepreneurial process. Therefore, this model has contributed towards the design of the conceptual framework discussed in Chapter 3.

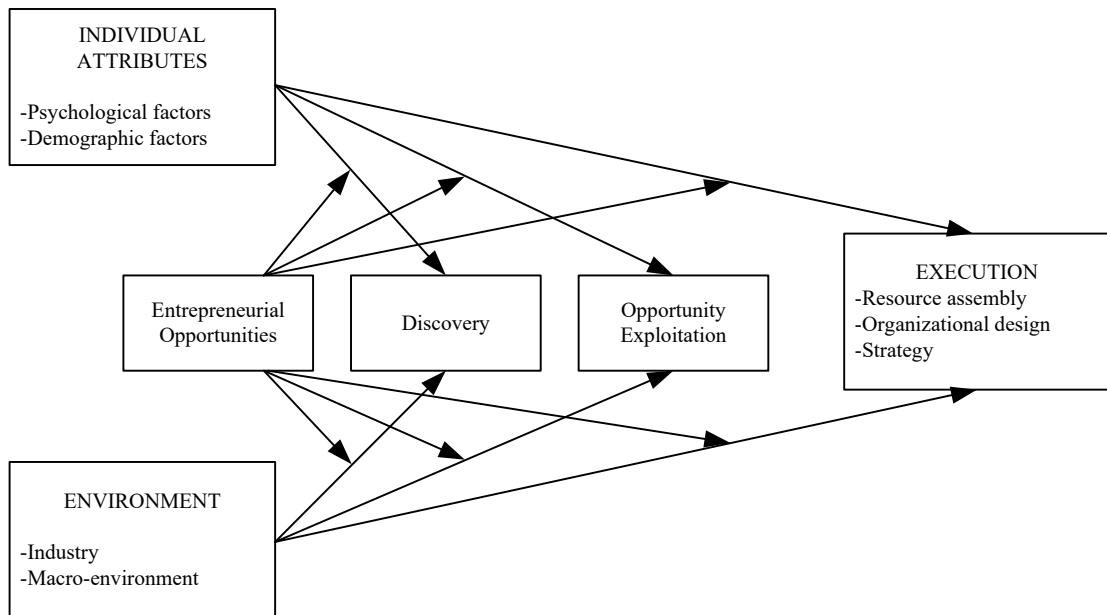


Figure 2. 2 Shane’s (2003) unifying theoretical framework of entrepreneurial opportunity (Moroz, and Hindle, 2012, p807)

It is highly likely that post venture creation stage, most entrepreneurs will be looking for opportunities that provide growth, such as new creative ideas or value-added activities to support their growth strategy. To gain insight into this cognitive activity and to find out how these business opportunities emerge and are pursued (McMullen and Dimov, 2013) assumes an opportunity-centred process that unfolds as the individual moves through three distinct phases: opportunity recognition, evaluation and exploitation (Shane and Venkataraman, 2000; Ardichvili et al., 2003; McMullen and Dimov, 2013). At any time during the three phases of the opportunity process, the entrepreneur will be processing information and making opportunity-related decisions.

2.4.1 Entrepreneurial opportunity identification

Taking a process approach showed that the first stage of the opportunity was viewed from two perspectives based on the theories of the Austrian school: either opportunities exist

and are discovered by alert entrepreneurs or they are subjectively perceived or created (Renko et al., 2012), portrayed as a 'discovery' or 'enactment' viewpoint (Vaghely and Julien, 2010). This opportunity discovery viewpoint originates from cognitive psychology and the enactment viewpoint from developmental psychology. In addition, the literature on entrepreneurial opportunity provides a variety of perspectives: opportunities are discovered (Shane, 2000), recognised (Baron, 2006), enacted (Gartner et al., 2003), socially constructed (Sarason et al., 2005) intentionally perceived (Krueger, and Kickul, 2006), without any definition (Renko et al., 2012) or from an information processing perspective (Sarasvathy et al., 2003). These different perspectives illustrate the diversity represented in the entrepreneurship literature.

Within the specific context of entrepreneurship, opportunity identification is seen as a distinct skill of entrepreneurs (Gaglio and Katz, 2001). Shane and Venkataraman (2000) have also suggested that people differ in their ability to identify new means-end relationships and that cognitions play an important role in the discovery of entrepreneurial opportunities. This latter notion has generated considerable literature that has explored the opportunity identification process (for example, see Keh et al., 2002; Ardichvili et al., 2003; Brigham et al., 2007; Krueger, 2007; Hajizadeh and Zali, 2016). However, whereas a common approach is to study opportunity recognition and exploitation (for example, Corbett, 2005; Kuckertz et al., 2017), the review identified that a specific focus on the evaluation stage is needed to understand the link between these two parts of the process. As noted by Wood and McKelvie, (2015), this critical bridge warrants further exploration, as it is still unclear how entrepreneurs evaluate potential opportunities.

2.5 The opportunity evaluation literature stream

The opportunity evaluation literature stream was the first stream reviewed. Both opportunity identification and opportunity evaluation are pre-requisites for entrepreneurial action, so it is surprising that opportunity evaluation has not had equal attention. There is evidence that this research stream is now gaining more interest, as seen in empirical studies (for example, Autio et al., 2013; Shepherd et al., 2014; Wood and Williams, 2014; Wood et al., 2014; Chandra, 2017; Rastkhiz et al., 2018). Moreover, a

feature of the literature is that a specific viewpoint is taken, such as first person opportunity belief as an “opportunity for me” (McMullen and Shepherd, 2006, p141), a third person opportunity belief as engagement with the environment, (Shepherd et al., 2007, p80), attributes (Urban, 2014), metacognitive factors (Haynie et al., 2009; Mitchell et al., 2010; Barreto, 2012; Urban, 2012; Wood and Williams, 2014), time based international opportunity evaluation (Chandra, 2017) or fuzzy screening techniques and a decision-making model (Rastkhiz et al., 2018). Despite this fragmentation, key themes based on opportunity evaluation illustrate the stage as an intensive, cognitive process (Autio et al., 2013), a cognitive assessment of the value of new goods or services (Haynie et al., 2009), a first-person course of action (McMullen and Shepherd, 2006) and a critical bridge between opportunity identification and action (Wood and McKelvie, 2015).

As mentioned previously, the review showed that most attention has focused on opportunity recognition and exploitation (for example, Pech and Cameron, 2006; Hulbert et al., 2013; Kuckertz et al., 2017) without any clear identification or acknowledgement of the link between identification and action. Defined as a “critical bridge” (Wood and McKelvie, 2015, p273), opportunity evaluation as a cognitive process is used by entrepreneurs for interpreting the opportunity (Wood and McKelvie, 2015), where experience and knowledge is used to construct mental images of whether or not the opportunity is worth pursuing (McMullen, 2010). Wood and McKelvie’s (2015) extensive review on opportunity evaluation as future focused cognition, based on journal articles from 2002-2014, highlighted four themes that were typically representative of the field: mental models, integration, congruence and action orientation. They also noted that only five core articles provided a definition of opportunity evaluation in the context of their study (see Dimov, 2010; Mitchell and Shepherd, 2010; Haynie et al., 2012; Autio et al., 2013; Wood and Williams, 2014).

Wood and McKelvie (2015) stated that a key difference of the evaluation phase was the personal element (Wood et al., 2014), represented as a first-person assessment of the opportunity ending with entrepreneurial action (McMullen and Dimov, 2013). In other words, it is necessary to consider *how* the opportunity is evaluated as separate from the decision to exploit (Haynie et al., 2009). This is a very important point, as it makes a clear distinction of evaluation as a separate stage of the opportunity process as “what will be”

(Haynie et al., 2009, p338). Moreover, this is very different from the identification and exploitation stages, which frequently involve third person opportunities and the assembly of resources for either a new product, service or business (Autio et al., 2013). Thus, opportunity evaluation can be delineated as a separate stage of the identification process.

As a consequence of this, a cognitive perspective is needed to determine how the interpretative processes of the attractiveness of the opportunity is played out (Wood and McKelvie, 2015). Although other stakeholders may be involved in the process and contribute towards the decision-making, the evaluation process is assumed for this study to be a cognitive process. This involves the construction of mental representations of the opportunity, along with the integration of person specific factors, such as information processing preferences (Wood and McKelvie, 2015).

2.5.1 Opportunity evaluation and decision-making

A review of the opportunity evaluation literature showed that most took a structure/cue perspective (Wood and Williams, 2014), focusing on risk (Keh et al., 2002; Foo, 2011), opportunity and knowledge (Haynie et al., 2009) or exposure to information (Autio et al., 2013). Wood and Williams (2014) have advanced the field with an empirical study on rule-based decision-making and the effects of informational cues and knowledge resources on frameworks used by entrepreneurs to address the fragmentation issue. Moreover, Williams and Wood (2015) argued that rule-based reasoning provides a suitable mechanism for understanding cause and effect computations, which is used to determine whether the opportunity is desirable or feasible. A limitation of this study is that measures were used at a single point in time, based on a description of an entrepreneurial opportunity. This does not capture any change that may evolve over time (Shepherd et al., 2014).

Rule-based cognitive processing as a logical and sequential application is a useful conceptualisation for explaining opportunity evaluation (Wood and Williams, 2012). Moreover, rule-based reasoning may not be the only way entrepreneurs evaluate opportunities, as intuition as a gut feeling has been shown to provide an initial screening

assessment (Bryant, 2007). Supporting the application of intuition in opportunity-related decisions, Agor's (1986) early research on intuition identified three fundamental different approaches to decision-making; 'explorers' who used intuition to foresee the correct path to follow, 'synthesizers' who used intuition at the back end of the decision process and 'eclectics' who checked their intuitive feelings against the data. Kickul et al. (2009) found important differences between analytical and intuitive styles which influenced how individuals evaluated opportunities. As a consequence of this, entrepreneurs may be more versatile in their thinking and therefore not inherently rational in their decision-making process, using intuition to assist their evaluations. Thus, the selection and processing of information may be guided by an intuitive process that "goes far beyond considering some simple rules" (Julmi, 2019, p298).

2.5.2 Opportunity evaluation and the role of time

There is little empirical research that explicitly investigates the role of time in opportunity-related decisions. Prior research mostly takes a static perspective and ignores the fact that these decisions may change over time (Shepherd et al., 2014). According to Haynie et al. (2009), opportunity evaluation is future focused and likely to be conducted as a series of stages. Additionally, Vaghely and Julien (2010) argued that opportunity identification as a process is time sensitive and incubates intuition. According to Shepherd et al. (2014, p7), "future longitudinal studies are needed that follow changes in the entrepreneurs' opportunity-related evaluations and decisions over time". This emphasises the importance of taking a longitudinal, cognitive approach for the research study and a first person focus for developing understanding (Wood and McKelvie, 2015), although there is very little prior research that has taken this approach.

One example is a longitudinal study by Chandra (2017). This highlighted opportunity evaluation as unlikely to be a consistently managed rule-based process, as each entrepreneur has a different set of thoughts and experiences based on their previous mistakes and learning, which as intuitive expertise may influence their decisions. The time-based process model of international entrepreneurial opportunity evaluation showed how entrepreneurs refined and revised assessments as they developed experience

(Chandra, 2017). This infers that knowledge exchange is time based, so the model may be relevant for more experienced entrepreneurs in the evaluation process, where decisions are refined based on past experience. Additionally, the model showed different layers of reality, involving mistakes and setbacks that helped entrepreneurs revise their rules and learn from these errors. This revision process was also evidenced in Nutt's (2008) research on decision-making, where a failed idea prompted a redevelopment process. Thus, taking a longitudinal study would indicate any potential revision of these rules in the opportunity-related decision process.

2.6 The entrepreneurial decision-making literature stream

The second literature stream reviewed focused on entrepreneurial decision-making. This is regarded as a core activity in entrepreneurship (Vermeulen and Curşeu, 2008), one that is necessary for day-to-day actions and essential for the development and growth of the business. According to Gustafsson (2006), new venture creation and decision-making is a main area of entrepreneurship research. Cognitive representations of the opportunity capture the accuracy and complexity of the decision-making situation (Lucas et al., 2008). Most importantly, decisions made during the opportunity identification and evaluation stages will have a significant outcome of the growth of the business. A consequence of this means that entrepreneurs working in competitive and demanding situations have to respond quickly to opportunities in these ambiguous or uncertain environments (McMullen and Shepherd, 2006; Dutta and Thornhill, 2008).

The review showed that entrepreneurial decision-making was a well-developed research stream, with a diverse range of studies, such as biases and heuristics in strategic decision-making (Busenitz and Barney, 1997), entrepreneurial decision-making (Baron, 2007), decision competences (Dewberry et al., 2013), intuition (Sadler-Smith, 2004) and confidence (Cunningham and Anderson, 2018). Most research fell into two broad categories: looking at what decision makers do and their associated behaviour and the ways that decisions are made. However, the fragmented nature of the stream presents challenges for identifying knowledge gaps, so a more holistic, integrated view may help to address this by exploring any overlap between common conversations.

2.6.1 Entrepreneurial decision-making models

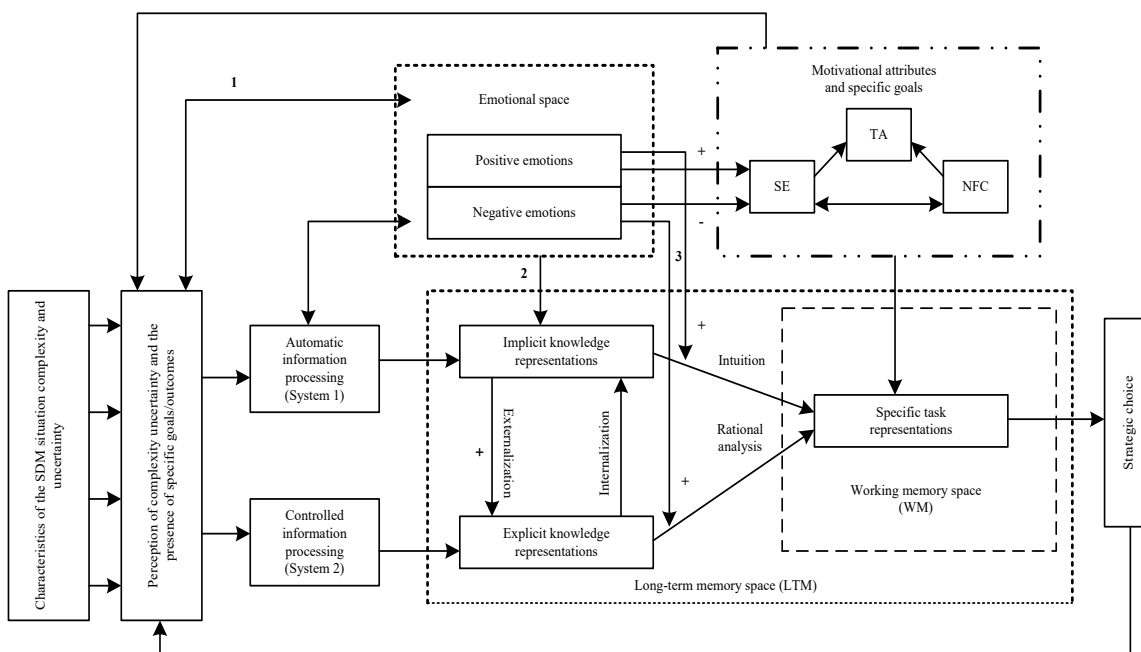
A further challenge noted from the literature review is that fact that the entrepreneurial decision-making process has been conceptualised in different ways (Gibcus et al., 2008). There are many theoretical models from a variety of perspectives, such as rational decision making (for example, Tversky, 1973), naturalistic decision-making (recognition primed decision model, Klein, 2015) and a dual-process model of entrepreneurial strategic decision-making (Curşeu et al., 2008). This diversity can cause confusion. Typically, a traditional approach posited in literature is a linear model, where each decision follows a logical order of data collection and analysis information and where the decision maker is isolated from the event (Gustafsson, 2006).

Empirical research has supported the notion that both analytical and intuitive approaches work together in the decision process (Gibcus et al., 2008; Lee-Ross, 2014; Barbosa 2014; Sadler-Smith and Burke-Smalley, 2015; Sadler-Smith, 2016; Okoli and Watt, 2018). An early classic integrated model by Mintzberg et al., (1976) showed decision-making as a complex and unstructured process. This model was later revised by Mintzberg and Westley (2001) to address the limitations of taking a predominately rational approach. Three approaches to decision making were proposed: thinking first (rational), seeing first (intuitive) and doing first (action oriented). Successful decision-making should be based on all three approaches. There is no denying that a rational approach has its place in decision making, but the increased importance of intuition in entrepreneurship research suggests that a review of decision-making models is long overdue.

The strategic decision process (SDM) has been researched more in larger companies, compared to individual entrepreneurs in small business (Gibcus et al., 2008). Curşeu et al. (2008) proposed a dual process model of entrepreneurial strategic decision-making (ESDM) that considers the interaction between the two systems, shown in figure 2.3. This model is representative of current thinking as it considers dual process theory as activation of cognitive representations in the working memory (WM), resulting from implicit and explicit information processing. Additionally, this will be influenced by automatic information processing, motivational factors, emotions and expertise. One of

the benefits of this model is the relevance of personal factors in the decision-making process, as well as constraints imposed by the decision situation (Curşeu et al., 2008).

This model provides a framework that covers a broad range of cognitive aspects and the integration of both cognitive structures and processes. Unlike other models it does not present decisions as a series of steps and recognises that important decisions are influenced by complexity and uncertainty in the environment, resulting in a special category of decision makers (Curşeu et al., 2008). This model supports a first-person approach for opportunity evaluation (Haynie et al., 2009; Wood and McKelvie, 2015). The contribution that the ESDM model has made to this study is discussed further in Chapter 3, as it guided the framework for the conceptual model proposed for this study.



Note: SE-self-efficacy, TA-tolerance for ambiguity, NFC-need for cognition.

The numbered arrows refer to ways in which emotions influence information processing stages.

1. Attention stage (emotions' impact on selective attention and perception)
2. Encoding stage (emotions' impact on encoding and learning new information)
3. Retrieval stage (emotions' influence on selective retrieval and knowledge activation)

Figure 2. 3 A dual process model of entrepreneurial strategic decision-making (Curşeu et al., 2008, p64)

Supporting this discussion further, Zividar et al. (2017, p243) argued that entrepreneurial decision-making as a phenomenon is “not explainable by assumptions of most existing

decision-making models” and requires the adoption of new approaches (Sarasvathy, 2001; Sinclair and Ashkanasy, 2005). Sarasvathy’s dynamic model of effectuation (2001), based on differences between effectual and predictive logic has been used by a rapidly growing number of scholars in decision-making research (for example, Dew et al., 2009; Reyman et al., 2016) as a means of addressing this problem. Sarasvathy argued that entrepreneurial action is based on the logic of causation or effectuation, a non-causal approach to decision-making. Here the entrepreneurs assess themselves and their expertise instead of the opportunity. The theory has provided an interesting new framework for decision-making and contributes to a growing research stream on differences between entrepreneurs.

However, effectuation theory as a non-causal approach to decision-making is not without its criticisms. According to Moroz and Hindle (2012), causal exchange will always coexist between entrepreneurs and their environment, as perceptions are framed by previously acquired knowledge. They argue that Sarasvathy’s (2001) definition of effectuation as a “dichotomous contrast” (Moroz and Hindle, 2012, p804) between effectual and predictive logic is contradictory to the suggestion that both co-exist within entrepreneurs. Certainly, applying dual process theory would illustrate the difficulty of taking an either/or approach, as these different styles of thinking are likely to co-exist. Sarasvathy (2001) noted that some entrepreneurs shift from effectual to causal logic as the business develops, but that they may also remain effectual throughout the entrepreneurial process. The challenge for any future research is to identify how this change evolves and what circumstances in business prompt effectual and causal thinking. As demonstrated in the cognitive style literature, polarized approaches do not embrace developments in dual process thinking, as conceptually a continuum or dichotomous contrast rather than a parallel-competitive approach is proposed. Dual process theory is more closely associated with implicit and explicit information processing (Julmi, 2019).

2.6.2 Taking a process approach to decision-making

It is interesting to note that despite a plethora of research on entrepreneurial cognition, there is still little research that explores how cognitive processes influence the

entrepreneur as they make growth decisions, particularly after the venture creation stage. Due to the diversity of empirical research in entrepreneurship, this has made it more difficult to further understanding (Shepherd et al., 2014), which is very relevant when examining the decision-making literature. Furthermore, fragmentation has made it difficult to identify future research opportunities, particularly concerning how decision-making changes over time. Moreover, both rational and bounded rationality models in the field of managerial decision-making are now considered less successful than originally believed (Langley et al., 1995; Nutt, 1999), which has led to a search for new approaches and perspectives (Sinclair and Ashkanasy, 2005). Coupled with developments in cognitive neuroscience and psychology, which supports dual process theories (Langley et al., 1995; Sadler-Smith and Burke-Smalley, 2015; Hodgkinson and Sadler-Smith, 2018; Bendall et al., 2019; Julmi, 2019), it is important to consider both rule-based and associative thinking (rational/analytical and intuitive) in the decision-making process. Thus, an integrated model, for example, Curşeu et al. (2008), as shown in figure 2.3, may be more appropriate when exploring evaluation and decision-making in context and for taking a dual-process conceptualisation of cognition.

Zivdar et al. (2017) proposed that a process approach is required (Shane et al., 2003; Moroz and Hindle, 2012) which includes an explanation of entrepreneurial action as the final stage of the opportunity process. They criticised existing decision-making models for not including any constructs associated with decision-making in uncertain environments, which does not provide a thorough explanation of the decision-making process of new business ventures. This criticism also applies to small business past the start-up stage. A process model perspective by Moroz and Hindle (2012) proposed numerous contexts including uncertainty which is more conducive for a small business environment. Notwithstanding, the process view taken by Moroz and Hindle (2012) is an interesting one, as it allows for a more integrated approach needed to address fragmentation in decision-making research, as well as providing a platform for the bigger picture (Wiklund, et al., 2009; Wood and McKelvie, 2015).

2.6.3 Entrepreneurial decision-making and the role of context

There is now growing recognition that entrepreneurship is a context-based phenomenon (Welter and Gartner, 2016). Reviewing the literature portrayed entrepreneurial decision-making frequently taking place in conditions of high uncertainty, time pressured and emotionally charged contexts (Shepherd et al., 2014). From an entrepreneurial perspective, the business environment will vary depending on the environmental circumstances, as well as the cognitions, motivations, expectation and goals that each entrepreneur brings to the environment in which they operate (Brännback and Carsrud, 2016). Furthermore, the context-cognition interaction is often ignored in research or limited to only a few control variables, such as demographical or geographical (Brännback and Carsrud, 2016). Similarly, the focus on quantitative methods in entrepreneurship research seldom takes into consideration context, other than the standard control variables used for statistical analysis and quantitative modelling (Brännback and Carsrud, 2016). Decisions may also involve processing information from a variety of sources, including social networks, previous experiences and expertise. Taking into consideration all these points, the impact of context on entrepreneurial cognition must be considered in the decision-making process, as “context is essential for making sense of what we encounter” (Brännback and Carsrud, 2016, p22).

It is important to consider context in entrepreneurship research as it may include uncertainty and negative outcomes (Zivdar et al., 2017), which will influence entrepreneurs’ decisions and evaluations. Research has highlighted the need to understand the role of context in decision-making which includes understanding the context of the decision-making environment as without this, “it is impossible to assess the probable consequences and choose thoughtfully amongst them” (Gibcus et al., 2008, p38). In particular, empirical research by Dutta and Thornhill (2008) illustrated the importance of competitive conditions on influencing growth intentions. Similarly, growth intentions were also shown to be stronger in a dynamic environment, (Wiklund and Shepherd, 2003). Dutta and Thornhill (2008, p319) also found that in favourable conditions, entrepreneurs raised their growth intention upwards and lowered these when conditions were difficult. This dynamic relationship between mind, environment and

action (Wright and Stigliani, 2013, p8) showed that growth opportunities were a feature of the external environment (Stenholm, 2011). Thus, for this study, in accordance with Welter and Gartner's (2016) recommendations, contextualization is considered important for understanding the evaluation stage of decision-making for future growth, so that the complex nature of the environment and its contribution to the opportunity identification process is fully explored and understood.

2.6.4 Entrepreneurial decision-making and the role of time

One important result from the review showed that research on the decision process over time is significantly absent from the field, similar to the opportunity evaluation stream. Dutta and Thornhill's (2008) longitudinal study over five years examined entrepreneurs with differing cognitive styles (analytic vs holistic), showing how they modified their intentions for growth when conditions changed in their external environment. Despite the fact that this study can be criticised for not using a reliable and valid instrument to determine style differences, it takes a longitudinal approach which is more unusual in the intentional literature. Additionally, findings showed how competitive market conditions (the context) influenced the information processing style of the entrepreneurs, which is discussed further in section 2.9.

Shepherd et al. (2014) noted that progress has been made in understanding how entrepreneurs make decisions in different contexts, but overall the understanding of the complexity and dynamics of entrepreneurial decision-making is incomplete. They emphasised that in particular, the ways in which individuals changed over time and how this influenced the decision-making process should be a new line of enquiry. It is interesting to note here that taking a temporal perspective is a commonly cited recommendation across different entrepreneurial themes. This suggests that a time-based study may aid future developments in understanding and contribute to future theory, where the entrepreneur as an individual unit of analysis is the focus. There is also a call for more longitudinal, qualitative work in the field of cognitive style and small business growth (Cools and Van Den Broeck, 2007; Cools et al., 2014) in order to capture the dynamics of growth.

These recommendations elucidate that longitudinal studies involve changes in both cognitive states and knowledge bases, needed to provide insights into how the opportunities mature (Ardichvili et al., 2003) and to study how such processes “from the inside” evolve over time (Grégoire et al., 2015, p137). Style is traditionally considered to be a stable construct, although research has shown that entrepreneurs have the ability to switch cognitive gears and adapt accordingly to different situations (Louis and Sutton, 1991). Opportunity identification is time sensitive and time dependent (Vaghley and Julien, 2010, p78), so approaches to opportunity-related decisions are more than likely to change over time. The researcher has proposed the use of longitudinal exploratory research for examining the dynamic nature of this decision process, as it will help to address some of the methodological limitations studying entrepreneurial cognitions as a static process (Grégoire et al., 2015, p133).

2.7 The entrepreneurial cognition literature stream

Finally, the third stream reviewed was entrepreneurial cognition, which is a diverse and comprehensive field of study in the entrepreneurship domain. Collectively, the cognitive perspective is well represented in entrepreneurship, characterised by many theoretical approaches, methodologies and variables, although it still remains highly fragmented and conceptually undeveloped (Grégoire et al., 2015, p128). The extent of this wealth of research has meant current research in entrepreneurship stresses the cognitive importance of the entrepreneur and has moved away from studies at firm level to focus more on entrepreneurs and the context in which they operate

From such a diverse range of literature reviewed, it can be said that most attention has focused on three main questions (Baron and Ward, 2004): the cognitive differences between entrepreneurs and non-entrepreneurs, the role of cognitive biases and errors in their thinking processes and the processes associated with opportunity recognition. In addition, self-efficacy is also a widely researched subject area and is used to predict differences between entrepreneurs and non-entrepreneurs. These differences are a key theme that runs through the cognition literature (for example, Busenitz and Barney, 1997; Mitchell et al., 2002; Arend et al., 2016; Amato et al., 2018), suggesting that

entrepreneurs think differently from non-entrepreneurs (Busenitz and Barney, 1997) and from other entrepreneurs (Baron 2006; Armstrong and Hird, 2009; Mitchell et al., 2007). Another commonly identified stream examines the differences in the way entrepreneurs' process information, called cognitive style, which explains how entrepreneurs gather and process information (Sadler-Smith, 2004; Lee Ross, 2014).

It is now more widely accepted that the entrepreneurial cognition stream has moved away from trait like characteristics that assumed entrepreneurs were different from non-entrepreneurs (Sánchez et al., 2011) as they were poor predictors of entrepreneurial activities (Krueger and Kickul, 2006). The cognitive approach is seen as useful for understanding how entrepreneurs think and why they do things, providing "some of the research machinery" (Mitchell et al., 2002, p96) that facilitates this understanding.

2.7.1 Cognitive structures as mental representations

In the entrepreneurial cognition literature, the cognitive structure stream has focused on mental models, scripts or schemas which has helped scholars understand how people make sense and organise information, using rules, abstractions and generalisations applied outside their immediate situation (Wright and Stigliani, 2013). Entrepreneurial expertise script theory (Mitchell et al., 2000) posits that entrepreneurs' knowledge structures and the way that they process information is different to non-entrepreneurs and that successful entrepreneurs can be characterised by an expert mind set (Krueger, 2007). This is a well-developed research stream (for example, Busenitz and Barney, 1997; Mitchell et al., 2002; Gustafsson, 2006; Arend et al., 2016; Naumann, 2017) that demonstrates expert scripts are related to venture creation decisions (Mitchell et al., 2000; Smith et al., 2009) and that experts follow recognisable, complex cognitive behaviours and processes (Baron and Ensley, 2006). These scripts simplify information processing, but the process of doing this introduces biases (Vaghely and Julien, 2010).

Notably, Grégoire et al. (2015, p136) argued that there is a need in entrepreneurship research to understand how people process the information they generate, such as knowledge retrieved or constructed, as implicit knowledge is developed and enriched

through years of experience (Gladwell, 2005). According to dual process theory, development of these representations allows the individual to process information subconsciously, where knowledge is held tacitly and unconsciously (Smith and DeCoster, 2000, p124). This frees up the individual's cognitive capacity for another task. Thus, intuitive action may not be just restricted to experts, but more commonly applied across most forms of work (Harteis and Billett, 2013). Additionally, individuals may carry out these processes in different and preferred ways (Armstrong and Hird, 2009). Hence the use of mental models as a conceptual representation of opportunity has played an important part in the opportunity evaluation research and is discussed further.

2.7.1.1 A mental model conceptualisation

In the opportunity evaluation literature, Wood and McKelvie's (2015) have categorized conceptual themes relevant to opportunity evaluation, including mental models as representing the opportunity's attractiveness. The mental model approach "provides an explanatory framework for how opportunity beliefs are shaped by individual-specific factors" and that these "individuation effects are not uniform" (Wood and Williams, 2014, p265). As such, these cognitive frameworks help entrepreneurs decide on the feasibility of the opportunity (Keh et al., 2002), by processing information subconsciously, matching the current context to their existing knowledge patterns (Vaghely and Julien, 2010). Baron and Ensley's (2006) research has showed that experienced entrepreneurs have richer and more detailed mental models than novices, based on a repertoire of tacit knowledge built from experience. Similarly, an expertise view of intuition also enables decision makers to frame decisions from quick and unconscious pattern recognition, based on domain experience (Sadler-Smith and Burke-Smalley, 2015, p12). Opportunity related knowledge leads to more positive evaluations (McMullen and Shepherd, 2006) but a limitation of this conceptualisation is that individuals will develop different mental pictures contingent with their experience and perception of the opportunity. Hence, empirical research must consider the differences between the way entrepreneurs use information, such as cognitive styles and experience, in order to determine how opportunity-related knowledge leads to more positive evaluations (Mitchell and Shepherd, 2010).

2.7.2 Knowledge as expertise in the evaluation process

As the nature of expertise is a well-developed research stream (for example, Mitchell et al., 2000; Mitchell et al., 2002; Gustafsson, 2006; Dew et al., 2015). Prior research has determined a variety of influences, for example, industry experience used to assess the value of an opportunity (Kor et al., 2007), the use of intuition (Dane et al., 2012), experience with prior failure (Wood et al., 2014), or “worst case scenario” (Bryant, 2007, p742). There is an also emerging idea in the opportunity evaluation literature that individual differences moderate the influence of contextual variables (Wood and McKelvie, 2015), such as market potential and resource efficiency.

Understanding how these changes take place and the differences between the cognitive structures of experts and novices will make an important contribution to the field of entrepreneurship (Krueger, 2007). Expertise has been proposed as a function of time and experience and is sequential, passing through a series of stages: novice, advanced beginner, competent, proficient and expert (Dreyfus and Dreyfus 2004; Kuhlmann and Ardichvili, 2015). A common research stream in the expertise literature is based on differences between novices and experts. Similarly, this comparison category is frequently found in the entrepreneurship literature, (for example, Armstrong and Hird, 2009; Dew et al., 2009). Meaningful patterns, acquired through experience, allow the entrepreneur to notice connections between seemingly unrelated patterns (Mitchell et al., 2002; Baron, 2006; Kahneman and Klein, 2009) and provide a framework for deciding what to do if the opportunity is feasible (Keh et al., 2002). As entrepreneurs become more experienced, their mental models develop clarity, richness of content, and a sharper focus on key attributes (Baron and Ensley, 2006; Krueger, 2007).

A criticism is that the comparison approach seldom indicates how this expertise develops over time and why experts think in qualitatively different ways to novices (Dew et al., 2015.) According to Dew et al. (2015, p35) expert entrepreneurs will switch cognitive gears when they perceive unlikely situations and use non-predictive approaches. Understanding how such differences evolve would illustrate what specific cognitive representations contribute towards an expert mindset, as well as the role that expertise

plays in opportunity-related decisions and how this contributes to the overall evaluation process. What “cognitive raw materials” (Baron and Ensley, 2006, p1341) are needed to achieve this expert status would be valuable for practitioners when developing materials for training programmes.

Likewise, it is important to consider that entrepreneurs are heterogeneous and will be at different stages of the entrepreneurial process and have different experiences. This is particularly relevant for longitudinal approaches. Thus, examining the individual’s mental models over time will provide insight how expertise is honed and developed. Entrepreneurs have different start up, environmental and previous work experiences, as well as domain knowledge. Novice entrepreneurs will have limited knowledge and experience and will therefore look at their networks to learn and acquire new knowledge (Hughes et al., 2007). This new learning is exploitative as they will be making use of known knowledge, acquired from others (Hughes et al., 2007), rather than explorative knowledge which is arguably key for innovative ideas and opportunity identification. Learning is an emergent sense making process (Rae, 2005, p324) and as Kuhlmann and Ardichvili’s study (2015) confirms, expertise is learned over time. This emphasises the importance of different types of experience (Harteis and Billet, 2013) and where learning addresses more complex issues and high value, non-routine work. Answering the question how expertise (as experiential learning) influences the decision process would illustrate what specific experiences contribute to successful evaluation which could be encouraged for future developmental learning.

2.7.2.1 Expertise and intuition

Intuition as expertise enables entrepreneurial decision-makers to frame problems quickly (Sadler-Smith and Burke-Smalley, 2015) and facilitates recognition of meaningful patterns which can be used to support for decision-making. These are critical cognitive processes necessary for opportunity recognition and decision-making. This is because these processes involve obtaining, learning and storing knowledge and how this knowledge is put to use. Taking an expertise-based view of intuition, Grégoire et al. (2015) argued that there is a need to understand how people process the information they

generate, such as knowledge retrieved or constructed. Agor's (1986) pioneering work posited that intuition was equally as important as rationality in management decision-making (Sadler-Smith, 2016). Research in neuroscience (Krueger and Welpel, 2014; Bendall et al., 2019) has shown that knowledge representations in the human memory is a conceptual system of "category knowledge, where each represented category corresponds to a component of experience" (Barsalou, 2003, p513). This supports the notion of intuition expertise as "deep smarts" (Sadler-Smith and Burke-Smalley, 2015, p12), where individuals respond quickly to situations through the use of previous knowledge and domain expertise. In other words, cognitive processes explain the manner in which information is received and how these mental processes interact with the other people and their environment (Sánchez et al., 2011).

2.7.3 Taking an information processing perspective

Krueger (2007) stated that if opportunity is considered to exist exogenously, then it is important to consider the cognitive processes "by which we take signals from the environment and construct a personally credible opportunity" (Krueger, 2007, p106). This exemplifies the importance of taking holistic approach to determine how cognitive processes and structures are used in the evaluation process. Arguably, the cognitive perspective associated with information processing is considered to be more central to entrepreneurship research (Vaghley and Julien, 2010). The information-processing perspective lies at the heart of existing theories of entrepreneurial cognition and demonstrates how opportunity-related information is processed by entrepreneurs for decision outcomes (Pech and Cameron, 2006). Vaghely and Julien (2010, p76) note that "opportunity requires a combination of creativity, innovation and market information" and that "information sharing builds up knowledge which can trigger action". Thus, it can be assumed that knowledge is generated, retrieved or constructed (Grégoire et al., 2015) and used as information in all stages of the entrepreneurial opportunity process.

Two key studies by Pech and Cameron (2006) and Vaghely and Julien (2010) take an opportunity identification information processing perspective which is useful for understanding the 'how' question. Both these studies showed that a qualitative approach

provides rich insights into the cognitive process. Additionally, Vaghely and Julien's (2010) study was conducted over a two-year period showing that entrepreneurs used both algorithmic and heuristic information processing for opportunity recognition. This is an interesting result because it supports Krueger's (2007, p131) notion that "human cognition often reflects dual cognitive processes, both rational and intuitive; and that "it is then very likely that there are more than one set of cognitive structures that reflect the expert mind set". This resonates with Wood and William's (2014, p595) recommendations that there may be more than one set of rules that entrepreneurs use as they move through each stage. As noted by Vaghely and Julien (2010), certain individuals had a special ability to process information, using both modes and could rapidly switch between the two. This implies cognitive versatility and supports use of dual processing theory for this study's theoretical framework. Results also showed the use of tacit information based on past experience, a heuristic type of information processing for opportunity construction and the importance of social interaction for information transfer. A limitation of this study is that the authors are considering developing a psychometric questionnaire to replace the interview guides. Although this may help to extend and speed up the process of data collection, it limits the richness of data that can be collected through qualitative methods over a time and just adds to the already dominant use of quantitative methods in the field (Cools et al., 2014).

In another study, Pech and Cameron (2006, p71) proposed an information processing framework (I-P) related to opportunity recognition, where both heuristics and intuition were used in the decision process. Using an (I-P) approach they plotted important decision factors and connectivity to develop an entrepreneurial cognitive and decision process model. This showed the entrepreneur as an active pattern seeker, assessing or rejecting each opportunity using specific decision criteria. Findings also showed that the opportunity-seeking decision process is holistic and that the information-processing architecture used to structure the decision process is complex and iterative. However, a criticism of their research is that it was based on a single study, so this framework is not representative for all entrepreneurs and cannot be generalised across a wider sample of entrepreneurial case studies. Furthermore, the model does not indicate interplay between the two processing modes or how contextual factors influence decisions. In addition,

although the framework illustrates various elements associated with opportunity recognition, interpretation is difficult as the diagrammatic representation does not show key influences in the process. Moreover, both these examples focus more on opportunity identification than evaluation, which adds weight to Wood and McKelvie's (2015) comments on the fact that opportunity evaluation is frequently missed out in empirical studies of the opportunity process.

2.7.4 Entrepreneurial cognition as a dual cognitive process

Taking a cognitive perspective in entrepreneurship must consider the dual process nature of information processing (Hodgkinson and Sadler-Smith, 2018). Advances in neuroscience now portray human cognition as a dual cognitive process (Epstein, 1994; Sadler-Smith; 2004; Krueger and Welppe, 2014; Sadler-Smith; 2016; Hodgkinson and Sadler-Smith, 2018; Bendall et al., 2019). This has brought dual process models to prominence and when used as a theoretical framework has provided new insights for decision-making (Sadler-Smith, 2016; Hodgkinson and Sadler-Smith, 2018). The dual processing perspective is preferred amongst decision-making theorists (Dane and Pratt, 2007; Hodgkinson and Sadler-Smith, 2018), where the distinction between two kinds of thinking is related to the higher cognitive processes of judgement and decision-making. This is depicted as a fast, intuitive mode and a slow and deliberative mode (Hodgkinson and Clarke, 2007; Evans and Stanovich, 2013). Both these information processes operate simultaneously and arise from independent cognitive systems and have different properties (Epstein et al., 1996; Smith and DeCoster, 2000; Hodgkinson and Sadler-Smith, 2003; Dane and Pratt, 2007; Hodgkinson and Sadler-Smith, 2018).

2.7.4.1 The Cognitive-Experiential Self-Theory (CEST)

The Cognitive Experiential Self Theory (CEST) (Epstein, 2003; Epstein 2008; Epstein et al., 1996; Pacini and Epstein, 1999) is a well-respected psychological theory used in management, psychology and entrepreneurship. CEST proposes that intuition and analysis are two interrelated but distinct systems, known as System 1 and System 2, largely independent of one another (Hodgkinson and Sadler-Smith, 2003; Hodgkinson

and Sadler-Smith, 2018). CEST is a dual process theory which illustrates and explains the impact of both systems, portrayed as conscious (analytical or rational) and non-conscious processes (intuitive or experiential) and their resulting behaviour.

The increasing development of research in cognitive psychological processes has furthered understanding how the non-conscious process of intuition contributes to organisational and individual behaviours (Evans, 2003; Evans and Stanovich, 2013; Hodgkinson and Sadler-Smith, 2018). However, two fundamentally different categories of dual process theory have developed: default-interventionist and parallel competitive (Hodgkinson and Clarke, 2018). CEST theory is categorised as the latter type. This categorisation has created conceptual and theoretical challenges for researchers undertaking empirical research. Not only are dual process theories used to explain individual behaviour but the more recent microfoundations movement (Barney and Felin, 2013) has highlighted the importance of looking at the bigger picture (Wiklund et al., 2009) and individual, team and organisational interrelationships. As posited by Hodgkinson and Sadler-Smith (2018), the application of dual process theory to more recent research has highlighted the criticality of differences between the two accounts and their appropriate selection for studies at different levels.

CEST views information processing as an intuitive experiential and analytical rational system that operates on a parallel-competitive basis. This means that “the experiential system and rational system operate in parallel [and] the two systems are bidirectionally interactive” (Hodgkinson and Sadler-Smith, 2018, p480). The resulting “behaviours are experientially or rationally determined and the relative contribution of either system is a function of the person and situation” (Epstein, 2008, p25). This theory thus provides a psychological explanation of the interplay between intuitive and analytical information processing (Hodgkinson et al., 2009; Hodgkinson and Sadler-Smith, 2018). As both systems are independent an individual can “switch more readily between analytic and intuitive processing strategies” (Hodgkinson and Clarke, 2007, p246), known as cognitive versatility or a “versatile style” (Sadler-Smith, 2009, p16). This cognitive interplay is an essential ingredient for understanding how both processing modes are used in judgment and decision-making and how they provide the entrepreneur with ability to switch

between different modes in different situations and contexts for maximising decision-making effectiveness.

CEST views intuition as a “different kind of thinking” (Epstein, 2008, p32) which is not limited to just heuristic processing (Hodgkinson and Sadler-Smith, 2018). Furthermore, both systems can often engage in conflict which can be seen as a “struggle between feelings and thoughts” (Pacini and Epstein, 1999, p972) but mostly demonstrated as a “seamless integration” between both information processing modes (Hodgkinson and Saddler-Smith, 2018, p480). This gives rise to “more complex behaviour, such as creativity and wisdom” (Epstein, 2008, p35).

A key difference between CEST and the default-interventionist model (Evans, 2008; Evans and Stanovich, 2013) lies in the notion of integration and interplay. CEST proposes that the experiential and rational processing systems interact competitively but also cooperatively and collaboratively. This is in contrast to the default-interventionist model which assumes System 1 and 2 processes only conflicts and competes. System 2 processes may override System 1 processes but as System 2 processes do not usually intervene, errors and biases develop. The down side of this approach is that to stimulate System 2 processes, effortful thought must be encouraged, implying a more structured process and where a behavioural response is “controlled either heuristically or analytically” (Evans, 2007, p322). This interpretation of dual based theory provides a narrower viewpoint and thus offers less explanatory capability for a wider range of phenomenon (Epstein and Pacini, 1999).

The parallel-competitive account takes into consideration the timing of the interaction which can be sequential or simultaneous, depending on individual preferences and situation. This means that nonconscious, automatic, sequential processing can influence conscious reasoning and vice versa (Hodgkinson and Sadler-Smith, 2018). Therefore, even if a person believes they are processing rationally, the experiential system will continue to operate and influence behaviour. Likewise, intuition has the potential to inhibit and facilitate analysis (Hodgkinson and Healey, 2011), so CEST provides a plausible explanation for dynamic interplay. Understanding how this influences a

decision situation can help to mitigate any negative intuitive thoughts, such as previous bad experiences, or apply thinking in a more rational manner when required, that is, it promotes the notion of cognitive versatility. As noted by Hodgkinson and Sadler-Smith (2018, p483) this dynamic capability lies at “the core of organisational learning and innovation” and provides a suitable framework for analysing mental models that have developed representations as a result of prior reasoning, deliberation and experience.

All in all, the parallel-competitive account of dual processing theory of CEST provides a more insightful framework for studying empirically the interplay between the two systems (Baldacchino et al., 2015; Sadler-Smith, 2015; Hodgkinson and Sadler-Smith, 2018) and is “a valuable theoretical resource for an improved understanding of the decision processes implicated in entrepreneurship” (Sadler-Smith, 2016, p220). The CEST theory with its underpinning logic of a parallel-competitive account also provides a theoretical framework for explaining how associative knowledge structures are learnt over time and can be activated, with the potential to affect judgments and behaviour (Smith and DeCoster, 2000). Similarly, the acquisition of intuitive expertise, built from learning, experience and feedback (Hodgkinson et al., 2009) is essential for the development of complex, domain relevant mental representations, needed for pattern matching and contextual awareness in decision-making. In summary therefore, the CEST theory provides an integrative, flexible and more nuanced application for exploring decision-making in a complex and dynamic cognitive environment.

2.7.5 Intuition as information processing

Notwithstanding, developments within dual process theory have highlighted the importance of intuition (for example, Khatri and Ng, 2000; Sadler-Smith, 2004; Sinclair and Ashkanasy 2005; Sadler-Smith and Burke-Smalley, 2015; Hodgkinson and Sadler-Smith, 2018), which is deemed increasingly important in business decision-making. In addition, the process of intuiting or intuition has been linked to expertise development, as intuition is a key element of human information processing, present as pattern recognition based on past experience and enactment through social interaction and sense making (Vaghely and Julien, 2010). Research suggests that intuitive decisions are only

effective if a high level of domain expertise is present (Kahneman and Klein, 2009) and where individuals have taken part in repetitive practice for many years (Dreyfus and Dreyfus, 2004; Ericsson et al., 2006).

2.7.5.1 Dual process theories and intuitive expertise

Advances in dual processing research have furthered understanding of the nature of intuition and decision-making (e.g. Dane and Pratt, 2007; Betsch, 2008; Epstein, 2010; Gore and Sadler-Smith, 2011; Hodgkinson and Sadler-Smith, 2018; Julmi, 2019). The parallel-competitive account of dual-process theory assumes the intuitive system processes information holistically and the analytical system processes explicit information (Epstein, 1994; Smith and DeCoster, 2000; Sadler-Smith, 2016). As shown by Dane et al. (2012), sequential tasks are more conducive to analytical decision-making in contrast to non-decomposable tasks that are more suited to intuition. Their results suggested that as individuals attained a moderate level of expertise, intuitive decision effectiveness increased, in contrast to previous research (for example, Kahneman and Klein, 2009) where intuitive decisions were only effective with high levels of expertise.

This is an important finding, as even if some expertise increases the effectiveness of intuitive decision-making (Dane et al., 2012), arguably novices would be capable of making intuitive decisions before they are fully proficient as experts. A criticism of this investigation is that the use of business students' experiences as novices is unlikely to be similar to entrepreneurs who may have some prior business experience, and thus results cannot be generalised across to entrepreneurial contexts. This is a consequence of using students for entrepreneurship research, where contexts and experiences differ to those of experts. However, this does pose an interesting question as to how much expertise a novice entrepreneur needs before they are able to use their intuition effectively for decisions and challenges the typical notion that intuitive expertise may take ten years or so to develop (Sadler-Smith, 2016).

Additionally, the research field is further complicated by the fact that individuals also differ in their tendency to favour intuition and analysis respectively (Sinclair and

Ashkanasy, 2005; Hodgkinson and Sadler-Smith, 2003; Betsch and Iannello, 2010) and that “successful entrepreneurs can be characterised by an expert mindset” (Krueger, 2007, p123). Intuition involves both knowing (judgmental and based on experience) and sensing (gut feelings) (Elbanna and Fadol, 2016). Novice entrepreneurs are known to be more analytical than experienced entrepreneurs (Gustafsson, 2006) and less susceptible to biases and heuristics which are used to manage information and reduce uncertainty (Tversky and Kahneman, 1973; Bryant, 2007). According to Gore and Sadler-Smith (2011) expertise and intuition are not synonymous and that “there are mechanisms of expert decision-making performance that involve intuitive processing and those that involve deliberate processing” (Salas et al., 2010, p10). If intuitive decision-making effectiveness is related to expertise learned in the domain environment (Kahneman and Klein, 2009), then in order to develop the growth of a business and improve decision effectiveness, it is important to understand what critical influences guide and support the development of expertise. This is especially relevant as decisions made on tacit knowledge are intuitive and thus strengthening intuition will accelerate expertise (Klein, 2015, p166). Longitudinal exploratory research using novice entrepreneurs will provide a suitable methodology to help unpack this process.

2.8 Using a cognitive style lens to explore the decision process

It seems that despite the plethora of research on entrepreneurial cognition, there are still gaps that require exploration. Wright and Stigliani (2013, p8) posit that it is necessary to explore in depth the cognitive styles that entrepreneurs use when making decisions whether or not to grow their business. This is a challenging recommendation, for it suggests the use of an appropriate style measurement that must reflect the developments in cognition and the dual process approach.

Clearly, cognitive style has been used to describe the way entrepreneurs process information for behavioural outcomes (for example, Boucknooghe et al., 2005; Gállen, 2006; Baron, 2007; Dutta and Thornhill, 2008; Armstrong and Hird, 2009; Lee Ross, 2014). Nevertheless, to date there is no research on the role of cognitive style in the decision-making process for opportunity evaluation. Cognitive style has been shown to

lead to different pathways of intent and is a significant moderator of intention (Krueger and Kickul, 2006) but there is still is no clear link between cognitive style and decision-making for growth, or what cognitive styles entrepreneurs rely on when making these decisions (Wright and Stigliani, 2013, p8). Whether certain cognitive styles lead to certain growth outcomes (Wright and Stigliani, 2013) is a research question.

2.8.1 Criticisms of cognitive style as a methodological practice

The cognitive style literature presents an interesting history in entrepreneurship and organisational management research, where traditionally the focus has been on bipolar differences between analytical and intuitive thinking (Cools and Van Den Broeck, 2007; Cools et al., 2014). Yet, despite a plethora of research during the last three decades, it has been repeatedly criticised for a myriad of tests, confused and overlapping definitions and terminology, inappropriate measurements and lack of independent valuation (Peterson et al., 2009; Cools et al., 2014). As a result of this, style research must be “rigorous in its deployment of valid and reliable methods of assessment, operate within a unifying conceptual model and be practically relevant” (Armstrong et al., 2012a, p14).

Responding to this, research by Kozhevnikov et al. (2014) and Cools et al. (2014) positioned the more commonly used style dimensions in a multidimensional and multi-layered matrix. This brings into question the validity of typically used style measurement instruments that focuses on bipolar differences. A review of the methodological practices in style research by Cools et al. (2014) has also criticised the multiplicity of style categories and research designs, arguing that a shift from studies that have examined antecedents or consequences to variance models must consider contextual factors, longitudinal designs and measures that adopt a multidimensional cognitive framework, such as CEST (Epstein, 1985, 1994, 2008, 2010, Epstein et al., 1996; Pacini and Epstein, 1999). More qualitative or mixed methods are also needed for theory development and testing. This study’s research design has addressed these recommendations by taking a mixed method approach to the research question.

Notwithstanding, cognitive style research has made important contributions towards management, organisational, and education fields (Kozhevnikov, 2007). It has been widely used in the psychology and entrepreneurship domain, for example, the influence on managers' choice of decision-making (Cools and Van Den Broeck, 2008; Yang et al., 2012), managerial behaviour (Cools and Van Den Broeck, 2008) and that decision-making styles are compatible with cognitive styles (Hough and Ogilvie, 2005; Gallén, 2006). Successful entrepreneurs use an intuitive style more frequently (Baron, 2007) and entrepreneurs are more intuitive than non-entrepreneurs (Armstrong and Hird, 2009). Other studies have used cognitive style for organisational studies (Hayes and Allinson, 1998), managerial behaviour (Cools and Van Den Broeck, 2008) the exploration of the person/organisation/misfit relationship (Brigham et al., 2007) and the founding and survival of businesses (Hird, 2012). The literature on cognitive style is prolific, both conceptually and empirically.

2.8.2 Unidimensional versus multidimensional perspectives for style research

A key issue, currently seen in style research centres on the multidimensional perspective rather than a unidimensional style perspective. A multidimensional approach is recommended to provide a clearer profile (Armstrong et al., 2012a), as prior research has shown that different cognitive styles indicate differences between entrepreneurs, for example, growth intentions (Dutta and Thornhill, 2008), entrepreneurial drive (Armstrong and Hird, 2009), intentional pathways (Krueger and Kickul, 2006), self-efficacy (Barbosa et al., 2007) and the effectiveness of style in different phases of the business venture creation (Olson, 1985).

Over the last decade, entrepreneurial cognition has moved towards a dual processing interpretation, whereby mental processes are two separate but complementary information processing systems as the basics of thinking and reasoning (Smith and DeCoster, 2000; Dane and Pratt, 2007; Evans and Stanovich, 2013; Sadler-Smith, 2016). This is in contrast to style research from the sixties onwards, which generated a wide range a range of tools used to measure intuition and analytical thinking as a bipolar construct. Akinci and Sadler-Smith (2013) have tested both unitary and dual process

views of intuitive-analytical style self-report instruments, and made recommendations for measurement instruments to address the dual processing view. They suggested that a valid and reliable instrument is needed for assessment of intuition and analysis as distinct constructs and not as a bipolar continuum. This unitary versus dual process distinction has been an ongoing debate between the two different approaches and has divided the field of cognitive style research.

2.8.3 Cognitive style: the unitary versus dual process debate

A commonly used measurement instrument has been the Cognitive Style Index (CSI) (Allinson and Hayes, 1996), which is based on the unitary style construct as a single bipolar dimension from intuition to analysis. However, conceptualizing intuition and analysis at each end of a continuum infers that any increase in one mode is at the expense of the other. This has implied that individuals are ‘either /or’ and thus cannot be operating both systems together (Hodgkinson and Sadler-Smith, 2003). According to Cools et al. (2014), the three most commonly used instruments are the Kirton Adaption-Innovation Inventory (KAI), the CSI and Myers Briggs Type Indicator (MBTI). Notably underrepresented were measurement instruments that represent orthogonal style dimensions. It seems that style research has been slow to move away from a unitary approach and align itself to dual process conceptualisation.

This on-going debate has significant implications for theoretical and empirical contributions. Hodgkinson et al. (2009, p280) recommended that CEST was best used for those taking a dual process view. In order to advance the field, a dual process approach is needed and the “use of a smaller number of key style dimensions with better established theoretical underpinnings and more robust psychometric properties” (Akinci and Sadler-Smith: 2013, p213). Thus, the choice of measurement instrument is critical for theoretical contribution, discussed next.

2.8.4 Construct measurement of cognitive style

The review of the style literature showed historically there is a confusing array of cognitive style measures available, which address different cognitive style families and therefore measure different aspects of style. From a practical viewpoint there is a wide choice of measures available, where common preferences have been the CSI (Allinson and Hayes, 1996). This was used for measuring analysis and intuitive styles in organisational research and the MBTI as a personality inventory, first published in 1962, based on the theory of psychological types described by C.G. Jung. The development of the CSI as an intuition-analysis measure has been criticised as a unidimensional bipolar continuum by Hodgkinson and Sadler-Smith (2003). They posit a two-factor model, where the intuition-analysis cognitive style is viewed as a unipolar construct, with an analysis and intuitive dimension (Sadler-Smith, 2009; Cools et al., 2014), more in line with dual process theory. Despite these recommendations, the debate has not yet been resolved.

Reviewing these style measurements stressed the importance of two key criteria for this study; the use of an instrument that reflected a multidimensional approach and an instrument that measured both intuition and analysis from a dual process perspective. The Cognitive Style Indicator (CoSI) was selected as it has been validated and used in management research (for example, Cools and Van den Broeck, 2008; Cools et al., 2012) as it supported the multidimensional approach, in line with current thinking. The validation of the tool has addressed correlation of the measure by using several independent measures previously common within the field of business and management. The CoSI instrument measures three different styles; a knowing style, a thinking style and a creative style. The literature review also showed that the REI and its underlying theory of CEST was more compatible with developments in dual process theory (Akinci and Sadler-Smith, 2013). Thus, the instrument selection is critical. This is discussed further in Chapter 3.

2.9 Cognitive versatility: the interplay between processing modes

Advances in neuroscience have generated more complex conceptualisations of intuitive and analytical approaches for decision-making (Hodgkinson et al., 2009; Hodgkinson and Sadler-Smith, 2018). This is an interesting development as it promotes both styles as orthogonal and conceptually allows interplay between the two modes of processing. Hodgkinson and Clarke (2007, p246) have proposed a 2 x 2 typology based on the dual process conceptualisation of cognitive styles and strategies, shown in figure 2.4.

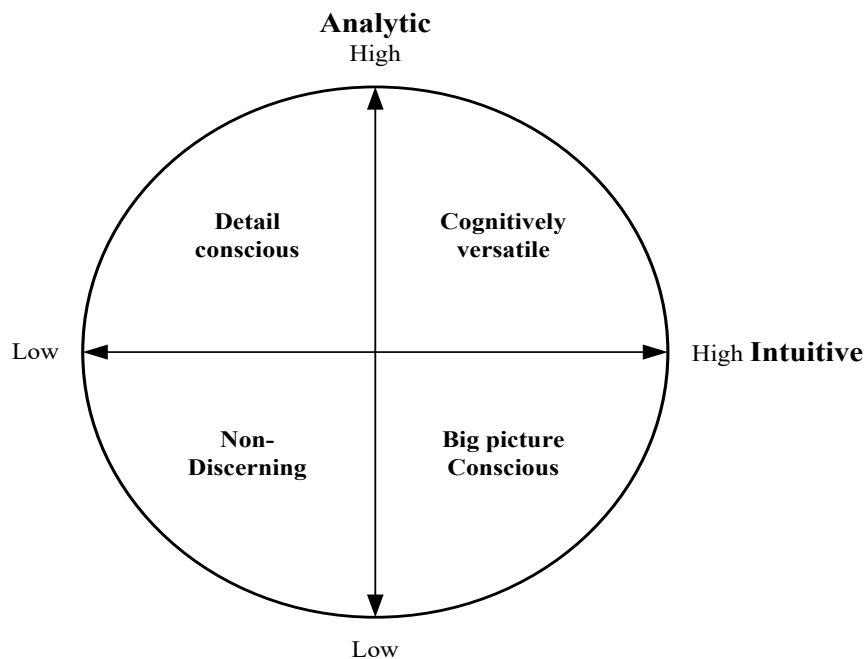


Figure 2.4 A dual process conceptualisation for cognitive styles and strategies (Hodgkinson, and Clarke, 2007, pp243-245)

This conceptualisation proposes the development of versatility between intuitive and analytical styles as a useful cognitive strategy when situational demands are different to the entrepreneurs' preferred style. A cognitive versatile individual is predisposed to use both styles equally. The model has subsequently provided a framework for scenario planning that can be used for strategy as practice (s-as-p), observation and training (Hodgkinson and Clarke, 2007, p250).

According to Akinçi and Sadler-Smith (2013), most decision-making tasks require the use of both intuitive and analytical modes, where intuition and analysis may co-occur rather than work in opposition. Thus, cognitive versatility is the ability to switch between both intuitive and analytical modes of thinking (Hodgkinson and Clarke, 2007, p245). Consistent with dual process theory, versatility produces a more balanced perspective (Sadler-Smith and Shefy, 2004; Groves et al., 2011). If this is so, then the development of cognitive versatility is an important stage in the entrepreneurial process. Given that cognitive style is considered a stable construct, although opinion on this is still divided, potential versatility of style may be considered advantageous. Therefore, style flexibility or ability to synthesize a style commensurate for the appropriate environment may equip the growth-oriented entrepreneur with strategic advantage.

2.9.1 Cognitive versatility and opportunity-related decisions

Entrepreneurs use considerable mental processes and information processing to evaluate and make decisions on whether or not an opportunity is commercially viable. Willingness to engage and evaluate opportunities depends on the individual thinking processes entrepreneur use as they assess and evaluate these opportunities, as well as the external factors that impact on the evaluation and decision-making process for the opportunity. Arguably a versatile approach would be advantageous, where high levels of both intuition and analysis are used together, as it has been shown to mediate the relationship between experience and opportunity identification (Baldacchino et al., 2013, p262). Whether or not this is observed in the opportunity evaluation stage is a question for future research and an objective of this study.

Cognitive versatility is based on the premise that versatile thinkers access an inferential, integrated library of knowledge (Browne, 1996). A key early piece of work by Louis and Sutton (1991, p57) proposed a view of cognitive processing involving conscious and automatic modes, where there was a movement between modes. Individuals can switch “cognitive gears” according to different situations. They pointed out that although a number of models of cognitive functioning had been developed, few had considered any movement or connection between modes. Adding to this earlier work, studies have

demonstrated the importance of intuition in decision-making (for example, Khatri and Ng, 2000; Sadler-Smith 2004; Sadler-Smith and Burke-Smalley, 2015). However, conceptual models and empirical studies that emphasises the effects of cognitive variables have been prolific at the expense of those that have examined the complexity of cognition as a process (Grégoire et al., 2015). As evaluation is an interpretive process of previously acquired information, it is logical to assume that both modes of processing would be used as entrepreneurs construct a mental picture of what the opportunity means to them for future action (Wood and McKelvie, 2015).

2.9.2 Empirical studies and cognitive versatility

The literature review showed that research on versatility as a focus of study was limited. More often or not, discussion inferred that cognitive versatility had an important part to play in the thinking process. An example of this is Lee Ross's (2014) study on entrepreneurial thinking in small businesses, designed to extend and develop Khatri and Ng's work (2000) and to test Hodgkinson and Clarke's (2007) notion of cognitive versatility. Findings suggested that styles were complementary and used simultaneously in decision-making and that a rational style "may be present alongside intuitive thinking in most situations" (Lee-Ross, 2014, p11). This meant intuitive and rational information processing styles were not viewed as independent and could function simultaneously in decision-making, which infers versatility (Lee-Ross, 2014, p12).

Another empirical study by Baldacchino et al. (2013) explored cognitive versatility and opportunity identification, using the CEST as the theoretical framework. This showed intuition to be a key cognitive process that linked experience to opportunity identification and that a versatile approach, which uses high levels of intuition and analysis together, mediated the relationship between experience and opportunity identification. This meant both analysis and intuition helped entrepreneurs to identify potential opportunities and that the use of analysis was to 'complement their intuition' and check that they were on the right track. Experienced entrepreneurs were thus more cognitively versatile than novices, consistent with prior research. This illustrated that the thinking process is dual in nature, but a focus on one or other of the information processing modes does not

provide a complete understanding how the relationship between experience and opportunity identification could be developed in a beneficial way. Furthermore, the study recommended that scholars needed to consider cognitive versatility, rather than just looking at intuition or analysis on their own, as an overreliance on analysis rather than intuition was not conducive to identifying more opportunities. As such, the relationship between experience and opportunity identification is still not fully understood.

In contrast to this Brigham et al. (2007) identified when individuals are in a state of cognitive misfit, that is, a mismatch between the preferred cognitive style and the work context, resulting in the use of specific coping behaviours for handling this. The ability to use coping behaviours does suggest some versatility, whereby entrepreneurs can switch from their preferred style to a coping style with minimum effort. Based on this research, Brigham et al. (2007, p34) proposed a person-organisation fit model, suggesting that cognitive misfit could lead to more negative individual outcomes. However, the CSI style measure was used for assessing decision-making style, which is based on the unitary dimension criticised earlier, rather than using a dual process perspective. As the dual process conceptualisation allows for possibilities of individuals to be flexible between both styles, using this approach for their study may have led to different interpretation of the results.

In addition, taking a cognitive perspective, Gustafsson (2006) also argued that the nature of the business opportunity prompted different modes of decision-making, with results showing that experts adapted their decision-making behaviour, but novices used more analytical decision-making irrespective of the task demands and context. One of the criticisms of this study is that by locating cognitive processes and tasks along a cognitive continuum (Hammond, 2000) inducing intuition or analysis, is not conducive with a dual process approach. Referring to Hodgkinson's and Clarke's (2007) dual process conceptualisation of cognitive styles and strategies suggests that conceptually, individuals can be both high on the intuitive and analytic dimensions. It is interesting to note that the theoretical midpoint position on the Cognitive Continuum, called 'quasi rationality' could potentially indicate that both intuition and rationality were used simultaneously, if a dual process approach was taken, thus inferring versatility.

Despite the fact that previous literature has labelled cognitive style as a stable construct (Hayes and Allinson, 1998), according to Olson (1995), different styles are more appropriate at different stages of the business. The notion of a versatile style has been conceptually suggested by Sadler-Smith (2009) and Hodgkinson and Clark (2007). Thus, it is possible that a versatile style can be synthesised, particularly if taking a parallel-competitive approach of dual-process theory (Hodgkinson and Sadler-Smith, 2018), where the analytical mode and intuitive mode work seamlessly together. This would conceptually be possible as dual process theory supports the multidimensional conceptualisation and the matrix hierarchical model, where versatility of styles between different levels or dimensions may be operationalised. This exploration of a versatile style is a crucial aspect of this research study as the ability to use both processing modes as a versatile style (Sadler-Smith, 2009; Hodgkinson and Sadler-Smith, 2018) would enable the entrepreneur to use the best suited processing mode accordingly.

2.9.3 Versatility as a synthesis of style

Within the context of entrepreneurial cognition, the notion of using both analytical and intuitive information processing is frequently evidenced in literature. For example, Simon (1987) stated that effective managers used both analysis and intuition for decision-making. Hodgkinson and Sadler-Smith (2003) have argued that the ability to switch between ‘habits of mind’ and ‘active thinking’ (Louis and Sutton, 1991, pp55-56) is an essential skill for managers in organisations today. Significantly, Dane and Pratt (2007, p48) also stated, ‘many provocative ideas about the interplay between rational and intuitive decision making have been suggested; empirical research in this area, particularly in the field of management remains insufficient’. The researcher would agree that to date, this is still correct.

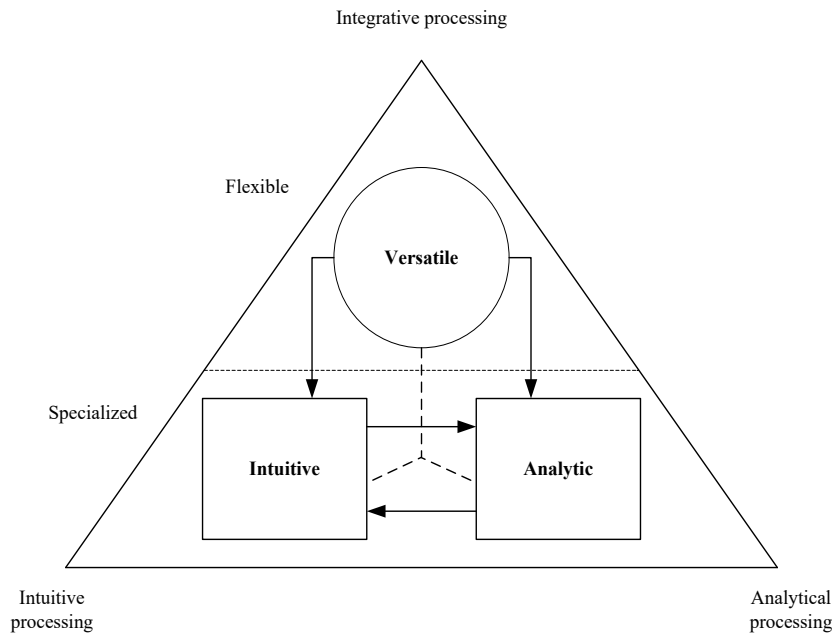


Figure 2. 5 A duplex model of cognitive style (Sadler-Smith, 2009, p15)

Taking this point further, Sadler-Smith, (2004, p176) suggested that it may be possible to “synthesise a variety of styles commensurate with the needs of specific situations”. A proposed a duplex model of cognitive style (see figure 2.5) shows the model with a hierarchical structure (Sadler-Smith, 2009). At a specialised level, both the intuitive and analytical processing modes are stable preferences. At the flexible level, each mode can be used interchangeably as and when the situation demands. Individuals with a versatile style use cognitive strategies that enables them to process information that is complementary to their preferred mode and in response to the situational demands. This model, although it has not been tested empirically, does support the integrated and independent nature of human thinking and dual process theories. It introduces a conceptual framework that can be used when exploring the ability of individuals to operate in cognitively versatile ways and has potential to provide a unique contribution for a more unifying model or conceptual framework that is underpinned by dual process theory. Applying the model to opportunity-related decisions infers that entrepreneurs have an adaptive capability to process this decisional information, contingent with context and experience. This is an important proposition for future research.

2.9.4 A balance of styles as a beneficial strategy

As Sadler-Smith (2004) proposed, a non-unitary approach implies the use of a dominant style alongside an auxiliary style. This supports Mintzberg's (1976) earlier work where the synthesis of logic and intuition was an important aspect of organisational effectiveness. If managers (and by extension entrepreneurs) learned to develop appropriate behaviours or strategies likely to be effective in solving problems in organisations, then it may be possible that more experienced entrepreneurs exhibit a mixture of style characteristics. Groves et al. (2011) found a positive link between the entrepreneur's linear and non-thinking styles, which they called a 'versatile balance' and suggested that this balanced thinking style may be critical for survival and viability. They have suggested that future research should specifically examine the relationship between this balance and key measures of business survival. Hence this suggests that a synthesis or balance of style may be a critical aspect of entrepreneurial strategic decision-making for successful growth and a missing area of research. This research study aims to explore and determine the potential operationalisation of the balance between analytical and intuitive styles and how these are synthesised.

2.10 Entrepreneurial cognition and the role of time

As mentioned previously, time is rarely factored into the opportunity process, although there are a few empirical studies (for example, Dutta and Thornhill, 2008; Autio et al., 2013; Andresen et al., 2014; Chandra, 2017) that take this into account. According to Ardichvili et al. (2003, p106), successful opportunity development is a cyclical and iterative process, influenced by key factors of alertness, prior knowledge, social networks, personality traits and the type of opportunity. In view of this the study takes a temporal approach to explore this further.

A longitudinal approach by Andresen et al. (2014) has integrated social theory with the entrepreneurship literature, resulting in a model of the opportunity process, whereby the focus was not on the individual but on collaboration. Data was collected over a five-year period using multiple methods. Although the model contributes to social entrepreneurship

theory, which is not the focus of this study, nevertheless, it does provide an interactive and integrative view of the opportunity process, thus supporting calls for a more holistic approach (Wiklund et al., 2009; Cools et al., 2014). Also, elements of this collaborative entrepreneurial process model have synergy with this study's proposals for the development of an opportunity evaluation model, proposed in Chapter 6.

Taking a different approach, Chandra's (2017) longitudinal study showed that opportunity evaluation was a multidimensional process that may be revised over time. The study found that the ability to revise decision-making rules was critical for the entrepreneurs' long-term success and in line with Wood and Williams' (2014) rule-based processing approach to opportunity evaluation. In a similar manner, Dutta and Thornhill's (2008) five-year study showed that entrepreneurs varied their growth intentions, depending on the competitive and environmental conditions at the time. Both these studies demonstrate the importance of looking at a time based-process model for enriching understanding of the decision process and illustrating that the process can be non-linear and flexible (Chandra, 2017). As such, a longitudinal study may unravel previously held assumptions about opportunity-related decisions.

Time also provides repeated experiences needed to be called an expert which are significant for shaping expertise (Baron and Ensley, 2006). Both Sadler-Smith (2016) and Ericsson et al. (2006) have posited that it takes ten years of learning and practice to develop detailed domain schemas. This shows the importance of taking a longitudinal approach in order to capture the significance and contribution of developing experience and the continual practice and processing of business-related information. Styles are considered a stable construct, but the dual process conceptualisation and a multidimensional perspective makes it possible for style to adapt over time as experience is gained. From a methodological perspective, this suggests that any research question must be of a temporal nature if it is to capture any changes in the opportunity process. In the cognitive style literature, Cools and Van Den Broeck (2007) and Cools et al. (2014) have also called for more longitudinal, qualitative designs to improve understanding. Taken together, this reiterates the need to take a temporal approach for future studies.

2.11 Taking an integrated approach to the research question

It was noted from the review that despite a variety of different approaches to conceptual and empirical research across the three themes, (opportunity evaluation, decision-making and entrepreneurial cognition), there were similar issues and recommendations common to all three. This prompted an integrated approach shown in figure 2.6 below. Each theme is shown as a circle in which are listed the key gaps and recommendations for that theme.

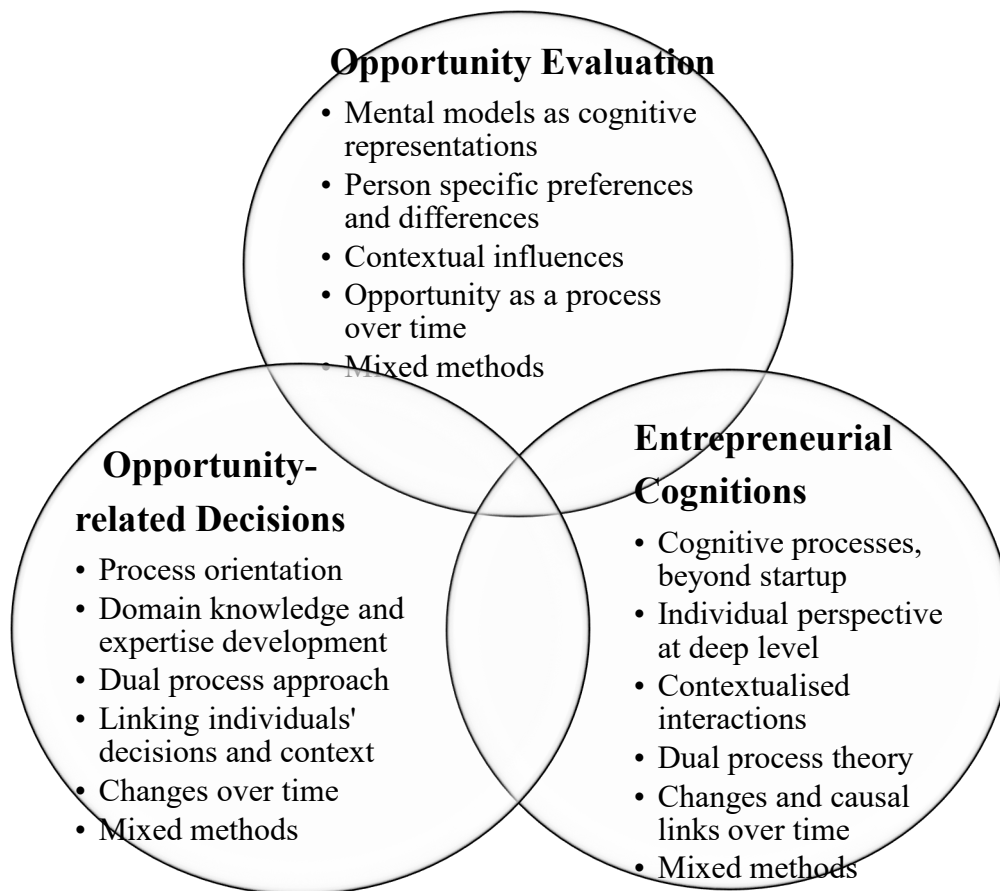


Figure 2. 6 Integrative framework for the study's research question

Appendix 2 illustrates the common issues and gaps noted from the literature review and summarised for each theme that were used for the framework. This process was based on conceptual and methodological concepts that were either missing from or

recommended for future research. Reviewing these gaps and recommendations showed that a holistic approach was the best way forward to answer the research question, by integrating some of the fragmentation and disparate issues that were evident from the review.

To summarise, this provided an interactive and contextualized framework (Andresen et al., 2014; Mitchell et al., 2014) based on a dynamic, multi-level and micro foundations perspective (Barney and Felin, 2013). The integrated approach focused on the individual cognitions of the entrepreneurs, exploring their mental models at a deep level to determine how these decisions were made in context and how these were influenced and developed over time. Additionally, a mixed methods and longitudinal approach was required for taking a dual process theoretical approach in line with current recommendations.

In support of taking an integrated and holistic framework, there are examples mentioned in the entrepreneurship literature that also take this approach. Sánchez et al. (2011) noted that an integrated model was needed to provide a view of the cognitive infrastructure and its development. Curşeu et al. (2008) also proposed a dual process model of entrepreneurship strategic decision-making (ESDM), as an integrative model of factors, particularly emotion, motivation and information processing (see figure 2.3, page 54). Although this model is predominately a cognitive one, it also incorporates the complexity and uncertainty of the decision situation, thus addressing the relevance of contextual variables present in a small business environment.

In the psychology literature, Smith and DeCoster (2000) have argued that integration represents an increasing trend, because the traditional focus on specific topic areas are difficult to place in comprehensive and conceptual frameworks. This “suggests the importance of language and social influences on individual cognition” (Smith and DeCoster, 2000, p129). Additionally, Wiklund et al. (2009, p352) posited that the use of an integrated model “requires a focus on theoretical constructs at a high level of abstraction”, as well as investigation of endogenous variables. This allowed the relationships of constructs and small business growth to be explored within and across perspectives. Similarly, earlier work by Busenitz et al. (2003) argued that research should

focus on the intersection of environments, individuals and teams, opportunities and the mode of organizing, where complexity exists, rather than a research of a single concept focus. Taken together, this integrated perspective will allow the researcher to evaluate relationships and the importance of different constructs (Wiklund et al., 2009) in the context of opportunity-related decisions.

Despite these examples, challenges and criticisms of the diversity of process models has led to a call by Moroz and Hindle (2012) for a new evidenced-based model of the entrepreneurial process. They posited a critical relationship existed between individuals and opportunities and that the “transformative and disruptive value of knowledge is an explicit or implicit component” of every model (Moroz and Hindle, 2012, p811). This comment places the entrepreneur centre stage in the decision process for opportunity evaluation, where perception and feasibility of the opportunity and the use of knowledge is needed for both rational and intuitive information processing. Thus, the entrepreneurial process itself may contribute to the development of new knowledge, skills and experience (Shepherd et al., 2014), which in turn may influence how entrepreneurs make their decisions. In addition, Wood and Williams (2014) lament the fact that there is still no integrative framework that identifies the cognitive structures, such as ways of thinking or informational cues that underlie the process and that frequently the evaluation part of the opportunity process is largely ignored. A proposal for an integrated framework of opportunity identification, development and exploitation by Peiris et al. (2013) is a further criticism of this issue, as the model does not account for the evaluation stage of the opportunity process.

2.11.1 Using an integrated approach to define the objectives

To summarise, the literature review of these three themes in the entrepreneurship literature (opportunity evaluation, decision-making and entrepreneurial cognition) has resulted in an integrated framework that was used to establish the study’s objectives. This integrated approach has also been used to inform the conceptual framework, discussed in the next chapter. Thus, the study’s objectives ratify a holistic and integrated approach by taking an information processing approach at a deep cognitive level, conceptualised

within dual process theory. Additionally, a mental model approach was adopted for identifying and exploring specific preferences and the development of expertise for opportunity evaluation and decision-making. The study has been contextually situated in the opportunity evaluation stage of the entrepreneurship process and examines the question after venture creation. Mixed methods and a longitudinal approach were chosen to explore the research question at an individual level of analysis.

2.12 The research study's objectives

The objectives are summarised as follows:

***Objective 1:** To explore the information processing styles that entrepreneurs use over a two-year period in order to determine factors that influence their opportunity-related decisions.*

The evaluation stage is still under researched. Empirical work on opportunity has frequently “glossed over” opportunity evaluation (Wood and McKelvie, 2015, p257). A cognitive process view is needed to understand this critical component as a key element of entrepreneurial opportunity identification. Taking an information processing approach to decision-making will contribute to a better understanding of the relationship between internal and external characteristics and how these within-individual variances respond to situational differences in the external environment (Barbosa, 2014). The use of cognitive style as a lens to understand opportunity evaluation is a novel approach.

***Objective 2:** To explore how cognitive versatility is used in the decision-making process by examining how entrepreneurs adapt their preferred cognitive style contingent with context.*

The use of a cognitive lens provides a platform for the study of cognitive structures and frameworks. Cognitive versatility is under represented in the literature and to date, has not been explored in the opportunity evaluation stage. An exploration of this construct will improve understanding how versatility influences the relationship between knowledge, opportunity-related decision-making and information processing.

Objective 3: *To compare and contrast differences in the thought processes between novice and mature entrepreneurs to determine the relationship between style, versatility and prior experience.*

A longitudinal and mixed methodology will explore how entrepreneurs evaluate and make opportunity-related decisions and how the development of experience and changing environmental circumstances influences the way that entrepreneurs process information for decisional outcomes.

Objective 4: *To examine the mental representations used by entrepreneurs as they evaluate an opportunity, from initial decision through to final decision and to visually represent their thinking process using concept mapping techniques.*

Mental models will show how entrepreneurs create cognitive images that represent the evaluation of the opportunity and how any changes impact on their deep cognitive structures. The use of a dual process framework will provide further insight into structures and processes used for analysis and intuitive thought. Providing a dual process approach challenges existing theories and boundaries in entrepreneurship research and will contribute to understanding the relationship between entrepreneurial cognitions and decision-making for theory development (Shepherd et al., 2014).

Objective 5: *To develop a theoretical model for the process of opportunity evaluation and opportunity-related decisions that considers the iterative, dynamic and temporal nature of the subject matter.*

The decision-making process underpinning the evaluation of entrepreneurial opportunities and how the process evolves over time remains underexplored and poorly understood. A mixed method, longitudinal approach is a suitable methodology for understanding how this process evolves, adapts and changes in accordance with the development of the individual's experience and changes in the business environment.

Objective 6: *To develop a teaching framework for opportunity-related decision-making, that will assist practitioners and educators help small business entrepreneurs understand and improve their decision-making effectiveness and cognitive complexity.*

Support initiatives, for example from GOV.UK and fsb, still emphasise financial, technological, legal and networking support. Independent training providers offer a broader scope, for example, intuitive decision-making and performance management, but these come at a cost and time away from the business. This teaching framework allows practitioners to work face to face with entrepreneurs in the context of their existing business. By combining the benefits of rational deliberation and intuitive information processing not only increases the complexity of their mental models, but provides insight into the way that they evaluate opportunities and helps them understand and improve how they think through their decisions for future business growth.

2.13. Chapter summary and the research question

To conclude this chapter, Wright and Stigliani (2013, p4) argued that there is limited understanding about individual cognitive decision processes, which is a “problematic omission in the literature on the growth of entrepreneurial ventures”. Additionally, they stated that further research is needed to determine how entrepreneurs make decisions to grow (or not grow) their business. Exploring these two viewpoints in the entrepreneurship and management literature led the researcher to follow this line of enquiry across three different entrepreneurship themes of opportunity evaluation, decision-making and entrepreneurial cognition.

The chapter has reviewed the key approaches in the three streams identified from the literature review, which established the following research question:

“How do entrepreneurs make decisions when evaluating business growth opportunities and what internal and external factors influence this decision-making process?”.

The literature review illustrated key findings and insights which indicated a gap in understanding how entrepreneurs made decisions whilst evaluating an opportunity, and that a longitudinal, dual process cognitive perspective was needed to make contributions for future theory and practice. As a result of the review across three themes in the entrepreneurship literature, an integrated framework was proposed to structure the

exploratory nature of this study. The insights from this integrated perspective led to a focus on the entrepreneur as the unit of analysis and an exploratory study of the cognitive processes associated with the assessment of an opportunity as “attractive to me in the context of the existing knowledge, skills, abilities and resources of the venture” (Haynie et al., 2009, p338) and as a distinct phase in the entrepreneurship process (Wood and McKelvie, 2015). Additionally, the result of the literature review informed the theoretical, conceptual framework to support the research question, which is discussed in the next chapter.

Chapter 3: Conceptual framework

“For any field to have its usefulness it must have a conceptual framework that explains and predicts a set of empirical phenomena, not explained or predicted by conceptual frameworks already in existence in other fields”
Shane and Venkataraman (2000, p217)

3.1 Introduction

This chapter will establish the conceptual framework for the research study and explore the constructs related to the research question. As discussed in the literature review, three entrepreneurial research streams have been integrated to provide an in-depth understanding how entrepreneurs make decisions when evaluating an opportunity for growth, past the start-up stage of their business. This integration represents a new approach to the phenomenon under study.

The conceptual framework has focused on entrepreneurial cognition as the unit of analysis, in the context of opportunity evaluation and opportunity-related decisions. This chapter provides the framework that explains the relationships between the main constructs of the study, arranged as a visual structure to show how each key construct relates to one another. This has helped the researcher identify and construct her world-view of the phenomenon to be investigated (Grant and Osanloo, 2014). It has also allowed the researcher to move beyond the ‘what’ descriptions to explanations of ‘how’ and ‘why’, by exploring dynamic relationships between the key constructs.

3.2 The conceptual model as a framework for the research question

As defined by Miles et al. (2014, p20) a conceptual framework “explains, either graphically or in narrative form the main things to be studied, the key factors, variables or concepts and the presumed interrelationships among them”. This provides a potential framework for the research investigation (Ravitch and Carl, 2016). In addition, an integrative framework calls for a higher level of abstraction of cognitive, theoretical constructs and their relationships (Wiklund et al., 2009, p352). Any framework must

reflect the thinking behind the entire research process and provide the basis for context and methodology (Ravitch and Carl, 2016). For this study, opportunity evaluation, opportunity-related decisions and entrepreneurial cognitions were examined in the literature review, with identified gaps and recommendations from previous studies defined and integrated. The rationale for this integration was that a “bigger picture” approach (Wiklund et al., 2009, p351) would further understanding how entrepreneurs evaluated and made decisions, based on their perceptions of opportunities for growth. A cognitive perspective, using a cognitive style lens was chosen to frame the ‘how’ question and to provide a new approach.

3.2.1 Developing the conceptual framework

First, as a consequence of the review, it was noted that the cognitive processes associated with opportunity evaluation have largely been ignored and that opportunity evaluation is a first person, future-focused assessment (Haynie et al., 2009; Shepherd et al., 2007; Williams and Wood, 2015). According to Haynie et al. (2009, p338), existing knowledge, skills, abilities and resources provide the context of whether or not the opportunity is ‘attractive to me’, rather than being ‘attractive to someone’. Developing this point further suggested that the core of the conceptual framework was based on the individual’s cognitive environment, including the use of knowledge, expertise and experience for a thinking process that involved judgment criteria and decision-making for opportunity evaluation.

Building on this, it was noted from the review that according to Wright and Stigliani (2013, p8) it was “important to engage in a deeper understanding of the cognitive styles that entrepreneurs rely on when making such decisions [on growth]”. Dual process theories are increasingly being used for cognitive research (Hodgkinson and Clarke, 2007; Hodgkinson and Sadler-Smith, 2018) supporting any potential blending of intuitive and analytical styles, considered the most valued approach for strategic decision-making (Hodgkinson et al., 2009). In addition, given the suggestions for a rule-based framework for opportunity evaluation (Wood and Williams, 2014; Williams and Wood, 2015), a more sophisticated conceptualisation based on both analytical and intuitive approaches to

decision-making may provide greater insight of the interplay between these two approaches and how it is used for opportunity evaluation.

Thirdly, even though the assumption is made that opportunity evaluation is a first-person approach (Haynie et al., 2009), external resources, such as using information from teams, personal networks or hard data will be employed by the entrepreneur. These external networks, either interpersonal or inter-organisational assist knowledge and information transfer as well as providing an expanded resource base (Hughes et al., 2015). As these resources mostly sit outside the internal cognition of the individual they are positioned in the external environment in the conceptual framework. This addresses Wright and Stigliani's (2013) comment whereby both the internal (the person) and external factors (the environment) that may influence decision-making on growth are missing from the entrepreneurship literature.

In order to aid development of the conceptual framework, indicative content used to inform the design, shown in table 3.1, identified the important constructs that emerged from the literature review. A brief description of each construct is provided, as well as reference to the literature that either investigated this construct empirically or provided a conceptual review. It was important that these constructs were explored across the three integrated themes, checked against gaps and recommendations identified from the literature review before they were defined. The definitions shown in table 3.2 captured what was meant by each of these mental abstractions through the use of a few words. These constructs were then used as building blocks for future theory development. Additionally, these definitions were used to inform the conceptual framework design, which ensured that the construct definition was consistent across the three themes. From these construct definitions, the framework was compiled comprising of four building blocks: dual process theory, cognitive style, opportunity-related decisions and influencing factors in the external environment. An overview of the conceptual framework is provided first in the next section, before each building block is explained in turn.

Table 3. 1 Literature used to inform design and construct definitions

Construct	Content identified from literature review	Examples of authors
Opportunity Evaluation	A time-based process, theoretical framework as rule-based reasoning, first person future oriented cognition, mind in the middle, attributes are influencers, evaluation represented by mental models, regulation by different external stimuli	Keh et al., 2002; Bryant, 2007; Haynie et al., 2009; Vaghely and Julien, 2010; Autio et al., 2013; Urban, 2014; Wood and Williams, 2014; Grégoire et al., 2015; Wood and McKelvie, 2015; Williams and Wood 2015; Chandra, 2017.
Cognitive Style	Differences between entrepreneurs and non-entrepreneurs exist, styles are predictors of entrepreneurship, style indicate growth intentions, both intuitive and analytical styles are relevant, duplex model promotes versatility, styles are situation specific, cognitive style used as heuristics, adaptive cognition and meta-analysis of styles relevant, affective responses used as gut feelings	Leonard et al., 1999; Bryant, 2007; 2007; Krueger, 2007; Dutta and Thornhill, 2008; Hodgkinson et al., 2009; Novak and Hoffman, 2009; Sadler-Smith, 2009; Blume and Covin, 2011; Armstrong et al., 2012b; Akinci and Sadler-Smith, 2013; Cools et al., 2014; Kozhevnikov et al, 2014; Lee-Ross, 2014; Knockaert et al., 2015; Arend et al., 2016; Wang et al., 2017; Amato et al., 2018; Chen et al., 2018.
Cognitive Versatility	Versatility as switching between modes, existence of two orthogonal uncorrelated constructs, a versatile balance between linear and nonlinear styles is useful, cognitive style as a duplex model includes a versatile style	Louis and Sutton, 1991; Sinclair and Ashkanasy, 2005; Hodgkinson and Clarke, 2007; Dutta and Thornhill, 2008; Sadler-Smith, 2009; Groves et al., 2011; Lee - Ross, 2014; Baldacchino et al., 2015.
Intuitive Expertise	Expertise develops through pattern matching and takes time, style is moderated by expertise	Gustafsson, 2006; Elbanna and Fadol, 2016; Sadler-Smith and Burke-Smalley, 2016.
Opportunity-related decisions	Entrepreneurial decision-making is a core activity subject to opportunity beliefs, decision-making in an uncertain environment, decision-making and intuition, the role of experienced based knowledge influences opportunity cognitions in the decision process	Gustafsson, 2006; Pech and Cameron, 2006; Ucbasaran, 2008; Wright and Stigliani, 2013; Barbosa, 2014; Clarysse et al., 2014; Shepherd et al., 2014; Maine et al., 2015; Sadler-Smith and Burke-Smalley, 2015; Sadler-Smith, 2016; Zividar et al., 2017.
Environmental influences	Social networks, competitive and unstable environments, role of context all influential	Dutta and Thornhill, 2008; Wright and Stigliani, 2013; Hughes et al., 2015; Yang and Zhang, 2015; Elbanna and Fadol, 2016.
Dual process system	Dual process perspectives are used for empirical research, but subject to criticisms, measurement REI to be used for validity	Epstein et al., 1996; Smith and DeCoster, 2000; Hodgkinson and Clark, 2007; Curşeu et al., 2008; Leaptrott and McDonald, 2008; Novak and Hoffman, 2009; Sadler-Smith 2009; Gore and Sadler-Smith, 2011; Evans and Stanovich, 2013; Sadler-Smith, 2016; Hodgkinson and Sadler-Smith, 2018.

Construct	Definition and reference to literature
Opportunity evaluation	How individuals evaluate the worthiness and attractiveness of opportunities, once identified, discovered or created, for me or my firm (Williams and Wood, 2015, p 219)
Cognitive style	Stable attitudes, preferences of habitual strategies that determine an individual's mode of perceiving, thinking and problem-solving (Messick, 1976)
Cognitive versatility	The ability to switch back and forth between habits of the mind and active thinking (Louis and Sutton, 1991), that is, to switch more readily between analytic and intuitive processing strategies (Hodgkinson and Clarke, 2007, p247)
Intuitive expertise	The domain-specific, complex pattern matching process (Klein, 2015) as complex domain relevant schemas (Dane and Pratt, 2007) and deep cognitive structures (Krueger, 2007, p124), intuition as a component of intuitive expertise (Harteis and Billet, 2013, p153)
Opportunity-related decisions	The decisions entrepreneurs make relating to the opportunity process (opportunity recognition, evaluation and exploitation), specifically those decisions that focus on the evaluation stage (Shepherd et al., 2014, p3)
Environment influences	Factors that exist exogenously and that may influence the evaluation process, such as social networks (Hughes et al., 2015; Yang and Zhang, 2015) team cognitions (Mol et al., 2015) advice and feedback for intuitive expertise development (Sadler-Smith and Burke-Smalley, 2015, p15; Sadler-Smith, 2016)
Dual process system	Dual process system as a parallel-competitive theory based on CEST (Epstein, 1994, 2008, Epstein et al., 1996, Pacini and Epstein, 1999) whereby the experiential system and the rational system operate in parallel and the two systems are bidirectionally interactive (Hodgkinson and Sadler-Smith, 2018, p 480) and the relative contribution of either system is a function of the person and situation (Epstein, 2008, p25)

Table 3. 2 Construct definitions derived from the literature review

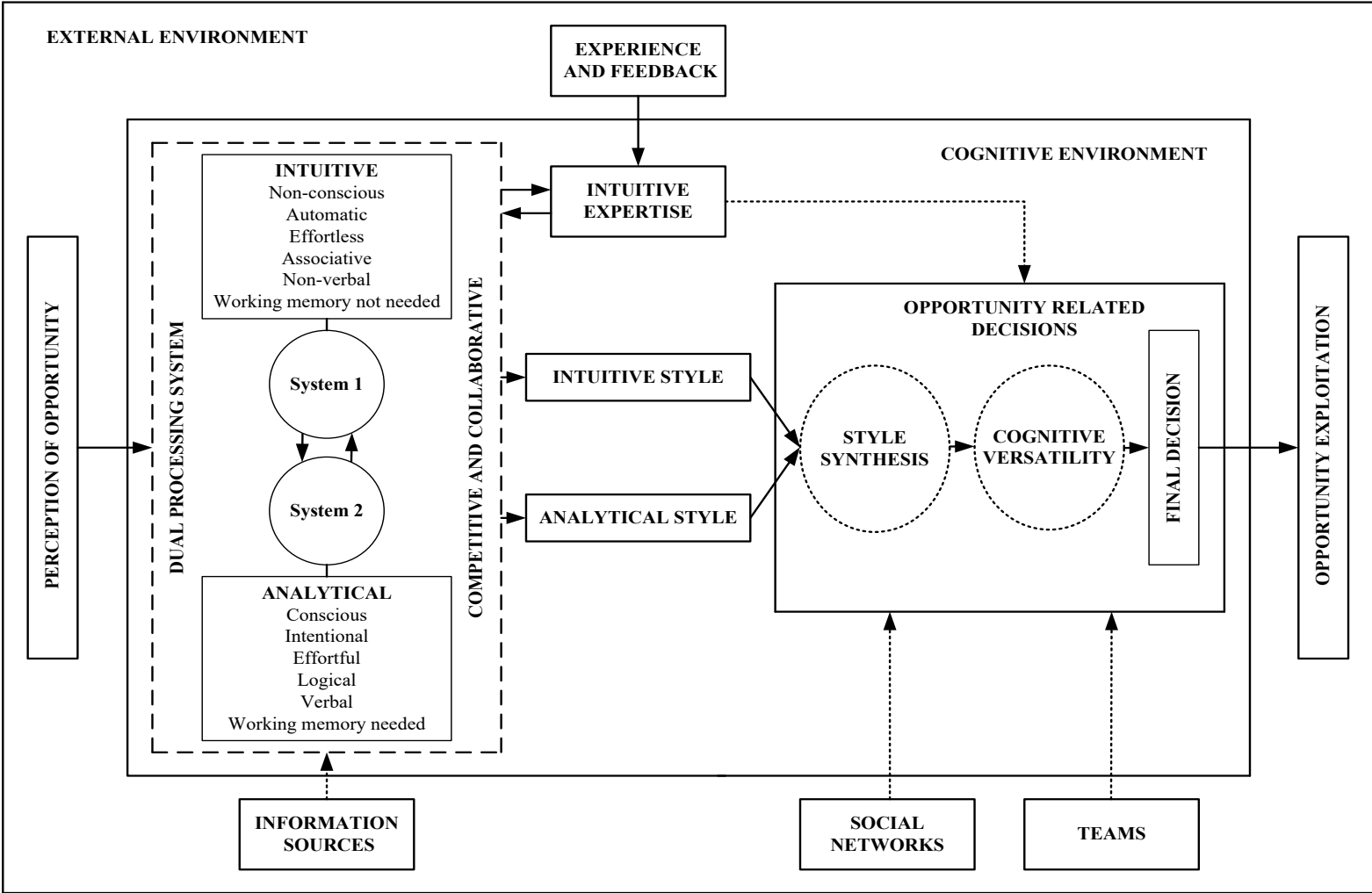
3.2.2 The conceptual framework design

The conceptual framework is shown in figure 3.1 and explained as follows. First, the process commences after the perception of a pre-identified opportunity for growth in the external environment. After this, the entrepreneur uses both information processing modes, contingent with their cognitive style preferences to evaluate the opportunity. These modes of processing take place at different levels of cognitive thought, using analytical processing as a conscious act of working memory and an intuitive processing as a non-conscious, iterative and reflective process (Bryant, 2007; Vaghely and Julien, 2010). This evaluation process is underpinned by CEST.

As the evaluation unfolds, judgments and decisions are made on the feasibility of the opportunity, how it is 'attractive to me' (Haynie et al., 2009; Wood and Williams, 2014; Wood et al., 2014) and whether the opportunity will bring growth. Others may also be involved in information searching and contribute towards decision-making. The decision process will be influenced by the entrepreneur's experience and expertise (Gibcus et al., 2008; Sadler-Smith and Burke-Smalley, 2015), or by other individuals, such as teams or social networks. The conceptual framework illustrates that entrepreneurs, when making opportunity-related decisions draw on their intuitive expertise, acquired from domain experience and feedback (Sadler-Smith, 2016). They also tap into their social networks and team conversations to support their final decision for exploitation and action.

In accordance with dual process theory and cognitive style, the entrepreneur will use both intuitive and analytical styles for information processing during opportunity-related decisions and adapt their preferred style according to external influences (Louis and Sutton, 1991; Hodgkinson and Clarke, 2007). Novices will show an analytical style preference, whereas experienced entrepreneurs will synthesise their styles, demonstrating cognitive versatility. This mediates the relationship between opportunity identification and experience (Baldacchino et al., 2015). As novice entrepreneurs become more experienced they use their intuitive expertise to help them make more intuitive decisions. Thus, their level of experience mediates their preference for analytical and intuitive information processing. The process of opportunity evaluation, from initial assessment through to final decision is an iterative process over time.

Figure 3. 1 The conceptual framework



3.3 The first building block: dual process theory

The first building block details the underpinning theory. The literature review indicated that dual process theories provide an explanation of the duality of information processing, whereby both analytical and intuitive processing were essential for decision-making (Hodgkinson and Sadler-Smith, 2018). Although theory is not usually included in a conceptual framework, the researcher argues that as this underpins the cognitive perspective and the cognitive constructs represented in the framework, an explanation is required for the reader.

Drawing on research that has examined differences in analytical and intuitive styles in decision-making (for example, Hodgkinson and Clarke, 2007; Curşeu et al., 2008; Lee-Ross, 2014) the framework is based on the premise that individuals evaluate and make decisions using both processing modes. Prior research has shown that dual process theories are valuable for explaining cognitive processes, particularly in the field of intuitive decision-making (for example Sinclair and Ashkanasy, 2005; Hodgkinson et al., 2009; Lee-Ross, 2014; Elbanna and Fadol, 2016). Styles are considered orthogonal, a different viewpoint compared to bipolar models (Hodgkinson and Clarke, 2007; Sadler-Smith, 2016). A criticism of the entrepreneurial cognition literature is that dual process theory is frequently implicit and not explained as an underpinning theory. Rather, the language associated with the description and outcomes infers dual process notions (for example, Blume and Covin, 2011; Vance et al., 2011).

3.3.1 Dual process models in entrepreneurship

Curşeu et al.'s (2008) cognitive model of entrepreneurial strategic decision-making (ESDM) is clearly one example based on the dual process of decision theorists (for example, Smith and DeCoster, 2000; Stanovich and West, 2000; Dane and Pratt, 2007). The model has provided a detailed, dual process framework that considers emotion, motivational attributes and situational variables. This model discussed in the previous chapter (see figure 2.3, p54) provided inspiration for the conceptual framework design.

The entrepreneur's cognitive system receives information from the environment using sensory and perceptual processes (Curşeu et al., 2008). Information required for problem solving and decision-making processes, as part of opportunity evaluation, is gathered and organised, coded and sorted according to "habits of mind" (Louis and Sutton, 1991, p55). This is stored in the long-term memory as a bank of mental representations or as activated representations that are only available through the working memory space, used for particular tasks (Curşeu et al., 2008). Between the information gathering as a perceptual process and the working memory space, two interdependent processes, known in dual process theory as System 1 (automatic processing) and System 2 (controlled processing) exist and transform knowledge (Curşeu et al., 2008).

Dual process systems are also known under a variety of terms, for example, experiential/rational (Epstein, 1994), associative/rule based (Sloman, 1996), System 1 and 2 (Stanovich, 1999) or Type 1 and 2 (Evans and Stanovich, 2013). As the conceptual framework has been informed from models proposed by Epstein (1994, 1996, 2008), Curşeu et al., (2008) and Sadler-Smith, (2009), for the purpose of this study the duality of processing will be referred to generically as System 1 and System 2, to maintain consistency of an overarching nomenclature in line with previously reviewed literature. System 1 processing is a nonconscious heuristic way of processing information learnt through experience. System 2 as conscious information processing is based on analytical processing and explicit thought processes, which puts restrictions and limitations on the cognitive system (Curşeu et al., 2008).

Taking a psychological perspective according to Smith and DeCoster (2000), these systems translate input representations (visual patterns) to output representations (word meanings). As learning takes place, small incremental alterations of these representations are updated as a result of repetitive practice. In contrast to this, conscious representations capture interesting details about new events (Smith and DeCoster, 2000). The process of consolidation as new memory from one system to the other takes time, frequently weeks to years (Smith and DeCoster, 2000).

Hodgkinson and Sadler-Smith (2018) note that an important distinction of dual process application for empirical research is the choice between default-interventionist and parallel-competitive accounts of dual process theory (Evans, 2003, 2007, 2008). This is based on the interplay between the two systems and is a key consideration for this study. For a default-interventionist theory, System 1 prompts intuitive, default responses where the analytic (System 2) processes may or may not intervene, but importantly do not compete as parallel processes (Evans, 2003, 2007, 2008), thus inferring a behavioural default-interventionist response. In contrast to this, parallel-competitive principles offer a more compelling explanation as they allow for “a richer interpretation of the dynamics of intuition and analysis” (Hodgkinson and Sadler-Smith, 2018, p480). This approach underpins the cognitive-experiential self-theory (CEST) (Epstein, 1985, 1994, 2008, 2010; Epstein et al., 1996; Pacini and Epstein, 1999) discussed next.

3.3.2 Cognitive-Experiential Self-Theory (CEST)

The Cognitive-Experiential Self-Theory (CEST) (Epstein, 1994; Epstein et al., 1996; Pacini and Epstein, 1999), updated as CET (Epstein, 2014), was used for the theoretical foundation of the conceptual framework and has been applied previously in cognition literature (for example, Marks et al., 2008; Fletcher et al., 2011), but mostly from a psychological perspective. This theory is a dual process model of cognition and proposes two cognitive information processing systems: 1) an experiential system known as System 1 that is pre-conscious, automatic, associative and non-verbal and 2) a rational system that is conscious, controlled, logical, verbal and largely affect free known as System 2. The resulting behaviour is the outcome of the dynamic interplay between these two automatic and controlled systems (Epstein, 1994; Epstein et al., 1996, Pacini and Epstein, 1999). Individuals are considered to differ in terms of their preferences for each system (Pacini and Epstein, 1999) as well as their mode of cognition associated with judgment biases.

The experiential system and the rational system operate in parallel, are bidirectionally interactive and demonstrate behaviours “where the relative contribution of either system is a function of the person and the situation” (Epstein, 2008, p25). The interplay between

the two systems allows exploration of style differences and their relationship as the system adapts by learning from experience. The degree to which either analytical or intuitive information processing modes are preferred is determined by individual differences in information processing (known as cognitive styles) and the processing demands of the situation (such as competitive conditions, environmental uncertainty, time pressures). The CEST theory accounts for experiential and rational processing which can interact on a competitive and collaborative basis, thus supporting the notion of versatility. This provides “a firm foundation for further theoretical advances” (Hodgkinson and Sadler-Smith, 2018, p483) that is contingent with the objectives of this study. The key attributes of CEST theory are shown below in table 3.3.

Experiential system: System 1	Rational system: System 2
Pre-conscious Holistic Automatic Effortless Affective Mediated by vibes from past events Associative Concrete images, metaphors narratives More rapid Immediate action Slower more resistant to change Changes with repetitive, intense experience	Conscious Analytic Intentional and controlled Effortful Logical Mediated by conscious appraisal of events Abstract symbols, words, numbers, slower, delayed action Changes more rapidly with the strength of an argument and new evidence

Table 3. 3 Attributes of the Cognitive Experiential Self-Theory (adapted from Epstein et al., 1996, p391 and Hodgkinson and Sadler-Smith, 2018, p481)

Additionally, Rational-Experiential Inventory (REI) assesses these individual preferences and provides a linked psychological measurement for consistency between theory and data collection. High rational scores are associated with conscientiousness, openness to experience and freedom from cognitive biases in contrast to high experientiality scores associated with emotion, cognitive biases and heuristics (Marks et al., 2008). Founder characteristics are important for achieving rapid growth (Barringer et al., 2005) and more intuitive entrepreneurs have been shown to have a higher level of drive towards entrepreneurial behaviour (Armstrong and Hird, 2009). This suggests that understanding

the duality of thinking and preferences for information processing may be useful for determining individual differences between high growth and slower growth businesses. As there is little empirical research that looks at how SMEs grow (Gilbert et al., 2006; Shepherd and Wiklund, 2009; Navarro et al., 2012) this is an important for policy and practice to understand “different combinations of forms of growth which are capable of driving high growth” (Navarro et al., 2012, p82). As noted by Wright and Stigliani (2013, p8) whether “intuitive thinking is most likely conducive to the decision to grow the firm...remains an empirical question”. This statement is a key driver for this research study.

Hodgkinson and Sadler-Smith (2008) proposed the use of the more tenable dual process conceptualisation which allowed for the representation of distinct constructs and a typology of cognitive styles based on the REI (Hodgkinson and Clarke, 2007). The use of a smaller number of key style dimensions with “better established theoretical underpinnings and more robust psychometric properties” (Akinici and Sadler-Smith, 2013, p212) makes a more appropriate connection to the conceptual framework. Additionally, most studies have found the experiential and rational scales of the REI to be uncorrelated (Pacini and Epstein, 1999), meaning that a high rational score does not assume a low experiential score, and vice versa. Given the application of a parallel-competitive account (Hodgkinson and Sadler-Smith, 2018) for this conceptual framework design, these properties are essential for cognitive interplay.

3.3.3 Dual processing theory and opportunity evaluation

According to Williams and Wood (2015), rule-based reasoning underpins how individuals evaluate opportunities. The cognitive psychology perspective suggests that two distinct processes draw on the memory systems in two different ways: the associative processing mode as a pattern completion and a rule-based processing mode (Smith and DeCoster, 2000). This is summarised in table 3.4. Information can be transferred from the rule-based system to the associative system through the repeated use of a rule, but can also move in the other direction when individuals partake in reflective practice (Smith and DeCoster, 2000). Thus, the two systems are interactive, supporting the use of a

parallel-competitive approach for underpinning theory (Hodgkinson and Sadler-Smith, 2018).

Associative processing (Intuitive)	Rule-based processing (Rational)
Draws on associations	Draws on symbolically represented rules
Associations are structured by similarity and are learned over many experiences	Rules are structured by language and logic and can be learned in just one or a few experiences
Occurs automatically and preconsciously with awareness of the results of processing	Occurs optionally, when capacity and motivation are present and often with conscious awareness of the processing stages

Table 3. 4 Properties of the two processing modes (Smith and DeCoster, 2000, p111).

3.4 The second building block: cognitive style

The construct of cognitive style is used as the research lens for this study and as the second building block. Defined as stable attitudes, preferences or habitual strategies that determine an individual's mode of perceiving, thinking and problem solving (Messick, 1976), examples of its use in entrepreneurship and management are wide ranging, (for example, Kirton, 1994; Khatri and Ng, 2000; Hough and Ogilvie, 2005; Gallén, 2006; Cools et al., 2012; Dane et al., 2012; Yang et al., 2012; Sadler-Smith and Burke-Smalley, 2015).

The cognitive style construct in this framework adopts a multidimensional perspective, where both processing modes are orthogonal dimensions (Hodgkinson and Sadler Smith, 2003) measured as separate, conceptual constructs. This is considered more representative of styles (Leonard et al., 1999; Kozhevnikov, 2007; Kozhevnikov et al., 2014) and recognises the different stages of cognitive processing such as perception, memory and thought (Miller, 1987, 1991). This is key to the framework, whereby style

operates at different levels of cognitive complexity and on mental processes at any of these levels (Kozhevnikov, 2007). A cognitive flexible individual will adapt their style to the situation or task in hand (Kozhevnikov, 2007).

Cognitive styles are valuable predictors of behaviour (Armstrong et al., 2012a) and are used in this conceptual framework as indicators of how information is processed. There is a growing understanding that despite stable preferences of style, individuals have an ability to switch between styles and be cognitively versatile in their use (Hodgkinson and Sadler-Smith, 2003; Hodgkinson and Clarke, 2007; Dutta and Thornhill, 2008; Lee-Ross, 2014; Baldacchino et al., 2015) contingent with context and task demands. Versatility has been explored in the opportunity identification process and according to Baldacchino et al. (2015) mediates the relationship between experience and opportunity identification. The inclusion of a versatile style, synthesised as a flexible use of both styles (Sadler-Smith, 2009) in this conceptual framework is to determine whether versatility performs the same function as identified by Baldacchino et al. (2015) for opportunity evaluation.

Intuitive system	Analytical system
Affect-laden	Affect free
Comparatively fast in operation	Comparatively slow in operation
Slow in formation	Fast in formation
Parallel and holistic	Serial and detail focused
Involuntary	Intentional
Cognitively undemanding	Cognitively demanding
Imagistic/narrative based	Abstract/symbolic based
Unavailable to conscious awareness	Open to conscious awareness

Table 3. 5 Attributes of the duplex model of cognitive style (adapted from Sadler-Smith, 2009, pp15-16)

Table 3.5 illustrates the attributes of the duplex model proposed by Sadler-Smith (2009, p16) as two information processing modes, representing a stable preference for one or the other as a versatile style. Both can be used interchangeably, contingent with the situation. This cognitive versatility has been presented previously in Chapter 2, section 2.9.3.

3.4.1 Cognitive versatility as an adaptive strategy

The conceptual framework proposes that cognitive styles are synthesised and modified according to external influences and as a result of learning and experience demonstrate the versatility proposed by the duplex model (Sadler-Smith, 2009). Although styles are considered stable, they may change in response to specific circumstances as well as a range of variables, such as previous experience, habits, intellectual abilities, which may affect the development and choice of style (Kozhevnikov, 2007). This ability is known as cognitive versatility (Hodgkinson and Clarke, 2007; Sadler-Smith, 2009). Examining the construct of cognitive versatility highlighted several other theoretical frameworks seen in the entrepreneurship literature. The Cognitive Continuum Theory (CCT, Hammond, 2000) has been used in judgment and decision-making as a unifying theory (Gustafsson, 2006). This was discarded by the researcher because conceptualizing intuition and analysis as either/or was not a simultaneous functional characteristic of dual process theories (Hodgkinson and Sadler-Smith, 2003).

Prior research by Hodgkinson and Clarke (2007) proposed a quadrant framework based on high-low analytic and intuitive styles, categorising four different types of cognitive strategy: detail conscious, big picture conscious, non-discerning and cognitively versatile. A cognitively versatile strategy was highly analytic and intuitive, whereby individuals “attend to analytic detail and cut through that detail”, as and when required, with an ability to “switch more readily between analytic and intuitive processing strategies” (Hodgkinson and Clarke, 2007, p246-247). This supports the notion of versatility. Vaghely and Julien (2010) also proposed a model combining pattern type information processing and heuristic information processing along a flexible continuum. This model posited that the way an entrepreneur processed information was a dynamic combination of both types. Both models suggest a synthesis of style in conjunction with a parallel-competitive account of dual process theory.

The ability to demonstrate flexibility as an adaptive strategy provides the entrepreneur with the know-how to match the decision-making process to the opportunity. This ability is key to effective decision-making and may differentiate experienced entrepreneurs from novices, hence inclusion of versatility in the conceptual model. Additionally, individuals

also differ in their tendency to favour intuition and analysis respectively (Hodgkinson and Sadler-Smith, 2003; Sinclair and Ashkanasy, 2005; Betsch and Iannello, 2010). Novice entrepreneurs are considered more analytical than experienced entrepreneurs (Gustafsson, 2006) and less susceptible to biases and heuristics used to manage information and reduce uncertainty (Tversky and Kahneman, 1973; Bryant, 2007). Hence, if intuition mediates the relationship between experience and evaluation, there should be clear differences in the way that novices and mature entrepreneurs process information, as novices will not have the same degree of intuitive expertise as experienced entrepreneurs. Likewise, differences in the way entrepreneurs process information may indicate a desire for strategic growth and planning (Ginn and Sexton, 1990; Knockaert et al., 2011). Wright and Stigliani (2013) note that it is important to understand how cognitive style and decision-making for growth are linked. This framework proposes that a relationship between intuition, intuitive expertise and feedback and that a versatile style will assist dynamic growth capability.

3.4.2 Intuitive expertise

Included in the framework is the concept of intuitive expertise as a quick, unconscious matching process for intuitive decision-making (Sadler-Smith, 2016). This is important for the development of an intuitive style which may or may not be important for growth and performance. Thus, experienced decision-makers can quickly put information into meaningful patterns which would not be recognised by novices, highly relevant when evaluating an opportunity. It is not fully understood how much expertise is needed before the benefits of intuition can be realised, although intuitive expertise takes at least ten years or more to develop, enhanced through experience and feedback (Sadler-Smith, 2016). According to Dane et al. (2012) even a moderate level of expertise increased the effectiveness of intuitive decision-making on non-decomposable tasks. This suggests novices may use some intuition, albeit to a lesser extent than experts. The assumption is made that a novice entrepreneur's pattern matching will be different to that of experienced entrepreneurs for opportunity evaluation.

Wood and Williams (2015) argued that entrepreneurs develop different mental models of opportunity (Fiske and Taylor, 1991; Krueger, 2007; Baron, 2006) by comparing

cognitive images of ideal and actual opportunities based on their experience and knowledge. This rule-based reasoning was a key mechanism by which entrepreneurs formed mental representations (Smith and DeCoster, 2000) and a useful framework for opportunity evaluation research (Wood and Williams, 2015). They also suggested that although Bryant's (2007) research suggested evidence of an intuitive trusting gut as a first screening process to eliminate poor opportunities, a more deliberate and analytical process was used to evaluate at a deeper level. Hence, the assumption is made that both analytical and intuitive processes are evidenced in the opportunity evaluation process.

3.5. The third building block: opportunity-related decisions

The third building block is based on the cognitive processes associated with opportunity-related decisions. Previous entrepreneurship research has examined how entrepreneurs think differently to non-entrepreneurs (for example, Fiske and Taylor, 1991; Busenitz and Barney, 1997; Krueger, 2007; Baron, 2006; Mitchell et al., 2007) and how context, such as risk, uncertainty and ambiguity has influenced the decision process (Keh et al., 2002; Dutta and Thornhill, 2008). Novices are considered to be more analytical, which suggests that they use a more analytical process for decision-making (Gustafsson, 2006). Reviewing decision theory showed that earlier models were based on rational choice, for example Mintzberg's et al. (1976) or the bounded rationality model (Simon, 1972) which adopts a behavioural stance as an alternative to classic rationality. This approach was challenged by examples from behavioural decision theory and cognitive psychology. Variation in individual and contextual differences and the use of heuristics (see Tversky and Kahneman, 1973; Busenitz and Barney, 1997; Pech and Cameron, 2006) resulted in judgements and behavioural outcomes that were not the result of an analytical process. Rational processes are now considered less powerful than originally thought (Hodgkinson and Clark, 2007; Sadler-Smith and Burke-Smalley, 2015).

A different approach known as naturalistic decision-making (NDM) (Klein, 2015) proposed experiential knowledge and pattern matching as the basis for decision-making, rather than choice. This has clear theoretical underpinnings with dual process theory. According to Gustafsson (2006, pp17-18), action orientation, mental imagery and

schematized knowledge suggests that entrepreneurial decision-making is naturalistic in nature. This approach supports the use of intuition, derived from patterns based on experience (Klein, 2015). Hence, NDM emphasises the cognitive elements of what individuals as experts do well, therefore drawing attention to the importance of intuition and tacit knowledge, although may not always be appropriate for all entrepreneurs.

Finally, decisions made about exploiting opportunities will be affected by differences in the way in which these are processed (Shepherd et al., 2014). The outcomes of these opportunity-related decisions are also the result of how information has been gathered, framed and organised (Barbosa, 2014). As smaller SMEs behave differently from large companies due to the individual, personal style of management (Hulbert et al., 2012), the cognitive processes are critical for evaluating the scope of the growth opportunities. The conceptual framework highlights the importance of the entrepreneur's cognition as a dual process information processor when making decisions on a business growth opportunity and its relationship with the environment as the entrepreneurial decision context. This is explained next.

3.6 The fourth building block: the external environment

The fourth building block considers the external environment. The conceptual framework includes four concepts, information sources, feedback and practice (for intuitive expertise), social networks and teams as a result of the literature review, deemed to influence the decision process. The framework proposes that information sources are a key influence for those with an analytical processing preference, whereas those with a more intuitive preference use intuitive expertise. The use of practice and feedback in their domain environment (Sadler-Smith, 2016) provides the conduit for intuitive processing and development of a versatile style. This will decrease an individual's need to focus on extensive data collection as a heavy cognitive load, which will in turn allow the entrepreneur to intuitively use their experience instead.

Additionally, prior research has suggested that entrepreneurs use their social networks for information collection (Yang and Zhang, 2015), which has been explored in a variety of

settings, for example, opportunity identification (Ardichvili et al., 2003), social networks from a rational perspective (Casson and Giusta, 2007), the influence of social media on opportunity (Park et al., 2017), for learning (Hughes et al., 2007) or the influence of social networks on economic growth (Chen, et al., 2018). According to Yang and Zhang (2015), a large social network allows the entrepreneur to gather considerable information, because the more ties the entrepreneur has, the greater the information flows directly and indirectly. A diverse network brings different experiences, non-repeated information and new knowledge, which helps the entrepreneur to verify any new information received (Yang and Zhang, 2015). This framework proposes that social networks will have a significant influence on the cognitive decision process of the entrepreneur by helping them to question, double check and verify the potential information for the opportunity.

The way that team members work together plays an important role in shaping business outcomes (Ensley et al., 2003). An extensive literature review of team cognitions by Mol et al. (2015) illustrated that content related knowledge is shared as task specific-knowledge structures in entrepreneurial teams (Ensley and Pearce, 2001; Ensley et al., 2003). Sharing also refers to complementarity (Mol et al., 2015) where over time team members became familiar with expertise within the team, known as team specific knowledge. According to West (2007) collective cognition mediates the antecedents and outcomes of team decision-making and venture performance. Furthermore, Furr et al. (2012) argued that cognitive flexibility of the team is influenced by their domain knowledge. Taking these findings together, this study argues that the entrepreneur will use the teams' knowledge and expertise to support the gathering, interpreting and synthesizing of information required for opportunity-related decisions.

3.7 Chapter summary

In conclusion, this chapter has discussed the conceptual framework for the research question, based on entrepreneurial cognitive theory. Several constructs as building blocks have been discussed and their relationships. The central premise of the framework is based on dual processing theory, using cognitive style as the research lens, where styles are orthogonal and multidimensional. This allows for style synthesis and cognitive

versatility, depending on different situations and levels of expertise. In addition, dual processing theory supports development of multi-level and multi-dimensional cognitive style model which incorporates intuition in the decision-making process.

The concept of intuitive expertise is included in the framework, as it is expected that during this study's time frame there will be learning outcomes from domain experience through feedback and practice. Use of CEST allows the use of valid and reliable psychometric measures for style assessment that are compatible with dual process theory. The conceptual framework has synthesised several concepts from the entrepreneur's cognitive environment and the external environment, which frames the research question and illustrates the relationships between cognitions, the external environment and the decision-making process for opportunity evaluation. This framework provides a structural reference point for the development of the research design and choices of methodology, discussed in the next chapter.

Chapter 4: Methodology

“Worldmaking as we know it always starts from world’s already on hand; the making is a remaking (Goodman, 1978, p6)

4.1 Introduction

This chapter presents the methodology for an exploratory study on how entrepreneurs make decisions when evaluating business growth opportunities. Adopting a dual process cognitive perspective, the study explores how these opportunity-related decisions of small business entrepreneurs, past the start-up stage are used for growth. The ‘how’ question is an important consideration in the entrepreneurship literature (McKelvie and Wiklund, 2010; Wright and Stigliani, 2013). Taking a cognitive perspective will illustrate how entrepreneurs’ mental representations influence the temporal nature of opportunity-related growth decisions. A focus on the opportunity evaluation stage will provide insight how these are evaluated for future business growth strategies. Maximising the entrepreneur’s potential for achieving this is significant for business sustainability and policy and practice (Wright et al., 2015).

Continuously growing businesses are less commonly used in entrepreneurship research (Achtenhagen et al., 2010; Davidsson et al., 2010; McKelvie and Wiklund, 2010), so this study provides a different viewpoint by exploring opportunity related-decisions made by slower-growth firms (Ginn and Sexton, 1990), compared to prior research that has focused on higher growth (for example, Barringer et al., 2005; Henrekson and Johansson, 2010). Although higher growth firms are an indication of successful performance (Barringer et al., 2005), the argument for exploring how slower growth firms evaluate opportunities and make decisions is to improve understanding how this is cognitively processed by the entrepreneur, so that support can be tailor made for future growth and sustainability. This is critical given the current growth performance of small business in the Eastern region at a net revenue balance of -6.5% (fsb, 2019).

As discussed in Chapter 2, this study takes an integrated perspective to the research question to address fragmentation noted in the entrepreneurship literature (Wiklund et al., 2009; Achtenhagen, 2010; Shepherd et al., 2014; Wright and Stigliani, 2013; Barbosa, 2014). Taking a mixed method approach supports both qualitative and quantitative approaches for addressing the shortcomings of fragmentation. An exploratory multiple-case study strategy was chosen to support this method by bringing together several recommendations made across the three literature streams reviewed earlier and to provide a “bigger picture model” for theory development (Wiklund et al., 2009, p351).

In particular, the opportunity evaluation stage of the entrepreneurial process is under researched (Wood and Williams, 2014), so this exploratory study will provide empirical and conceptual evidence how this stage of the entrepreneurial process unfolds. A longitudinal study was chosen in response to Wood and McKelvie (2015) and Shepherd et al.’s (2014) recommendations, whereby more research is needed to illustrate temporal changes in entrepreneurs’ opportunity-related decisions. Additionally, there are very few time-based studies in the evaluation literature (for example, Autio et al., 2013; Andresen et al., 2014; Chandra, 2017).

To determine the meanings of these opportunity-related decisions and how these shaped outcomes prior to action, a pragmatist paradigm was adopted as the philosophical perspective for a mixed methods design. This allowed the researcher to look at what is meaningful from both a positivist and constructivist way (Biesta, 2010). Taking Guba and Lincoln’s (1985) two competing paradigms, positivism and constructivism as a starting point for methodological enquiry, the notion of constructivism, originating from naturalistic enquiry and Dewey’s (1859-1952) pragmatic theory of learning as a result of continuity within experience (Neubert, 2009) was chosen. The plurality and relativist nature of Guba and Lincoln’s (1985) constructivist paradigm facilitated capture of multiple meanings and complexity associated with an integrated approach. Dewey’s notion of learning and experience as an active player (Hickman, 2009) implies the development of varied and multiple meanings constructed in the minds of individuals. Thus, any development and changes in knowledge and meanings over time could be addressed by a pragmatic paradigm. Underlying this belief was the notion of

complementarity and the ability to approach data from both qualitative and quantitative perspectives.

The proposed strategy to answer the research question was a multiple-case, concurrent triangulation mixed methods design (Saunders et al., 2016). This supported the researcher's philosophical beliefs that underpinned the exploratory and descriptive nature of the research question and the rationale provided for the design choice. A multiple-case study design was chosen as the methodological link between the philosophy and data collection methods (Denzin and Lincoln, 2011) and for theoretical replication (Yin, 2018), as the findings will contribute towards theory building. This will provide a time-based process model of opportunity-related decision-making and will provide a contextual account of the phenomenon in a real-world situation. Additionally, mixed methods research allows for rich, thick description and a range of evidence (Yin, 2018).

Finally, the process of data collection used semi-structured interviews and cognitive self-report psychometric instruments for assessing cognitive style and cognitive mapping techniques. The qualitative data was thematically analysed (Braun and Clarke, 2006, 2013, Nowell et al., 2017) and descriptive statistics were used for style assessments (Pacini and Epstein, 2003; Cools and Van den Broeck, 2007). This allowed for data and methodological triangulation (Patton, 2015). Additionally, cognitive mapping techniques (Cossette, 2002; Curşeu et al., 2008; Eden 2004) were derived from the qualitative data, which was quantified for cognitive complexity calculations (Curşeu et al., 2008). Methodological issues and limitations encountered by the researcher during the research process, as well as issues of ethical practice, validity and reliability are discussed at the end of the chapter.

4.2 The research methodology

Firstly, previous research has examined the cognitive processes of information processing for decision-making (for example, Baron, 2007; Vaghely and Julien, 2010; Groves et al., 2011; Lee-Ross, 2014; Elbanna and Fadol, 2016), but findings exemplify that it is still not clear what type of processing (analytical or intuitive) is more conducive for

opportunity-related decisions. The literature review highlighted the need for a comprehensive understanding exactly how entrepreneurs made decisions on growth opportunities and in particular, the factors that influenced this (Wiklund et al., 2009; Wright and Stigliani, 2013; Barbosa, 2014), as well as the cognitive styles that entrepreneurs used when making these opportunity-related decisions (Wright and Stigliani, 2013). Therefore, the study posits that an integrated approach combining three research streams over a time period will provide insight into this process (Wiklund et al., 2009; Davidsson et al., 2010). Exploring ways entrepreneurs process information will capture the dynamics of the decisional situation in a natural setting.

4.3 Research paradigms on basic beliefs and enquiry

To determine the research strategy required to answer this question, the researcher's philosophical position and the nature of knowledge was examined. This commenced with a review of research paradigms on basic beliefs and enquiry, as well as assumptions about different paradigms. Defined as either "a philosophical framework that guides how scientific work should be conducted"(Collis and Hussey, 2014, p43), a system of beliefs and practices that influences how researchers select methods used for their study (Morgan, 2007; Plano Clark and Creswell, 2008) or "worldview" (Creswell, 2014, p16), the term was first introduced by Kuhn (2012) and personified the differences that scientists held on definitions of reality and methodology (Mertens, 2012). Besides, differences based on paradigms as worldviews or paradigms as methods (Mertens, 2012; Shannon-Baker, 2016) has created an extensive debate within the community of mixed methods researchers (Tashakkori and Teddlie, 2010).

Typical paradigms chosen for quantitative and qualitative approaches are positivism and interpretivism. Positivism assumes the researcher and object are independent entities and where enquiry takes place as questions and hypotheses that are tested and verified (Saunders et al., 2016). In contrast to this, interpretivism is concerned with the subjective experience of individuals, using meanings as the conduit for understanding their world view and the development of the subjective relationship between the researcher and the participant (Chowdhury, 2014; Saunders et al., 2016). Over time, other paradigms have

emerged based on different philosophical and methodological assumptions (Mertens, 2012; Collis and Hussey, 2014). The original contribution and debate on paradigm differences (Guba and Lincoln, 1994) was updated to include a participatory paradigm. Table 4.1 indicates the key differences between ontological, epistemological and methodological aspects of enquiry and the nature of knowledge (Lincoln et al., 2018). This debate highlighted assumptions on ethics and epistemology and placed a focus on the nature of qualitative enquiry.

	<i>Ontology</i>	<i>Epistemology</i>	<i>Methodology</i>
Positivism	Naïve realism, real reality but apprehendable	Dualist, objectivist, findings true	Experimental, manipulative, verification of hypotheses, chiefly quantitative
Post positivism	Critical realism, real reality but only imperfectly and probably apprehendable	Modified dualist, critical tradition/community findings probably true	Modified experimental, manipulative, critical multiplism, falsification of hypotheses, may include qualitative
Critical theory	Historical realism, virtual reality shaped by social, political, cultural, economic, ethnic and gender values, crystallized over time	Transactional/subjectivist, value mediated findings	Dialogic, dialectical
Constructivism	Relativism, local and specific constructed realities	Transactional/Subjectivist, co-created findings	Hermeneutical/dialectical
Participatory	Participative reality, subjective-objective reality, co-created by mind and given cosmos	Critical subjectivity in participatory transaction with cosmos; extended epistemology of experiential, propositional and practical knowing, co-created findings	Political participation in collaborative action inquiry, primacy of the practical, use of language grounded in shared context

Table 4. 1 Original paradigm positions on basic beliefs and enquiry (Guba and Lincoln, 1994, p109) and updated by Lincoln et al. (2018, pp111)

Pragmatism, transformative emancipation, dialectics and critical realism are commonly used for mixed methods research (Shannon-Baker, 2016; Creswell and Plano Clark, 2011). These are described in more detail in appendix 3. For a mixed method approach, frequently researchers address the suitability of one paradigm choice over another (Mertens, 2012) or whether a qualitative or quantitative approach is more appropriate (Morgan, 2007). In addition, explicit discussion about the paradigm used is frequently not discussed (Creswell and Plano Clark, 2011; Shannon-Baker, 2016). In order to address this omission, the next section explains the paradigm choices made for the research study.

4.3.1 Paradigmatic choices for the research study

One of the key recommendations that emerged from taking an integrated perspective was the need for a process approach. This addressed changes over time and the influence of any cognitive interaction between the individual and the environment for the ‘how’ question. This interest in viewing opportunity evaluation and the cognitive processes associated with opportunity-related decisions guided the researcher’s worldview towards a constructivist paradigm, based on Lincoln and Guba’s (1985) naturalistic enquiry. This was because constructivism is viewed as a knowledge based mental activity, where individuals perceive and interpret information in order to construct their own reality shaped as mental models. In addition, the acquisition of expertise through experience facilitates the development of unique knowledge structures, which construct, transform and use information to assist mental processes (Mitchell et al., 2014).

It is the researcher’s belief that a more dynamic and temporal approach was needed to explore opportunity-related decisions. A typical approach seen in the psychology and entrepreneurship cognition literature (for example, Keh et al., 2002; Kim et al., 2010) tests a proposed hypothesis that is scientifically verified, explained using causal laws and deductive theory (Collis and Hussey, 2014). Conjoint analysis has been used in the entrepreneurship literature (Haynie et al, 2009; Urban, 2014; Wood and Williams, 2014). The shift within the social sciences towards qualitative research presents an alternative to

positivism because “rich insights into the complex world are lost if such complexity is reduced entirely to a series of law like generalisations” (Saunders et al., 2019, p116). In addition, the study of meanings and constructed knowledge assumes a more subjectivist perspective, which has guided the researcher towards qualitative enquiry and a constructivist paradigm.

4.3.2 Taking a constructivist approach

Interpretivist and constructivist perspectives share a common, intellectual heritage (Schwandt, 1998), as both propose that to understand meaning requires interpretation, “the mind is active in the construction of knowledge” where “we invent concepts, models and schemas to make sense of experience and further, we continually test and modify these constructions in the light of new experience” (Schwandt 1998, p237). Constructivists believe that knowledge and truth are created from personal experiences acquired from interaction with the environment, tested through social negotiation (Lincoln et al., 2011; Merton, 2012). This is in line with the exploration of mental models defined as “conceptual frameworks and knowledge component relationships that are organised to represent perceived reality” (Wood et al., 2014, p255).

Cognitive representations are used to develop frameworks of what circumstances mean for future action (Wood and McKelvie, 2015) and the development of intuitive expertise as a process that happens over time, developed through prior experience, practice and feedback (Sadler-Smith and Burke Smalley, 2015; Sadler Smith, 2016). Moreover, there is extensive empirical work on mental models and pattern matching within the entrepreneurship literature (for example, Baron, 2006, 2007), as well as constructivist theorising as a model of entrepreneurial opportunity (Krueger, 2007; Wood and McKinley, 2010). Furthermore, the debate between whether or not opportunities are discovered or created (Alvarez and Barney, 2010; Vaghley and Julien, 2010) has been suggested by Metzger and King (2015) to be pertinent for constructivists, as this presents perception as a mutually exclusive alternative, rather than complementary opposites. This dichotomy echoes similar debates seen in the cognitive style and dual process camps. Moreover, the dual process approach theoretically provides a mechanism for both

intuitive and analytical thinking (Hodgkinson and Sadler-Smith, 2018), which demonstrates the way information is retrieved and accessed and used for reconstruction of new knowledge. However, a criticism of constructivism is that it does not take into consideration the role of passive perception and mechanical learning methods (Fox, 2001), which may be the preference for more analytical thinkers as they process information for evaluation.

Dewey's (1859–1952) pragmatic theory of truth posits that truth is neither discovered nor invented but is constructed as a result of problem-solving (Hickman, 2009). This is central to the idea of pragmatism, where the meaning of truth of an idea lies in its consequences (Hickmann, 2009). Also fundamental to this is Dewey's notion of learning and experience as an "active player" with "a set of behaviours and expectations from past events" (Hickman, 2009, p8). Taken together, this infers that individuals develop varied and multiple subjective meanings, allowing the researcher to examine complexity (Creswell, 2014). Similarly, Guba and Lincoln's (1985) constructivist paradigm is also pluralist and relativist; there are multiple constructions in the minds of individuals that are all potentially meaningful. This approach is well suited for integrated perspectives, because it can incorporate the multiple meanings and complexity of mixed methods that may be more difficult to achieve with narrower designs. The perceived value of combining two distinct methodologies provides confidence in the results achieved through integration (McKim, 2017), as well as addressing connections between theory and data through abduction and shared meanings (Shannon-Baker, 2016).

Objective four examines the mental representations used by entrepreneurs as they evaluate an opportunity using cognitive mapping techniques. Here cognition is seen as an advancement of understanding, where the participant's existing knowledge is used to "construct something that works cognitively, that fits together and handles new cases that may implement further enquiry and invention" (Goodman, 1978, p163). Taking a constructivist approach, the entrepreneurs' mental models would then be continually matched against existing patterns of knowledge. These models were tested, modified and evaluated according to existing constructions and then reconstructed in the event of new experiences or knowledge, gained from action and experience.

This approach embraces the pluralistic nature of reality, expressed as different language and symbols which can be ‘stretched and shaped’ to fit human action (Schwandt, 1998). It has also allowed the researcher to step inside the thinking of individual entrepreneurs to determine links between each concept in terms of explanations and consequences (Eden, 2004). This echoes Dewey’s (1859-1952) sentiments on the importance of truth as a consequence of an idea. Embedded in this pragmatic notion is that “truth claims are seen as part of the temporal sequences of enquiry. They involve a process of construction that looks backward as well as forward” (Neubert, 2009, p25). This portrays cognition as a temporal sequence or iterative process, which is discussed next.

4.3.3 Taking a process approach

The study responds to a call in the entrepreneurship literature for the temporal nature of the phenomenon to be investigated (Barbosa, 2014; Cools et al, 2014; Shepherd et al., 2014; Wood and McKelvie, 2015). Although examining the structures of entrepreneurial cognition is a well-developed research stream (Mitchell et al., 2002; Baron, 2007; Haynie et al., 2010; Vaghley and Julien, 2010; Arend et al., 2016), cognitive processes as a time based-process of opportunity evaluation is underexplored and poorly understood (Chandra, 2017). Responding to this call will illustrate how cognitive processes adapt in response to differing influences and circumstantial demands and the impact of developing experience on the opportunity evaluation process. Likewise, studying the evaluation process over time will unravel the iterative and cognitive process of opportunity evaluation.

Given the dominant focus on cross-sectional, quantitative approaches in the cognitive style literature (Cools et al., 2014), longitudinal and qualitative studies are still relatively scarce in the field. To address this gap a repeated measures design was adopted to capture significant factors that influenced the evaluation process and to determine how entrepreneurs adapted their style contingent with context. A five-year longitudinal study was outside the scope of this doctoral thesis, but a two-year repeated measures study captured the complexity and dynamics of the process for theory development. The richness of a qualitative approach elicited concepts that could be visually mapped as mental models. Known as cognitive mapping, this technique is explained in section 4.10.

Hence, the processing of information over time, not only showed how the entrepreneurs arranged their constructed knowledge as mental representations, but also how newly emerged concepts were integrated into this framework, as a result of experience. This development aligns with a constructivist approach, as well as Dewey's concept of truth, drawing on past and future experiences as a constructed process (Neubert, 2009).

Additionally, process research helps to understand how and why things happen (Langley, 1999). This puts centre stage time and context, which was a key reason for taking a repeated measures qualitative approach for the study (Yin, 2018). Not only does qualitative research provide the depth and detail for analysis as thick description, but it also facilitates the manipulation of words as narrative strategies, quantification of numbers and graphical forms (Miles et al., 2014). Moreover, this provided scope for exploring the cognitive concepts used for the evaluation process, as well as alternative strategies for addressing the research question and a methodological contribution as an integrated approach.

The conceptual framework described in Chapter 3 supports the interplay of analytical and intuitive processing, known as cognitive versatility (Louis and Sutton, 1991; Hodgkinson and Clarke, 2007). This addressed objective one and two, by proposing that entrepreneurs used different cognitive styles for information processing, depending on context and task, thus exhibiting versatility as they adapt their style to context. As argued by Barbosa (2014, p299), the way that each decision process is structured and framed is key to understanding how entrepreneurs think. It is unlikely that individuals structure their decisions as a purely rational process (Vaghley and Julian, 2010), so further empirical research to show how information is gathered, framed and organised is needed at an individual level.

Despite a positivist stance towards style in the psychology and entrepreneurship literature, intuition as expertise is assumed to be a pattern matching exercise based on previous prior experience and learning (Sadler-Smith and Burke-Smalley, 2015). Taking a Dewey approach also assumes learning involves active experimentation, observation, construction, testing and discussion (Neubert, 2009). If constructivists view individuals as generating and transforming patterns through which they construct their realities

(Reich, 2009), so the constructivist paradigm helps to view the nature of knowledge and knowledge accumulation as informed, sophisticated reconstructions from experience (Guba and Lincoln, 1994). This infers a conflict between both the ontological and epistemological stance if a quantitative measurement instrument for cognitive style is chosen for the assessment of information processing styles (Akinci and Sadler-Smith, 2013; Sadler-Smith, 2016). This conflict between interpretation as a qualitative approach and measurement using a quantitative approach has resulted in a pragmatic stance.

4.3.4 Adopting a pragmatic approach for the exploratory study

The exploratory study posits that neither a quantitative nor qualitative approach will provide a detailed answer to the research question, nor support the integration of three different research streams for a bigger picture view. Knowledge is ever changing as a product of time and the cultural context in which is interpreted and constructed. There is a plethora of quantitative style studies in the entrepreneurship cognition literature that span several decades (for example, Agor, 1986; Keh et al., 2002; Bryant, 2007; Dutta and Thornhill, 2008; Armstrong and Hird, 2009; Dew et al., 2009; Muñoz, 2018), so a different approach was needed to advance the field. Likewise, a purely qualitative approach can be criticised for an inductive approach to data without the use of prior theories and concepts (Denscombe, 2008) and an emphasis on social structures and processes, rather than psychological ones (Padgett, 2008).

This led the researcher to consider potential compatibility between quantitative and qualitative approaches and positivism and interpretivism. As such, a post positivist quantitative data collection and constructivist qualitative data collection can be used “for deeper understandings based on the convergence and dissonance found in the approaches” (Mertens, 2012, p256). Besides, the pragmatic paradigm is frequently used to support mixed methods research and allows researchers to consider more complex questions and to collect a range of evidence that would not be possible by a single method alone (Biesta, 2010; Mertens, 2012; Shannon-Baker, 2016; McKim, 2017; Yin, 2018). Kuhn’s (2012) key debate on a paradigm shift and Lincoln and Guba’s (1985) naturalistic inquiry (often called constructivism) created an alternative to the dominant positivist approach (Morgan, 2007). This division led to conflict between the two stances, known

as the ‘paradigm wars.’ Thus, by the end of the 1980, a mixed methods paradigm had emerged as a middle ground between post-positivist and constructivist research paradigms, called pragmatism. This paradigm posits that it is possible to apply different philosophical approaches within one study by adopting the philosophy as a continuum, rather than taking opposite positions (Tashakkori and Teddlie, 2010) as an epistemological method for mixing methods (Johnson et al., 2007; Onwuegbuzie et al., 2009).

Paradigmatic element	Constructivism	Pragmatism	Postpositivism
Ontology	Phenomenon represents <i>multiple realities</i>	<i>Multiple realities</i> , rejects traditional dualism, influence of the inner world of human experience, meaning, knowledge tentative and changing	Objective social science enquiry
Epistemology	Subjectivist, <i>co-created findings/meaning</i>	<i>Knowledge is both constructed</i> and based on the reality of the world we experience	Researchers are neutral, empirically stated hypotheses
Methodology	Hermeneutical/ <i>dialectical</i> , time and <i>context free</i> generalisations are not possible	<i>Thoughtful/dialectical</i> , thinking outside the box, pluralism of methods and perspectives	Generalizations <i>time and context free</i>
Rhetorical	Detailed, <i>rich and thick description</i>	<i>Rich and thick</i> (empathic description)	Use of formal voice and technical terms
Nature of knowledge	Individual and collective reconstructions	Emic and etic viewpoints, respect for nomological and ideographic knowledge	Non-falsified, hypotheses that are facts or laws
Knowledge accumulation	Reconstructions, vicarious experiences, <i>internal statistical generalisation, analytical generalisations, case to case transfer, naturalistic generalisations</i>	Iterative and dynamic, researcher tries to improve on past understandings in a way that fits and works in the world, <i>internal statistical and analytical generalisations, case to case transfer, naturalistic generalisations</i>	External replication, external statistical generalisations

Table 4. 2 Comparison of underlying belief systems for constructivism, pragmatism and postpositivism (adapted from Onwuegbuzie et al., 2009, p112)

To ensure that this approach justified the researcher's underlying belief systems of constructivism discussed earlier with pragmatism, the overlaps (*in italics*) between each of their distinguishing characteristics, as shown in table 4.2, illustrated that a constructivist-pragmatic approach was a comfortable and plausible justification for the researcher and illustrated common ground for both strategy and design. Quantitative and qualitative research designs must be compatible and complementary in order provide a philosophical justification for use of both within the same study (Onwuegbuzie et al., 2009) and not just a simple task of choosing what seems to work best. This is a criticism of a pragmatic approach, but pragmatists will argue that this emphasises creating shared meanings and joint action (Morgan, 2007). Here the focus is placed on complementarity, where both quantitative and qualitative methods are combined to “compliment the advantages and disadvantages present in each” (Shannon-Baker, 2016, p325).

4.3.5 Axiological assumptions

The final assumption associated with the identification of the researcher's paradigm is axiology, defined as the role of values in enquiry (Collis and Hussey, 2014). This demonstrates how value is attributed the participants, the data collection methods and the audience to which the findings are presented (Kivunja and Kuyini, 2017). Positivists believe that research is value free and that the objects they are studying will be unaffected by the research. This viewpoint is more difficult to equate with the social sciences, primarily concerned with the behaviour and activities of people (Collis and Hussey, 2014). A value laden axiology is aligned to pragmatism (Howe, 1998) frequently regarded as the underpinning paradigm for mixed methods.

Pragmatic mixed methods often overlook the question of ethics or values as it applies the maxim of whatever-works (Hathcoat and Meixner, 2017) or “what works” for inquiry, rather than “what works for whom” (Biddle and Schafft, 2015, p323). In view of this, researchers often sidestep the issue of deciding the nature of pragmatic axiology. Biddle and Schafft (2015, p330) argue there is still an under specification of axiology in mixed methods research, but adopting Dewey's notion of rejecting the ‘fixed and final’ good for

evaluating research value against the wider community of practicing enquiry might help to define overarching shared values of what is meant by good and useful research.

4.4 The research strategy

Any strategy must provide sufficient guidance for the research study, where the conceptual framework suggests the “direction along which to look” (Blumer, 1969, p148). According to Saunders et al. (2016, p177), a research strategy is “a plan of how the researcher will go about answering her or his research question”, guided by the objectives, time, resources available and the researcher’s philosophical beliefs. Taking a different approach, Yin (2018, p38) posited an inclusive and pluralistic view for the research strategy based on three conditions: 1) type of research question 2) control over behavioural events and 3) distinguishing between historical or contemporary events for social science research.

These three conditions are shown in table 4.3 and how they inform strategies of enquiry for study. The mixed methods chosen for this research study is highlighted in italics in the table below.

Method	Form of research question	Requires control over behavioural events	Focuses on contemporary events
Experimental	How, why?	Yes	Yes
Non-experimental such as surveys	Who, what, where, how many, how much?	No	Yes
Archival analysis	Who, what, where, how many, how much?	No	Yes/no
History	How, why?	No	No
Case Study	How, why?	No	Yes
<i>Mixed methods</i>	<i>How, why? Open-ended questions for Qual, closed-ended for Quant</i>	<i>Yes/No depending on Qual/Quant dominance</i>	<i>Yes</i>

Table 4. 3 Strategies of enquiry for social science studies (adapted from Yin, 2018, p9 and Creswell, 2014, p41).

Both Saunders et al. (2016) and Yin (2018) acknowledged that it is important to select the most advantageous strategy for answering the research question from those available, such as experiment, survey, case study, action research, ethnography, cross sectional studies, participative enquiry or longitudinal studies (Bryman and Bell, 2015; Collis and Hussy, 2014; Saunders et al., 2016). Consideration of these provided the rationale for choosing an exploratory multiple-case study strategy.

4.4.1 An exploratory comparative multiple-case study strategy

The aim of the study was to explore how entrepreneurs made opportunity-related decisions. The need to focus on this “contemporary phenomenon in depth and within its real-world context” (Yin, 2018, p15) guided the researcher towards an exploratory comparative multiple-case study strategy. This strategy was chosen to facilitate exploration of the entrepreneurs’ cognitions and decision processes in their natural setting over time, in order to understand the differences and similarities between cases and to analyse the data within and across different situations (Yin, 2018). As multiple case studies are typically used for exploratory research, this approach would confirm and replicate similarity of results and provide a strong, more reliable theory that is firmly grounded in data (Yin, 2018). Each individual entrepreneur was considered as a case, analysed separately and compared at each data time point for similarities and differences using within-case and cross-case methods. Each case study met certain criteria (see appendix 7) and was selected using purposeful sampling, discussed in more detail in section 4.5.1.

Case studies are an all-encompassing mode of enquiry and suitable for different data collection procedures (Tsang, 2014; Yin, 2018). They are also an appropriate method for identifying mechanisms and processes associated with growth over time and for capturing data that illustrates differences between context and different levels of analysis (Miozzo and DiVito, 2016). Thus, a multiple-case study approach would allow within-case and cross-case analysis of the entrepreneurs’ cognitive processes and the external environment. This strategy is an important choice for the pragmatic paradigm, as it assumes multiple forms of data collection. Furthermore, both qualitative and quantitative

data can be integrated the research design and used to support triangulation and theory building (Tsang, 2014).

The researcher examined key criteria proposed by Yin (2018) for selecting a multiple-case study strategy (see table 4.3). First, examining and exploring how the mental representations and information processing styles were used for opportunity-related decision-making, addressed the ‘how and why’ questions. Second, exploratory multiple-case studies suited the dynamic nature of opportunity-related decisions and contextual influences (Tsang, 2014). They are also appropriate for the study of processes as they allow observations over a period of time, which reveals changes and developments (Yin, 2018). Third, comparison between multiple cases assisted the deconstruction and reconstruction of the entrepreneurs’ cognitive processes and mental models and captured differences between “events in time and context, paying attention to their temporal ordering, interactions and institutional environment” (Miozzo and DiVito, 2016, p97). Finally, common designs for a constructivist approach include case studies, based on the premise that knowledge is subjective, socially constructed and mind dependent (Creswell, 2014).

Given that opportunity evaluation is frequently “glossed over” (Wood and McKelvie, 2015, p257), a multiple-case study strategy with a mixed method research design provided a contemporary focus and methodological pluralism for a fragmented field. This gave insight of the micro differences between the cognitive structures of entrepreneurs, needed for understanding the relationship between style, versatility and experience. Similarly, as there would be no control over the behaviour and responses of the participants, a detailed description of rich, real events in a natural setting would be captured and supported the holistic and integrated framework of the research question.

Both qualitative and quantitative approaches facilitated the use of inductive, deductive and abductive reasoning in line with a pragmatist perspective. Crossover mixed analysis (Frels and Onwuegbuzie, 2013) allowed the use of mixed research techniques without contradicting the researcher’s underlying beliefs. This interpretation helped to contextualize the qualitative findings and allowed explanation of logical inferences to aid

theory building for objective five. Pattern recognition across and within case is also useful for replicating and developing theory (Eisenhardt and Graebner, 2007; Yin, 2018). Moreover, theory building from case studies is also considered to bridge qualitative evidence for testable theory within deductive research (Eisenhardt and Graebner, 2007). As this is an integrated approach to the research question by combining gaps from previously empirically studied themes, there is justification for using theory building rather than theory testing research. Also, there is still an incomplete picture of how entrepreneurs evaluate and make opportunity-related decisions. As time-based process models for opportunity evaluation are scarce, taking this approach makes an important contribution to entrepreneurship decision-making literature.

4.4.2 Mixed methods as an approach

A mixed methods approach provided a bridge between qualitative and quantitative methods (Onwuegbuzie and Leech, 2006; Eisenhardt and Graebner, 2007), allowing “the use of induction (discovery of patterns), deduction (testing of theories and hypotheses) and abduction (uncovering and relying on the best set of explanations for understanding one’s results)” (Johnson and Onwuegbuzie, 2004, p17). Additionally, the justification for combining qualitative and quantitative methods is to provide an integrated methodology (Plano Clark and Creswell, 2008), where the research question acts as the driver for the type of research design, sample size, instrument measure and analysis techniques required (Onwuegbuzie and Leech, 2006).

A key aspect of the definition is how qualitative and quantitative components are mixed in the study, where the different elements are interlinked to answer the research question. Using separate quantitative and qualitative methods offsets the weaknesses of one method with the strengths of another (Plano Clark and Creswell, 2008). It is the integration of these two elements during the research process that provides the rigour of the methodology. Table 4.4 demonstrates how characteristics of these elements overlap between philosophical assumptions, for example, the philosophical assumptions underlying postpositivism allows postpositivists to utilise some qualitative techniques, such as word count or content analysis. Likewise, qualitative enquiry, specifically

constructivism, can use descriptive statistics, variances and measures (Frels and Onwuegbuzie, 2013). This adds to the rationale for choosing mixed methods.

Decision-making has been well researched in entrepreneurship but mostly using a dominant, quantitative methodology (Busenitz and Barney, 1997; Mitchell et al., 2000; Baron and Ensley, 2006; Gustafsson, 2006; Dew et al., 2009; Haynie et al., 2012; Arend et al., 2016). Likewise, the cognitive style literature reflects a traditional quantitative approach (Cools and Van den Broeck, 2007; McMullen and Dimov, 2013; Cools et al., 2014), prompting a call for more qualitative research to advance the field (Cools and Van den Broeck, 2008; Cools et al., 2014). Although mixed methods research is increasingly

Research element	Postpositivism	Constructivism	Pragmatism
Rhetoric	Formal, personal voice and technical terminology	Empathetic description, informal, rich, thick and detailed	Use of both impersonal passive voice, technical terminology and empathetic rich description
Qualitative analysis	Qualitative analysis that generates numbers as part of the findings, e.g. wordcount, classical content analysis	All forms of qualitative analysis	All forms of qualitative analysis
Quantitative analysis	All forms of descriptive and inferential statistics for making external statistical generalisations*	Descriptive statistics, some inferential statistics for internal statistical generalisation** but not external generalisation	Descriptive statistics, some inferential statistics for both internal statistical generalisation and external generalisations

*external statistical generalization involves making generalisations, judgments, inferences or predictions on data stemming from a representative statistical (i.e. optimally random and large) sample of the population from which the sample was drawn

** internal statistical generalisations from one or more representatives or elite participants from which the participant was selected.

Table 4. 4 Paradigm characteristics and analytical methods (adapted from Frels and Onwuegbuzie, 2013, p186).

accepted as a methodological choice (McKim, 2017), a growing body of literature is still dominated by the quantitative strand of the research, where qualitative methods playing a supportive role (Cameron and Molina-Azorin, 2011). Their study showed that mixed methods had the lowest percentage of methodological choice for entrepreneurial research.

The decision to implement a mixed methods design was based on the premise that using both qualitative and quantitative methods was better than the use of a single method (Creswell and Plano Clark, 2018; McKim, 2017). Mixed methods research can be used for quantitative based descriptive research and qualitative research for processes, experiences and perceptions (Frels and Onwuegbuzie, 2013). Appendix 4 has summarised the relevance of each mixed method feature.

Qualitative data provided depth and detail on the decision-making process and for relationships between the external environmental influences and preferences for information processing modes. Quantitative data collection allowed corroboration of findings on style changes with qualitative findings. According to Frels and Onwuegbuzie (2013) collecting quantitative data using psychometric instruments during the interview process helps to contextualize qualitative findings and enhance interpretations. This clarified the outcomes of information processing over time, allowing changes to be explored, explained and confirmed by the measures of quantitative findings. For this study, using psychometric instruments added significant depth to understanding the development of cognitive versatility and the relationship between this and experience.

4.2.1.1 Criticisms of the mixed methods approach

There is an ongoing debate over mixed methods research, identified as eleven key controversies by Creswell (2011, Chapter 5, pp260-283). Several of these are discussed further as they are relevant to this study. First, there is a confusing array of definitions found in literature, compounded by changes as the debate evolved, for example, from the “disentanglement of methods and paradigms” (Creswell, 2011, p271) to establishing mixed methods as a methodology. Plano Clark and Creswell (2007) attempted to solve this dilemma by blending both methods, resulting in a philosophical and method

orientation approach, one that has been adopted in this study's framework and discussed in the next section. However, whether mixed methods are viewed as a methodology, a mixing of philosophical positions or as a method with its own world view, vocabulary and techniques (Tashakkori and Teddlie, 2003), the mixture of definitions suggest for an accepted approach a concise definition is required for future progress.

Second, the paradigm debate still continues and has led to a discussion on the incompatibility thesis. Creswell and Plano Clark, (2011) advocated a multiple paradigm approach related to different phases of the design. Morgan (2007, p50) stated a paradigm is "shared beliefs systems that influence the kinds of knowledge researchers seek and how they interpret the evidence they collect". Additionally, Denscombe (2008) introduced the notion of communities for sharing and collaborating in the pursuit of knowledge. Taken together this demonstrates fragmentation of mixed methods which has been noted across disciplines (Creswell et al., 2011).

Third, a criticism made is that mixed methods favour postpositivism over interpretivism (Creswell and Plano Clark, 2011), where qualitative enquiry plays a secondary role, for example, an embedded design where the qualitative role supports the primary quantitative role. Creswell noted that whatever the role it "elevates qualitative research to a new status" (p277) and the researcher would agree with this approach, particularly in the entrepreneurial cognitive psychology literature, which is dominated by quantitative methodology (Cools et al., 2014). A "mixed methods interpretivism" (Creswell et al., 2011, p277) would therefore support the calls for mixed methods noted in Chapter 2.

Finally, the variety of designs and methods that are attributed to mixed methods research, which although provides diversity of practice adds to the fragmentation issues and lack of synergy between qualitative and quantitative methods. A typology of designs was summarised by Creswell and Plano Clark (2007), one of which was adopted for this research study. However, recommendations by Schoonenboom and Burke Jonson (2017) have emphasised new quality designs that consider both primary and secondary dimensions, to ensure that a synergistic approach for high quality research is met. The benefit of this approach is that it does not rely on the dominance of one method over another but considers value and representation as equal. This synergistic approach would

mitigate some of the quant/qual issues and the utility of whether or not the design is appropriate and provides added value. A common assumption is that a combination of methods provides better understanding. A synergistic approach would add to this debate.

4.4.3 The mixed methods research design

As mentioned above, there is a diversity of mixed method designs, but a commonly used approach is arranged by timing and dominance (Padgett, 2008; Schoonenboom and Johnson, 2017) called sequential/concurrent and QUAN/QUAL (Padgett, 2008; Plano Clark and Creswell, 2008). In sequential designs, either qualitative or quantitative data is collected as a first stage and other data types for the second stage. In contrast, concurrent designs collect both types of data almost simultaneously and where priority may be given to one type of data over the other (Castro et al., 2010; Schoonenboom and Johnson, 2017).

The design chosen shown is a concurrent triangulation QUAL+ quant design (see figure 4.1). Concurrent designs are a commonly used to confirm, cross validate or corroborate findings within a single study (Plano Clark and Creswell, 2008). They are used for studying relationships, where the quantitative phase of the study does not drive the qualitative phase (Onwuegbuzie and Leech, 2006). Given the added resources, time and expertise required for a mixed method study, it was necessary to ensure that the design guaranteed robust findings. The design has two research strands which are independent, that is, the dependence of the qualitative data does not depend on the results of the quantitative data analysis. The quantitative strand was used for assessment scores of cognitive styles (quantitative, independent variable) and the qualitative strand for perceptions of the feasibility evaluated opportunity (qualitative, dependent variable). Data was collected over five time points, shown from T0 (benchmark) to T4 (final). Both quantitative and qualitative results were analysed independently and then merged and interpreted at each time point for a joint display and integrative statement (Onwuegbuzie and Leech, 2006; Schoonenboom and Johnson, 2017). The final integration of data was after time point four. The resulting QUAL themes were linked to the QUANT results for triangulation and for exploration of style synthesis.

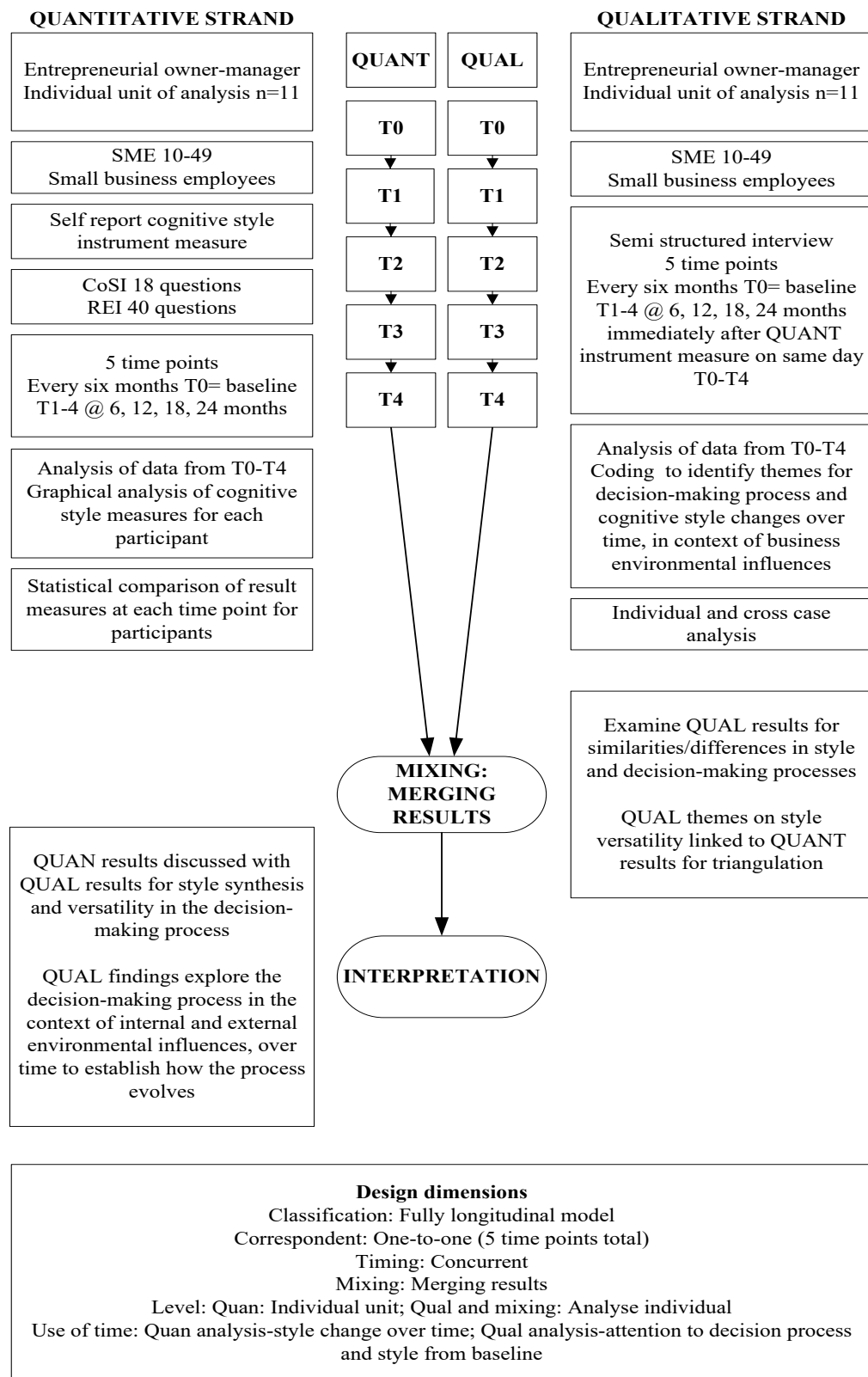


Figure 4. 1 The study's concurrent, triangulation design (adapted from Molony et al., 2011, cited in Plano Clark et al., 2015, p308).

4.4.4 Research study design plan

The mixed methods approach explained in section 4.4.2 broadly reflects the core assumptions of a pragmatist paradigm, using both quantitative and qualitative methods for data collection and analysis. The design plan sets out a cohesive approach to ensure that it matches the phenomenon under study, where the perceived value of combining both quantitative and qualitative data is to increase validity in the findings, gain a deeper understanding of the phenomenon and to assist in knowledge creation (McKim, 2017). Furthermore, mixed method studies are considered more valuable (Molina-Azorin, 2011). From a practical perspective, the plan ensured that the mixed method approach was seamless and provided a framework for rigorous data collection and analysis.



Qualitative strand – textual evidence						
Stages	1	2	3	4	5	6
Conceptual framework	Con current Design	Collection	Processing and Conversion	Analysis	Interpretation	Integration
QUAL  Parallelism in study development of dual process theory, cognitive styles, intuitive expertise and opportunity-related decisions QUANT 	Semi structured interviews over 5 time points.	Audio recording in natural setting.	Transcribed to Word documents uploaded to NVivo11, open coding.	Thematic and content analysis, association matrices, cross case matrices, concept coding.	Analysis of quotations, key themes and influences, temporal changes, time line of key events.	Integrated analysis, drawing conclusions for theory building.
			Descriptive statistics and transcript quotes.	Quantify qualitative text for cognitive complexity and connectivity calculations.	Re-contextualisation and triangulation between strands.	
	REI and CoSI self-report instrument measures over 5 time points.	Self-report assessment prior to interview in natural setting. Sales data collected per month.	Scores entered on conversion scales, mean and percentage calculations. Mean regression calculations.	Descriptive analysis, graphs and regression to mean, cognitive mapping and relationships.	Cognitive mapping, cognitive complexity, temporal changes, time line of key events and style triangulation	
Quantitative strand – numerical evidence						

Table 4. 5 Study design plan (adapted from Castro et al., 2010, p4)

The design plan shown in table 4.5 was implemented in six stages: design, collection, processing and conversion, analysis, interpretation and integration. Adapted from Castro et al.'s (2010) integrated approach, the table shows the plan for the dominant qualitative and the quantitative strand. Stages 1-5 represent the process followed for each time point T0 to T4. The qualitative strand followed each stage 1-4 as an inductive-deductive process, exploring the relationships outlined in the conceptual model using thematic analysis (Braun and Clarke, 2006, 2013; Nowell et al., 2017). The quantitative strand also followed stages 1-4. Data was collected using two standardised style measures, the REI (Epstein et al., 1999) and the CoSI (Cools and Van den Broeck, 2007) for descriptive analysis and triangulation. Interpretation for both strands was iterative between stages and time points. Final integration of both strands supported development of theory.

Although the combination of a qualitative and longitudinal approach provided valuable insights (Galloway et al. 2015, p491), there were several limitations to this design plan. A main limitation cited in literature is attrition (Galloway et al., p491), but this was managed by keeping the time interval between stages short and retaining engagement with participants via email. In many respects, the researcher was lucky as the two withdrawals were immediately post end of year 2 data collection. Longitudinal studies are also time consuming (Holder, 2018) and intervals between time points can stretch due to cancellations, outside the researcher's control. This was managed by follow up emails and rebooking. The vast amount of qualitative data generated meant processing and conversion was time consuming and administratively challenging (Holder, 2018). The design plan addressed this limitation by providing a structured programme for collecting, analysing and interpreting data, which kept the researcher on track.

4.4.5 Research time horizons

Time is considered a critical variable in a longitudinal approach (Holder, 2018). Prior research on decision-making and information processing uses fixed attributes for measuring outcomes (Langley et al., 2013) or as a sequence of events (McMullen and Dimov, 2013). According to Wood and McKelvie (2015) and Shepherd et al. (2014), more research is needed to capture changes in entrepreneurs' opportunity-related

decisions as well as the complexity and contextualized dynamics of entrepreneurial decision-making (Shepherd et al., 2014; Randolph-Seng et al., 2015). Similarly, Ardichvili et al. (2003) suggested that longitudinal studies are needed to show changes in cognitive states and knowledge bases to understand how opportunities mature. In addition, there is a call for more longitudinal, qualitative work in the field of cognitive style and small business growth (Cools and Van Den Broeck, 2008; McMullen and Dimov, 2013; Cools et al., 2014). Hence a longitudinal study was needed to address this gap and in particular, in the opportunity evaluation stream where they are scarce (Chandra, 2017).

4.4.6 The study’s longitudinal design

This study was planned with five phases of data collection at six monthly intervals over a two-year time period. Overall, fifty-five interviews were conducted. Table 4.6 shows each phase of interviews for each participant and the interval in months between visits. In several instances the intended month could not be met due to cancellations. Each time point captured different environmental conditions and influences as well as any developments from gained knowledge and experience.

Name	Jan'15	Feb	Mar	April	May	June	July	Aug	Sept	Oct	Nov	Dec	Jan'16	Feb	Mar	April	May	June	July	Aug	Sept	Oct	Nov	Dec	Jan'17	Feb		
E01	P					5							7							7						5		
E02							6							7						6							5	
E03							6							7						6							6	
E04							5								8					5							5	
E05								7							6							7					5	
E06								7							7						5							6
E07								6							6						6							6
E08							5								7						6						5	
E09								7							6							7						5
E10								5							6						6							5
E11								7							7						5							5
		First wave 2015					Second wave 2015					Fourth wave 2016																
	P	Pilot interview					Third wave 2016					Final wave 2017																

Numbers indicate interval times in months between visits

Table 4. 6 Interview schedule for data collection time points 2015-2017

Semi-structured interviews were planned at each time point with the self-report cognitive styles instrument assessed at the start of each interview, to minimise biased responses

from questions. Interviews lasted between 1-1.5 hours. The offer of incentives was made to help retain participants. Procedures for retention included a sign consent form (see appendix 5) for data collection over a two-year period, with specified dates so that the participant was well informed of the interview schedule and commitment for future visits.

4.5 The research population

For this study the manufacturing sector was chosen for the research population sample, as the researcher had close connections and networks within the industry and because manufacturers respond quickly to market changes and competitive conditions. It was anticipated that any changes in style or mental representations could be captured over the two-year time period, which would support the comparative multiple-case study strategy.

£ billion					
Manufacturing Division	2015	2016	2017	Sales changes year on year 2015-2016 (£ billion)	Sales changes year on year 2016-2017 (£ billion)
Motor vehicles, trailers and semi-trailers	48.4	54.6	57.5	6.2	2.9
Machinery and equipment n.e.c	24.8	23.9	26.2	-0.9	2.3
Fabricated metal products, except machinery and equipment	26.4	26.2	27.4	-0.2	1.2
Paper and paper products	10.1	9.9	10.9	-0.2	1.1
Computer, electronic and optical products	12.2	12.0	13.1	-0.2	1.0
Other manufacturing	4.9	5.1	5.7	0.2	0.6
Manufacture of electrical equipment	10.3	10.4	10.6	0.1	0.2
Printing and reproduction of recorded media	7.9	7.5	7.8	-0.4	0.3
Furniture	6.7	7.2	7.4	0.5	0.2
All other divisions	203.0	208.2	218.1	5.2	9.9
Total UK Manufacturers sales	358.1	364.7	384.5	6.6	19.8

Table 4. 7 Manufacturing sector research population showing contribution to growth year-on-year by division UK 2015-2017(Office for National Statistics, 2016, 2017)

Table 4.7 shows the contribution to growth and change from 2015-2017 of the manufacturing population sample, illustrating that the study was carried out during a period of increasing growth in the sector. Manufacturing represented in the sample were trailer design and manufacture, office furniture manufacture, electronic and electrical equipment and products, small-scale CNC engineered parts for the automotive industry and fabricated products. Purposive sampling of cases for comparison from this sector were selected from a broad range of entrepreneurial small business manufacturers with an established business of more than three years. This sampling process is described next.

4.5.1 Purposive sampling

The research population is a broad term covering the set of cases or groups members being studied (Saunders et al., 2016, p274). A sample is defined as a subset of a population chosen to represent the phenomenon under study (Collis and Hussey, 2014). According to Saunders et al. (2016), there are two broad sampling techniques, probability and non-probability sampling. Purposive sampling was chosen as a non-probability technique, characteristic of qualitative enquiry because it emphasises quality rather than quantity and suitable for very small samples used in case study research. A small-n sample was chosen that was sufficient in number to provide internal validity, isolate the phenomenon of interest, allow opportunity for observing the phenomenon contextually and provide confidence in the findings (Goodrick, 2014; Yin, 2018).

Purposive sampling, as described by Patton, (2015) can be divided into categories (for example, criterion, typical case, snowball, stratified). Criterion sampling was deemed most appropriate for an information-rich study of a process using small business entrepreneurs past the start-up stage. A single industry sector and the selection of a homogeneous group ensured any variation was minimal (Bryman and Bell, 2015). The sample of small manufacturing businesses, by EU definition 10-49 employees and with a turnover under £10 million (OECD, 2016, online) were geographically situated in East Anglia. The EU definition was chosen as it is more commonly used by the UK government.

For multiple-case studies, where the sample is for comparative purposes, the selection of cases is important to ensure that objectives can be met appropriately and satisfactorily for the data analysis and synthesis stage (Goodrick, 2014). Purposive sampling supported the selection of a small number of cases for in-depth study. Cases were selected based on clear criteria (see appendix 7) and addressed a range of experience that would be representative of small business entrepreneurs past the start-up stage. Findings were to be used to develop practitioner support programmes for existing businesses, so it was important that these criteria were clearly met. It was considered that the final eleven cases provided sufficient depth for describing patterns within and across cases and that the amount of data this would generate over the two-year period could be managed by the researcher.

Organisations in the area were contacted to act as gatekeepers for willing participants, such as the Federation for Small Business (fsb), Peterborough Manufacturing Cluster, Leicester for Business and MAS (East Midlands). A face to face meeting was arranged to explain the research with a flyer for background information (see appendix 6). Cooperating organisations distributed flyers to potential participants or used newsletters on their website. The researcher made several small presentations to breakfast business clubs. Overall, forty-three individuals were contacted and fifteen were selected based on the criteria shown in appendix 7. Gatekeepers discussed the research aim with business owners, followed by an appointment with the researcher if interested. This helped to maintain a transparent approach to the study's requirements and addressed issues of retention. The researcher was also sympathetic with business demands and demonstrated flexibility for visit arrangements. Four participants declined after this stage as they were unsure of the two-year commitment for data collection. All entrepreneurs had a business opportunity that they had just identified.

Eleven entrepreneurs finally matched the criteria for the study and represented a mix of prior business experience and ownership. Case studies were arranged into three categories for comparative purposes: novice, intermediate and mature. Novices were defined as having less than 5 years' experience as a founder and had only operated one business. Mature entrepreneurs had more than 20 years' experience as habitual entrepreneurs. As intuitive expertise takes approximately ten years to develop (Sadler-Smith, 2016, p216)

intermediate entrepreneurs were categorised as 10-19 years' experience. The definition for novice and mature entrepreneurs was adapted from Baron and Ensley (2006), Wiklund and Shepherd (2008) and Parker (2014).

Finally, demographics were collected at the start of the study and are shown in table 4.8. This provided the background context of the sample prior to commencement of data collection. The table shows the three categories of entrepreneurs as explained above, their age, business details and the identified opportunity/ies for growth, which was used as the basis for eliciting observation and discussion on decision-making and opportunity evaluation. Numbers were allocated to each participant to provide confidentiality so that anonymity of the was maintained in the report write up.

The purposeful sample was also guided by the Global Entrepreneurship Monitor's (GEM) definition of entrepreneurship. GEM combines the stage before the start of a new firm (nascent entrepreneurship) and the stage directly after the start of the new firm (owner-managing firm) and calls this early-stage entrepreneurial activity (GEM consortium, 2019, online, p20). This category accounts for entrepreneurial activity of businesses up to 3.5 years old. As the research focus was on businesses past the start-up stage, it was decided that businesses must have more than 3 years of trading to be termed novice, representing moving on from the early stage of entrepreneurial activity.

The final sample comprised of four novices, five mature and two intermediate entrepreneurs, providing a range of experience and contexts for a comparative multiple-case strategy. Wright and Stigliani (2013) noted that how growth decisions are made has not been a focus of attention, so the "need to know more about how the entrepreneur's cognitive processes shape growth" (p3) is important. As this is a developmental and dynamic process, it was necessary to observe the process across a range of experience and contexts in order to fully understand how these opportunity-related decisions are formed. Similarly, the information processing style was not preselected for each case study, as preferences and versatility for different styles was to be observed in different contexts, not in controlled environments.

Table 4. 8 Multiple-case study demographics at baseline T0, January 2015

Entrepreneur	Gender and age	Year established	Business description	Number of employees	Identified opportunity/ies for growth
01 Novice	Male, 26 yrs.	2010	Computer numerical controlled (CNC) machining and engineering.	12	Machine purchases to increase production and capacity of existing site
02 Mature	Male, 56 yrs.	1985	Lighting design and manufacture	14	Innovative lighting design and overseas office for global distributorship
03 Novice	Female, 35 yrs.	1975, started role in 2011	Display screens and design manufacture, family business	40	Design screen products for internet sales with internal restructure of company
04 Intermediate	Male, 53 yrs.	2003	Touch foil design and manufacture	30	New business strategy and partnership to develop existing global networks
05 Mature	Female, 51 yrs	1990	Embroidered clothing design and manufacture	18	Factory build to merge office and manufacturing on existing office site
06 Intermediate	Male, 57 yrs.	1999	Model prototyping and manufacture	17	Internal growth strategy to meet customer demands and strategic refocus
07 Mature	Female, 56 yrs.	1989	Design, print manufacture and mailing	23	New business strategy with appointment of senior management team
08 Novice	Female, 51 yrs.	2010	Trailer design and manufacture	13	Relocation to new business premises for growth
09 Mature	Male, 49 yrs.	1992	Pneumatic and electronic design and manufacture	12	Development of new design for manufacture and supply
10 Mature	Male, 63 yrs.	1979, 2012	CNC machining and engineering	10	New machine purchase and strategy to increase customer base
11 Novice	Female, 52 yrs.	2012	CNC machining and engineering	10	Business partner in case study 10 above

4.6 Limitations of the research design

There are several limitations to the research design. First, purposive sampling (Collis and Hussey, 2014; Saunders et al., 2016) limited the opportunity of other participants to present their views and experiences. The commitment for a two-year period also proved challenging and was a probable cause of the lack of response in the initial sampling stages.

Second, interviews are also subject to bias (Padgett, 2008; Saunders et al., 2016). To minimise influence by any preconceptions and personal opinions on observations and interpretations, the researcher ensured that there were no leading questions to elicit answers. This was minimised by examination of all data, independent of the researcher's prior experience and preconceptions. Participants may also withhold important information or offer answers that they believed the researcher needs to hear. This bias can be difficult control, but in this study the participant-researcher relationship that developed over the two-year time period helped to minimise this. Retrospective interviews are also subject to hindsight bias but the use of triangulation techniques highlighted any misleading information by cross-referencing results with other cases to check findings (Padgett, 2008; Saunders et al., 2016). This was achieved by integrating assessment results at each time point after the interview analysis and again during the interpretation stage.

Third, response bias is a limitation where self-assessed instruments are used, as the participant may offer biased estimates of self-assessed statements (Padgett, 2008; Leaptrott and McDonald, 2008; Saunders et al., 2016). As this study used two self-report instruments, the REI (Epstein et al., 1999) and CoSI (Cools and Van den Broeck, 2007), consideration of any limitations was significant for the study's design. Bias may occur when the participant misunderstands what the measurement is asking, where the participant perceives a desire to 'look good' or where the participant takes the safe option by choosing the middle digit in a Likert scale. This was minimised by using self-report instruments that have been validated and used before in management and entrepreneurship research (for example, Witterman et al., 2009; Chen et al., 2018) and

are recommended for use with a dual process approach (Gore and Sadler-Smith, 2011; Sadler-Smith, 2016).

Fourth, another limitation of the design was quantizing qualitative data, as it loses its depth, frequently cited as one of the main advantages for qualitative research. Using transcribed data instead of protocol analysis for establishing concepts is an alternative valid and reliable technique for mental models (Cossette, 2002; Curşeu, 2008). This technique over multiple time points used a comprehensive cross-referencing system, which was extremely time consuming, recording key concepts and transcripts for each entrepreneur across time points. An example is shown in appendix 8. These documents were used as a reference point during the analysis which systematically allowed the research to backtrack through events and coding outcomes for any queries or anomalies in the data.

Finally, the researcher noted that the complexity of mixed methods designs was time and resource heavy for planning, as well as requiring a high level of administrative competence. Collecting and analysing different sets of data over five time points for both strands meant that interviews and assessment results had to be quickly transcribed to avoid backlog and analysed prior to the next wave of interviews. The researcher proposed that a manageable research time frame for collecting and transcribing data at six-monthly time intervals was feasible, although this turned out to be a very tight turnaround in some instances. The process for collecting and analysis data is explained in the next section.

4.7 The qualitative strand: choosing the approach

Qualitative methods aim to provide an inside, person-centred, holistic perspective, which explores the detail of the research question in their context (Padgett, 2008). As a qualitative methodology assumes a dynamic reality (Padgett, 2008) it allows exploration in depth and detail so was chosen as the dominant approach for this study. Most qualitative methods are more inductive than deductive, where theory is developed after the collection and analysis of data (Bryman and Bell, 2015). Six primary qualitative approaches were reviewed prior to choice (ethnography, grounded theory, case study,

narrative approaches, phenomenological analysis and action-based research) as according to Padgett (2008), several assumptions must be considered. These are: 1) a holistic perspective assumes the whole perspective is being studied rather than several variables or causal relationships 2) understanding develops and evolves throughout the research process and data collection and analysis informs and guides subsequent activity 3) the focus is on understanding and describing the phenomenon as a dynamic and complex process 4) research involves fieldwork where the researcher has direct contact with the participants in their natural setting and 5) the researcher is the primary instrument for data collection and analysis. These assumptions were managed by the study's design plan and mixed methodology.

An exploratory comparative multiple-case study approach was chosen for the research strategy (Yin, 2018), as this met the philosophical assumptions of the pragmatic paradigm and appropriate methodologies for a dominant, qualitative mixed method study. A case study analysis uses multiple perspectives and data sources, which provides a rich data set for interpretation (Padgett, 2008). It is a widely used in management (Blumberg et al., 2008) and in small business and entrepreneurial research (Perren and Ram, 2004) and is suitable for explanatory, descriptive and exploratory research and for answering the 'why' and 'how' questions. This approach allowed the researcher to explore in detail the decision-making process and styles versatility in decision-making situations, in keeping with the study's aims and objectives.

When using a mixed methods strategy, it is essential to select the right approach that will work with the quantitative strand, otherwise the benefits of mixed methods are lost, due to inconclusive data from incompatible findings (Schoonenboom and Johnson, 2017). There are limited qualitative studies in the cognitive style literature (Cools and Van den Broeck, 2008; Cools et al., 2014) needed to advance the field. Qualitative methodology was chosen as the dominant approach to facilitate in depth exploration of the 'how' question, needed for developing future theory building and as a contribution to the style literature. Using a qualitative approach also allowed exploration of cognitive versatility, so that style variation could be observed over time in different conditions supporting iterative analysis. The approach facilitates rich in-depth exploration and addresses

relationships between external factors and style in the opportunity-related decision-making process.

Finally, referring to objective three, differences in the thought processes between novice and mature entrepreneurs were compared and contrasted to determine the relationship between style, versatility and prior experience. This illustrated how previous knowledge was constructed and deconstructed for decision purposes and the differences between the different constructed realities and mental models of novice and mature entrepreneurs. From the narrative accounts mental models were constructed to illustrate the development of cognitive versatility and the dynamics as a result of developing experience. This constructivist approach allowed exploration of the deep cognitive structures (Krueger, 2007, p125) of each entrepreneur as they evaluated business opportunities.

4.7.1 Qualitative data collection techniques

There are three main types of data collection found in qualitative research: participant observation, review of documents (secondary sources) and interviews. Although participant observation is suitable method for observing behaviour, it does not account for the perceptions of individuals (Kumar, 2011). Similarly, a review of documents, such as meeting minutes and strategy would not provide insight for deconstructing the decision process. Interviews allowed the freedom, flexibility and spontaneity in content and structure between interviewer and participant (Kumar, 2011). In accordance with an interpretative approach, semi structured, in-depth interviews were chosen to explore the perception and experiences of the decision-making process (Kumar, 2011).

4.7.2 Semi-structured interviews for capturing opportunity-related decisions

Structured, semi structured or in-depth interviews are used as a valid and reliable method for collecting data for the research question and objectives (Saunders et al., 2016). Structured interviews are based on a predetermined set of questions (Saunders et al., 2016), whereas semi-structured and in-depth interviews are less structured and are guided by questions and probes that can be adjusted to suit the interview context. They provide

opportunity for probing questions to elicit additional information. Characteristically they are used for qualitative analysis as the data collected is useful for answering the 'how' question. The interviews also help to explain meanings and descriptions of the phenomenon as well as for thinking aloud (Saunders et al., 2016). Hence semi-structured interviews were deemed to be the best choice for collecting data required for interpretation (Blumberg et al., 2008).

4.7.3 The pilot interview

Padgett (2008) advises that it is important to pilot test a set of open-ended interview questions prior to the first interview as incorporating a pilot interview in the design helps to smooth out any issues with interview questions and the application of the style self-report instruments. The pilot study was a single semi-structured interview with a novice entrepreneur. This pretested questions for the first interview and checked that the interview protocols were observed. Appendix 9 provides the rationale for the pilot interview questions, showing the main areas explored and where evidenced from the literature review. This provides accountability for the interview questions based on the literature review. Appendix 10 shows the questions asked at the pilot interview. The order of questions was changed after this pilot interview to improve flow and several questions were simplified due to duplication of content. Two questions were removed to address this. Feedback on content, sensitivity and interview time length was obtained from the participant.

Responses indicated the reliability and suitability of the question and avoidance of any issues during data collection (Denscombe, 2008). Administration of the cognitive style self-report instruments before the interview went smoothly and was not deemed too onerous by the participant. At the end of the pilot interview the participant asked to be included for the duration of the study.

4.7.4 Interview procedures

Data was collected from January 2015 to January 2017, over five time points (T0-T4). Each participant was interviewed five times over a two-year period. At T0, participants responded to questions about their background and growth intentions, what business opportunities they were considering and how they thought through their decision process as they evaluated an opportunity. This information is shown in appendix 11. Subsequent interviews asked participants about decisions, progress and items of interest which helped to fill in missing information and pursue leads from previous interviews (Padgett, 2008). At interview T4, the researcher asked for up to date information on the opportunities explored. This repeated interviewing developed engagement and facilitated the depth and detail associated with qualitative methods (Padgett, 2008).

Interviews were audio-recorded then transcribed into Word documents using Dragon Naturally speech recognition software. This was an efficient and time saving method of transcribing large amounts of rich, detailed data. Each interview lasted between 45 and 120 minutes. A set of open-ended questions were asked of all participants at the first interview (see appendix 12). For subsequent interviews, interview questions were derived from reading through previous transcripts to consolidate and identify new emergent themes for further questioning (see appendix 13 for the second interview guide). These same questions were asked of all participants in each wave, which ensured consistency and comparability between cases (Blumberg et al., 2008) and established an iterative process between data collection and analysis. Each wave of interviews was planned to be completed within a month, although in a few cases, due to cancelled appointments, this became six to eight weeks. Table 4.6 in section 4.4.6 shows the time intervals of these interviews over the period of study.

4.7.5 Thematic analysis

Thematic analysis can be widely used for qualitative research and can produce trustworthy and insightful findings as well as rich and detailed accounts of the data (Braun

and Clarke, 2006). Thematic analysis was used to analyse the data, as it is regarded as a suitable qualitative analytical method and coding process for typical qualitative research (Braun and Clarke, 2006). This approach uses a constant comparative process to highlight similarities and differences which allows the emergence of theoretical and abstract categories or themes that are used to build a theoretical model, as stated in objective five. As a flexible approach, thematic analysis is “independent of theory and epistemology and can be applied across a range of theoretical and epistemological approaches” (Braun and Clarke, 2006, p5). Thus, it can be a realist method which “reports experiences meanings and reality of participants...or a constructionist method which examines the ways in which events, realities, meanings and experiences” (Braun and Clarke, 2006, p6). It is suitable for the context of opportunity-related decisions. Furthermore, flexibility is particularly suited to a mixed methods approach as it allows a rich, complex and detailed data set to be explored, so that patterns within the opportunity-related decision process can be identified and analysed.

Given the nature of the mixed method design for this study, thematic analysis was thus deemed a suitable approach for the pragmatic, theoretical position. Additionally, the flexibility of the approach facilitated use of narrative and reflexive dialogue between the researcher and participants, in order to explore the way information was processed and represented. Thus, the analysis sought to understand both the relationship between the structure of thinking and experience and the contextual influences in which this occurred. This allowed interpretations of various aspects of the research study and hence provided insight into relationships that may be relevant for developing theory.

However, the flexibility of thematic analysis may lead to less rigorous analysis and poor coherence of themes, which undermines the trustworthiness of the findings (Braun and Clarke, 2006; Nowell et al., 2017). A practical, linear six-phased method as an “iterative and reflective process that develops over time” (Braun and Clarke, 2006, p16) was used to address criteria for trustworthiness during each phase (Guba and Lincoln, 1985; Braun and Clarke, 2006; Nowell et al., 2017). An explanation of each stage’s activity is provided in table 4.9. This is in response to Nowell et al. (2017) who argued that the data analysis of any research is frequently the section which receives the least discussion in literature.

Table 4. 9 The six phases of thematic analysis (adapted from Braun and Clarke, 2006, pp16-23).

Phase	Explanation of activity
Phase 1: Familiarising yourself with the data	<ul style="list-style-type: none"> • Raw data was transcribed into a Word document. • The researcher read and re-read through the data before coding. This allowed immersion in the data for active familiarisation where initial identification of meanings, patterns and other aspects commenced. • Initial notes or ideas for coding were recorded.
Phase 2: Generating initial codes	<ul style="list-style-type: none"> • Initial codes were produced from the data which identified a feature that appeared interesting to the researcher. This code was defined. • Coding used NVivo11 for open codes. All the transcribed data was reviewed so that patterns across the data set were captured. • Coding extracts were managed electronically within the NVivo software. Each block of text across transcripts and time waves were stored and categorized under a coding list. • The aim was to ensure that the context was not lost in the excerpts.
Phase 3: Searching for themes	<ul style="list-style-type: none"> • This commenced after all data had been initially coded and collated. • Codes were sorted into different themes, involving analysis of codes and how they formed overarching themes. • A thematic map of this early stage was drawn out so that relationships between codes and themes were developed. • Main themes, and sub themes were formed, codes that were not relevant discarded. • If themes did not belong anywhere then a coded called ‘miscellaneous’ housed these codes temporarily until they were used or discarded.

Phase	Explanation of activity (continued)
Phase 4: Reviewing themes	<ul style="list-style-type: none"> • Themes were iteratively worked across cases and time waves and refined. • The thematic map was checked to see if the themes worked across all data sets and adjustments made as required. • Data themes fitted together in a meaningful way to produce identifiable distinctions between themes. • Coded data extracts were reviewed and reworked if required. • Themes were then considered in relation to the data set so that the thematic map was clear and they told an overall story about the data.
Phase 5: Defining and naming themes	<ul style="list-style-type: none"> • Themes were clarified and a detailed analysis was conducted to show what each theme told and how it fitted into the overall picture of decision-making. • Relationships between themes were identified.
Phase 6: Producing the report	<ul style="list-style-type: none"> • This was written after the final analysis of the thematic data, outlying the merit and validity of the analysis as well as the detail within case and cross case over time. • Data extracts were selected for demonstrating the meaning.

As a widely used method (Braun and Clarke, 2006), thematic analysis must be rigorous in its application, in order to avoid inconsistencies when developing themes (Nowell et al., 2017). The concurrent mixed methods approach meant that data collection and data analysis was an iterative process that developed over time where phases 1-5 were worked at each time point. The final phase 6 was completed after all interview data had been analysed and interpreted.

4.7.5.1 The coding process for thematic analysis

A theme “represents a patterned response or meaning within the data set” and must “capture something important in relation to the overall research question” (Braun and Clarke, 2006, p10). For this study the entire data set across the five time points was used to provide a rich, thematic description of how opportunity-related decisions were made. An inductive approach was taken whereby the process of coding was iterative and data driven although it is important to note that data was “not coded in an epistemological vacuum” (Braun and Clarke, 2006, p12). The analysis of the transcript data initially illustrated two main themes: the use of analytical and intuitive styles in the individual’s cognitive processes and factors that influenced the structure of the decision-making process when evaluating the opportunity. The final thematic coding resulting in three key themes: the entrepreneur as a decision maker, as an information processor and as an expert (see table 4.10).

Codes are tags or labels that assign meaning as part of the thematic process to the descriptive or inferential information from the transcripts (Braun and Clarke, 2013; Nowell et al., 2017). A concise definition was made for each code to show how the researcher formulated the initial coding. These definitions are presented in appendix 14. The first coding (T0) was partly guided by themes identified from the literature review and that emerged from the data. Subsequent coding involved an iterative process of coding and reworking existing codes, introducing new codes and backtracking through previous interview data to check that nothing had been missed.

Coding descriptions were reviewed after the first and second data analysis, the number of participants to whom the descriptive code was allocated and the total number of coded descriptions across the eleven transcripts. These codes are shown in appendix 15. This initial coding process provided a broad overview of the data. The process was repeated for the second timepoint where the initial coding was added to, merged and refined, then cross-checked against the objectives. Memos were kept on the decision thought process and relationships that emerged from the data. Constant comparison analysis was made across each case and between case, as a systematic search for similarities and differences across the two waves of interviews (see appendix 16 for an example). Subsequent T3 and T4 coding reviewed existing patterns and new emergent themes. This iterative process gradually built up more complex groups of codes. By the end of the two-year period there was an extensive bank of coded data across the data sets, based on each time point of interview data. During interviews T2-T3, the researcher searched for themes that showed changes over time. A final list of codes is shown in appendix 17.

4.7.5.2 Searching for themes

By the end of the second coding process, several sub-themes were emerging. The next phase re-focused the analysis at a thematic level (Braun and Clarke, 2006, 2013; Padgett, 2008). Codes were analysed and sorted into theme piles, then refined into sub themes. The researcher ensured that the process was valid, reliable and rigorous by following a repeated cycle of analysis, which allowed relationships to be explored and identified in subsequent waves of data collection. The analysis of each wave directed the interpretative nature of the coding. Within-case analysis created micro themes of the phenomena that were applied to each single case. The cross-case analysis created overarching, integrative themes compatible with all cases. The repeated measures design also allowed the researcher to check factual accuracy at the next wave of interviews (Denscombe, 2008).

A final review and update was completed at interview T4 where key milestones during the two-year period were reviewed and discussed. This information was used to inform key events noted in the growth profiles of each entrepreneur and to validate previous interview content. The final arrangement of themes is shown in table 4.10.

Key themes	Sub theme 1	Subtheme 2
The entrepreneur as a decision-maker	Making the decision	Collecting information for a decision
		Processing information for a decision
		Assessing the risk
		Planning how the opportunity will operationalise
	Thinking it through	Visualising the process
		Thinking about the decision
		Checking the decision
		Validating the decision
	Feelings about the decision	Feeling confident in making that decision
		Trusting others as an information source
		Controlling the decision process
		Using a gut feeling
	External influences	Customers and their needs
		Competition in the market
		Financial influences
		The changing business environment
Using people in the decision-making process	Using teams for information and advice	
	Using networks for information and advice	
The entrepreneur as an information processor	Developing a versatile approach	Preference for an analytical style
		Preference for an intuitive style
		Ability to use both styles
The entrepreneur as an expert	Learning by doing	Using past experience
		Learning from mistakes

Table 4. 10 Thematic coding showing themes and subthemes

4.8 The quantitative strand: choosing the approach

Previous cognitive style literature has been dominated by a quantitative approach (Cools et al., 2014). The purpose of this study was to move beyond hypothesis testing and statistical techniques, more commonly associated with quantitative methods and provide a different approach as recommended in the style literature (Cools and Van den Broeck, 2008; Cools et al., 2014). Surveys were not considered suitable for a mixed methods strategy, because although they provide a broad range of data, the focus was on understanding rich and detailed behaviours and perceptions of opportunity-related decisions as a complex process, involving several constructs, the social actions of the entrepreneurs and their interrelationships.

As the mixed methods was a multi-phase design (Saunders et al., 2016), combining quantitative analysis of cognitive style with qualitative analysis of interviews supported triangulation of findings for corroboration and validity. This confirmed the validity and authenticity of the data (Saunders et al., 2016) and led to data and methodological triangulation which improves the validity of results. Furthermore, the ability to quantize the qualitative data (Saunders et al., 2016) allowed the researcher to analysis causal relationships, cognitive complexity and connectivity in the cognitive maps. This provided greater insight into the decision-making process and the differences in thinking between novices and mature entrepreneurs. The use of two self-report instrument afforded an alternative, credible diagnostic assessment of style preferences as a reliable means to assess the differences between the two information processing modes. Although a psychometric self-report instrument is more in line with a positivist paradigm, the researcher proposed that the mixed methodology chosen reflected the best choice for style collection and supported the strategy for triangulation.

4.8.1 Quantitative data collection

The cognitive style measurement instruments used were the CoSI (Cools and Van den Broeck, 2007) and the REI (Pacini and Epstein, 1999), which captured the way information was processed for decision-making, contingent with context and different

and developing experiences over time. These were chosen because they addressed the theoretical debate between bipolar and multidimensional cognitive styles measurement instruments and potential versatility and synthesis. The CoSI was designed for a business environment rather than a psychological one and thus deemed more appropriate for this research study (see appendix 18). The REI as a second instrument was chosen as it supports the dual process theoretical framework (see appendix 19). Both instruments can be aligned towards the multidimensional style approach which conceptually supports style synthesis. Cognitive styles assessments were used to collect data to provide a reliable statistical comparison of individual styles over the two-year time frame and for triangulation.

The growth intentions of each participant were assessed at the first interview, based on independent and growth-oriented characteristics (Douglas, 2013). These can be viewed in appendix 11. As growth is a dynamic concept, it was important to track the growth of each participant's business so that any changes or influences in either style or decision process were mapped to business growth. According to Douglas (2013), there is a gap between intention and behaviour, so intention was measured at the start of the research to establish predisposition of each participant. Tracking data was collected monthly as sales figures and employee numbers, a common measure used in growth research. Data was entered into an Excel spreadsheet and used for graphical statistics to indicate changes in growth patterns. This informed decision-making and versatility analysis from the qualitative data and aid triangulation. These findings are discussed in the next chapter.

4.8.2 Using self-report instruments for measuring cognitive style

The CoSI is a self-report questionnaire of eighteen items, taking about ten minutes to complete, useful for practical application in real settings. The questionnaire proposes the analytic-intuitive cognitive style dimensions as a knowing style, a planning style and a creating style. Internal consistency is measured by Cronbach's alpha coefficients ranging from 0.73 to 0.85 confirmed by reliability, item and factor analysis. The REI (Pacini and Epstein, 1999) is also a self-report questionnaire of forty items for measuring both analytical and intuitive styles. The REI has sound psychometric properties and exhibits

good internal consistency (Cronbach's $\alpha > 0.85$) and test re-test reliability ($r > 0.76$) (Pacini and Epstein, 1999). Both self-measures were used to demonstrate whether style flexibility and preferences were contingent with internal or external influences.

The authors of these instruments were emailed directly and permission was granted for use. These self-report questionnaires provided a benchmark assessment at the start of the study and an ongoing assessment of style over the two-year period. The assessment of the diagnostic was completed before the interview so it would not be influenced by the interview questions. This was vitally important, as the application of mixed methods was to provide corroboration of cognitive style from the two different data sources, namely interview transcripts and style assessments.

4.9 Data analysis of cognitive style assessments

Three different styles types were assessed, knowing, planning and creating style from the CoSI (Cools and Van den Broeck, 2007) and a rational and experiential style from the REI (Pacini and Epstein, 1999). Raw scores were entered onto a conversion sheet for style assessment measures (see appendix 20). The results of the three different styles, knowing, planning and creating style were represented graphically over the time points so that subtle changes could be visually noted. Each REI assessment score was transcribed using a conversion chart. All style results were tabulated to compare across time points and triangulated against qualitative analysis on style.

4.9.1 Triangulation of quantitative and qualitative data

The quantitative data was used for triangulation with the qualitative data to obtain a comprehensive interpretation of the phenomenon. Triangulation by mixed methods in this study has been undertaken for confirmation and completeness due to the complexity of the research subject. According to Denzin (1978, 2012) there are four types of triangulation: theory, methodological, observer and data triangulation. In this study methodological and data triangulation were used for complementarity, researcher and respondent bias and to minimise any threats to trustworthiness. Two categories of

triangulation were selected: data triangulation (assessments and interview) and methodological triangulation (software-based inferences and descriptive self-report assessments).

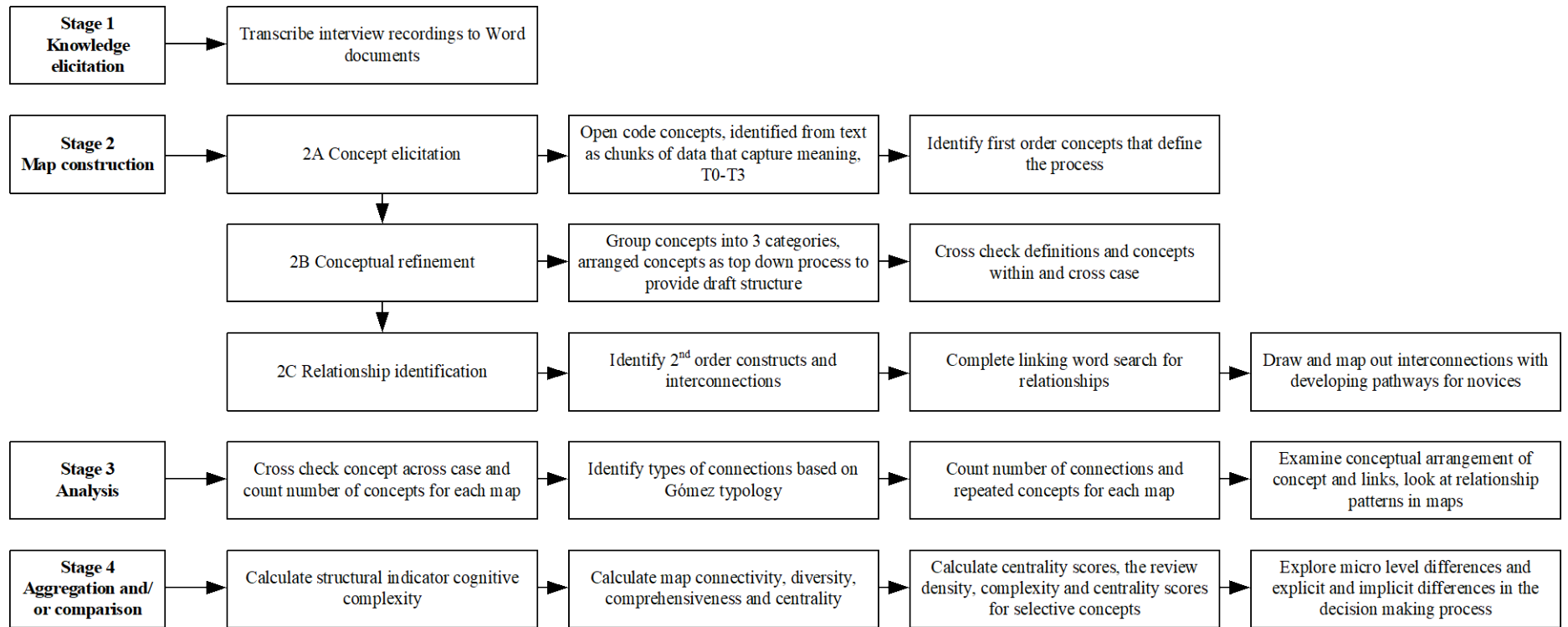
For this QUAL-quan design, simultaneous methodological triangulation was used to enrich description and to utilise normative data for comparison of results where the findings complemented one another (Plano Clark and Creswell, 2008). The interrelationships of ‘inside’ (subjective) and ‘outside’ (objective) allowed interpretation of complementarity through different levels of reconstructing meaning of the phenomenon. Interviews allowed for this reconstruction through shared language. This combination of interpretative meanings not only improved confidence in the results by demonstrating convergence and contradictions for refining interpretations but also helped the researcher understand the complexity and context of the phenomenon. Analysis of both case and cross case was combined across time points for data triangulation to increase validity of the findings. Frequency of styles were mapped against business growth and events and compared to the coding patterns and themes.

4.10 Cognitive mapping as a novel approach

The data collected over the time period produced such a wealth of information that it prompted the researcher to consider how to best use the data in alternative ways, in line with mixed methods and a pragmatic stance. The complexities of the decision process were illustrated using cognitive mapping techniques proposed by Cossette (2002) and Curşeu (2008). This aided interpretation and allowed more in-depth analysis of the entrepreneurs’ mental representations during opportunity-related decisions.

A cognitive map is a “representation of the perceptions and beliefs of an individual about his own subjective world” (Klein and Cooper, 1982, p63), derived from personal construct theory (Kelly, 1955). This allowed the researcher to look holistically at

Figure 4. 2 Diagram showing the process used for constructing ideographic cognitive maps (adapted from Curşeu, 2008, pp76-8)



individual concepts and links in the decision process. Traditionally, maps are drawn as arrows representing causality, showing chains of concepts from explanations at the bottom of the map through to consequences at the top of the map (see Ackermann and Alexander, 2016). This modelling technique produces accurate representations of structure and concepts derived from the qualitative data for analysis. The insight gained from this technique was significant.

An ideographic approach was taken, derived from cognitive mapping techniques, rather than a nomothetic approach, as the study focused on the individual entrepreneur, not on groups or populations. Ideographic mapping techniques are based on the assumptions that knowledge representations are both personal and domain specific (Curşeu, 2008). The cognitive maps showed the thought process of each entrepreneur as they evaluated the opportunity. Figure 4.2 shows the process followed for map construction from interviews T0-T3. Concepts can be defined as concrete, abstract, fictitious or real (Curşeu, 2008) and relations as the connections between concepts, which constitute the meaning of the way they are linked and connected, based on typology proposed by Gómez et al. (2000).

Category: Internal cognitive environment	Category: External environment	Category: Decision stages
Gut feelings	Expertise	Perception of opportunity
Assesses risk	Learning from mistakes	Gut feeling
Finance and investment checks/impact	Accountant/Bank	Initial decision
Past experience	Data sources	Collects data and information
Pros and cons for options	Talks to others	Data analysis
Visualisation	Talks to team	Thinks it through
Planning/operational/strategic	Co/Directors' discussion	Validates decision
Reviews and checks data	Feedback	Final decision
Asks questions	Planning	
Delegates	Listens to others' views	
Exit strategy		
Plan B		
People required		
Trust		
Confidence		

Table 4. 11 Examples of commonly seen concepts for each category

Text was descriptively coded to identify decision-making concepts and their interrelationships, using the participant's language. First and second order concepts were identified, compared across case and adjusted where concepts were similar or expressing the same idea, as understood by the researcher. Concepts were derived from data using the participant's language to illustrate their thought process (Gómez et al., 2000). Using Hodgkinson and Clarkson's (2005) classification, four steps were followed for constructing the maps: 1) knowledge elicitation, 2) construction, 3) analysis and 4) aggregation and/or comparison. Three key categories were identified across all time points: the internal cognitive environment, external environment and decision stages which were used as a framework for the draft map. Examples of commonly seen concepts for each category are shown in table 4.11.

4.10.1 Analysis of the cognitive maps

Transcripts were re-read for influencing linking words, such as 'because' and 'therefore' in a similar fashion to Cossette's (2002) prior research. The analysis followed a rigorous, iterative process, cross-referencing concepts and themes derived from the qualitative analysis T0 to T3. Draft cognitive maps were discussed with the participant at T3 and several minor alterations were made to the map structure. The map was reviewed again at T4 with the participant for final clarification. Relationship connections based on Gómez et al. (2000) taxonomy (causal, associative, chronological and structural) and Cossette's (2002) analysis techniques were applied for analysis. This allowed key relationships between concepts to be noted for theory development.

Map connectivity and density was calculated from the completed maps (Cossette, 2002; Curşeu, 2008). Each map was analysed for a centrality score, which provided a relationship measure for each concept and those directly or indirectly linked to it (Eden, 2004; Cossette, 2002). Linking terminology using examples from Cossette (2002) and other verbs and expressions identified from the transcripts were applied to the concept excerpts. These links were noted for each participant. A word search based on these links was completed for each profile transcript to double check against any omissions. In accordance with Cossette (2002), any recognition of a possible as opposed real influence

of one concept on another was considered sufficient to be noted. Structural indicators, map connectivity (CMC: the number of connections established between concepts) and relative cognitive map complexity (RCMCo: number of concepts used to define a conceptual domain) were calculated. A high value for RCMCo indicated that the map was richly interconnected and diverse in relation to the number of concepts used in the map (Curşeu, 2008). These indicators showed the way relevant knowledge was represented for the decisional situation (Curşeu, 2008).

4.11 Reliability and validity of the data

Common to a constructivist paradigm, validity is found where trustworthiness and authenticity are associated with an individual's experiences and perceptions. The researcher relied on "the participants views of the situation being studied" (Creswell, 2003, p8), the impact of their own background and experiences and how to "generate or inductively develop a theory or pattern of meanings" (Creswell, 2003, p9). This approach is consistent with qualitative data collection or a combination of both qualitative and quantitatively mixed methods to support the qualitative analysis.

Typically, qualitative research proposes credibility, transferability, auditability and confirmability (Guba and Lincoln, 1985), as alternatives to internal and external validity, reliability and objectivity cited for quantitative research. Credibility describes the degree of fit between the views of the respondent and how the researcher interpreted and described these views (Creswell, 2003). This was supported by the knowledge gained by the researcher during the literature review and development of the conceptual model, as well as use of *a priori* concepts to inform the interpretative findings. Triangulation also aided the degree of fit. Transferability described how the findings of the study were generalised. Single case studies are often criticised because of their lack of generalisability. The researcher has addressed this issue by cross-case analysis and ensuring the study had a suitable sample number, as much as practically possible.

For any research study, a record of procedures must be traceable for auditing, so that other researchers know how findings were arrived at and interpreted. The researcher kept a

memo book to document the interpretative process, a paper filing system for map development and an extensive electronic record of all work undertaken for the thesis, whether or not it was used for the final report. The use of a software programme NVivo 11 for coding and categories provided a clear audit trail by actively searching for disconfirming evidence which minimised researcher bias. The programme was used as an aid to analysis only, as it does not analyse the data itself. According to Jackson et al. (2018, p75), there are four criticisms of the software: 1) it can act as a barrier between researcher and data 2) sample projects may guide and establish a trend 3) an overreliance on mechanisation may be misinterpreted as rigour and 4) coding may be at the expense of building qualitative interpretations and constructing theory. Therefore, whilst there may be potential problems with the use of NVivo, the researcher posits that correctly applied it provides a thorough and creative method for assisting analysis of large amounts of qualitative data.

Qualitative research does not capture a fixed reality nor replicate findings (Padgett, 2008) as each individual interview is not repeatable in the same way. According to Padgett (2008, p80), there is a distinct possibility that the researcher's presence would distort beliefs and behaviour. To counteract this, the researcher maintained a professional stance and encouraged dialogue, although prolonged engagement helped to develop a relationship so that this was less likely over time. The researcher held multiple interviews over a two-year period using a variety of encounters with the participants, such as interview, phone, observation and email. However, the researcher was aware that the relationship must not become overfamiliar and lose "interpretative distance" (Padgett, 2008, p117). Any discrepancy in the findings were discussed with the participants. The use of thematic analysis ensured findings were clearly linked to the data for confirmability. Quantitative data for the assessments was kept for each participant over the time frame as a paper and digital record. These records will be shredded after completion of the thesis.

4.11.1 Ethical practice

As the interviews involved face-to-face engagements, negotiated access was based on informed consent before any interview took place. According to Braun and Clarke (2013,

p61) research “should be of the highest ethical standards” based on the four principles of respect, competence, responsibility and integrity. These issues are an important consideration before research commences. Ethical approval was granted by the university prior to the commencement of this study (see appendix 21). Ethical practice for the study’s data collection and analysis was addressed by covering ten points.

1. Informed consent was met by providing a description of the study’s aims and objectives, the purpose of the study, how the data will be used, the potential outcomes and the procedures for number and duration of interviews to inform the participant of the interview schedule and the time frame of the research (Braun and Clarke, 2013; Yin, 2018). This ensured that data collection procedures were transparent, deception or disclosure was avoided (Yin, 2018) and expectations were clear (Denscombe, 2008).
2. Full identification of the researcher, phone details and business email address were provided for each participant to obtain and maintain good relations (Padgett, 2008, p84). This allowed the researcher to be contacted for queries, further information and progress on the thesis and conference papers.
3. As informed consent is based voluntary participation, the participant allowed interviews to be recorded but could request cessation of the recording at any time during the interview (Ritchie et al., 2014, p92). The participant could also request that all or part of recording be withdrawn or refuse to answer certain questions on whatever grounds they felt were justified (Saunders et al., 2016, p244).
4. Anonymity and confidentiality were made clear to all participants. Participants were assured that any references to people, organisation and places were removed.
5. Reference numbers were provided as pseudonyms for each case to prevent people and places from being recognised (Saunders et al., 2016, p244). To ensure this anonymity was maintained, the participant’s identification was not linked to the information provided without their permission and that any undue intrusion was avoided (Ritchie et al., 2014, p87) as a result of a longitudinal study (Saunders et al., 2016).
6. Interviews were transcribed by the researcher to maintain confidentiality. The participant could request a copy of any transcript at any time during the study,

was kept informed of progress and was sent copies of any conference papers prior to presentation (Saunders et al., 2016).

7. Data files were securely stored with password protected access on an encrypted laptop as protection from unauthorized access or usage. This was stored in a secure place following data protection act guidance during collection and analysis. Any other information stored on flash drives was password encrypted. Tapes and transcripts were not be labelled in ways which compromised anonymity, and any identifying information was stored separately (Ritchie et al., 2014). Recorded data was stored on a hard drive and kept in a safe. The original recordings will be deleted when the thesis has been uploaded to DORA. Other electronically stored data sets will be wiped from the DMU secure server after 5 years. All paper data will be shredded and placed in the confidential waste bags after the award has been granted. (Saunders et al., 2016, p263).
8. The researcher carefully assessed any possibility of harm or adverse effect as a result of participation in the research study (Braun and Clarke, 2013; Saunders et al., 2016; Yin, 2018). Any personal or sensitive disclosures were not included in the data analysis. This was explained to the participant at the first interview.
9. The recording will be stopped if any distress was noted during the interview (Ritchie et al, 2014; Saunders et al., 2016). In this case, the researcher would assist the participant and direct him/her to staff welfare or other facilities in the organisation that could be used or to points of contact that were available to assist with any distress management after the interview. Any indication of harm given during the interview would elicit a response from the researcher for the participant to either report it themselves after the interview, or to seek help in some other way.
10. The researcher was also aware that obtaining voluntary information may evoke emotional distress or disclosure of personal information in some instances. This was dealt with in the context of the interview, so that no harm was caused. The interviewer remained a non-judgmental and a sympathetic listener (Ritchie et al., 2014). The researcher carried out the research as sensitively as possible being fully aware of issues of diversity, such as race, gender, social class, age, ethnicity

and sexual orientation and was a socially responsible and neutral when interpreting and understanding the data.

11. Arrangements were made to protect the researcher from harm and minimise risk during fieldwork by informing a third party of date, time and contact details (Ritchie et al., 2014, p105).

4.12 Chapter summary

This chapter has explained how the researcher arrived at the choice of a pragmatic paradigm for the exploratory investigation and the methodological considerations that led to a mixed methods research design. The rationale for a QUAL-quant design was to provide a fresh approach to the research question using an integrated methodology that addressed the shared meanings and joint actions underpinning a pragmatic approach. The inductive-deductive process of the research design and the pragmatic emphasis on intersubjectivity helped to “combine established methods in new ways” to generate “new insights” and contributions (Shepherd et al., 2014, p28).

The research study was based on a purposeful sample of eleven entrepreneurial owner-managers in the manufacturing sector as a good indicator of market fluctuations and competitive conditions. Entrepreneurs past the start-up stage were selected to represent a less commonly used profile from the business life cycle and for an exploratory multiple case study strategy. The nature of the longitudinal repeated measures, concurrent, triangulation design was outlined (Denzin, 1978, 2012). Qualitative interviews provided rich in-depth descriptions of the participants’ experiences and decision-processes elicited through dialogue and then interpreted using thematic analysis and NVivo11 software. The two self-report instruments provided a cognitive measure used for triangulation for corroboration and complementarity. The qualitative data was also used for concept elicitation for cognitive mapping, which added another dimension to the analysis in the form of mental models, map connectivity and cognitive complexity calculations. The wealth of information generated from this exploratory study provided detailed and significant insights and findings for theory development. These findings are presented in the next chapter.

Chapter 5: Findings

*“Learn how to see. Realise that everything connects everything else”
Leonardo da Vinci, (1452-1519).*

5.1 Introduction

A mixed methods approach was presented in Chapter 4 which produced two sets of findings at each time point, one from each strand as illustrated in the research design. These two sets of findings were analysed and integrated at each time point before the final merging and interpretation of results. The detailed findings are presented in the following order, explained as follows.

First, in order to illustrate the context in which the research question and objectives were explored, the chapter commences by describing the socio-demographic features of the research sample. This includes the background of each entrepreneur, their business ownership and the growth history during the two-year study. This contextualised the analysis of qualitative and quantitative data collected during the research period and placed each entrepreneur within the dynamic context of their business over the two-year time period. Graphs show the monthly sales turnover of each business and key events noted from the data collection for the bigger picture (Wiklund et al., 2009). This provided a preliminary understanding of the longitudinal nature of the context in which the opportunity-related decisions were made.

Second, findings from the cognitive style assessments, the CoSI and REI, showed how the analytical and intuitive styles were used for the evaluation process and how style preferences were adapted by entrepreneurs, contingent within context and experience. Wright and Stigliani (2013) posited that exploration of the link between cognitive style and decision-making for growth is needed. Taking an information-processing perspective has demonstrated how opportunity-related information is processed by entrepreneurs for decision-making, using both quantitative and qualitative methods for observation of the phenomenon. The concurrent nature of the findings from both methods were used relative

to each other to address the research objectives and integration strategies (Plano Clarke et al., 2015). This has provided significant insight into the decision process.

Third, although Gustafsson (2006) argued that experts' decision-making behaviour was adaptable and novices were more analytical in their decision-making, regardless of the nature of the task, the triangulation of findings between quantitative and qualitative methods gave in-depth understanding. This showed that in line with dual process theory, both modes of processing were independent of each other (Hodgkinson and Sadler-Smith, 2018). Entrepreneurs could be high on more than one style, although this was contingent with experience. Also, both modes of processing were evident in the decision-making process and entrepreneurs were able to switch between analytical and intuitive processing strategies (Louis and Sutton, 1991; Hodgkinson and Clarke, 2007). Thus, they engaged in a style that was contingent with different situations and task demands. Exploration of this versatility between different information processing modes prompted a unique observation of the development of a versatile style (Sadler-Smith, 2009).

Fourth, cognitive mapping techniques (Eden et al., 1992; Eden, 1998; Cossette, 2002; Eden, 2004; Curşeu, 2008; Eden and Ackerman, 2010) illustrated the mental representations of each entrepreneur as they made decisions. These findings showed key concepts in the evaluation process, how different stages were structurally represented and that the arrangement of concepts in the maps was contingent with experience. Also noted were differences in the mental representations of novice, intermediate and mature entrepreneurs across the time frame and the arrangement of concepts in their cognitive maps. From this emerged the key concept of 'Thinks it through'. In addition, findings also showed the importance of key concepts 'Past experience' and 'Talks to others' in the process.

Fifth, a unique observation in the novices' cognitive maps for year two showed that a missing link between 'Thinks it through' and 'Past experience' was key for improving structural relationship and connectivity. An outcome of this finding indicated the importance of experience for the development of intuitive expertise, which will be useful for practitioners who are providing support to improve decision-making effectiveness. Furthermore, qualitative data was coded for cognitive complexity and concept centrality.

Key concepts in the evaluation and decision process were identified, which provided a conceptual structure for model development. Understanding the cognitive complexity of each entrepreneur and how they operated in complex and dynamic environments illustrated how the internal complexity of their mental model fitted the complexity of the environment. In cognitive terms this is required for effective decision-making (Curşeu, 2008). Findings from this analysis were used to propose a model of opportunity-related decision-making, presented in Chapter 6.

Finally, opportunity evaluation must reflect the time sensitive nature of the phenomenon (Zahra et al., 2014). The longitudinal approach produced findings that allowed one-to-one correspondence (Plano Clarke et al., 2015) between the data at each time point. The parameters of the data collection at six monthly intervals allowed the findings to be mapped and visually represented across time points, facilitating within case and cross case comparisons. Time was treated as an ordinal variable (that is, time point T0 as baseline, T1 as the following interview and so on), but the temporal nature of both data sets provided unique insights into the process. Overall, utilising mixed methods and a longitudinal design produced results that could not be captured from a single cross-sectional study. The insights gained from this have resulted in valuable contributions to the entrepreneurial cognition literature.

5.2 Research participants: socio-demographic data

This study was conducted using participants from the East Anglia region. The region is made up of six counties, Essex, Hertfordshire, Bedfordshire, Cambridgeshire, Norfolk and Suffolk and several standalone cities, for example, Cambridge, Luton, Norwich and Peterborough. It also has a southern border which is close to the London commuter belt. The East of England is the fourth most populated region in the UK, totalling 6.15 million in 2017 and with a Gross Domestic Product (GDP) of €202b in 2016, representing 9.3% and 8.4% of the UK population and GDP respectively (OECD, 2016).

The participants of this research study were small business entrepreneurs working in the manufacturing sector. For this research study an entrepreneur is defined as an enterprising individual who has established a new organisation (Gartner, 1988) based on an

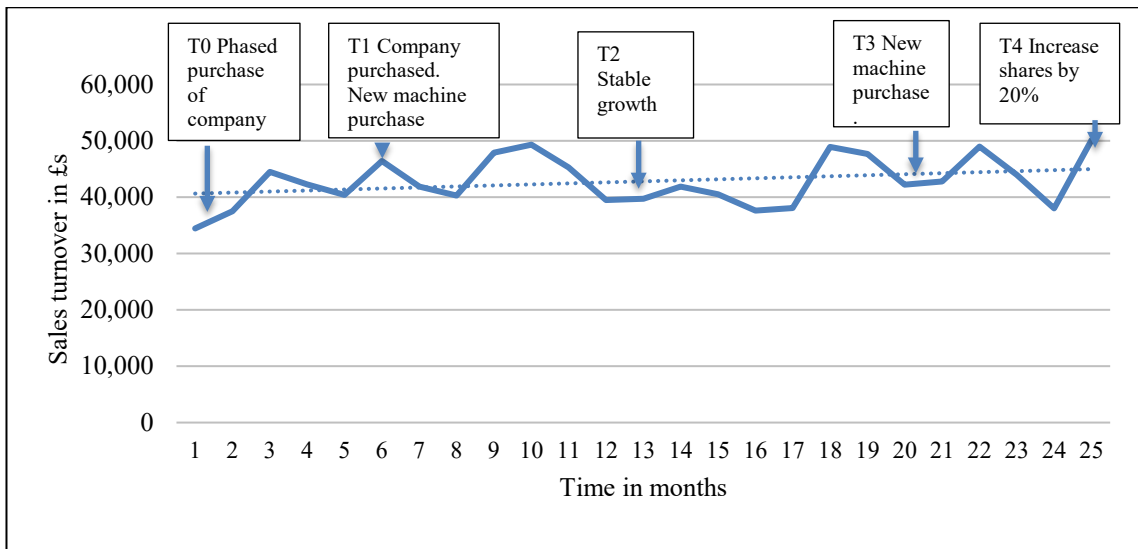
opportunity where new products, services or raw materials are brought to market and sold for more than production costs (Casson, 1982). The final research sample consisted of eleven participants: six males and five females. According to the latest government statistics, (House of Commons, 2018, on line), the gender split in manufacturing is 76% men and 24% women, although this does not indicate business ownership, just employment. For this study the male: female ratio did not represent this statistic due to the nature of the small purposive sample. In the sample the youngest participant was 26 years old, the oldest was 63 years old; the mean age of participants was 50 years.

5.2.1 Tracking business growth

A variety of measures are used to capture growth, the most frequently used indicator being employee numbers and sales revenue (Achtenhagen et al., 2010; Davidsson et al., 2010). Information was collected for both indicators from each participant during the study time frame. According to Davidsson et al. (2010) very few managers view employee growth as a goal, because employment growth is not always correlated with sales growth (Wiklund et al., 2009). In response to Davidsson et al.'s (2010) criticisms on growth indicators, this study noted their recommendations and choose sales turnover as the best suited growth measure for the research question. Findings from the sales turnover are discussed next.

5.2.2 Context and the growth process

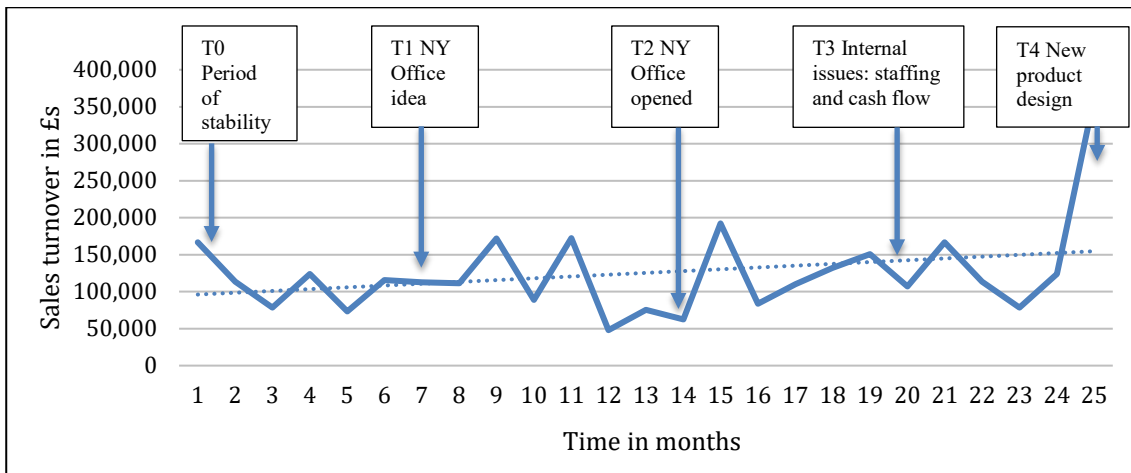
Sales data was collected monthly and recorded as a line graph over the study period. The graphs exhibited three different categories of growth based on the business sales turnover from 2015-2017 which was categorised as follows: little or no growth (0-4% year-on-year), planned growth (>+5% year-on-year) and negative growth (<0% year-on-year). These performance categories were adapted from Blackburn et al. (2013), based on the variations noted in the sample. The graphs showed a stochastic nature of sales turnover so a linear regression line was added to show the increasing or decreasing trend, although this assumes growth to be linear and uni-directional. Key events were labelled on the line graph to show the context for any significant growth changes over the two-year study. An example is provided for each category and discussed.



E01 Summary of key events noted from interview at each time point				
T0: Month 1	T1: Month 6	T2: Month 13	T3: Month 20	T4: Month 25
Phased purchase of company with partner (50:50 shareholder), established new strategy as director.	Became owner in September (month 9), planning on new machine purchase to increase work capacity.	Stable business growth, intention to consolidate production practices and improvements.	Slow development of growth, another new machine purchase to increase orders.	Established a leadership position in company, exploring opportunity to increase own shareholding by 20%.

Figure 5. 1 Growth tracking data of E01 and key events noted at interviews

For the first category, little or no growth, entrepreneur E01 showed an 0.18% increase in sales turnover over the two-year period (see figure 5.1). This did not reflect his intention noted at the baseline assessment T0, but the qualitative data analysis showed his reluctance to risk any business opportunities that would not guarantee a steady income and cash flow for managing his financial commitments to purchase the company. The outcome of this was a cautious evaluation of opportunities and an emphasis on an analytical decision-making process.

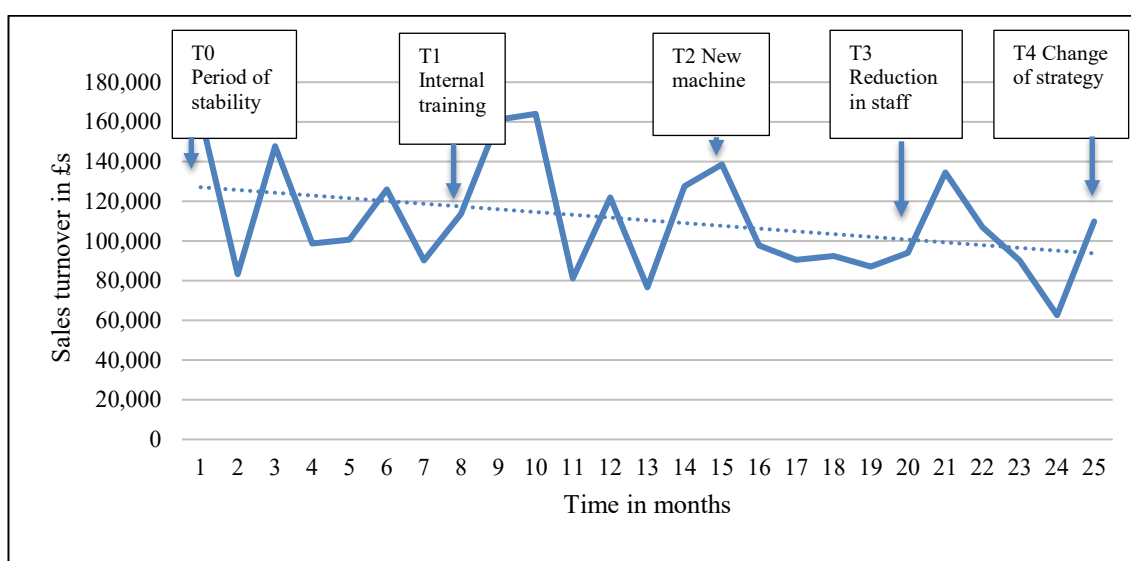


E02 Summary of key events noted from interview at each time point				
T0: Month 1	T1: Month 7	T2: Month 14	T3: Month 20	T4: Month 25
Business investment has stabilised company, some new market opportunities.	Strategic decision to open NY Manhattan office, cash rich.	NY office opened, new product ideas, business growing globally.	NY slow, staffing problems, loss of orders, using cash in bank to support.	New product design released increased orders, rapid growth.

Figure 5. 2 Growth tracking data of E02 and key events noted at interviews

The second category of planned growth is shown above in figure 5.2 for mature entrepreneur E02. This participant had high growth intentions at the beginning of the study and was aiming to increase his sales turnover by 50%. This was in response to increase global distributorship and release a new innovative product. The opportunity for a New York office provided some increase in growth, but internal staffing issues in year two caused an unexpected loss of orders and a decrease in sales turnover of -16.68% for 2016, compared to the previous year. By January 2017 (month 25), sales of the new design were reflected in the sales turnover. A similar pattern of growth, also based on a new product opportunity was seen with E09 (see appendix 23 for the growth profile). Both examples E02 and E09 are indicative of the long development times for some opportunities to become commercially viable and the impact that this has on planned growth intentions.

Additionally, entrepreneurs E05 and E08 who had planned growth based on new premises showed an increase in sales turnover for 2016 of 10.48% and 89.7% respectively. Both these profiles can be viewed in appendix 23. For entrepreneur E05, (new factory build) and entrepreneur E08 (relocation) these opportunities facilitated development of their customer base. Despite the increase in sales turnover, the relocation for E08 pushed resource utilisation and efficiency almost to breaking point and caused subsequent problems the following year. Likewise, for E05 the new factory build caused a temporary loss of manufacturing efficiency. This indicates the importance of carefully managing disruptive change for planned growth so that it does not have a negative impact on the planned growth intention.



E06 Summary of key events noted from interview at each time point				
T0: Month 1	T1: Month 7	T2: Month 15	T3: Month 20	T4: Month 26
No intention to grow but consolidate and stabilise, developing internal efficiency.	Internal developments, training of staff for team skills.	New machine, still developing right first-time culture, staffing and efficiency problems.	Turnover down, staff layoffs, overstaffed, reverting back to smaller company.	Picked up from standstill figure, technology still issue, strategy to focus on finishing and specialism.

Figure 5. 3 Growth tracking data of E06 and key events noted at interviews

The third category, for example entrepreneur E06, as shown in figure 5.3 above, illustrated a decrease in sales turnover of -17.41% with negative growth. This was due to internal staffing problems and where the product was now too expensive compared to their competitors. In addition, the use of 3D printing by other players was having some impact in the market sector. A strategic decision was made by the directors to focus on high end prototyping with improved technological investment. The study was completed before the outcome of this decision was evident. Entrepreneur E03 also showed negative growth at the end of the two-year period at -7.68% due to sales team issues that affected cash flow. The profile can be viewed in appendix 23 and shows the gradual reduction in turnover over the two-year study. This she admitted was due to taking 'her eye off the ball' in year two, whilst undertaking the production improvements. This was most likely due to her inexperience in managing multiple improvement plans at director level. All other profiles of entrepreneurs in the sample that have not been discussed are shown in appendix 23. They are categorised accordingly with the definitions provided at the start of this section and provide explanation of the growth changes during the study time frame.

5.2.3 Context and time in opportunity-related decision-making

The profiles illustrated the temporal nature of growth in small business. Moreover, a temporal approach to the study allowed the researcher to explore the significance of past, present and future events. This is critical for understanding the process for opportunity-related decision-making, as the entrepreneur will evaluate information using multiple contexts and orientate their thinking towards what has happened, what is happening now and what is expected to happen in the future (Fletcher and Selden, 2016). Hence, context is not just the 'when', 'where' and 'how' circumstances or viewed at differing levels (micro, macro and meso) but a relationship between context and the entrepreneur. The growth profiles of the entrepreneurs' business discussed earlier illustrates the impact of context on sales turnover. Thus, as the opportunity is future focused (Wood and McKelvie, 2015) this will involve perception, evaluation and interpretation of information by the entrepreneur as well as reflection and recollection of past events and decisions (Fletcher and Selden, 2016). This reflection will be contextually derived and is noted in the findings where appropriate.

5.3 The use of analytical and intuitive styles for opportunity-related decisions

This future focused activity (Haynie et al., 2009) will involve information processing where the entrepreneur collects and analyses information pertaining to the feasibility of the opportunity. Overall findings from the cognitive style analysis showed that entrepreneurs can be differentiated by their cognitions, as indicated by prior research (Busenitz and Barney, 1997; Armstrong and Hird, 2009; Arend et al., 2016). The study's findings add to this prior research by exploring the micro differences between entrepreneurial cognitions, showing that style differences were contingent with experience and context. This was evidenced in both the qualitative and quantitative findings.

5.3.1 Preferences for analytical or intuitive styles

The nature of the initial benchmark readings pointed to the heterogeneity of individual characteristics at a micro level (Busenitz et al., 2003; Shepherd et al., 2014). Firstly, the base line style assessments are displayed in table 5.1 and show that the entrepreneurs exhibited different preferences for different styles across time points.

Entrepreneur	CoSI Knowing style (A)	CoSI Planning style (A)	CoSI Creative Style (I)	REI Rational Style (A)	REI Experiential Style (I)
E01 novice	90	71	66	83	41
E02 mature	90	66	89	82	70
E03 novice	90	57	62	85	58
E04 intermediate	56	57	86	76	79
E05 mature	80	77	89	88	90
E06 intermediate	90	66	89	96	70
E07 mature	80	60	89	86	74
E08 novice	40	63	71	61	78
E09 mature	75	54	91	72	84
E10 mature	75	77	68	65	72
E11 novice	75	86	77	75	83


Note: A= analytical dimension I=Intuitive dimension  highlighted key score

Table 5. 1 Baseline T0 cognitive style assessments scores for CoSI and REI

For both assessments, the CoSI, and REI, the higher the assessment score, the greater the preference was for that style. For example, novices E01 and E03 had a high analytical score for both cognitive style assessments and a lower creating and experiential (intuitive) style. This supported Gustafsson's (2006) research which showed that novices were prone to analytical decision-making, regardless of the nature of the task. In contrast to this result, novices E08 and E11 had a higher planning than knowing style (see their scores 63 and 86, circled in table 5.1), as both were establishing and planning their new business at this benchmark assessment. This finding provided an early indication of the adaptive nature of style. Both novices had previous business experience, particularly E08, who had worked in the same industry. As a result of this prior domain experience, both showed a higher experiential (intuitive) style than other novices (see table 5.1). This has two implications: prior experience and knowledge for E08 was being utilised as intuition-as-expertise (Sadler-Smith and Shefy, 2004) and context, that is business circumstances, was influencing their preference for analytical information processing at this time point. Both entrepreneurs E08 and E11 were involved in planning activities at T0.

In contrast to prior research that takes a unitary or single bipolar dimensional viewpoint (for example, Allinson and Haynes, 1996; Krueger and Kickul, 2006; Barbosa et al., 2007; Wasdani and Mathew, 2014; Stienstra et al., 2015), this study's findings showed that entrepreneurs were not demonstrating either a high analytical or intuitive score, but were high on more than one style at a time. For example, mature entrepreneurs E02 and E07 had high knowing and creative styles for the baseline CoSI assessment (90/89 and 80/89) and a high rational style for the REI (82 and 86), circled in table 5.1. These entrepreneurs had prior domain knowledge or intuitive expertise, which explains the higher creative style. The high rational style showed that they were also processing information analytically, albeit with a preference for the knowing dimension. Other entrepreneurs, such as E04, E05 and E09 showed high creative/experiential scores, demonstrating an intuitive preference. Associated with this intuitive preference was their engagement with innovative projects at the time of their assessment, which inferred that context was influencing their style preference.

5.3.2 Switching between styles

As all entrepreneurs used both analytical and intuitive information processing modes when making opportunity-related decisions, this supports the notion of styles as orthogonal dimensions (Hodgkinson and Sadler-Smith, 2003; Sadler-Smith 2009; Kozhevnikov et al., 2014). Dual process theory proposes an ability to switch between styles as needed (Hodgkinson and Clarke, 2007) providing a more balanced perspective (Sadler-Smith and Shefy, 2004). Interaction between the two modes of processing can be sequential or simultaneous, depending on differences in preference for experiential or rational processing (Epstein et al., 1996; Pacini and Epstein, 1999; Hodgkinson and Sadler-Smith, 2018). Prior literature has proposed that a cognitive versatile individual is predisposed to use both styles equally (Hodgkinson and Clarke, 2007) and that intuitive and rational information processing styles can be brought to bear simultaneously in decision-making (Lee-Ross, 2014). This study's findings indicate that this is correct.

The following excerpts from novice (E03) and mature (E02) entrepreneur illustrate this interplay between both styles:

“... [the decision] can be based on the gut feeling, so it's as if you get the feeling, you then evaluate it in your head, yes, I'm gonna go with it and then I would do the analytical side...we need to do this, this is going to work, I can see big areas for it and then after I've had that feeling I will then do my research, so that's where my analytical comes in...” (E03, T1)

“I think gut feeling is probably the strongest, whether that comes from experience, confidence or a combination of all that over 30 years? I still think that if something, if a really brilliant idea comes up and my gut feel isn't [there,] I'm just not confident with it, because something doesn't sit right with me, I probably wouldn't sanction that ..., but you've got to be diligent, you've got to go back and do that analysis because you can so easily miss something intuitively that is thrown up by the analytics that actually makes you think hang on, we're doing something fundamentally wrong here. I've had [that] before, that's where your confidence, your experience, that's where it's very easy to have a gut feel and to say this is what we do here, and I know it's going to work, let's get on with it, let's just do it. We analyse it further down the line, but we know, we know it's not going to trip us up, this is okay! They're the easy ones, anything else I think you've got to bring a degree of analysis in from day one really.” (E02, T2)

As cognitive versatility is considered to be the ability to learn from experience (Browne, 1996), the researcher looked for significant changes in style scores between time points as an indication of change in style preference, taken as +/- 2% of the mean. For example, as shown in figure 5.4 below, E03's preference for a CoSI analytical knowing style decreased over time points at the same time as an increase of the intuitive creating style. This increase of an intuitive style, alongside a decrease in the 'needing to know' dimension of the analytical style was an interesting observation.

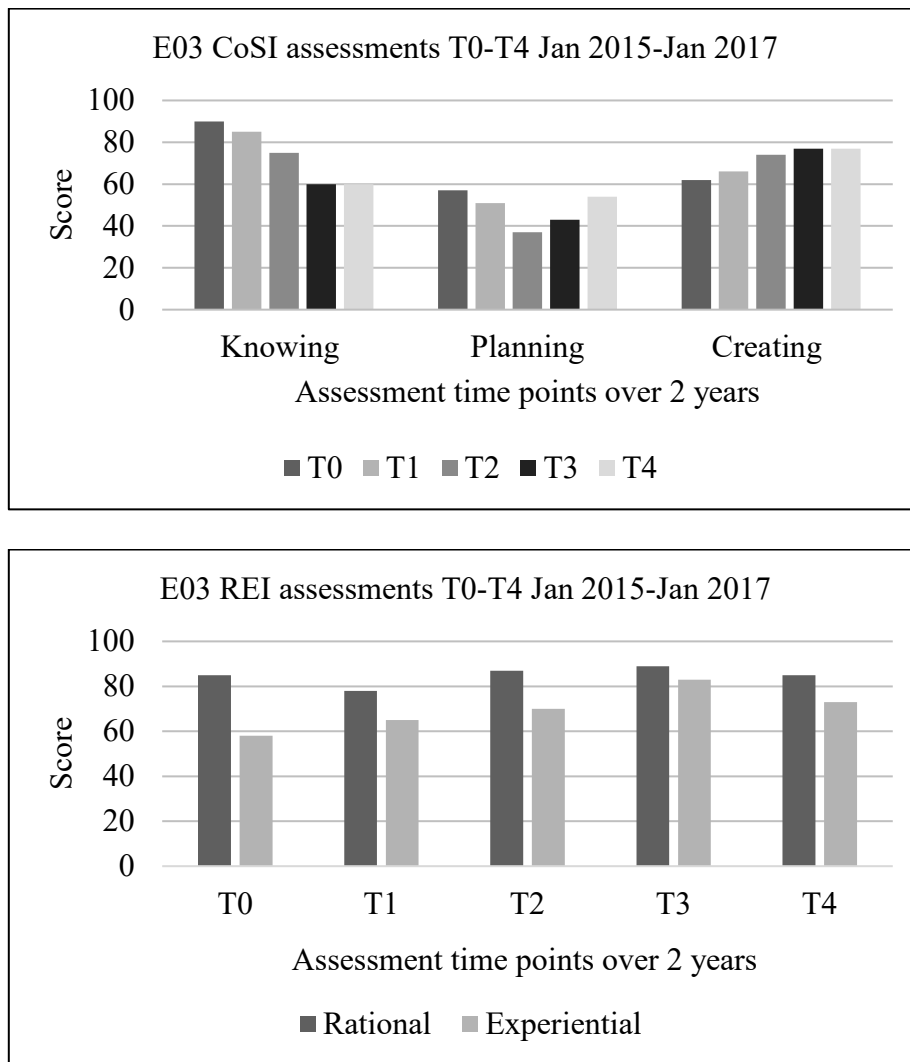


Figure 5. 4 Changes in style preference for E03 over time points T0-T4

Prior research by Gustafsson (2006) demonstrated an analytical preference for novices. These findings question this statement, as novices showed an ability to switch between styles and a steady increase in the intuitive score contingent with experience.

Furthermore, this interplay and gradual increase of an intuitive style illustrates the benefits of a longitudinal study for exploring the micro differences of style preference. For example, the CoSI planning style of novice entrepreneur E03 showed variation at all time points, with an increase between T2-T4 as a result of improving production efficiency and release of a new product. Likewise, the REI rational score for E03 also showed a significant increase from T1 to T3 as well as the experiential intuitive style. However, taken together, the scores overall indicated a higher preference for analytical processing compared to intuitive processing over the time frame. This would suggest a preference for analysis, as suggested by Gustafsson (2006). The benefits of using CoSI to measure style provided a clearer indication of micro differences along the analytical dimension.

5.3.3 The development of an intuitive style

These findings discussed above infer the development of an intuitive style. This increase in the style scores was seen over time points, for example novice entrepreneur E01 in figure 5.5 showed an increase of the intuitive experiential style from T0 to T2. This increase is the result of acquiring new knowledge from experiential learning, which would strengthen intuition through the development of tacit knowledge (Armstrong and Mahmud, 2008; Krueger, 2007; Klein, 2015), shown as an increase in the experiential style. Similarly, this increased preference for an intuitive style is also evident in the longitudinal profile of E03, shown in figure 5.6, as a slow, gradual increase of the intuitive style over time from T0 to T3. This increase reflects the acquisition of tacit knowledge gained from experience.

The researcher posits the acquisition of new knowledge can be evidenced over the longitudinal profile of novice entrepreneurs. As intuition is a key element of human information processing, present as pattern recognition based on past experience and enactment through social interaction and sense making (Vaghley and Julien, 2010), this is not a surprising result. The novices' implicit schemas were developed through learning and experience as they interacted with their environment. New knowledge would be stored in the long-term memory. This would increase their ability to use intuitive

information processing, which would be reflected in their preference for an intuitive information processing mode. As intuitive expertise takes approximately ten years or so to develop (Sadler-Smith, 2016, p216), then this would be seen as a gradual increase of the intuitive score over time.

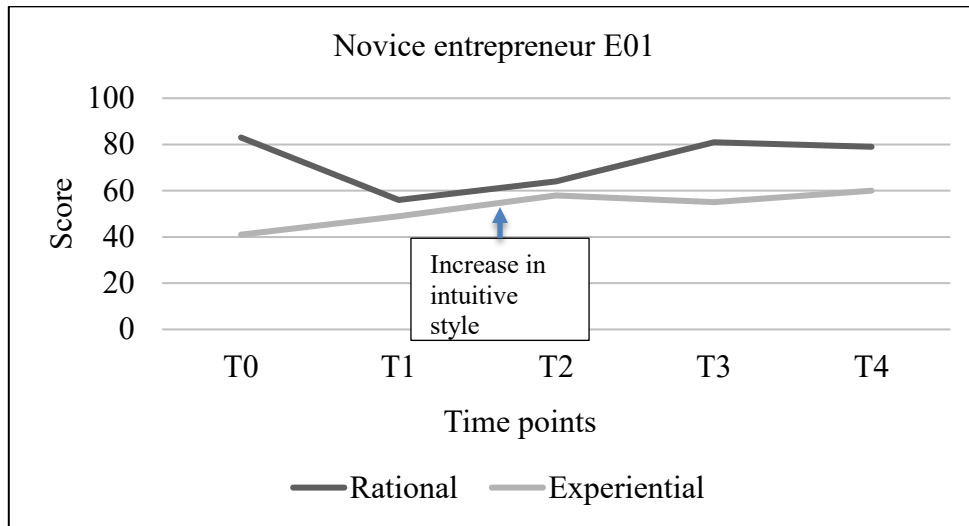


Figure 5. 5 Increase of experiential style for E01 over timepoints T0-T4

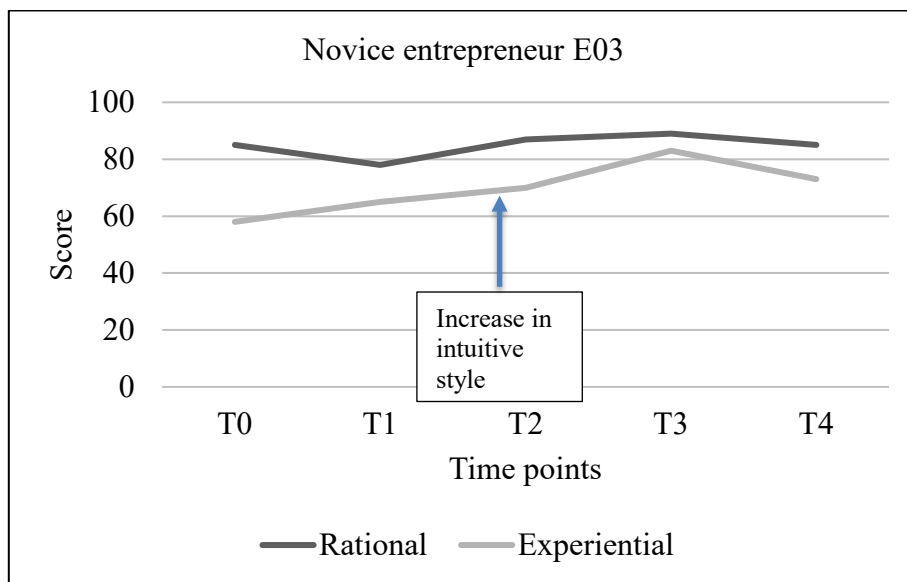


Figure 5. 6 Increase of experiential style for E03 over timepoints T0-T4

Qualitative analysis also showed that the use of prior experience was significant, exemplifying that developing tacit knowledge increased the intuitive style score. The following excerpts below are from two novices, E01 and E03, describes how they used their newly acquired experience:

“If I’ve got prior experience definitely, because I can sort of tap into that and think what did I do in this kind of situation and how did it pan out before? What were the risks then and how did they present themselves? I keep going back to prior experience, I’ve just got more of that...but I’ve got more internal knowledge to draw on now than I had when I started, when I started I had zero knowledge, so I couldn’t possibly make a decision based on no experience.” (E01, T2)

“I think as the years are going by I’m feeling more confident in the decisions that I’m making, which is going on my experience. Where it’s gone wrong, if I’m getting that feeling, then it’s following, it’s so you are saying you’re more able to make that quick gut feeling, you are using previous experience.” (E03, T2)

These findings confirm that intuition is developed through implicit learning during professional practice (Harteis and Billet, 2013). This infers that over time, novices will become more proficient in adapting their preferred style to different situations as they will be able to use both intuitive and analytical information processing modes. This adaptation of style preference to situation was also evidenced and is discussed next.

5.3.4 Changing style contingent with situational influences

The style assessment findings confirmed that entrepreneurs exhibited the ability to adapt their preferred style in accordance with the task situation or as an adaptive strategy to environmental changes (Hodgkinson and Clarke, 2007). Prior literature has highlighted that individuals differ in their preference for analysis or intuitive styles (Hodgkinson and Sadler-Smith, 2003; Sinclair and Ashkanasy, 2005; Betsch and Ianello, 2010) and that the ability to switch between information processing modes is advantageous (Hodgkinson and Clarke, 2007). These adaptive changes of style preference were observed both in the quantitative and qualitative findings, highlighting the benefits of mixed methods for triangulating findings. Entrepreneur E08 provided an insightful illustration of this adaptability, stating that although her initial decision to relocate was an intuitive one, she now felt that she was processing information more analytically.

“Yes, it’s become more analytical really, yes as a reassurance to myself that the decision I have made intuitively is valid, my little safety blanket.” (E08, T0)

A further example of this change can be seen in the quantitative results for E08, shown in figure 5.7, where an increase for knowing and planning style at T1 was in response to information required for decisions concerning the business relocation.

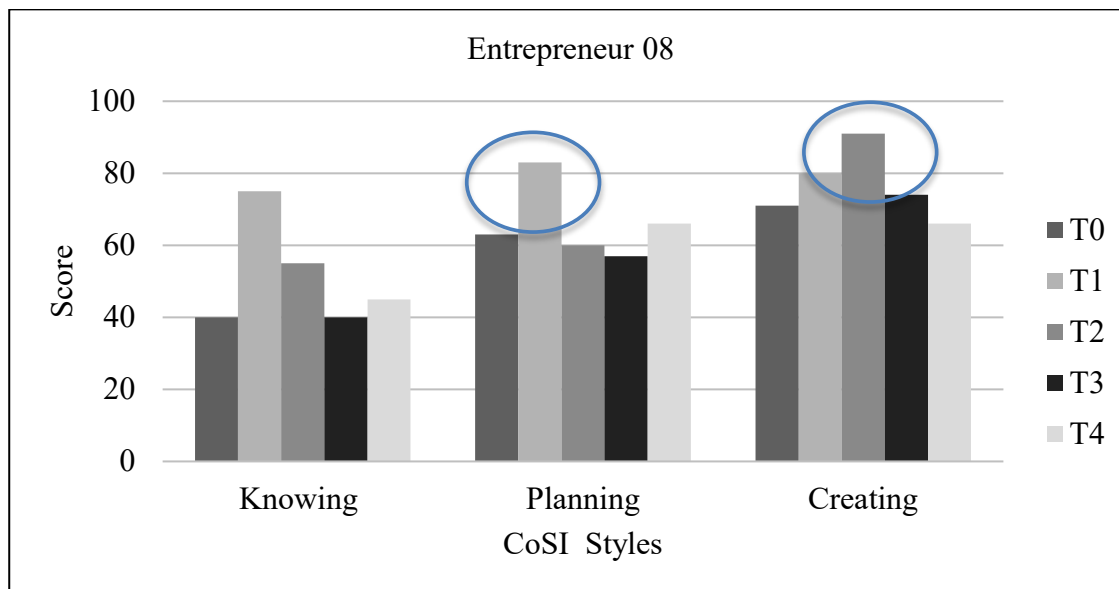


Figure 5. 7 Style change over time points T0-T4 for novice E08

Qualitative findings also support the style assessments as explained by entrepreneur E08 at time point T1:

“I think it needs to be more planning... because creativity is not always about the detail, it is sometimes if you haven’t got the detail you make mistakes...I didn’t think I worked that way, I still don’t think I normally work that way, I appear to be [planning...].” (E08, T1)

By timepoint T2 and T3, as shown above in figure 5.7, the business move was completed and a return to the preferred intuitive style was evident at T2 as a high creating score. The excerpt below explains why E08 had returned to her preferred style:

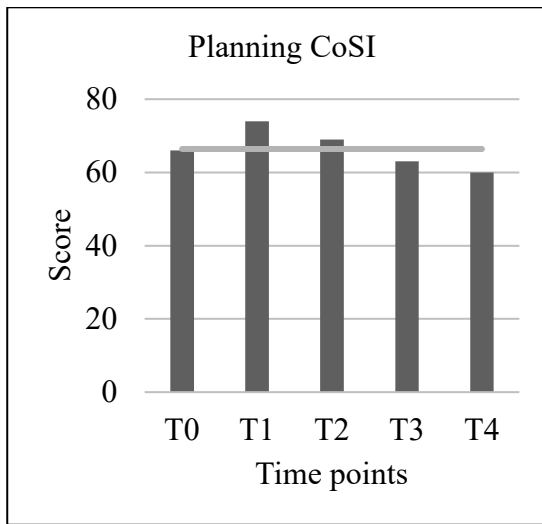
“I’m quite creative so it doesn’t really lend itself to that... for example, this moving, I told you how much analysing and research and checking and double checking that I did, but not since them... no, it was only relevant for what was going on then.” (E08, T2)

Another example of this adaptive strategy is seen at timepoints T3 to T4 in figure 5.7, as a decrease in the CoSI creative style. During this time frame, qualitative analysis showed that E08 was experiencing internal staffing and supply chain difficulties, resulting in a significant reduction of orders and cash flow problems. When asked about this decrease observed in the intuitive style and an increase in the planning style preference E08 replied:

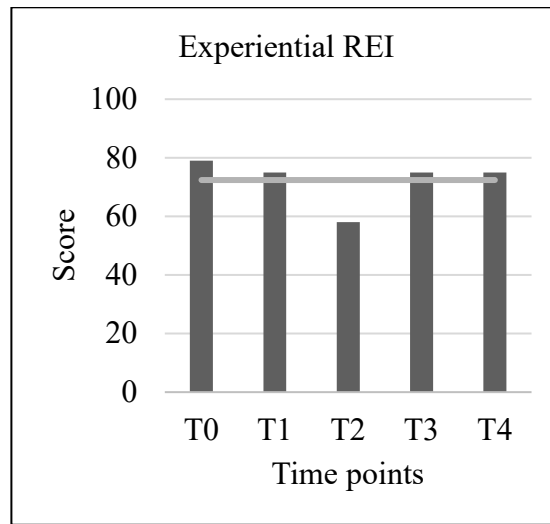
“No, I think I do more and more planning, I still think I’m in planning [style] ... probably analytical, much more process and structure and analysing. It’s almost like a reminder that I am a grown up... because I own and manage a business so come on, be serious, do it properly”. (E08, T3)

Other significant changes were also observed that showed the ability of entrepreneurs to adapt style preference to the situation. This provides empirical evidence that supports Hodgkinson and Clarke’s (2007) model of contrasting styles and strategies and Sadler-Smith’s (2009) interpretation of style as qualitatively different forms of thinking.

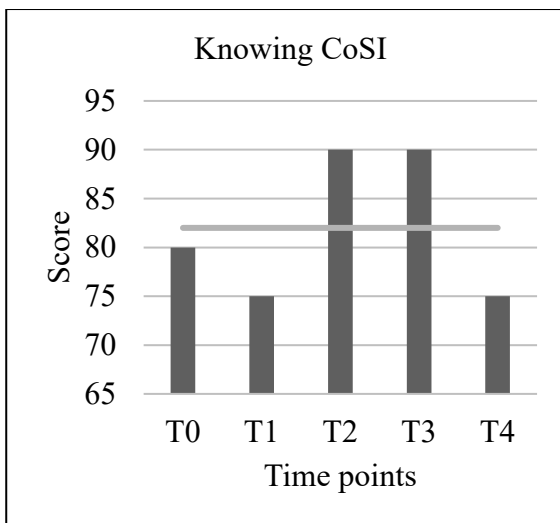
The following four examples shown in figure 5.8 illustrate this point. Each graph shows the style scores for each time point and a horizontal line that represents the mean. Entrepreneur 02 showed an increase of planning style linked to establishing the New York office at T1. A sudden decrease in the preferred intuitive style for entrepreneur E04 was due to a loss of confidence in a partner’s strategic plan for product development at T2. Both entrepreneurs E05 and E06 showed a change in a knowing style: E05’s change at T2 and T3 was associated with the new manufacturing factory site build and E06’s sudden increase at T4 reflected knowledge required for business targets and a change in business focus. These examples demonstrate that entrepreneurs matched their style to the situation and adapted their preference accordingly. Furthermore, this underlined the importance of taking a multidimensional and dual process approach, recommended by Kozhevnikov (2007), Kozhevnikov et al. (2014) and Cools et al. (2014) to capture this interplay between styles.



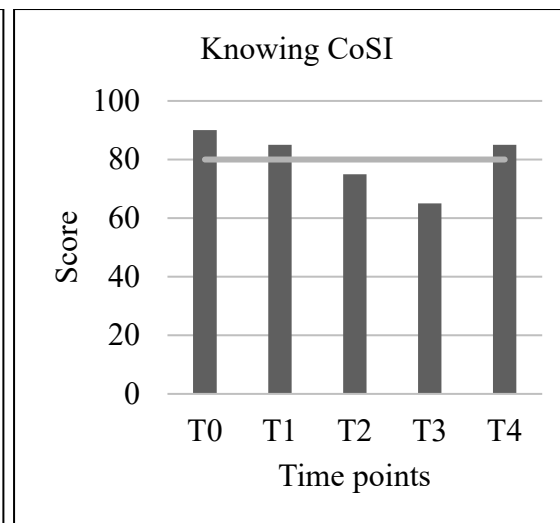
Entrepreneur E02: NY office T1



Entrepreneur E04: Loss of confidence T2



Entrepreneur E05: Site build T2 and T3

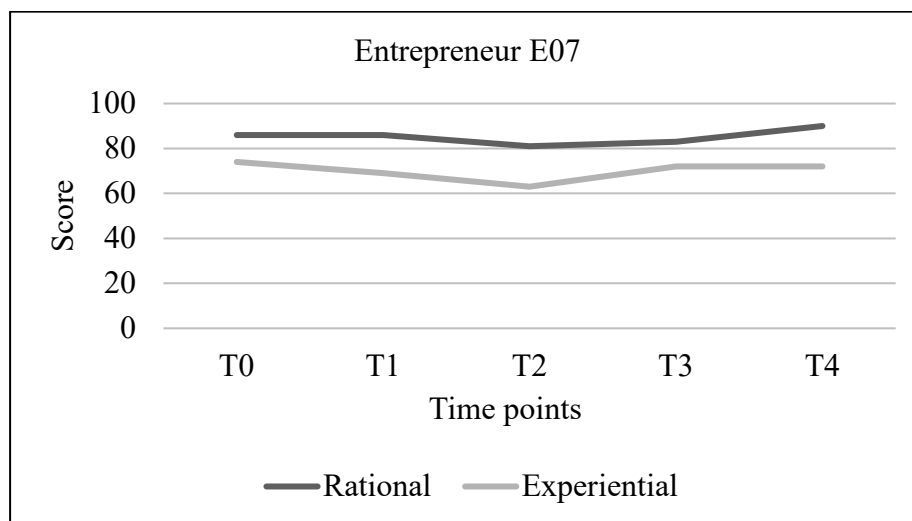
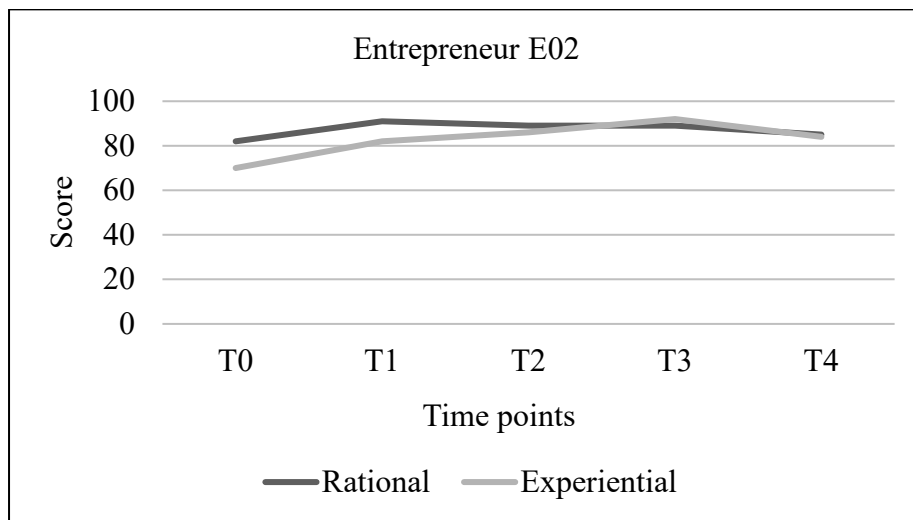


Entrepreneur E06: Skills issues T3

Figure 5. 8 Examples of changes in style preference as an adaptive strategy

As a result of this analysis over time points, a unique finding emerged. This was the observation of a versatile style (Sadler-Smith, 2009) based on dual process formulation (Hodgkinson and Sadler-Smith, 2018). These findings are the first to provide empirical evidence of this versatile style, as proposed by Sadler-Smith (2009). This observation suggested that a more balanced style between analytical and intuitive preferences was consistently used for information processing by mature entrepreneurs. This versatility was clearly observed from the REI assessments, where the most experienced entrepreneurs in the sample (20+years) exhibited each mode of processing as the parallel

operation of dual processing. Examples of this are shown in figure 5.9 below for three mature entrepreneurs E02, E07, E09 and one novice, E11. It is posited that the versatility seen in E11 was domain expertise gained from previous administrative and planning experiences in different sectors, now applied to her new role as company secretary and administrator. The graph shows the parallel nature of between the rational and experiential styles.



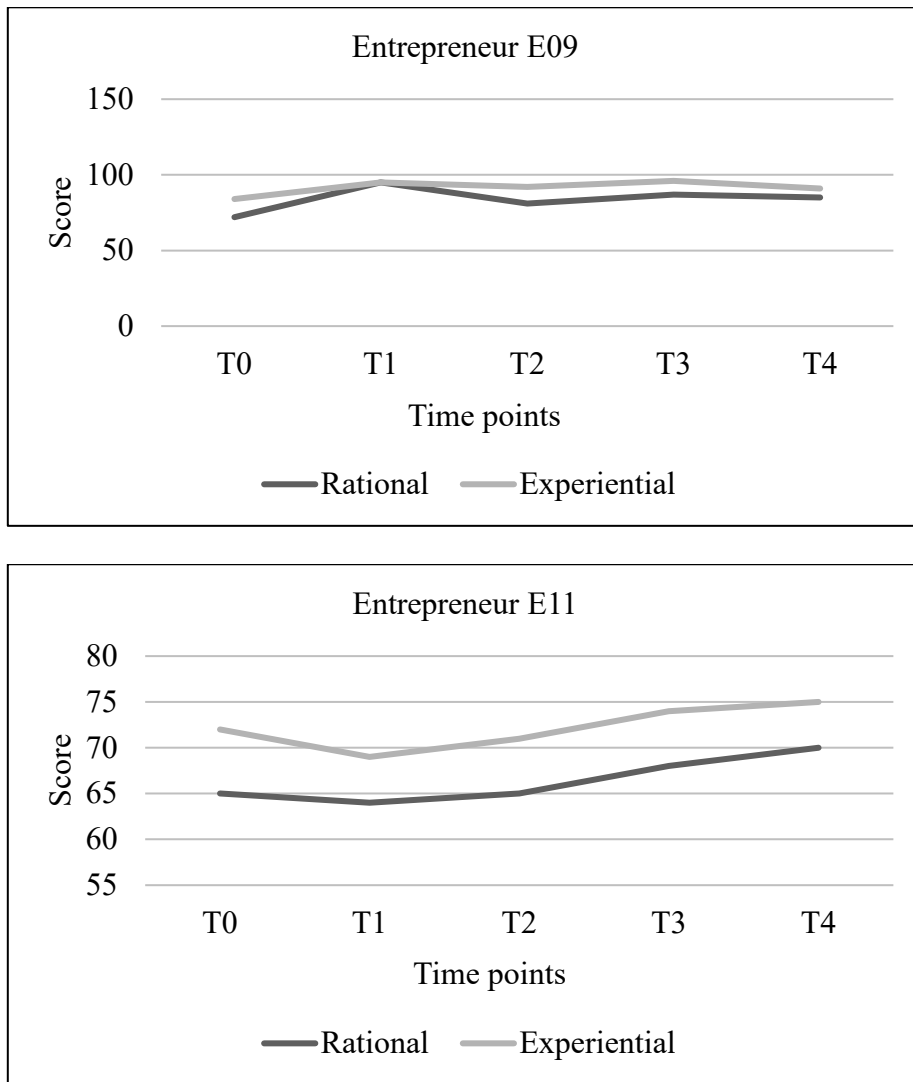


Figure 5. 9 ‘Mirror effect’ between rational and experiential styles over time points

Described by the researcher as a ‘mirror effect’, this versatile style was clearly observed in the REI assessment results across all time points. The rational and experiential styles are represented by a line graph over the times points T0-T4. Although not always parallel across the whole graph, in most cases they do mirror the small variations of style patterns across time points. The four examples of this parallel imagery between the rational and experiential style are seen in the line graphs across time points, “used interchangeably as the situation demands” (Sadler-Smith, 2009, p16). This was evident where there was little or no significant variation of style to context, apart from E02 and the slight increase in the experiential style at T3, which coincided with the new lighting product design and release. The exception here in the mature category was E05, who was building a new

factory and showed a significant change from an intuitive to analytical style during this period, T2-T4. This can be seen below in figure 5.10, as an adaptation of style preference to context. A return to the versatile, balanced style noted by factory build end at T4.

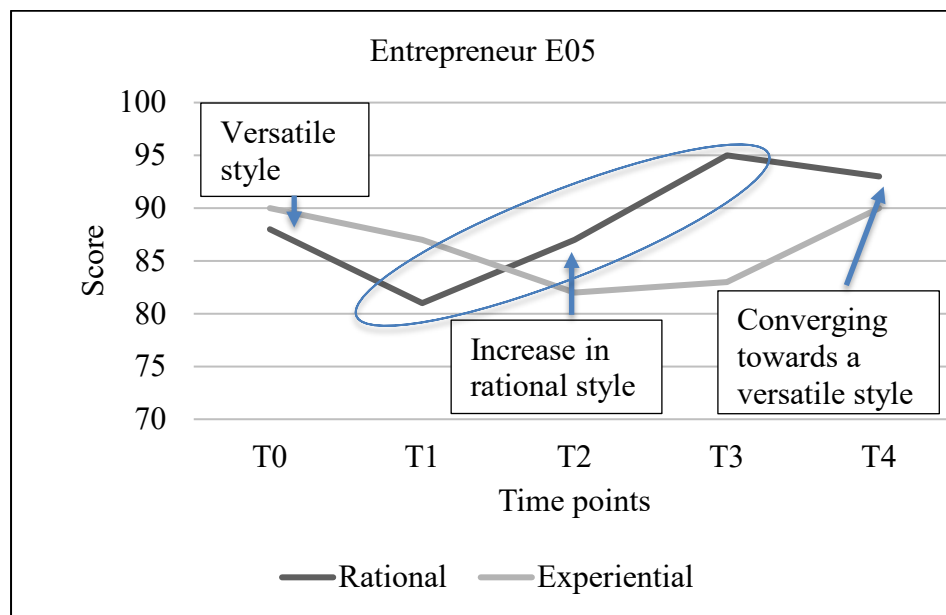


Figure 5. 10 Adaptation of rational and experiential style preference to context

5.4 Observation of cognitive versatility

Observation of this versatile style contributes both conceptually and empirically to the cognitive style literature. Sadler-Smith (2009, p15) proposed a duplex model of cognitive style, incorporating a versatile style as a combination of both analysis and intuition. In this model the versatile style is used interchangeably as the situation demanded, as a seamless interplay between the two modes of information processing. This supports the findings shown above. As intuition has been shown empirically to be a key cognitive process that links experience to opportunity identification (Baldacchino et al., 2015) a versatile approach, where high levels of intuition and analysis used together, likewise links experience to the opportunity evaluation stage. Based on the conceptual model proposed by Sadler-Smith (2009) qualitative transcript data from T0 – T3 was coded to see how this versatility emerged from data analysis. Examples are shown in table 5.2 below as coded transcripts.

First Coding	Transcript example with time point	Second coding
<i>Analytical style</i>	I've always known that I've held myself back in situations because I was dillydallying, I was analysing it, analysing and sometimes you've got to stop analysing and just do something. (E03, T0)	Analytical preference
<i>Analytical style</i>	All the way through you're analysing it and you're making sure that you have looked at every angle so that you feel that if you get to the end of it and it has gone wrong you might be able to see where it's gone wrong and maybe learn from it. (E03, T2)	Learning from mistakes
<i>Intuitive style</i>	Somebody gives me a project to look at with all the drawings or whatever, I have no gut feel, you know, just another job to look at. Where somebody says we're looking to do an idea, that's when your gut comes into it, because you think all those all those things in your mind, because you think can you do it, can your business do this, can your people do this? All that goes on very rapidly, you build up a quick picture which is probably the basis analysis. (E09, T3)	Weighing up pros and cons Using a gut feeling Visualisation Thinking it through
<i>Intuitive style</i>	I think the gut feeling is somewhere here, knowing that the idea is right. (E05, T3)	Using a gut feeling
<i>Cognitive versatility</i>	I think I'm going more towards gut feeling rather than analytical. I'm never going to leave the analytical, that's never going to go. I know that but it's, but I think I'm using that more supportive rather than prominence. I don't think you can progress just on one type because if you are constantly making your gut feeling and learning from it and analysing, I suppose...I think you've got to work the two. (E02, T1)	Changing style Developing versatility
<i>Cognitive versatility</i>	I wouldn't ever make a decision on gut alone... sometimes I just get a feeling, I get a feeling about something, I just have to go away and have to make sure that is the right decision to make before I go with my gut. (E01, T0)	Checking the gut feeling, cognitive versatility
<i>Cognitive versatility</i>	I think I am analytical but it's the two things really. It's hard to differentiate, it's hard to say yes, I'm sitting here and thinking how many times this has happened and what we've got to do to make this right sort of thing. (E04, T3)	Cognitive versatility, Using past experience
<i>Cognitive versatility</i>	I think I'm moving towards it [intuitive style] in making a decision, but that doesn't mean I stop analysing it after I've made the decision... I've made the decision [intuitively] and then checked up. (E03, T0)	Changing style, Cognitive versatility

Table 5. 2 Examples of coded transcripts for analytical, intuitive and versatile styles across time points

Versatile thinkers access and use their inferential knowledge (Brown, 1996; Krueger, 2007; Vaghley and Julian, 2010) in response to task demands. This brings centre stage the importance of gaining expertise for differentiated and effective information

processing, where analysis is needed for processing detail and intuition for contributing towards the bigger picture (Hodgkinson and Sadler-Smith, 2018).

The versatile style is underpinned by CEST (Epstein, 1985, 1994, 2008, 2010; Epstein et al., 1996; Pacini and Epstein, 1999). Accordingly, both processing modes can be used simultaneously and are complementary. Curşeu (2008, p82) argued that the “most proximal factor to a decisional outcome is the cognitive representation developed in the working memory (WM) space, which is the result of interplay between the functioning of System 1 and System 2”. Hodgkinson and Sadler-Smith (2018) have reminded scholars that the nature of dual process theory as a parallel-competitive account, conceptualises information processing as a dynamic interplay between the two systems. Thus, the use both styles during decision-making (Cools et al., 2011; Lee-Ross, 2014) as a dynamic interplay (Cools et al., 2011) or as a dance of systems (Epstein, 2008) demonstrates versatility. The dual process conceptualisation also provides a firm conceptual framework for individuals to switch between analytic and intuitive processing modes (Louis and Sutton, 1991; Hodgkinson and Clarke, 2007; Sadler-Smith, 2009) as two parallel, interrelated but distinct systems, largely independent of one another (Hodgkinson and Sadler-Smith, 2018).

Coding identified phrases showing intuitive and analytical information processing, such as ‘feeling’, ‘intuitive’ or ‘gut’ for an intuitive style or ‘facts’, ‘analysis’, ‘check’ for an analytical style. Where both types were used in the explanation or there was an inferred move from one to another, coding for ‘versatility’ was applied. This is shown in Table 5.3 where more detailed examples from two case studies E04 and E07 are provided. Phrases in bold highlight an analytical style, those in italics highlight an intuitive style. References made to versatility are underlined. The excerpts below clearly illustrate interplay between the different information processing modes.

Further examples were evidenced from the qualitative data. Entrepreneurs E03 and E04 describe this interplay.

“I don’t think it’s a clear process of steps. I do tend to jump around a bit so I’ll start to have a think about it and then I’ll be checking that in my head and thinking

about that and how I feel about that and then I might go back and think well I need to support that with something and I write about it so no, it's probably this, jump forwards and then jumps back." (E03, T1)

"I would say it's basically a merger of the two, the things just, they work in unison for me in that respect." (E04, T1)

Entrepreneur	T0	T1	T2	T4
E04	"I tend to use the intuitive, it's stronger than the analytical, I do intuitive before I do analytical."	"I'd sort of double between, because I do a lot of stuff up here in terms of, if I absorb some facts that I would have been processing, a lot of facts in my head."	"I still think what probably happens is that I take over information and then check, a bit of intuitiveness [comes] into that decision-making process."	"I very much think it was a mixture of things, I would just go and observe but then I suppose that's collecting data...I might sit and think about the process, how to work through in my head but again, that's doing some analysis...I might occasionally think I wonder if it's that, and I suppose that is more intuition rather than analytical... I think the two things probably flip-flop."
E07	"I'd say a mixture of intuition, gut and facts, a good mix."	"I spend a lot of time thinking but I don't sit in the corner and just think if that makes sense it's like thoughts come, they just roll in nice and easy and then you just validate it."	"Yes, but you are using the intuitive with the analytical because why did I start doing the analytical in the first place, ... Using both of them, because one is actually feeding the other."	"You're doing it both simultaneously, it's a simultaneous thing you've got that feeling and you know where it's from... you can't separate one from the other... it's the whole thing, it's interwoven, so it's looking at the whole and it's not just looking at one."

Table 5. 3 Examples of coding taken from the qualitative data extracts for E04 and E07 over four time points.

Findings also showed that entrepreneurs checked out their intuition, either as a physical check if a novice, or as reflective thought if more experienced. This was seen as a feedback loop in the cognitive maps of mature entrepreneurs, reviewing facts and information to confirm or provide confidence that the initial decision was correct. This was similar to Agor's (1986) eclectic decision makers, where the initial intuitive feelings were checked against the data. Arguably, the ability to engage in information processing where each mode was deployed according to context would be beneficial for decision-making. As opportunities are frequently new experiences, intuitive processing would be more likely used when information was incomplete. It is conceivable that the development of a versatile style, as a pattern matching process would be a better option, as it is highly unlikely that new opportunities would be framed in the same way as previous ones. The findings showed that despite an initial gut feeling response, these intuitive responses were checked out, regardless of experience. As explained by two novice entrepreneurs E01 and E03:

"I've never been that good at doing things just on gut feeling, gut feeling does come into it but I've never trusted my gut so much that I wouldn't go and do some research first". (E01, T0)

"I must do the two things, the intuitive and the checking the info...mmm, I think the, the intuitive thinking comes out first really...no it's definitely you feel it, then you check it..." (E03, T3)

For novices, the checking process showed a change from an active information search (Iederan et al., 2009) to a more intuitive one over time. The two excerpts below from novice E03 and mature entrepreneur E09 show the different thinking processes associated with this checking process:

"I still have the preferred analytical style but I think experience is letting me find new ways of holding that information [in my head], then to quickly draw upon it, whereas before, when you don't have so much experience you have to go out there and find the information." (E03, T2)

"I think I am analytical in my mind, although I'm not writing something down. I do question the figures and the numbers you know, I sit with a calculator although I'm not writing anything down, it's pinging into my mind you know, so yes there is some analysis or the benchmark of what I'm thinking (E09, T1)

Likewise, the ability to process information mentally, rather than note it down was associated with making quick decisions based on a gut feel.

“...what I’ve done I think last year I’ve been acquiring knowledge...I think I will be able to make decisions quicker and I think I would probably, I don’t think I would doubt as much. That’s all going back to my experience isn’t it?” (E03, T2)

“I can make very quick decisions without checking and going into detail because it’s in my mind.” (E09, T2)

These qualitative excerpts confirmed that entrepreneurs across all time points demonstrated the ability move between analytical and intuitive styles, although novices exhibited this to a lesser extent. In order to identify how this expertise developed and the part it played in the process, the structure of each entrepreneur’s mental representations was explored using cognitive mapping techniques. This is discussed in the next section.

5.5 Cognitive mapping techniques for the decision process

Cognitive maps were used as a visual representation of thoughts, concepts and their relationships associated with the entrepreneurs’ thought processes (Curşeu, 2008; Curşeu et al., 2010). The technique is ideally suited to reveal insight into the process that took place during opportunity-related decision-making and has been explained previously in Chapter 4, section 4.10. The complexity of the knowledge representations should match the complexity of the information environment for successful strategic decisions (Dane and Pratt, 2007; Curşeu, 2008).

A cognitive map is shown by a network of nodes and arrows that acted as links and “where the direction of the arrow implies believed causality” (Eden, 2004, p674). This exploration of the way in which entrepreneurs represented knowledge relevant for their particular decisional situation (Klein and Cooper, 1982) provided a window into the unseen space of the working memory of the entrepreneur (Curşeu, 2008). It also provided a structural framework that informed decision behaviour and connectivity (Pech and Cameron, 2006). Taken together, this allowed the researcher to interpret cognitive representations of decisional outcomes (Curşeu, 2008).

Cognitive mapping content analysis described by Curşeu (2008, pp77-78) was used to code the interviews. In order to effectively manage large amounts of data for comparative analysis, profiles were compiled for each entrepreneur. As discussed in Chapter 4, coded transcript examples were cut and pasted into a profile template for each entrepreneur with the time point noted for analysis. The coded concepts were identified from this process and mapped across all profiles for consistency of approach and definitions. The process was then repeated across time points (see appendix 14, 15 and 16). As a result of this iterative process, a comprehensive record of key concepts and transcribed excerpts for each entrepreneur across all time points highlighted concepts used for opportunity-related decisions. Each entrepreneur's cognitive map was compiled from this rigorous and extensive analysis.

5.5.1 Cognitive map categories

The cognitive maps indicated clear differences in the structures of novice and mature entrepreneurs' mental models. Findings indicated two map categories in the evaluation process: those entrepreneurs who commenced with a gut feeling which prompted an immediate initial decision and those who collected and analysed data before they made an initial decision. The former category included all intermediate and mature entrepreneurs and one novice entrepreneur who had considerable prior domain experience. The latter category included the remaining novice entrepreneurs E01, E03, E011 and two mature entrepreneurs, E07 and E10. This categorisation commenced the initial sorting of the map findings.

The analysis explored the cognitive thought process from the perception of opportunity through to final decision and gave a visual representation of thought flow as concepts and links, rigorously derived from the data. These concepts were represented by arrows that showed relationships. An example from each category is discussed in the following section to illustrate key differences between map structure and the concepts.

5.5.1.1 Cognitive map profile of mature entrepreneur E02

The cognitive maps provided an understanding of the thought process as opportunities were evaluated and decisions made. For each map, the process commenced with the perception of an opportunity. For this the first category, the process began with a gut feeling followed by an initial decision. The cognitive map is shown in figure 5.11. This entrepreneur started his business in 1985 and the initial benchmark style assessment indicated an intuitive style preference. The gut feeling was seen as an important part of the process:

“...the gut feel is very much part of the process, I’ve never been able to take that out of it, you have a feeling if that is right or if that is wrong.” (E02, T0)

Subsequently, the gut feeling prompted an initial decision which was briefly checked using data and information, similar to Agor’s (1986) eclectic type mentioned earlier. Next, the concept ‘Thinks it through’ represented this core concept, positioned in the centre of the map. The stage used both modes of information processing, analysis and intuition, represented by concepts such as ‘Visualisation’ for intuitive processing or ‘Finance and investment check’ and ‘Data analysis’ for analytical processing. Feedback from the team and external stakeholders was used to provide resource information for reflection. Potential consequences such as ‘Risk’, ‘Plan B’, ‘Cashflow’ or ‘End goal’ were also evaluated.

Next, entrepreneur E02 validated his initial decision by talking to others who had relevant experience and knowledge and holding a discussion meeting with his senior team and/or directors for further feedback. Moreover, as part of this validation process, data was briefly checked before the final decision was made. For both opportunities observed during the time frame the process was identical. In addition, a similar arrangement of stages and concepts were seen in other examples of a mature profile, for example, E05 and E09. Their maps can be seen in appendix 24.

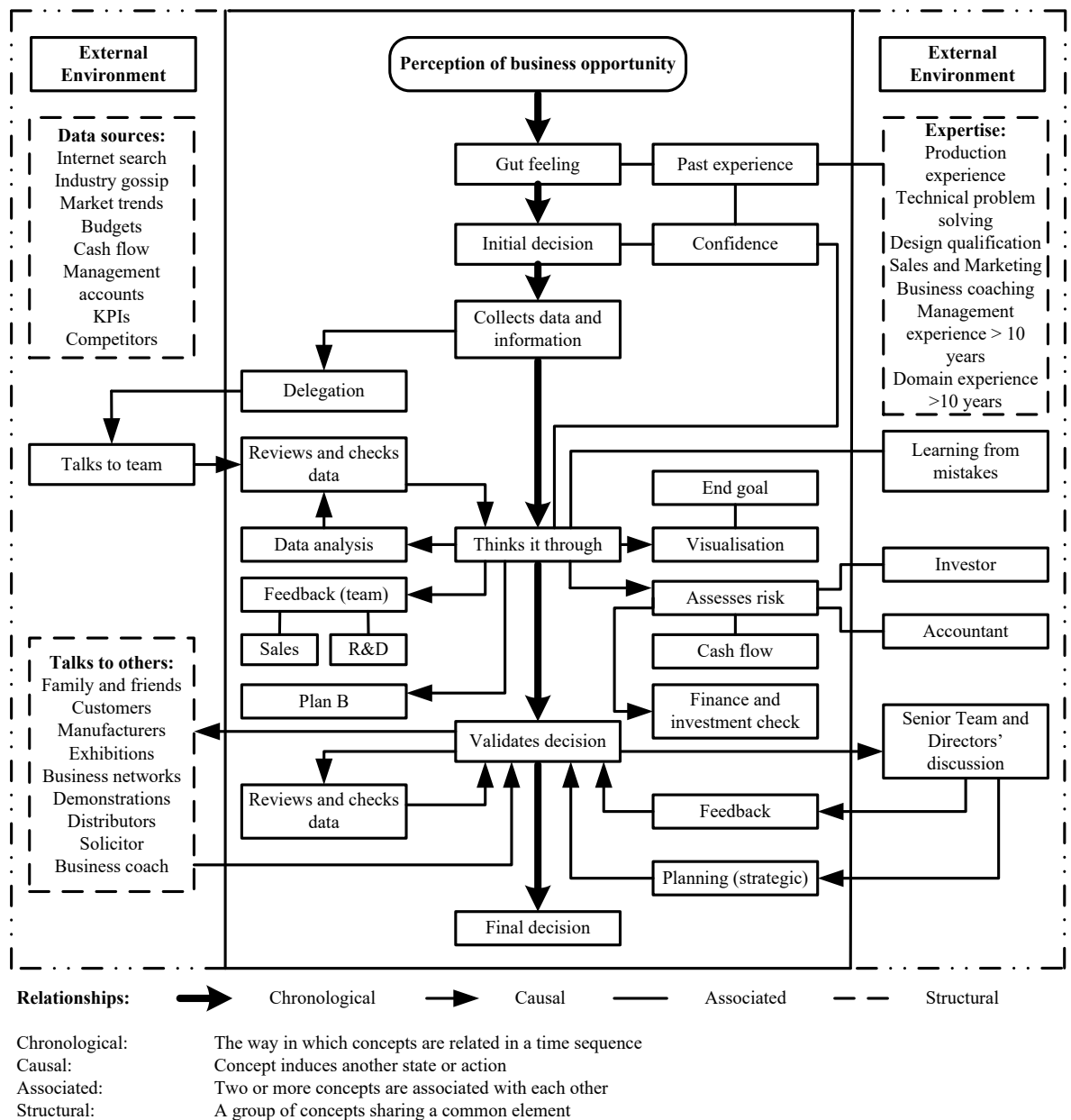


Figure 5. 11 Cognitive map of mature entrepreneur E02

The map relationship links were categorised according to Gómez et al. (2000). This provided insight into the chronological sequence of the evaluation process and any causal relationships. The common sequence noted in mature entrepreneurs typically started with a gut feeling that prompted an initial decision. This was followed by collecting data and information, thinking through the opportunity, validating the earlier, initial decision before ending with a final decision for action. These stages were identified as core concepts occurring as a mental process. The nature of this sequential thought process

triggered several causal thought pathways, for example, 'Data analysis' and 'Reviews and checks data' was a causal loop linked to 'Thinks it through'. Similarly, some concepts, such as 'Feedback (team)' were associated with other concepts such as 'Sales' and 'R&D' information. These links increased the complexity of the mental models.

The positioning of concepts in the mental model framework as the internal cognitive environment and external environment provided a more insightful, holistic picture of the process and relationships between concepts, the entrepreneur and other stakeholders. In contrast to opportunity evaluation as first-person assessment (Haynie et al., 2009), findings showed that some key evaluation stages took place in the external environment, moving from a first-person to third-person process, either as an information source or the use of a third person assessment of the opportunity. This was seen where some concepts, such as 'Data sources' and 'Talks to others' were situated outside the internal, cognitive environment. Entrepreneur E02's cognitive map demonstrated an iterative staged process between the cognitive mental processes and interaction with other in the external environment. For example, 'Validates decision' involved key discussions with other stakeholders that were external to his own mental model. Thus, opportunity-related knowledge obtained through experience was considered to lead to more positive evaluations and where expert knowledge moderated negative effects of uncertainty (Wood and McKelvie, 2015).

5.5.1.2 Cognitive map profile of intermediate entrepreneur E04

Intermediate entrepreneur E04 (see figure 5.12) started business with a partner after being made redundant from employment. He had prior knowledge and domain experience in technical operations and the benchmark assessment showed a preference for an intuitive style. The map was very similar to that of mature entrepreneurs, such as E02, where the process began with a gut feeling followed by an initial decision. This was not surprising, as both intermediate entrepreneurs in the sample had more than ten years domain experience thus exhibiting intuition-as-expertise (Sadler-Smith and Shefy, 2004; Sadler-Smith and Burke-Smalley, 2015). Data collection took place before the opportunity was evaluated and thought through and the basic analysis was part of this thinking process.

Validation of the initial decision was made using team and external networks as a checking process prior to final decision, important for verifying or justifying the initial gut feel. This final decision was also validated by talking to the senior team and directors for feedback. As stated below:

“I will probably need to go and look at something at the end, but I would have thought it through before I go and validate it.” (E04, T1)

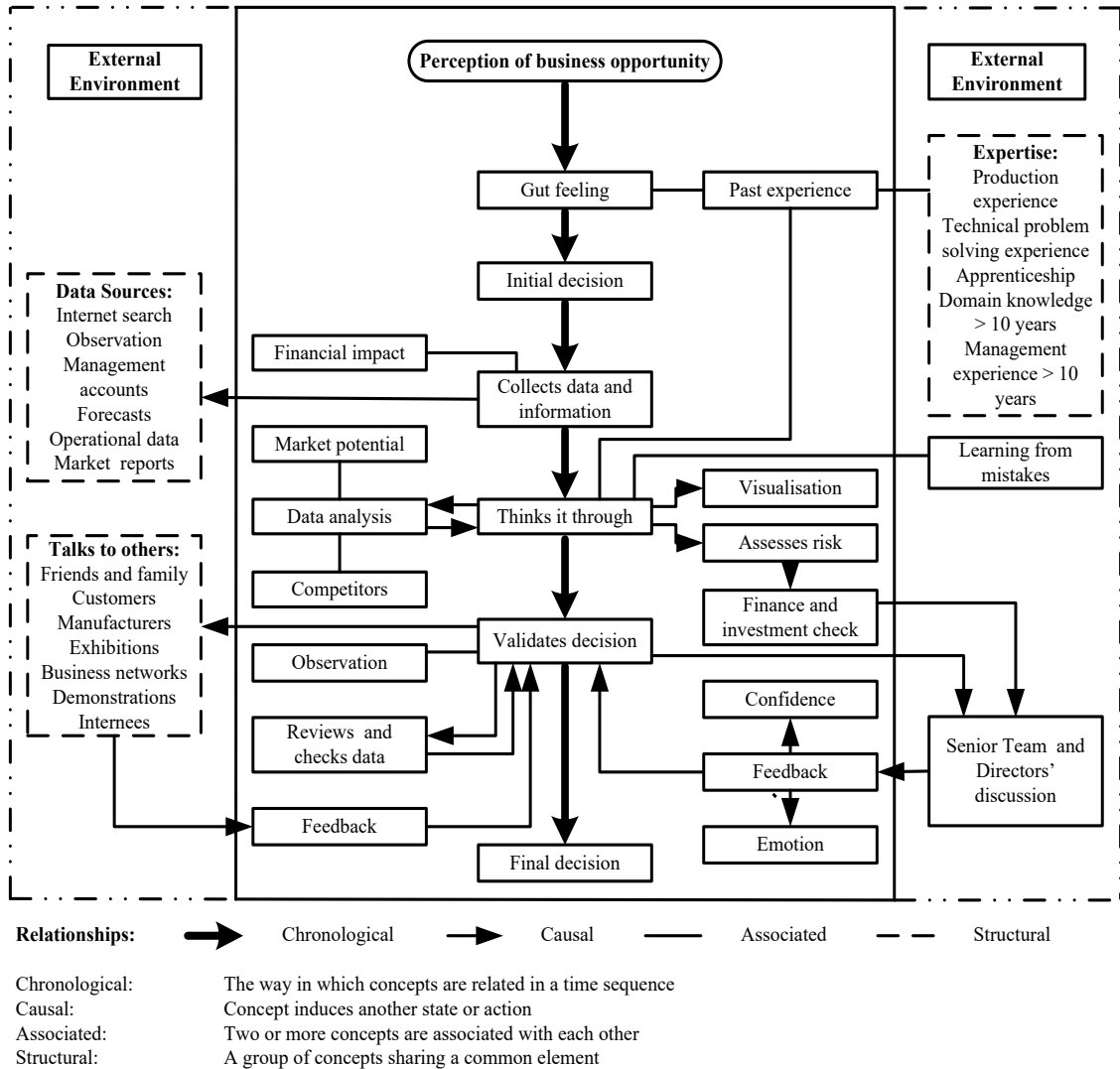


Figure 5. 12 Cognitive map of intermediate entrepreneur E04

Additionally, map concepts showed both modes of processing, for example, finance and investment checks as an analytical style and visualisation as an intuitive style. The use of past experience as an inferential library for information gathering was also evident, showing that when entrepreneurs had domain knowledge they were able to rely more on intuition (Dane et al., 2012). Both entrepreneurs E02 and E04 exhibited this relationship.

5.5.1.3 Cognitive map profile of novice entrepreneur E01

In contrast to the previous two examples, novice entrepreneur E01 showed a different arrangement of concepts with a benchmark analytical style preference (see figure 5.13). The evaluation process began with an assessment of risk. If high risk the process followed a detailed data collection and analysis stage before it was thought through. However, if the opportunity was considered low risk, such as opportunities for small, repeatable business orders, there was no data collection and analysis. External stakeholders were used during both these stages as information sources. After the ‘Thinks it through’ stage, an initial decision was validated with the co-director prior to final decision. The initial decision as a final stage was noted in other novice entrepreneurs’ maps. This infers that an analytical process was carried out to assess feasibility before a decision was made.

A unique observation was noted in year two of the study. The map analysis showed that a link developed between ‘Past experience’ and the centre core concept ‘Thinks it through’, represented as a dotted line in figure 5.13. This link created a new, direct pathway to ‘Past experience’ and ‘Expertise’ concepts, which extended and linked together other concepts that had not previously been related. This link was present in all mature and intermediate entrepreneurs’ cognitive maps in contrast to novice entrepreneur E01, where it was only evident in year two of the study. The qualitative data suggested that this was due to experience. The excerpt below supports this observation:

“It might take place in my mind a lot more rather than physically writing stuff down and researching and documenting things like that. I feel like it’s a little bit, the more and more we go along it’s more organic we just know, we just know. And it’s not because we’ve just got a gut feeling, I think it’s just because now we’ve got prior experience.” (E01, T3)

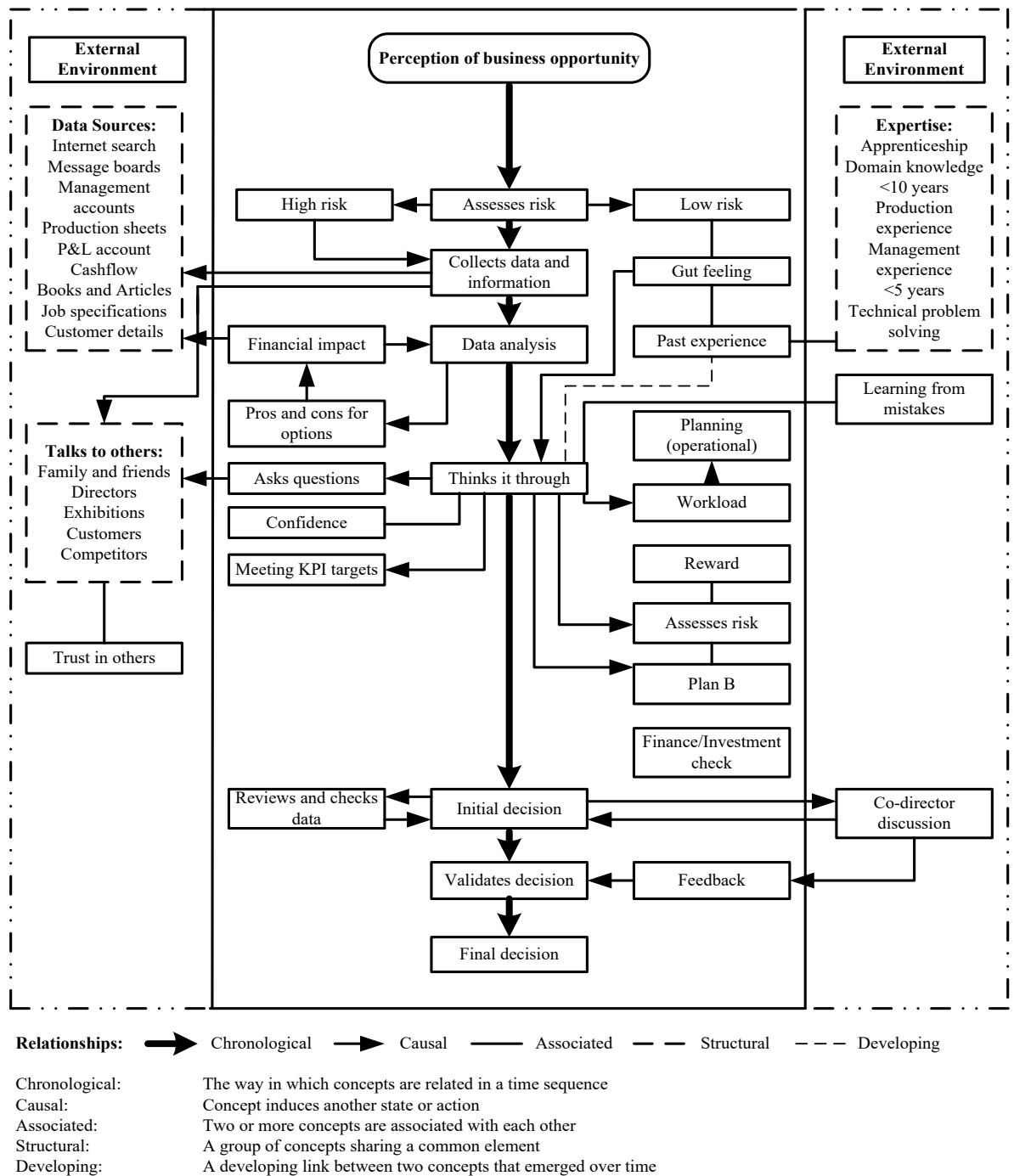


Figure 5. 13 Cognitive map of novice entrepreneur E01

As this development created a new pathway, it showed how inferential knowledge was accessed and structured in the cognitive map. This is a significant finding of the study as a critical component in the construction of mental images of what could be (McMullen, 2010). It also provides empirical evidence how deep cognitive structures evolve and how

knowledge is shaped and constructed for opportunity-related decisions. Furthermore, it shows the importance of the central core concept 'Thinks it through', present in all entrepreneurs' cognitive maps. Hence this finding shows the link to implicit knowledge in the thinking process and facilitates the operation of intuitive expertise. Absence of this link provides structural evidence why novices are considered more analytical than mature entrepreneurs.

5.5.2 Structure and position of concepts

Collectively, the cognitive maps identified micro differences between novice and mature mental models. These showed how cognitive changes at a deeper level can be used for developmental experiences (Krueger, 2007). Prior research by Agor (1986, pp12-14) identified three different approaches to decision-making: eclectics (cross checkers against intuition), synthesisers (structured information gathering and analysis) and explorers (intuition only). This study indicated some similarity with Agor's (1986) categories, but this study's findings provide a more fine-tuned explanation of the mental structural differences. In addition, based on the position of the initial decision, two other very different arrangements of this categorisation also emerged from the data. These are explained next as they show how the mental structure of the map is contingent with context.

5.5.2.1 Cognitive map profile of novice entrepreneur E08

Novice E08 began the process with a gut feeling similar to that seen by mature entrepreneurs, but without a link from 'Past experience' to 'Thinks it through' despite domain experience gained from previous employment in the sector (see figure 5.14). The baseline assessment showed a preference for an intuitive style.

By year two a pathway or link had developed between the concepts 'Thinks it through' and 'Past experience', similar to E01. The map above still showed a more typical novice focus on operational details and financial matters with completion of data analysis after reflection on the opportunity, but some visualisation associated with creativity and

experiential thinking was evident. Moreover, although this cognitive map showed application of both information processing modes, predominately an analytical process was used to check out the initial gut feel decision based on prior market experience.

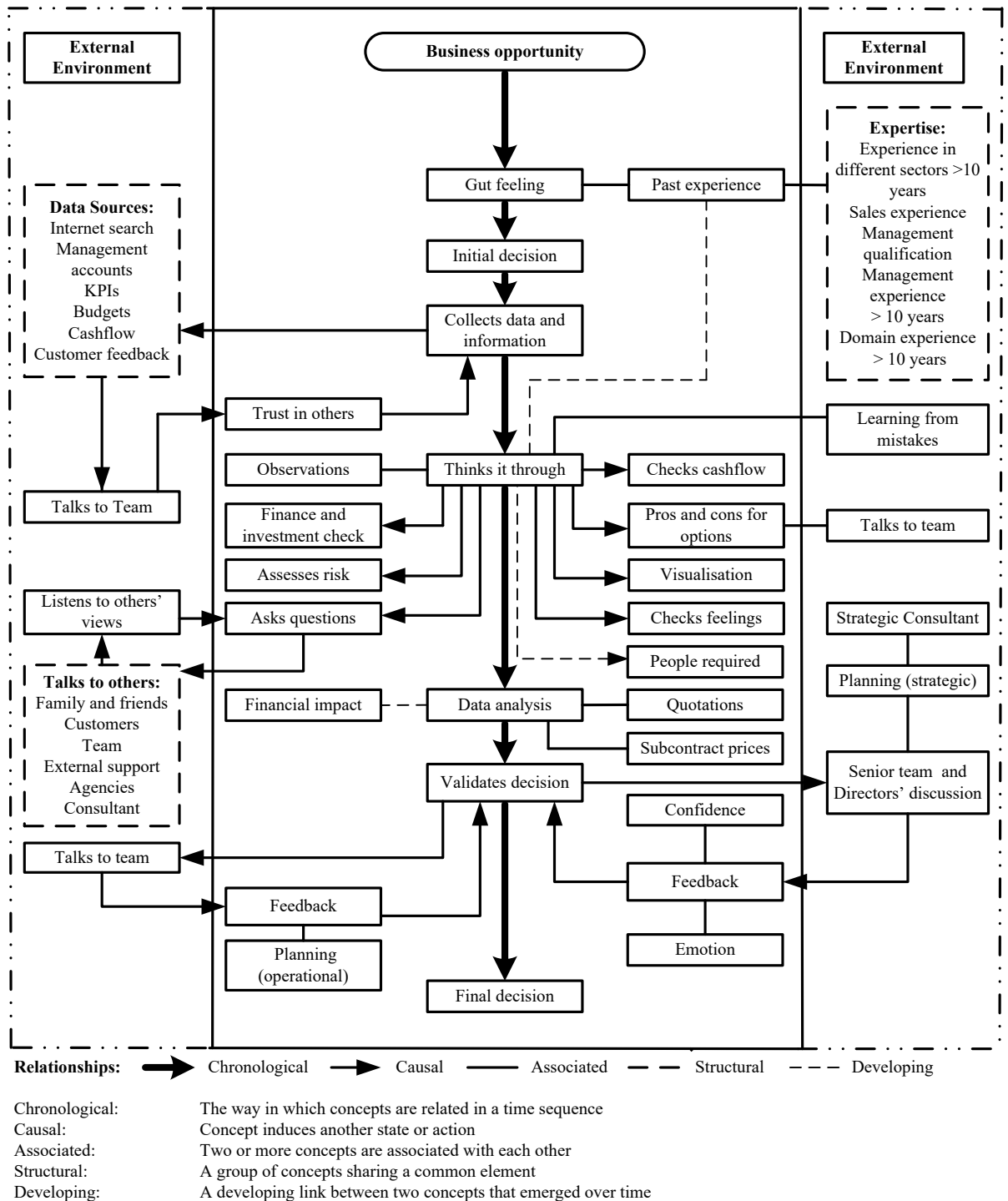


Figure 5. 14 Cognitive map of novice entrepreneur E08

Some explanation of this difference can be made using dual-process theory. According to Hodgkinson and Healey (2011), intuition can either inhibit or facilitate analysis. The researcher posits that the challenge and pressures of establishing the business on a new site, plus the added responsibility of higher overheads, increased employee turnover and new risks prompted a change of style preference from intuitive to planning style. This suppressed the use of previously acquired domain experience in accordance with dual process theory. As the excerpt illustrates:

“I don’t believe myself to be a particularly planning person until I need to be. I would have thought that most of the time I’m quite creative because I’m not really a rule follower, I’m a bit like making it up as I go along... it may be intuitive but it supported by facts and data, it’s very collaborative.” (E08, T1)

As such, this novice cognitive map was a mixture of both categories. It showed a staged evaluation process with some typically mature arrangements, such as ‘Validates decision’ and ‘Initial decision’ concept positions, but with data analysis as a separate stage for the first year, without the link between ‘Past experience’ and ‘Thinks it through’. Other developing links were also evident between ‘Data analysis’ linked to ‘Financial impact’ and ‘Thinks it through’ linked to ‘People required’ by year 2. Both these concepts represented new business content that had to be considered, which suggested that a more analytical approach was being taken. An excerpt from T3 interview provided some indication of the reason for this change:

“...there are lots of adverse stresses, lots of stresses, lots of external stresses on me at the moment, so I’m not really sure how I’m making my decisions... if you think about short or long-term goals, you need to think about how well it’s going and how your business is going to get there, and you can’t just do that by saying just, that’s what we are going to do. You’ve got to you know, spend more time looking at it and working out how you are going to get there. (E08, T3)

Findings indicated that limited experience in managing the business and operational manufacturing processes were impacting on the information processing style, as concepts and links were associated more with the analytical processes of business management, rather than prior experience, as discussed earlier in section 5.3.4. This example indicates how triangulation provides corroboration between quantitative and qualitative findings and exemplifies the benefits of using the strengths of both methodological approaches.

5.5.2.2 Cognitive map profile of mature entrepreneur E07

Another different arrangement was noted in mature entrepreneur's E07 cognitive map shown in figure 5.15. During the study, E07's focus was on the development of the Senior Management team in preparation for an exit strategy. The initial bench mark assessment showed that the preferred style was analytical. As majority shareholder, E07 evaluated opportunities and took these to the Board for a final decision. The process was similar to other mature entrepreneurs, as the evaluation process commenced with an initial gut feeling, followed by data collection, analysis and thinking through the opportunities. An initial decision was made at Board level, then validated afterwards using team feedback and checking data. This meant that the initial decision was not after a gut feeling as seen in mature maps, but after ratification with the Board. Notably, the decision process was strategic, aimed to develop the Board in decision-making techniques before E07's exit strategy in a few years' time.

The following excerpt notes the focus on the Board development:

“Sometimes I need keeping in check, especially as I'm looking at these people who are going to be running the business, I don't want people that are just yes people, people who erm, make a difference, ...yes, there's a team here that can actually take this forward... I suppose I'm dealing with different things...how to streamline, how to increase performance, how to keep the team motivated...”
(E07, T3)

The map showed that although there were similar concepts when compared to other mature entrepreneurs' maps, the central part of the process was quite a different arrangement of concepts, as a Board decision, rather than an initial decision after a gut feeling. Validation of the decision was based on thinking through team and directors' feedback, with some discussion with the team. The concept of 'Talks to others' was linked to 'Thinks it through'. This was quite different to other mature cognitive maps as there was no evidence of talking to others for validation at this stage. In this case the decision was validated by the senior management team and the Board. This may be a characteristic of team decision-making, but the findings here cannot be generalised, as there was only one profile that showed this arrangement of concepts in the sample.

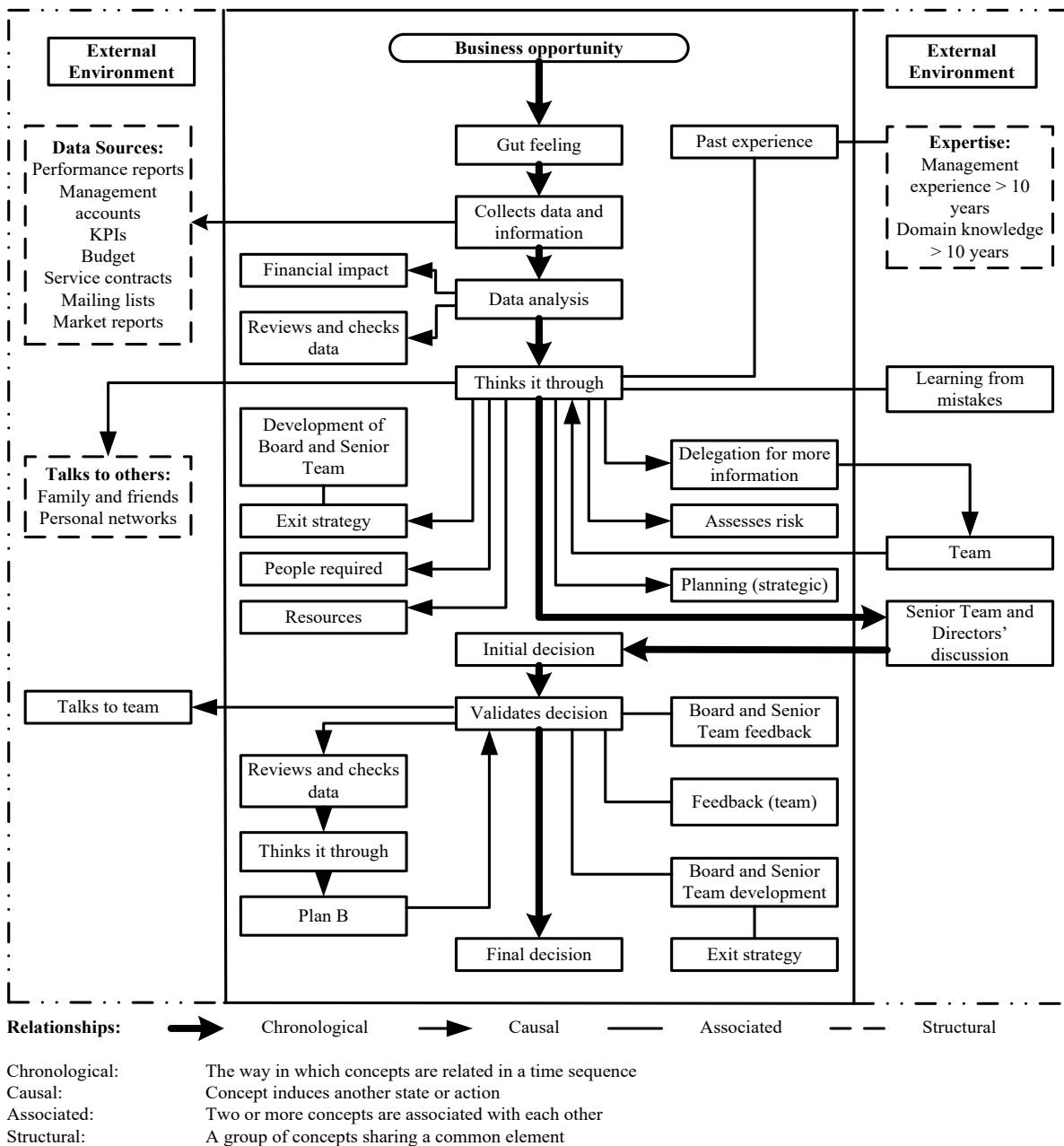


Figure 5. 15 Cognitive map of mature entrepreneur E07

Overall, findings from the cognitive maps and qualitative excerpts indicated that there were differences in the mental representations between novice, intermediate and mature entrepreneurs. Some cognitive maps exhibited unique features and these are explained next in more detail.

5.5.3 Similarities and differences between cognitive maps

The cognitive maps did not all exhibit the same opportunity-related decision-making process. Novice entrepreneurs indicated a preference for an analytical process and only based their decisions on gut feel or intuition if they had prior experience related to the opportunity. After this an assessment of risk and finance was taken and this resulted in data collection and analysis. If the assessment of risk was high or there was no past experience to draw on, the process was analytical with several checking processes.

In contrast to this, mature entrepreneurs quickly made an initial decision based on a gut feeling, then cross checked the decision, using internal, external business and personal networks. After thinking through this information, the initial decision was then validated by talking to others. This was an important stage in the process. For mature entrepreneurs, they talked to others and their networks for validation of their initial decision. Novices however used this as an information source, tapping into others' expertise to substitute their own lack of knowledge. Thus, this concept served different purposes depending on experience.

Similarly, risk and confidence were positioned at different stages in the map depending on experience, but were important concepts of the decision process for all entrepreneurs. For novices E01 and E03, risk was high priority and featured at the start of the process, as part of their analytical information processing. For intermediate and mature entrepreneurs, it was part of their thinking through process. For both E10 and E11 it was a feature of their data analysis. Finance risk also emerged as an important influencing factor where if the opportunity was financially risky, after some basic analysis the decision-process was stopped, irrespective of any prior experience. Data and information collection showed that all entrepreneurs used similar sources, which suggested that the types of information required for evaluation was available from the internet. All entrepreneurs referred to past experience in their long-term memory and the value of learning from mistakes as a means of helping them make decisions.

As the cognitive maps were derived from the interview data, the context and background of the entrepreneur provided contextual insights of these differences. For example, mature entrepreneur's (E10) cognitive map (see figure 5.16) was different to other mature entrepreneurs, despite that fact that he had many years' experience in the sector. The style baseline assessment showed a high analytical score (knowing and planning) which slowly decreased over the time period as he grew more confident in his decision-making, alongside an increase in his preferred intuitive style. Thus, despite experience as a previous partner and shareholder, when he established his own business with a new partner he showed similar map characteristics to novices.

The process began with a gut feeling similar to mature entrepreneurs, followed by an iterative process that involved data collection and reflection before making an initial decision. Yet the positioning of the initial decision after thinking through the opportunity was a characteristic of novice maps. Qualitative data showed that this was due to a bad experience with cash flow and debt as a previous business manager/shareholder, which resulted in loss of confidence. Entrepreneur E10 explained the impact this had on his approach:

“Yes, much more cautious now and more cautious on how much we do for somebody before we say that's it... What we didn't want to do is put our house up for it this time, at this time of our life.” (E10, T0)

As depicted in figure 5.16, entrepreneur E10 exhibited a dominant analytical style and was very risk averse. Unlike other novices, no developing links were noted. This may be due to the fact that he already had sufficient expertise both in domain and management fields, stored as implicit knowledge. This expertise enabled him to quickly use his knowledge to frame the opportunity, but he was unable to move beyond the risk and negative uncertainty of the potential outcome. This is another example where intuition has the potential to both inhibit and facilitate analysis (Hodgkinson and Healey, 2011).

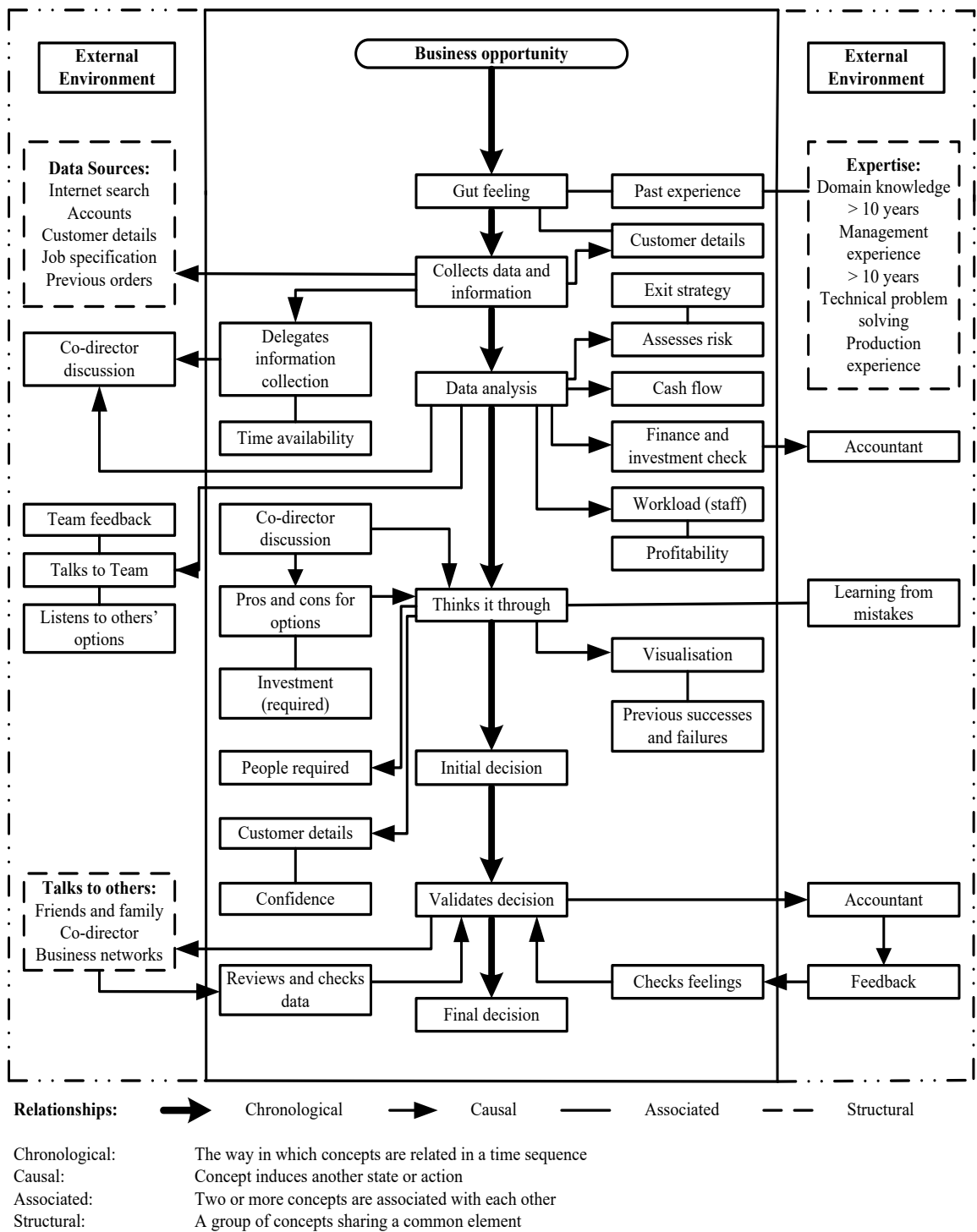


Figure 5. 16 Cognitive map of mature entrepreneur E10

5.5.4 Developing links in novice entrepreneurs' maps

As a result of taking a longitudinal approach, the acquisition of expertise or domain experience was seen as new links between concepts in the cognitive maps of novices. This unique finding showed how information was ordered and flowed and increased the complexity of the entrepreneurs' mental representations. This allowed them to meet the challenges of their environment. As explained by E03:

“You go on your gut feeling. I’m finding that last year I had to think it through, I had to be very step-by-step process, whereas now I think with age and experience I’ve started to think I’ve done that before, my gut feeling on that was right. I think I wouldn’t be surprised if you did this in 10 years’ time that I would have switched because I think I’d feel stronger in knowing that the rational thinking gave me the proper answer and then to go on my intuitive in years to come, based on the rational thinking I done previously.” (E03, T1)

The most frequent link that developed was observed between the concept ‘Thinks it through’ and ‘Past experience’, as mentioned in previous novice map examples. This link was directly correlated with an increase in the intuitive score, for example, novice entrepreneur E03 showed an increased score in the CoSI creative style and REI experiential style as her experience increased. Significantly, these findings indicated how domain experience was made up previous experiences and schemas stored in the long-term memory of System 1 over time, known as intuitive expertise (Sadler-Smith and Burke-Smalley, 2015). By year two of the study these developing links between concepts created pathways between concepts that had not been observed in the previous year. Not only did these newly observed links increase the complexity of the mental structure, discussed in the next section, but they also created access to the past experience concept via ‘Thinks it through’ process, highlighting experiential and reflective thought as a key stage. Hence, opportunity-related decisions are not just a choice of options and the result of a rational process (Barbosa, 2014), but an ordering and framing of both analytical and intuitive information processing.

These developing links were also noted in E11’s cognitive map, shown in appendix 24. Having only three years of business ownership experience, E11’s map comprised mostly of analytical concepts, with an initial decision made in conjunction with the co-director.

The thinking through stage was at the end of the process and without any link to past experience. The developing link between this stage and past experience, as seen in the other novice maps was not evident during year two of the study. The initial response to the opportunity was based on a gut feel and when asked about this E11 replied,

“I think the intuitive thinking comes out first really... and then you check it out... it’s definitely you feel it, then you check it” (E11, T3)

This intuitive preference for E11 is also seen as a high experiential style, shown in figure 5.17 below. According to dual process theory, this infers that E11’s previous business experience elicited an intuitive reaction, but overriding this response was the lack of domain expertise resulting in an analytical process for opportunity-related decisions. This can be explained by CEST theory which indicates how behaviours are influenced by a combination of both systems (Epstein, 1985, 1994, 2008, 2010; Epstein et al., 1996; Pacini and Epstein, 1999) and supported by the parallel-competitive interpretation of the dual process theory (Hodgkinson and Sadler-Smith, 2018).

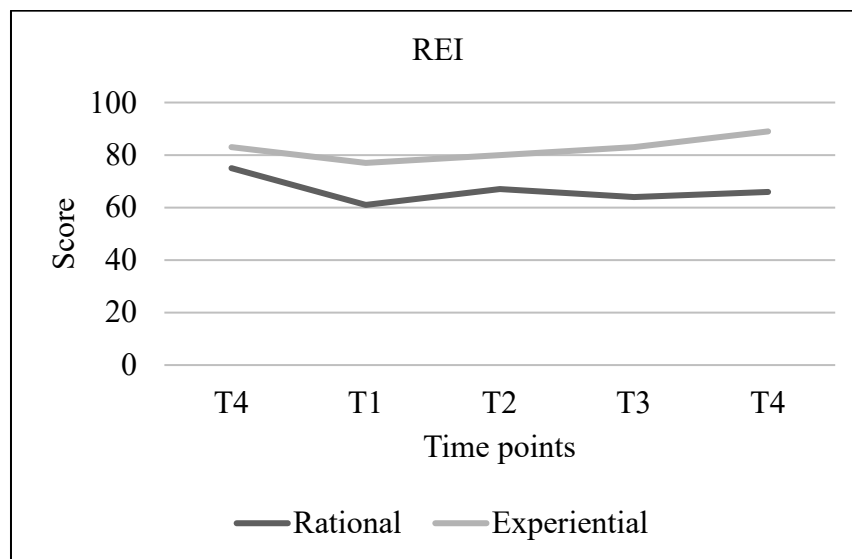


Figure 5. 17 Intuitive preference of novice entrepreneur E011

5.5.5 Past experience as a key concept

Analysis showed that past experience was a key concept used in the thinking through process, but in different ways depending on experience. Prior research has highlighted the role of experience and the importance of expert schemas for developing business opportunities (Grégoire et al., 2011). Mature and intermediate entrepreneurs would use this experience to match it quickly against previous experiences prior to their initial decision. Hence the initial gut feeling acted as the somatic marker of this intuitively recognised opportunity (Gore and Sadler-Smith, 2011). Findings supported this, showing that mature entrepreneurs were accessing knowledge structures held in their long-term memory, acquired and stored from previous experience. As stated by E04:

“I can analyse things quite well and I have a very high level of intuitive thinking ...you know that just comes from you know a lot of years [of experience] ... even now I hold in my head all of those experiences of all the different places that I’ve worked in and they’re very clear in my mind.” (E04, T2)

In contrast, novices followed a more analytical process and only based decisions on their gut if they had previous experience. Novice entrepreneurs went through a more laborious process of collecting information, weighing up the pros and cons and assessing the risk before reaching an initial decision. They spent time collecting data and information from a variety of sources, including their social networks. Their evaluation process was more deliberate compared to mature entrepreneurs where even a little experience was perceived as a benefit for decision-making.

“I know more now, I have more experience behind me now. I know how things are going to play out generally I can read situations a bit better because I have the benefit of experience.” (E01, T2)

Another key finding showed that novices used other people for information, perceived as a trusted source for expert advice. Where lacking, this was replaced by advice from other more experienced individuals. As one novice explained:

“Yes, my prior experience was from other people not from myself... if I can’t [make a decision] that’s where I go and do my research or talk to somebody who

has gone through it... because [now]I can sort of tap into that and think what did is do in this kind of situation and how did it pan out?” (E01, T2)

In contrast to this, mature and intermediate entrepreneurs cited different reasons compared to novices. These three excerpts explained how they used past experience.

“I mean it’s, it’s not always right, you know it gives you a background in which to be more analytical...you can cut to the chase because you have more experience...You’re pulling all those bits of history together into a decision...” (E06, T2)

“I think the past gives me a benchmark... if it’s something we’ve been familiar with as a business then I will always look at the past because it gives you a really good benchmark; How successful was this? Did we make money? Was this within our remit? All that sort of thing. If it’s something that we haven’t done before, I look at the past in some sense and think what that bit touched on and that bit touched on this, so we’ve got some sort of idea of where we can go.” (E09, T0)

“...experience backs up the data” (E04, T2)

Taken together, the study’s findings highlight the relationship between experience and intuitive processing and the important role that intuitive expertise plays for all entrepreneurs in their evaluation. Hence, in-depth knowledge or amassed intuitive expertise (Sadler-Smith and Burke Smalley, 2015) is an essential ingredient needed for effective opportunity-related decision-making.

5.5.6 Past experience and confidence

Another key finding noted was that successful previous experience inspired confidence in the decisional outcome. This excerpt illustrates the associative relationship between confidence and experience:

“... I’m always checking it in my head, I’m always doing that ... I think it’s a mixture [now], because if I’ve got something that I’ve done and I haven’t got any reference to it, I’ve got no experience, I will check first... Making a decision and actually having the confidence in what I know from experience to, to then feel, yeh, I’m going with that.” (E03, T1)

Mature entrepreneurs also commented on the importance of a confidence and its link to gut feelings, as noted in the excerpt below:

“Where you’re confident, you have experience, that’s where it’s very easy to have a gut feel and to say this is what we do here. You just go on experience. I think that’s a confidence thing.” (E02, T1)

“If it fits I can draw on and go on past experience, then I do that, the other way I know if there’s no other thing I’ve just got to go on how I feel. Do I feel confident, is it going to work? Then I go on the gut feeling, yes then I can do it.” (E10, T2)

These findings showed that confidence played an important part in the opportunity-related decision process. Confidence and emotion have been shown to contribute to firm founding and entrepreneurial resilience (Hayward et al., 2009), but findings in this study also indicated that confidence was a crucial element of the development of intuitive thought. Lack of confidence stalled the decision process and prompted an emphasis on analysis, which was detrimental to the evaluation process. As observed by one novice entrepreneur:

“I think it’s having the confidence in your decisions as well you know. If you’re making decisions and you’re constantly making intuitive decisions and they’re always going wrong I think it would scare you, and you would retract and you would go back to your [preferred style] but when you’re making lots of decisions and things do go wrong, you are in the real world, but they’re not major they’re just small, it’s not as bad I think, it gives you confidence. Isn’t it liked learning to walk? You’re always going to have a little tumble, but you get back up and you carry on. I think that it’s just a learning curve.” (E03, T3)

Confident and experienced entrepreneurs used analytical processing for checking purposes. Entrepreneur E05 referred to the relationship between past experience and confidence, but also the need to have figures. As noted:

“I think that confidence comes from past experience and having done something similar and then applying it... Confidence [also] comes from the knowing the full figures and knowing that even if we did what we did last year, all the bills will be paid, and all the staff will be paid, so that’s where my confidence comes from, it comes from the figures for me.” (E05, T3)

Confidence was also described as a comfort blanket. Novice entrepreneur E03 commented that the interview process provided her with confidence for decision-making.

This illustrates the added value of coaching and mentoring small business entrepreneurs by providing feedback and a time to talk and reflect. Thus, improved confidence through social interaction and networking with others would help to develop reflective thought and domain knowledge by gaining insight of others' experiences.

"Now I have an awareness and whilst I don't consciously think I'm stuck here, what are we going to do, right let's think back to what I've done in the past, I don't consciously do that. You've made me aware that I am doing that and that gives me confidence." (E03, T3)

"I think obviously with the benefit of experience in the business I'm more open to take risky decisions now than I have ever been, because I know, I know my thought processes, I know against gut feel and, I know when it feels right. Nine times out of 10 it is right and I can't always define in detail or explain why that is, but I'm happy to go with it." (E02, T1)

5.5.7 Past experience and learning

A significant finding was the importance of past experience in the evaluation process as a "combination of conceptual and experience-based development" needed for intuitive expertise (Sadler-Smith and Burke Smalley, 2015, p15). As noted by E09:

"...but I also think why did I arrive at that, is it because I've done that before, is it because of my experience in this and if so, am I really basing this on something tangible? Am I just sticking with the old way or have I actually learned something from my experience? So, there is a [learning] process that goes on." (E09, T2)

Mature entrepreneurs, for example, E02 referred to learning from past mistakes, as indicated by the following excerpt. In contrast to this, entrepreneur E09 also warned about the perils of being over confident.

"I didn't spot the situation until too late, but you learn that lesson and so I've got things in place now where we monitor much more closely that sale situation..." (E02, T3)

"...where you build up experience and you can almost, almost be over confident, no, cocky... there's danger with that I think, I've done that before...so I think you can easily slip into that, yeah, it's no problem. So, I think what you need to do is probably take a step back and sometimes[for] those decisions, take a little bit longer." (E09, T3)

For novices E01, E03 and E08 there was an increase in their complexity scores over the two years, discussed in section 5.7.2.3. These structural micro differences showed the impact these developing pathways had on the complexity of the mental structures. The temporal nature of the study indicated how novices developed new schemata and links as a result of their experiences, as a naturally occurring process of learning over time, but with the potential to be accelerated if the right kind of experiences are provided.

5.5.8 Developing links for team discussion and feedback

Another finding observed in the novice maps was the importance of team discussion and team feedback, which was also evidenced as a developing link in year two. These links were used for different purposes, for example, as a support for data analysis (E03), or for planning and feedback (E11). For both E08 and E03, teams were used help gather information for data analysis, pros and cons for options, as well as thinking through and to validate the decision. This wide range of consultation infers that teams acted in a supportive capacity. Novice E03 commented on the importance of building a strong team around her:

“...now I’m using people and I’m quickly interrogating people, getting that data a lot quicker then to make that decision.... I’m making sure that teams around me are very strong...” (E03, T2)

These findings showed that entrepreneurs used factors outside their own internal cognitive environment to assist their thought process. A variety of data sources, such as accounts, job sheets, customer details and the internet were typical examples of information sources, commonly used by all entrepreneurs. Additionally, talking to other people for information gathering or experience to support data analysis and to confirm that they were on the right track was also evident. Furthermore, mature entrepreneurs also used teams and networks, but only to validate their initial decision after they had thought through their opportunity, as though they needed to prove to themselves that they were right. This use of social networks, seen as ‘Talks to others’ and ‘Team/director discussion’ supplemented knowledge gaps and provided confidence in the final decision. One of the benefits of using cognitive maps was that they clearly indicated when the entrepreneur moved outside of their own thought process to seek the opinion of others.

This showed that the evaluation process was not just solely an individual effort but involved collaboration with others in the decision process.

5.6 Cognitive map findings

The cognitive map findings showed an iterative thinking flow between the information processing modes of the entrepreneur and the external environment. Differences between the thought flow of novice and mature entrepreneurs was noted. Findings also showed that novice entrepreneurs were less versatile in their decision-making process, but as they developed experience they adapted and changed their style according to the needs of the decision context. If they had previous experience their information processing was more intuitive. If the decision was considered to be important or there was no prior knowledge, the decision process followed an analytical process. The complexity of this process before final decision varied according to experience.

Overall the findings showed that there was a greater emphasis on analysis, rather than intuition by all participants. This inferred that the way entrepreneurs framed their opportunity-related decisions for the evaluation stage demonstrated a shift in thinking from a more intuitive thought process to an analytical one. Wood and Williams (2014) found that entrepreneurs tended to use rule-based decision-making when making opportunity evaluation decisions, similar to this study's findings. Moreover, both analytical and intuitive information processing concepts were represented in the mental models of entrepreneurs, where the 'Thinks it through' concept was linked to both analytical and intuitive concepts. This indicated that both modes of processing were used for opportunity-related decisions.

Additionally, in order to probe and understand relationships between the concepts used in the process and to determine how the complexity of the environment matched the complexity of the entrepreneurs' cognitive representations, cognitive complexity and centrality calculations were calculated from the qualitative data. These findings are discussed in the next section.

5.7 Cognitive complexity, centrality and opportunity-related decisions

Calori et al. (1994) argued that the relationship between cognitive complexity of an individual and a firm's performance is moderated by the complexity of the environment. This has important consequences for small business entrepreneurs who frequently operate in a challenging and competitive environment. Thus, using cognitive mapping techniques illustrated the way the entrepreneurs thought and processed information (Gómez et al., 2000). This showed how cognitive complexity had a mediating role in the relationship between information processing and the decisional outcome (Curşeu, 2008). These relationships are shown below in table 5.4.

Relationship	Explanation	Concept example
Association relation	Two or more concepts are associated with each other e.g. A is related or associated with B, A is connected with B	Competitor analysis and market potential is associated with data analysis
Causal relation	Concept induces another state or action. e.g. A is cause of B, A needs B	Thinking through an opportunity and evaluating it caused an assessment of risk
Chronological relation	The way in which concepts are related in a time sequence. e.g. A occurs before B	Perception of a business opportunity prompted a gut feeling first, followed by an initial decision
Structural relation	A group of concepts sharing a common element e.g. A and B are part of C	Previous experiences, such as domain knowledge, apprenticeship, production experience contribute to the development of expertise.
<i>Developing</i>	A developing link between two concepts that emerged over time e.g. A is now connected to B	Identification of an emerging connection between thinking it through and past experience

Table 5. 4 Examples of Gómez et al. (2000) topology of map relationships (adapted from Curşeu, 2008, pp78-79 and Gómez et al., 2000)

Firstly, indicators for cognitive complexity were calculated. Three basic scores were used: map connectivity, map diversity and map comprehensiveness. These are defined

as follows: 1) Cognitive map connectivity (CMC) as the most frequently cited indicator for comparing cognitive maps (Curşeu, 2008) referring to the total number of connections established between concepts, 2) Cognitive map diversity (CMD) as the number of distinct types of relations established between concepts on the map and 3) Cognitive map comprehensiveness (NoC) as the number of concepts used to define a particular conceptual domain. Next, several types of connections or links were identified and categorised according to Gómez et al.'s (2000) typology. A '*developing*' link was introduced by the researcher to capture an emerging link from the qualitative analysis, discussed earlier in section 5.5.4.

5.7.1 Relationship diversity and concepts

Findings showed four common and distinctive relationships in the cognitive maps: chronological, causal, associative and structured. As the process drew on specific domain knowledge and involved similar information processes and concepts, this was expected. There emerged a clear chronological sequence to the decision process, centred around the core concept of 'Thinks it through'. Causal links assisted the thought process and developed complex pathways and feedback loops. These added complexity to the structure and diversity of the thought process. Associated links were additional concepts that provided extra information in the pathway of thought or acted as a quick check of information. Structured relationships were groups of concepts clustered in the external environment, for example, talking to people or reading sources of information. Expertise was accessed through past experience. This classification indicated conceptual associations between concepts for opportunity-related decisions for evaluation.

5.7.2 Cognitive complexity and density

Each cognitive map was analysed and the number of concepts and links counted manually, as the researcher wished to stay close to the text to capture any emerging links. Linking terminology was explored in each of the entrepreneur's profile and cross referenced to the original transcripts. Verbs and expressions, such as because, following, next, increases, so that, as well as, as though, in order to, were identified. In many cases

there were inconsistencies and no direct links, so the recognition of a possible influence by one concept on another was considered suitable (Cossette, 2002). Examples of these linking words can be seen in appendix 25, guided by examples from Cossette (2002). Cognitive density and cognitive complexity were calculated manually by counting all links and concepts in each cognitive map, shown in appendix 26. Using the formulae number of concepts on map as C, number of links as L and density as $L/C (C-1)$, map density was calculated as well as map connectivity (CMC) and cognitive complexity (ACMCo). These formulae and calculations are shown in table 5.5. Figures shown in brackets refer to the second year of the study.

5.7.2.1 Cognitive density

The density of the maps did not show significant differences between entrepreneurs, apart from entrepreneur E11. The highest score was 0.30, the lowest was 0.021. This small variance suggested that concepts used in the evaluation process represented common knowledge for the decisional situation, irrespective of the number of years in business. According to Cossette (2002), the density of the figure was quite low (0.02), which suggested that the entrepreneurs thinking in this decisional situation was not particularly complex. Entrepreneur E11's higher score was probably due to lack of experience, as her domain experience came from a different industry, suggesting insufficient domain specific knowledge was available in the long-term memory to be drawn on.

5.7.2.2 Cognitive map connectivity and its relationship with style

Comparing the CMC of novices and mature entrepreneurs showed that the novice connections, that is, the numbers of connections between concepts was higher than mature entrepreneurs. Case study references are arranged in their groups (E01, E03, E08, E11 as novice, E04, E06 as intermediate and E02, E05, E07, E09, E10 as mature). This was still evident at the final time point T4 (see figure 5.18) which suggests novices were evaluating analytically as well as developing an intuitive style, thus making conscious and some unconscious implicit connections between data and information. Furthermore, as figure 5.18 indicates, when the rational style is added to the graph, it broadly follows a similar

profile shown by the creative/experiential style. Anomalies may be explained by the adaptation of preference to context at the at data point in line with cognitive versatility. More importantly, these findings suggest that the rational style is operating alongside the intuitive styles, as posited by Lee-Ross (2014) and that explicit data processing, as an analytical information processing style makes a significant contribution towards connectivity as well.

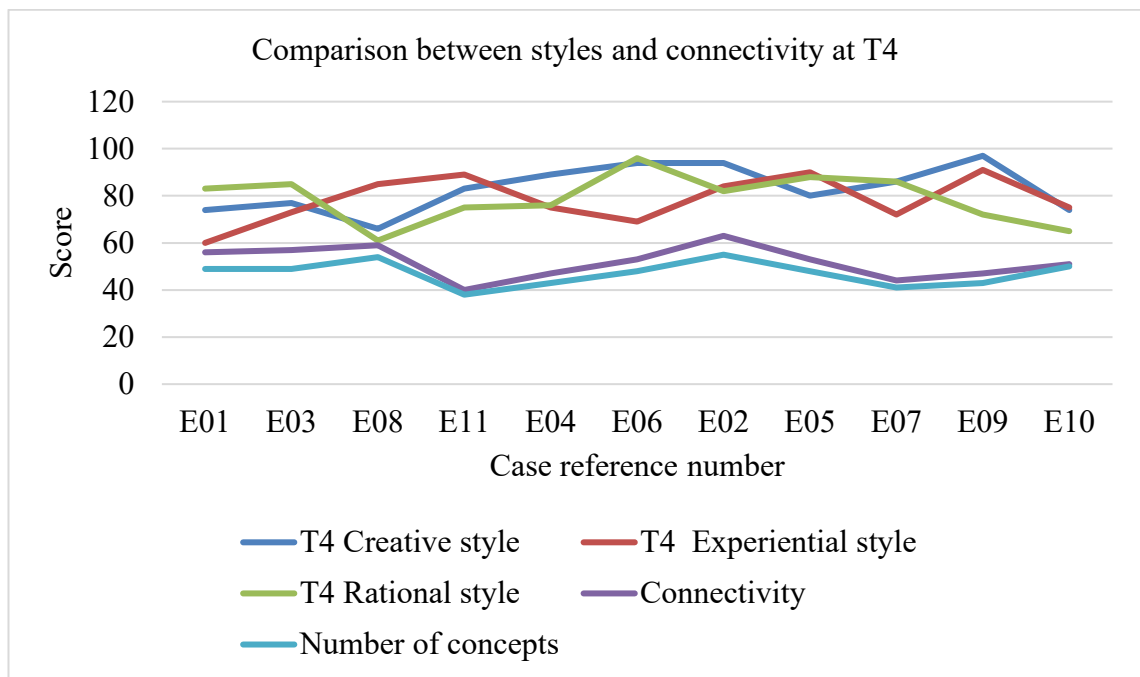


Figure 5. 18 Comparison between styles and connectivity at T4

Intermediate and mature entrepreneurs E04 and E09 exhibited mental short cuts (Bryant, 2007) which was determined by the qualitative analysis. Their complexity calculations showed lower scores which suggests less connections in their thought process and a lower connectivity score. Similarly, entrepreneur E07's lower connectivity may be explained by the introduction of her senior management team. Thus, she was not significantly involved in the strategic decision-making process, apart from the final decision (see her cognitive map on page 202). Mature entrepreneur E02, with 30 years of experience had the highest CMC score and a high intuitive style score. Figure 5.19 shows his high creative and experiential style at T0 and T4 and the resulting high connectivity, which suggests a relationship between these two constructs. Additionally, E02 demonstrated a

versatile style and was an innovative and creative individual with considerable domain knowledge and experience. Moreover, he was establishing a new global distributorship in New York and releasing a new product, hence processing considerable data and information for these initiatives. The introduction of this new innovative product design doubled sales turnover by the end of the study. Findings therefore suggest that high cognitive complexity mediates the relationship between style and performance, resulting in a high level of differentiation and integration and a mental model rich in concepts and connections. Connectivity scores for E05, E06 and E10 showed the next highest score and all exhibited high creating style scores and at times, a high knowing score. However, only E05 and E09 showed improved results in their business performance by the end of the study. Figure 5.19 demonstrates the relationship observed between the creative and experiential style at T0 and T4 and connectivity. Novices (E01, E03, E08 and E11) showed a closer scoring relationship between connectivity and style, but intermediate and mature entrepreneurs demonstrated a higher creative style overall. These findings indicate a complex relationship between style and the decision environment, which is influenced by expertise, experience and the entrepreneur's ability to be cognitively versatile.

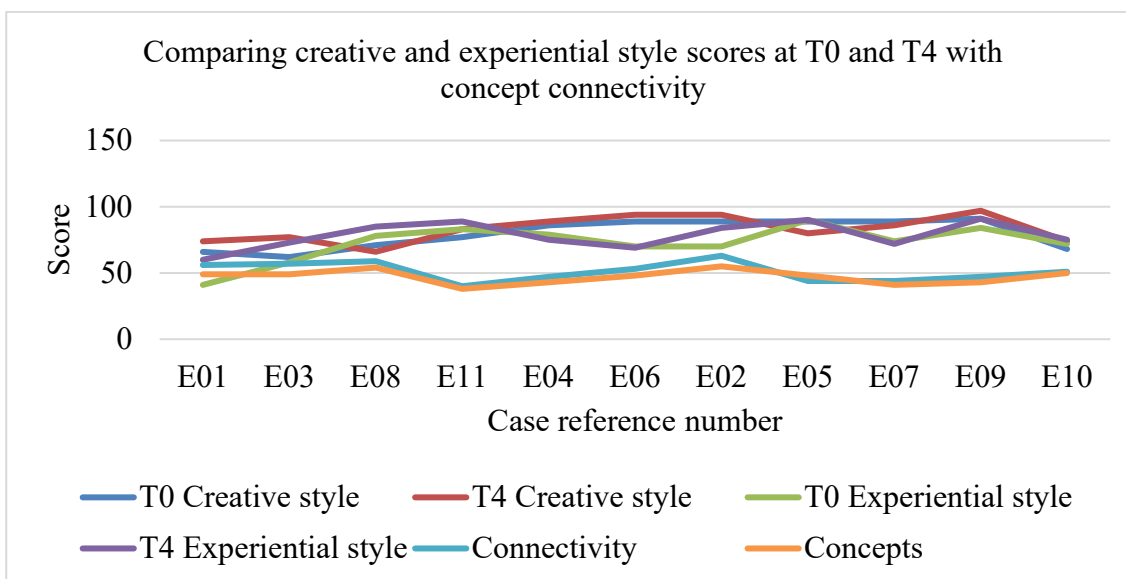


Figure 5. 19 Comparing creative and experiential style scores at T0 and T4 with concept connectivity

5.7.2.3 Cognitive complexity

The complexity scores shown table 5.5 gave a detailed picture. All novices showed an increase in year two for absolute complexity (ACMCo) and had high scores. A high value for ACMCo indicated that the entrepreneur used many concepts, richly interconnected in different ways, whilst making decisions and evaluating the opportunity. The high scores of mature entrepreneurs in challenging situations (E02 and E05) showed that they were using many concepts, both intuitively (as shown by high intuitive style scores) and analytically, searching for new information. Thus, they were making new connections between these and existing concepts. According to Calori et al. (1994), cognitive complexity matches the level of complexity in the environment and these findings support this. Additionally, novice entrepreneurs also had high scores because they were processing new information to plug the gaps, a System 2 and cognitively heavy process. Those entrepreneurs with lower scores, for example, E04, were engaging in heuristics which simplified the complexity of their mental model, resulting in lower scores. As the number of connections and concepts are used to calculate complexity, this suggests that cognitive complexity mediates the relationship between experience and information processing styles, including a versatile style.

A high result for RCMCo indicated a richly interconnected and diverse map in relation to the number of concepts. Figures in brackets for year 2 showed that novices were increasing the complexity of their mental models over time. Hence as they developed domain knowledge and experience, they showed an increase in both the number of concepts and connections. This indicated that their mental structure was developing complexity as a result of new concepts (schemata) and new links. The researcher posits that this was experiential learning or the development of intuition-as-expertise.

As explained in section 5.7.2.2, the decision context provided an explanation of the cognitive differences. Entrepreneur E02, E05 and E10 were making key decisions based on their opportunity that changed the nature and direction of the business. These entrepreneurs demonstrated a high preference for intuitive processing and were flexible in their thinking. Similarly, E08 experienced a similar decisional situation and also

Table 5. 5 Cognitive mapping analysis: cognitive density and complexity calculations for all participants

Formulae definitions	E01 Novice	E02 Mature	E03 Novice	E04 I/mediate	E05 Mature	E06 I/mediate	E07 Mature	E08 Novice	E09 Mature	E10 Mature	E11 Novice
Number of concepts on map (C)	49 (49)	55	48 (49)	43	48	48	41	52 (54)	43	50	35 (38)
Number of links (L)	55 (56)	63	54 (57)	47	53	53	44	56 (59)	47	52	36 (40)
Density L/C (C-1)	0.023 (0.024)	0.021	0.024 (0.024)	0.026	0.023	0.023	0.026	0.021 (0.021)	0.026	0.021	0.030 (0.028)
Cognitive map connectivity CMC Total number of connections between concepts	55 (56)	63	54 (57)	47	53	53	44	56 (59)	47	51	36 (40)
Diversity CMD Number of types of relationships	4	4	4	4	4	4	4	4	4	4	4
Comprehensiveness NoC Number of non-repetitive concepts	49 (49)	53	46 (46)	42	44	48	38	49 (51)	41	49	35 (37)
Absolute complexity ACMCo CMC x CMD x NoC	10780 (10976)	13356	9936 (10488)	7896	9328	10176	6864	10976 (12036)	7708	9996	5040 (5920)
Relative complexity RCMCo CMC x CMD /NoC	4.490 (4.571)	4.755	4.696 (4.957)	4.476	4.818	4.416	4.513	4.571 (4.627)	4.585	4.163	4.114 (4.324)

demonstrated a preference for intuitive processing. Additionally, the complexity of the Additionally, the complexity of the novice scores that increased in year two suggested that as their experience developed their cognitive representations became more complex. Lower scores for E04, E06 and E09 indicated a stable, business environment; in other words, business as usual. These findings infer a relationship between context and cognitive complexity that is contingent with an intuitive style preference.

The findings for E09 were not expected as this entrepreneur had consistently demonstrated a very high intuitive style preference for developing a key strategic opportunity. System 1 functioning leads to simplified representations (Curşeu, 2008) evidenced as fewer complex representations of the decisional situation. The qualitative findings also suggested that E09 was taking mental short cuts which would simplify the mental model structure. Entrepreneur E11 also had a low complexity score than other novices, but there was minimal involvement with the decisional environment as the business partner made all strategic decisions. Relatively inexperienced in the domain, E11 would be using simplifying mechanisms to reduce complexity of the environment. Overall, both these finding show that context and domain experience, as well as individual differences influenced the complexity of the representations, that is, complexity was context dependent.

5.7.3 Centrality findings

Centrality scores were also calculated to provide a multi-level analysis of the essential concepts used for opportunity-related decisions. The significance of each concept was calculated according to Eden et al.'s (1992) format and as explained by Cossette (2002, p173). Four levels of centrality were calculated manually on each map as follows:

1. All concepts directly related to it (first level) were scored 1
2. Second level concepts (linked to the first ones) were scored 0.5
3. Third level concepts were scored 0.33
4. Fourth level concepts were scored of 0.25

The most important concepts by links and centrality score were examined and concepts identified by centrality score calculations that were common to all decision maps. An example of a manual map with calculations for centrality is shown in appendix 26 to illustrate how these scores were calculated. Those concepts with a score of >10 are shown in table 5.6. The most important findings in this table was the ‘Thinks it through’ concept showing consistently a high score across the sample, apart from E11.

A concept is considered to be particularly significant when it has many links. Concepts were treated as an idea and an influential link as “a path linking one concept to another through one or more other concepts, or even loops in which a concept has an indirect influence on itself” (Cossette, 2002, p169). Maps were analysed to determine any changes over the time period and how the connections varied between entrepreneurs. The centrality score showed the significance of each concept “in which both the total number of concepts acting directly or indirectly as influencing factors and the length of all paths linking the concept are considered” (Cossette, 2002, p173). Thus, the cognitive map structure represented the thinking of each entrepreneur as a semantic network and as understood and represented by the researcher.

5.7.3.1 Centrality and the ‘Hub’

As a result of the centrality calculations, a unique and significant finding established the most important concept in the decision process. It revealed a central concept of the process, called the Hub, as a first person, reflective thinking process, involving analytical and intuitive information processing. This Hub or ‘Thinks it through’ concept consistently had the highest scores as a first order concept with the greatest number of direct links from it to other concepts and illustrated the core of the thinking process, as shown in table 5.6.

All concepts linked to this Hub illustrated which concepts were important to the entrepreneur as they reflected on the feasibility of the opportunity. The centrality scores were calculated to four levels of connectivity and provided insight into the arrangements and pathways of individual concepts. There was an emphasis on analytical information

Table 5. 6 Most important concepts by centrality score (greater than 10)

Concept name	E01 Novice	E02 Mature	E03 Novice	E04 Inter.	E05 Mature	E06 Inter.	E07 Mature	E08 Novice	E09 Mature	E10 Mature	E11 Novice
Assesses risk	13/17	23	13/13	18	18	18	11	14/17	17	14	9/9
Collects data and information	16/20	25	20/23	19	22	22	14	21/22	11	21	15/15
Confidence	12/13	17	6/7	16	11	16	X	8/9	15	7	X
Data sources	6/10	20	18/19	15	18	18	14	16/17	15	15	11/11
Data analysis	20/21	20	17/20	18	19	19	16	20/22	17	24	17/18
Expertise	7/11	18	8/14	13	13	16	8	7/13	17	24	8/8
Final decision	5/5	12	3/3	14	14	17	6	9/10	12	21	4/6
Finance/investment check	7/9	5	16/16	12	10	20	X	12/14	X	14	13/13
Financial impact	5/6	X	13/17	11	X	15	11	0/11	9	X	13/13
Feedback – team/ops/others	X	22	10/11	15	13&19	13	6	10/10	13	8	0/5
Gut feel	10/14	13	14/17	10	13	11	14	11/11	15	15	11/11
Initial decision	14/15	18	14/15	13	16	15	13	13/14	15	20	10/12
Learning from mistakes	11/15	21	13/16	16	18	18	12	14/18	17	12	X
Pros and cons for options	11/14	X	14/14	X	18	17	X	14/18	X	16	134/13
Plan B	7	20	X	X	18	18	7	X	X	X	X
Reviews and checks data	8/9	21	11/11	14	15	19	10	11/12	17	9	9/10
Refers to past experience	6/16	17	7/20	17	22	18	15	11/21	20	10	10/10
SMT/co/director discussion	8/9	17	6/7	12	14	13	15	11/12	13	15	8/8
Talks to team	X	14	16/16	X	10	9	6	9/10	X	15	0/5
Talks to others	7/14	21	12/16	14	15	16	13	15/16	14	10	5/6
Thinks it through or ‘Hub’	21/25	28	23/27	25	28	29	22	24/29	28	25	8/11
Trust in others’ opinions	7/7	X	13/16	X	X	X	X	11/12	14	X	X
Validates decision	9/10	28	6/7	25	25	22	13	16/17	20	19	X
Visualisation	X	17	12/15	16	17	X	X	14/18	18	13	X

Calculations after Eden et al. (1992), calculated to 2 decimal places and then rounded up to nearest whole number. Figure/Figure represents score Year 1/Year 2 for novice entrepreneurs, where concept and linking pathway was noted as new e.g. 16/21. The highest score of a repetitive concept i.e. present more than once in the map structure is listed, where the centrality score has been calculated for each concept present. X means that concept was not mentioned nor implied in the interview

processing, such as reviewing resources available or assessing risk, but also intuitive processing using tacit knowledge from past experiences and learning from mistakes. Several feedback loops were identified, such as ‘Data analysis’, ‘Talks to others’ ‘Talks to team’, which suggested these concepts were an important, iterative part of the evaluation process. Collectively, findings showed the presence of both modes of information processing, which implied a versatile approach in the arrangement and use of concepts for reflection.

The centrality of ‘Thinks it through’ is a significant result from this study and an area for future research. All entrepreneurs exhibited this concept, although there was some variation in the numbers of concepts that were directly linked to it, showing cognitive differences in reflective thought (see appendix 22 for examples of first level links to Hub to other concepts) Mature entrepreneur E09 exhibited the greatest number of direct links from the Hub to other concepts at 15, but the qualitative data had already indicated a preference for intuitive information processing and an active engagement in mental reflection for decision-making.

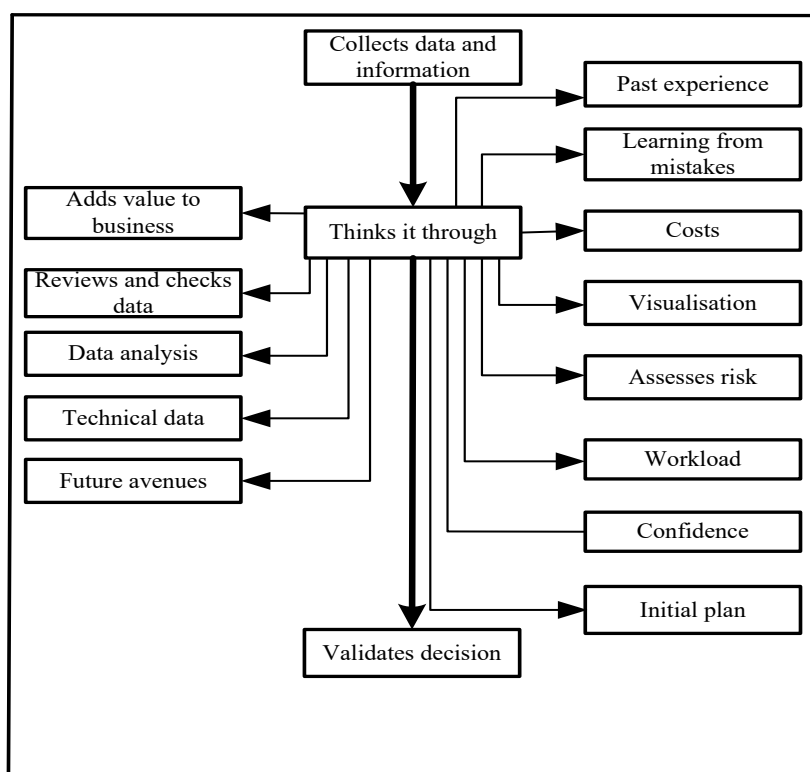


Figure 5. 20 ‘Thinks it through’ and first level concepts for entrepreneur E09

Figure 5.20 shows the complexity of this process and the priority that E09 placed on thinking about ‘what was’, such as past experiences and mistakes, ‘what is’, such as people required and workload and ‘what might be’, such as market fit and future avenues. This empirically supports Wood and McKelvie’s (2015, p256) definition of opportunity evaluation as “the degree to which events, situations and circumstances construed as an entrepreneurial opportunity represent a personally desirable and feasible action path”. As shown in figure 5.20, evaluation and opportunity-related decision-making includes reflection and recollection of negative and positive past and future events (Fletcher and Selden, 2016).

Mature entrepreneur E05 also showed high connectivity to ‘Thinks it through’ at 13 links and intermediate entrepreneur E06 at 13 links (see appendix 24 for their cognitive maps). Moreover, both were engaged in considerable information processing due to contextual circumstances (factory build and strategic refocus), so it is not unreasonable to assume that much thinking around decisional outcomes would be evident as a higher score. In contrast to this, entrepreneur E11 had the lowest connectivity at three links and a developing link in year two. Again, this was expected, as analysis had already shown that the cognitive map comprised of analytical concepts and that the entrepreneur had little involvement in making strategic decisions (see appendix 24 for the cognitive map). Similarly, novice entrepreneur E01 showed greater emphasis on data collection and analysis in year one, but a developing reflective Hub link for year two. In addition to this, intermediate entrepreneur E04 showed a very simple Hub profile at eight links (see appendix 24 for the cognitive map) although the information processing assessments showed an intuitive preference, inferring the use of heuristics for decision-making.

The external business context can explain this use of heuristics for entrepreneur E04, as the qualitative data showed that he was very dissatisfied and frustrated with the strategic direction of the business. The researcher posits that he had switched off and was not engaged with making opportunity-related decisions. In the final interview he disclosed that the business was up for sale and in fact by June 2018 the business was sold and he had resigned. These examples show the importance of mixed methods and a longitudinal

approach for eliciting greater insight how context, over time, has significant impact on the entrepreneurs' cognitive processing.

A key finding from this centrality analysis was the identification of the Hub and its link to past experience, which provided explanation how information processing was used for opportunity-related decisions. This insight how concepts and links evolved in a cognitive framework (Keh et al., 2002) moves researchers closer to understanding how the critical bridge (Wood and Williams, 2015) is conceptualised. Additionally, it is an original and critical finding for theory development, discussed further in section 6.8. As the central core concept of the opportunity-related decision-making process, it empirically confirms that implicit knowledge representations developed through experience, called intuitive expertise, help to generate more complex representations (Curşeu, 2008). These will have a positive impact on opportunity-related decision-making. Findings have shown, that analytical and intuitive derived concepts are beneficial for thinking through the feasibility of the opportunity and for constructing complex representations of what might be. As this link was absent in the first year of the study for novices, it shows that an absence of relevant experience for pattern matching prompted an analytical process for their initial decision and for thinking through the implications of the opportunity. The observation of this developing link between 'Past experience' and 'Thinks it through' in year two increased connectivity between this and other concepts, so the development of such a link has important implications for future decision-making.

5.7.3.2 Core concepts used in the process

Several other key concepts were identified from the centrality findings which indicated high scores. This showed core or first level concepts as an important link for reflective thought. 'Collecting data and information' had mixed results, although novice scores were much higher for year two, which was surprising, but the qualitative analysis showed that was to check out the opportunity with hard data prior to making initial decision. Secondly the concept 'Talks to others', used by novices for information collection and mature/intermediate entrepreneurs for validation, highlighted the importance of social networks and team relationships. The initial decision showed a similar score for all

entrepreneurs, indicating a first-person, cognitive process. Similarly, 'talks to team' for information, opinions and feedback also created new links between concepts. Thus, as the centrality score increased as a result of a link between these two concepts, so their thinking was more connected between the initial and final decision stages and was structured differently. Moreover, mature entrepreneurs had high scores for 'Past experience' and a direct link between this and 'Thinks it through' showing these were key concepts. Indirect links from these to other concepts showed interrelationships between confidence, expertise, gut feelings and the initial decision. Paths from this linked concept to concept generating long pathways and complex representations (Cossette, 2002). Overall, the centrality analysis highlighted the importance of the concept 'Thinks it through' as the most significant and core concept in the process.

5.8 Chapter summary

The purpose of the study was to understand how entrepreneurs evaluated a growth opportunity by exploring the cognitive dynamics and decision-making processes used by entrepreneurs. Findings showed that style was orthogonal and that entrepreneurs could be high on more than one style. This allowed entrepreneurs to be versatile and adapt their preference enabling them to switch from one style to the other according to situational changes in the external environment. The observation of a versatile style was a key finding of the study and provided empirical evidence for the duplex model proposed by Sadler-Smith (2009).

The concept of 'Thinks it through' comprised of analytical and intuitive processing as a core stage in the process. The use of cognitive mapping techniques indicated the complexity of the mental representations, how they were formed in the working memory space and the contribution that experience made to the process. Moreover, the arrangement of concepts showed this to be an iterative process comprising of several key stages, although these differed according to experience and context. In addition, the evaluation process was mostly a first-person process, with a key stage that involved intensive reflection and use of past experience. Social networks and teams were used to provide validation or information for decision-making.

The study of individual cognitive maps provided a comprehensive picture how the mental model was structured and the differences in the thought process between entrepreneurs. These micro-differences between the centrality scores for concepts illustrated which key concepts were used in the process and the importance of learning through experience. Differences in thought processes between novice, intermediate and mature entrepreneurs indicated a relationship between confidence and experience. Overall the findings showed that entrepreneurs' framework for opportunity-related decisions comprised of more analytical than intuitive concepts, but was influenced by individual differences and in response to the subjective influences of situational circumstances and events.

Finally, by combining cognitive style measures with qualitative data derived from interviews over five time points provided a deeper understanding how entrepreneurs used their information processing preferences when making opportunity-related decisions. The quantitative data added value to the qualitative analysis through triangulation and supported significant findings which showed how cognitive versatility functioned. Similarly, the temporal nature of the study indicated how these preferences changed over time as a result of experience and provided unique insight into the development of cognitive map connectivity. These significant and unique findings are discussed in the next chapter.

Chapter 6: Discussion

*"Don't become a mere recorder of facts, but try to penetrate the mystery of their origin."
Ivan Pavlov (1849-1936)*

6.1 Introduction

The primary aim of this study was to explore how entrepreneurs made decisions when evaluating business growth opportunities by taking a cognitive and integrated perspective to the research study. This chapter will discuss the study's key findings in relation to the relevant literature from the review presented in Chapter 2 and reflect on the implications these findings have for entrepreneurship theory and practice. The conceptual framework described in Chapter 3 illustrated the abstract representation of the study's concepts and relationships and identified the boundaries for the research question. The framework was used to explore and direct the mixed method approach and study design discussed in Chapter 4. The longitudinal design was conducted over two years, with data collection over five time points. The outcome of this temporal approach to the study's research question produced a rich mix of information for analysis and significant findings for future theory and practice.

The chapter begins by providing a summary of the study and an outline of the findings discussed in Chapter 5. Analysis of the quantitative and qualitative strands were mixed at each time point before the final interpretation. Findings are presented in four sub-sections: 1) the socio-demographic features of growth 2) how analysis and intuitive styles were used for opportunity-related decision-making and the micro differences between entrepreneurs 3) cognitive versatility and the development of a versatile style and 4) key insights from the cognitive map analysis approach to the research question. A teaching framework and decision-making model is posited, derived from the findings. Finally, the benefits of a longitudinal approach and recommendations for future research are discussed. The chapter concludes with a summary of contributions made to the entrepreneurship literature and the limitations of the study.

6.2 Study summary

The overarching aim of this study was to explore how entrepreneurs, when evaluating an opportunity made opportunity-related decisions and to determine the factors that influenced this process. This proposal was derived from two key contributors in the field of entrepreneurship and growth. Wright and Stigliani (2013) identified how entrepreneurs made decisions on growth and the cognitive styles that they used for this process was poorly researched. In addition to this, Wiklund et al. (2009) noted that the growth literature was highly fragmented and recommended that an integrative model across dominant perspectives would help to develop a bigger picture of small business growth for increased explanatory ability. Taking stock of these recommendations, this study took an integrated and holistic perspective, by combining and identifying gaps across three perspectives common to the entrepreneurship and growth literature: opportunity evaluation, opportunity-related decision-making and entrepreneurial cognition.

The study employed an individual level of analysis using a cognitive style lens for framing opportunity-related decisions and to aid in-depth exploration. Additionally, an integrated perspective was taken to address fragmentation in the opportunity evaluation and decision-making literature (Barbosa, 2014; Cools et al., 2014; Shepherd et al., 2014; Wood and Williams, 2014) and to answer calls from the cognitive style literature for more diverse research designs and qualitative and mixed method approaches (Kozhevnikov, 2007; Kozhevnikov et al., 2014; Cools et al., 2014). A temporal approach of five time points over two years was adopted for exploring these opportunity-related decisions, in order to understand how entrepreneurs adapted their mental representations of the opportunity as the evaluation process unfolded. This primary focus on the ‘how’ question allowed the researcher to explore relationships between key concepts in the entrepreneurs’ mental representations and the way that they processed information to evaluate and make decisions on the business opportunity. The mixed methods approach provided detailed insight and triangulation between findings for robust results.

The study was conceptually underpinned by CEST (Epstein, 1985, 1994, 2008, 2010; Epstein et al., 1996; Pacini and Epstein, 1999). This dual process conceptualisation

proposed a view of information processing as a product of the intuitive experiential and analytical rational system that can be sequential or simultaneous in timing (Hodgkinson and Sadler-Smith, 2018). The parallel-competitive account of this dual process theory allowed interplay between the two modes of processing and the potential for individuals to be high on both styles or cognitively versatile (Hodgkinson and Clarke, 2007). As the process of individuating, that is the process by which entrepreneurs make opportunities personal (Wood et al., 2014) implies individual differences in cognitions (Cools et al., 2014), it was assumed that information processing styles influenced assessments of opportunity (Vaghely and Julian, 2010; Williams and Wood, 2015). Hence, these individual preferences acted as mediators between the perception of the opportunity and the outcome of the evaluation process as a final decision. The ability of the entrepreneur to switch between styles according to business needs (Louis and Sutton, 1991; Hodgkinson and Clarke, 2007; Hodgkinson et al., 2009) provided agility and adaptability in different contexts. This and the ability to think and reflect using metacognitive processes to frame the decision (Dimov, 2010; Haynie et al., 2010) helped to shape whether or not the opportunity was feasible and desirable.

6.2.1 Outline of key findings

Tracking statistics showed the growth profiles of entrepreneurial small businesses to be stochastic and heterogenous. Growth was episodic rather than a feature (Henley, 2018) and all entrepreneurs expressed the intention to grow, which acted as a driver for entrepreneurial action (Wood et al., 2014). Findings identified three different categories of growth within the sample. Two entrepreneurial business indicated negative growth over the two-year period, due to internal constraints rather than changes in the external environment. Overall the findings supported the need to take a longitudinal approach to growth (McMullen and Dimov, 2013) for the bigger picture (Wiklund et al., 2009).

Novel findings from the style assessments showed a developing intuitive style in novices and a synthesised and versatile style in mature entrepreneurs, the latter as a balance of both styles. This was observed as a ‘mirror effect’ between the analytical and intuitive styles. The emergence of a versatile style was a key finding and is supported by dual

process conceptualisation. Entrepreneurs used both information processing modes, analytical and intuitive, and could be high on more than one style, thus demonstrating styles were orthogonal (Sadler-Smith, 2009; Cools et al., 2014).

A key finding from the cognitive map analysis showed the structure of the entrepreneurs' mental representations, from initial decision to final decision. From this observation two distinct categories were noted, based on the positioning of a gut feeling and initial decision in the cognitive maps. Additionally, the concept arrangement showed when the thought process moved from a first to a third person process (Haynie et al., 2009), for example, communication, information gathering and validation in the external environment. These findings determined two important external influences in the decision process; the importance of team discussion and feedback and the use of social capital for validation and information collection.

Cognitive complexity illustrated micro differences between entrepreneurs. Despite similar density scores, results showed that the entrepreneurs' mental models were not particularly complex (Cossette, 2002). The cognitive map connectivity told a different story and provided comparative analysis between novice, intermediate and mature entrepreneurs. In addition to these findings, complexity calculations, although not comparable (Curşeu, 2008) showed how knowledge was represented and how previous events impacted on mental model structures. These insights provided a holistic picture of the evaluation and decision process as an external model of the individual's thinking (Klein and Cooper, 1982).

Aggregation of style data with cognitive complexity showed that cognitive complexity mediated the impact and preference of entrepreneurial characteristics on decision outcomes (Curşeu, 2008). In addition, a high intuitive style and experiential way of thinking was associated with high cognitive complexity and the ability to integrate and use information from a variety of sources. Novice entrepreneurs also had higher cognitive complexity than expected, which increased over the time period as they gained experience and developed a more intuitive style. Overall, the findings supported a relationship

between cognitive complexity and performance which is moderated by the complexity of the environment (Calori et al.,1994)

The ‘Thinks it through’ concept was identified from the centrality scores as a central concept or Hub and proved to be a unique and important finding in the decision process. This significant finding for future research has implications for training and learning, as it indicates the importance of experiential learning and domain specific pattern matching (Armstrong and Mahmud, 2008). This central hub of connectivity between other concepts provided the framework for the staged evaluation model discussed in section 6.8 of this chapter. The centrality scores and style assessments also showed that novice entrepreneurs increased their preference to use an intuitive style over time.

To develop and accelerate the use of experience for intuition-as-expertise (Sadler-Smith and Burke-Smalley, 2015) a teaching model is posited for encouraging the use of different experiences in a learning setting, the outcome of which will help to extend and develop the entrepreneur’s cognitive structure. This model is to facilitate development of the link between ‘Thinks it through’ and ‘Past experience’ concepts through the provision of a structured activity that promotes different thought pathways for developing deep knowledge structures. Assuming that learning is inherently constructivist (Krueger, 2007), the provision of a practical teaching model for practitioners and educators to assist change of knowledge is a key aim of this study. As noted from the cognitive complexity analysis and centrality scores, new and different learning experiences assisted the development of intuitive thinking and its role in supporting confidence. The proposed framework was derived from the key concepts identified during the cognitive complexity analysis and is based on common, highest scoring first level concepts identified from this.

As a result of the study’s findings, a theoretical model of opportunity-related decision-making is proposed, derived from the qualitative analysis and the cognitive complexity and connectivity findings. This theoretical model of opportunity-related decision-making will act as a framework for future research and explanatory investigation. It addresses Williams and Wood’s (2015) recommendation that alternative reasoning models are needed to provide a more nuanced understanding of analytical and intuitive information processing in opportunity evaluation. Furthermore, this model illustrates the temporal

nature of the evaluation process as a staged, iterative process, as well as incorporating the changes within this process as novices gain experience.

6.3 Business growth profiles

Growth profiles of UK SMEs have remained stable since 2015 (Enterprise Research Centre (ERC), 2018, p6), a date which coincided with the start of this research study. Despite a period of economic stability during the study, findings showed that the entrepreneurs' growth profiles were heterogenous and that growth was episodic, rather than a feature (ERC, 2017). Thus, the reality of real business practice indicated that predicting growth was a challenge (Henley, 2018).

The observed changes in style as the entrepreneurs interacted with operational constraints added further insight into some of the causes for variance in the growth profiles and the benefits of observing change over time. This demonstrated the significant contribution that experience and experiential learning brought to the growth process and that cognitive style was influenced by the entrepreneur's interaction with the environment (Dutta and Thornhill, 2008; Kozhevnikov, 2007; Kozhevnikov et al., 2014). Thus, discussion and feedback on the outcomes of new experiences would aid the novice entrepreneur's understanding of the benefits of developing intuitive expertise, supported by coaching and mentoring from practitioners. These intervention activities ultimately have implications for educators and policy makers.

Findings from this study provided a more fine-grained insight of small business growth as three different categories: 1) little or no growth, 2) planned growth and 3) negative growth as a result of the longitudinal design. These categories provide a more nuanced understanding of the nature of small business growth and broadly support similar categories on business performance posited by Blackburn et al. (2013) and Wright and Stigliani (2013). The researcher posits that most entrepreneurs are more than likely to have experienced these growth patterns at some stage during their business growth cycle, regardless of how many years they have been in business. Since the idiosyncratic nature of small business growth was identified by Dobbs and Hamilton (2007), there has been

little move towards addressing how stochastic turnover impacts on the periodicity of growth (Dobbs and Hamilton, 2007) or how this influences the outcomes of entrepreneurial behaviour over time (Chandra, 2017). The growth profiles illustrate the importance of taking a longitudinal approach to provide a more realistic picture of the context in which these opportunity-related decisions are made.

6.4 Using styles for opportunity-related decisions

Findings from the cognitive style assessments showed that entrepreneurs could be high on more than one style at a time, a pattern that was repeated across time points. The CoSI (Cools and Van den Broeck, 2007) proposed a multidimensional model of cognitive style: a knowing style, a planning style and a creating style. Results of these assessment scores indicated that all three styles were employed for information processing and that style preference and flexibility was evident across the time points. Qualitative data indicated that this flexibility was a result of contextual influences and in some cases, these variations from the mean were quite extreme. The REI (Pacini and Epstein, 1999) scores for rational and experiential processing also showed a similar pattern.

This variance over time points is significant, both for theory and practice. These findings reinforce conceptualisation of style as orthogonal dimensions (Sadler-Smith, 2009; Cools et al., 2014). As proposed by Kozhevnikov (2007) and Kozhevnikov et al. (2014), style can be arranged as a multidimensional and multi-layered matrix where styles are orthogonal (Sadler-Smith, 2009; Cools et al., 2014), a conceptualisation that allows entrepreneurs to be high on more than one style at a given time. This is in contrast to the CSI (Allinson and Hayes, 1996) is regarded as a single bipolar continuum which assumes an increase of one mode at the expense of the other (Hodgkinson and Sadler-Smith, 2003). The conceptualisation of style in line with dual process theory as an orthogonal dimension rather than as bipolar dimension has helped to provide a more plausible framework for explaining any variance in style, or the ability to be high on more than one style at any given time. These multidimensional frameworks are seen as increasingly important (Epstein, 1994; Kozhevnikov, 2007; Sadler-Smith, 2009; Cools et al., 2014; Kozhevnikov et al., 2014).

In practice, findings showed that entrepreneurs used all three CoSI styles for information processing and that both analysis and intuition made contributions but at different stages in the process. Novices indicated a preference for analysis and had higher scores for rational and knowing/planning styles in the first year of the study, apart from E08, who had previous domain experience. Mature entrepreneurs showed consistently higher creative/intuitive scores across the time frame. REI scores showed a similar profile. These findings support the identification of novice entrepreneurs as more analytical processors (Gustafsson, 2006), entrepreneurs as more intuitive than managers (Allinson and Hayes, 1996) and that successful entrepreneurs use a more intuitive style (Baron, 2007; Armstrong and Hird, 2009). However, this study's findings suggest that this is somewhat an oversimplification, as examination of the micro differences between entrepreneurs' cognitive processes show a variance over time, implying that this simple categorisation is more complex than originally suggested.

6.4.1 Style preferences for intuition or analysis

Style findings showed that mature and intermediate entrepreneurs consistently exhibited a higher preference for a creative/experiential style throughout the study. Prior research has clearly shown that individuals differ in their preference for intuition and analysis (Hodgkinson and Sadler-Smith, 2003; Sinclair and Ashkanasy, 2005; Betsch and Ianello, 2010; Lee-Ross, 2014) and this study supports these findings. Although in general terms this is correct, closer inspection showed that changes in style were noted in all entrepreneurs, demonstrating an ability to employ a style commensurate with context. For example, regardless of experience, higher planning scores were associated with key events such as factory move, production improvements, new distributorship or a new project opportunity. In a similar fashion, high knowing scores were associated with collecting information for new opportunities or where the entrepreneurs' existing knowledge was insufficient for the opportunity. This fine-tuned analysis illustrated significant micro differences for these variations, as well as how context influenced information processing styles.

6.4.1.1 Comparing style preferences over time

Additionally, comparison of style scores at the benchmark interview (T0) with the assessment at the end of the two-year study period (T4) exhibited a similar pattern of preferences (see figure 6.1). Case study references are arranged in their groups (E01, 03, 08, 11 as novice, E04, 06 as intermediate and E02, E05, E07, E09, E10 as mature).

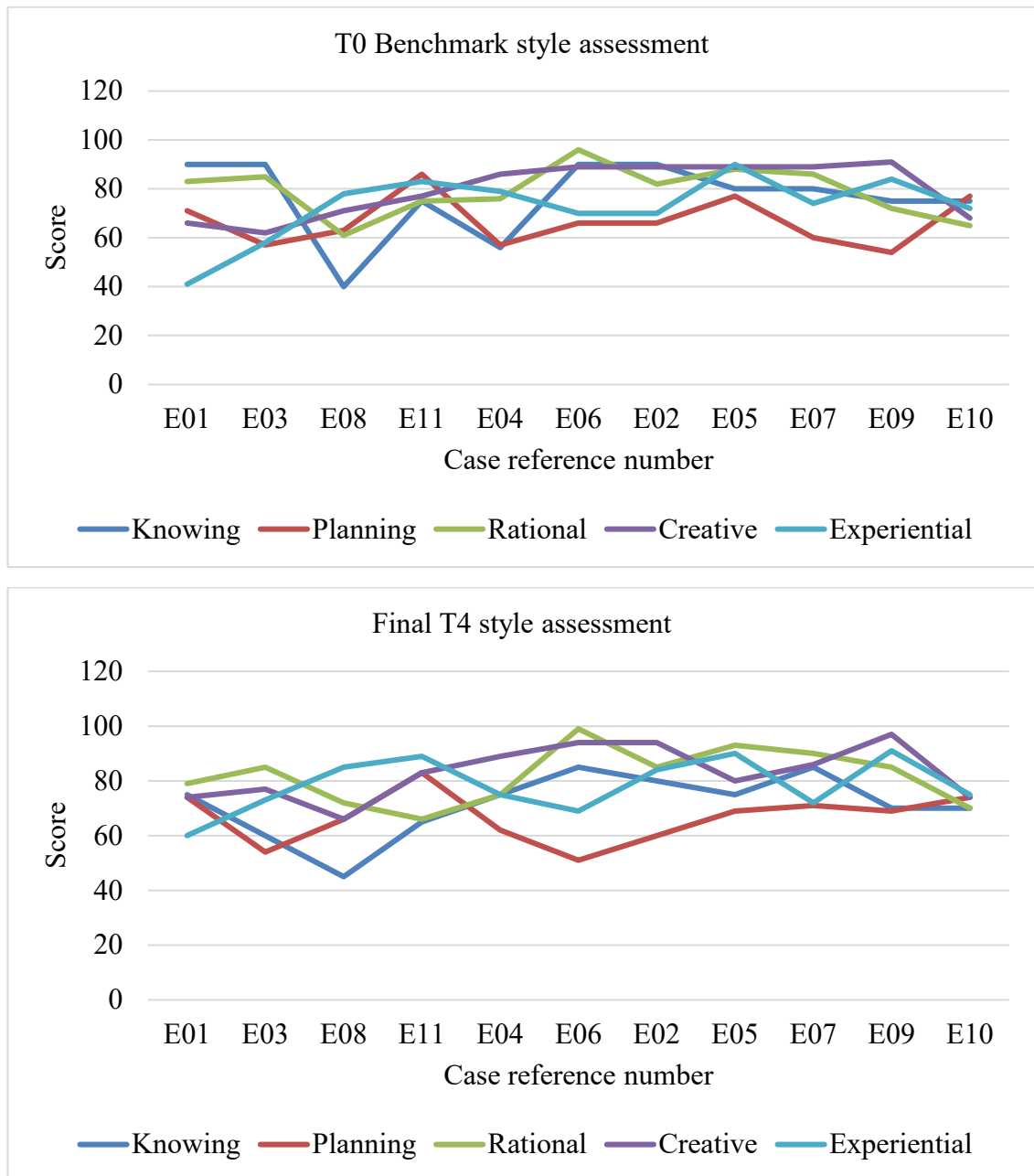


Figure 6. 1 Comparison of style assessment scores at start (T0) and end (T4) of study

Notably, over the two-year study styles show a similar profile, suggesting that preferences are “relatively innate stable states” (Sadler-Smith, 2009, p4). Figure 6.1 illustrates variation between novice scores at T0 compared to T4, showing that as novices developed versatility and experience, their creative and experiential scores increased. Second, several personal preferences are clearly evident, for example, E08 and a knowing style, E06 and rational thinking E11 and a planning style. This suggests a dominant preference, as there is very little change over the two-year period. A high creative style is evident in intermediate and mature entrepreneurs who are experienced and thus accessing implicit representations. The knowing style’s peaks and troughs mirrors changes in the external environment, emphasising this style is highly contextual. Planning style shows the lowest preference. These differences are discussed more detail in section 6.4.1.2.

Entrepreneurs are considered to exhibit a more intuitive style, supported by this study’s findings and that changes between the different modes can be explained by the operation of the parallel-competitive nature of dual process. This intuitive preference is an important entrepreneurial characteristic and has implications for policy and practice. Figure 6.2 shows that intermediate and mature entrepreneurs consistently had a high preference for a creative style whereas novices over time showed an increase in this preference. This means that the typical, linear rational decision-making model no longer sits comfortably alongside dual process conceptualisation. As shown in figure 6.2, the rational and experiential styles have a high preference and some similar parallel proximity between rational and experiential styles comparing T0 to T4. This infers cognitive interplay between the duality of information processing. Taking a practical viewpoint, although small business entrepreneurs must evaluate the benefits and costs of new opportunities that will enhance growth (Jin and Kirsch, 2015), which may be a more rational information process, these findings emphasise the importance of intuitive processing for decision-making. This has implications for policy to ensure that the advantages and disadvantages of both styles are made apparent in any training programme. If mature entrepreneurs develop an intuitive preference over time as a natural outcome of business management, then there is a clear argument to foster and develop this through specific, targeted programmes for small business entrepreneurs.

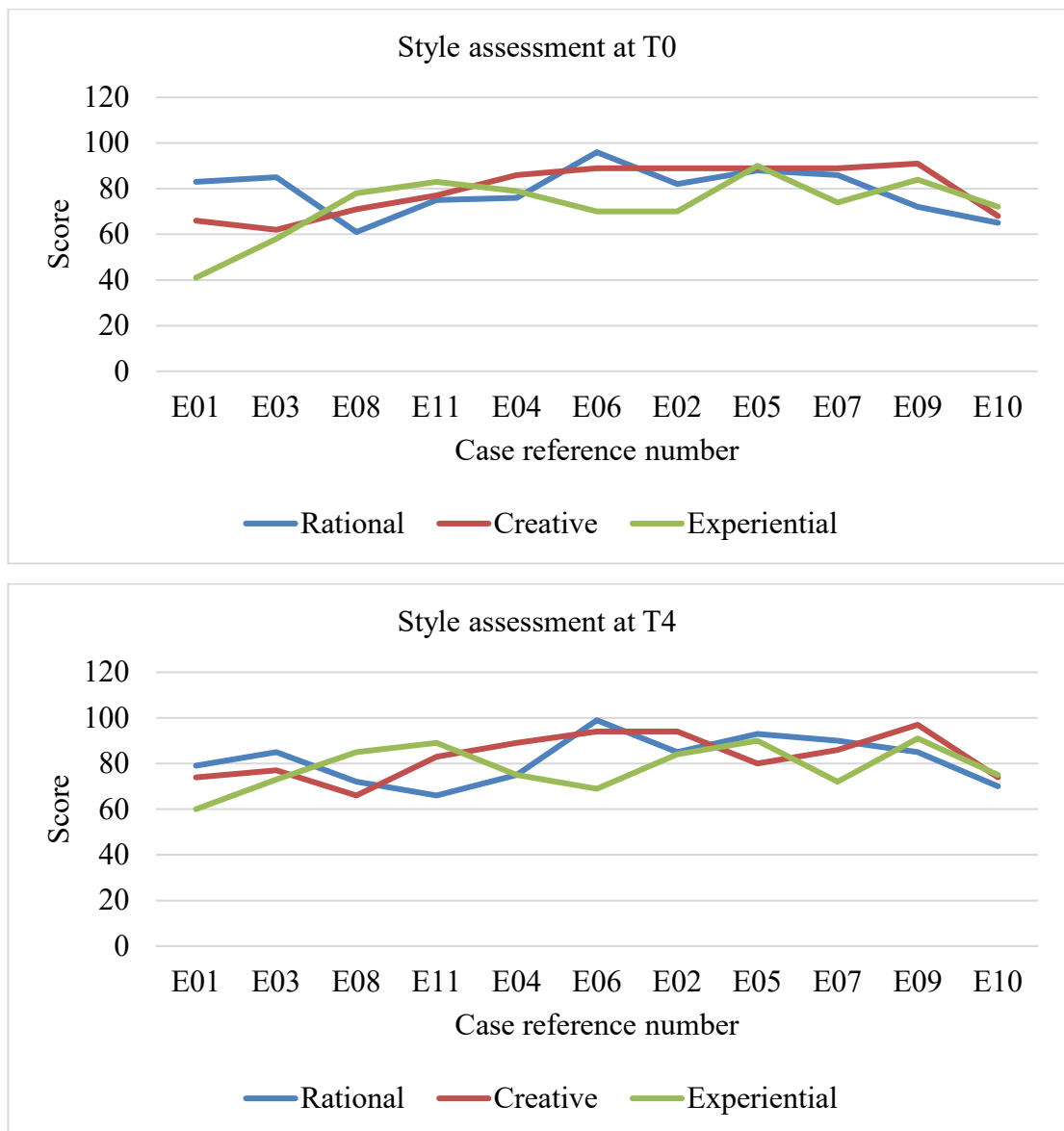


Figure 6. 2 Comparison of rational and intuitive style assessments at T0 and T4

Similarly, these findings also highlight the need to support the development of intuition for novice entrepreneurs and to understand how experience, feedback and practice assists this development (Sadler-Smith, 2016). As an intuitive style is associated with cognitive complexity (van Gestel, 2008), whereby the individual is more able to integrate information into a decision and thus can make more effective decisions based on a greater ability to differentiate and integrate, this is an important consideration when providing

practitioner support for growth. This relationship between cognitive complexity and an intuitive style is discussed further in section 6.5.6.

6.4.1.2 Analytical and intuitive style dimensions

Rather than make assumptions that novices showed a preference for analysis and mature entrepreneurs were intuitive, as prior research suggests (Allinson et al., 2000; Gustafsson, 2006), the scores gave greater insight into contextual differences between these two dimensions and how more nuanced adjustments were made in their information processing modes. Those novice entrepreneurs with the least experience (E01 and E03) showed a high knowing style preference; those with previous experience (E08 and E11) showed a higher experiential style at the start of the study. This indicated that tacit knowledge, used for making decisions and stored in the long-term memory was a useful source of information. By the end of the study, E01 and E03 showed a decrease in the knowing style and an increase in the creative style. This infers experience is important for the development of an intuitive style. In support of these findings, it is posited that the constantly changing nature of small business context acted as a learning environment, whereby novice entrepreneurs over time were able to adapt their style according to the situation, based on their experiences and developing expertise. This brings into question the added value of combining both approaches for decision-making (Hodgkinson and Sadler-Smith, 2018) and the ability to accelerate this naturally occurring process through practitioner and educator support.

In contrast to this, mature entrepreneurs showed that their preference for a planning style was the least significant dimension over the two years, apart from E05 who was engaged in a new factory build. It appears from these findings that planning is informal, unstructured and irregular (Brinckmann et al., 2010). Qualitative findings showed that overall it was the least preferred style. Cognitive map analysis showed that it was present in the mental representations of entrepreneurs and in the reflective thought process. Frequently planning for the opportunity was not written down in a formal sense, but discussed with others and the team for operational input.

The variance of style preference across time points provided empirical evidence that entrepreneurs can adjust their preferences accordingly and demonstrated a more insightful understanding of information processing in context. This supports Cools et al.'s (2014) proposal that researchers must pay more attention to context in cognitive style research. This is important on several counts. In order to evaluate an opportunity, it is advantageous for an entrepreneur to have direct experience with different contexts and differing information styles, so that the bigger picture (Wiklund et al., 2009) can be applied to the perception of the opportunity. A narrow, analytical preference would provide a structured way to consider new information (Wood and Williams, 2014), but may preclude consideration of more risk and reward factors associated with a creative style or new product innovation activity (Kraus et al., 2016) as exhibited by E02's new product release. Restructuring situations when solving problems and making decisions, tolerating ambiguity and searching for new possibilities are typical characteristics of a creative style (Cools and Van den Broeck, 2007) and are ideal for evaluating an opportunity.

Additionally, the process of making sense of new situations or opportunities involves pattern matching (Baron, 2006) using existing knowledge structures in order to determine favourable evaluation (Haynie et al., 2009), as entrepreneurs' opportunities are not evenly appealing as they will interpret circumstances differently (Dimov, 2010). Similarly, domain specific knowledge will also be used to evaluate these opportunities (Wood and Williams, 2014). The importance of individual differences in prior knowledge for opportunity evaluation (Haynie et al., 2009) points to the need for an intuitive style and expertise. Those entrepreneurs with opportunity-related knowledge can develop more refined mental templates (Krueger, 2007) which increases the complexity and connectivity of concepts associated with opportunity-related decisions. Similarly, leveraging prior knowledge and observed differences in cognitive adaptability has emphasised the role of knowledge and metacognitive abilities in decision processes (Haynie et al., 2010).

These findings add to the current debate in the cognitive style domain, by providing empirical evidence needed for a clearer understanding (Armstrong, 2012; Cools et al.,

2014). The ideal profile is to have a high level of functioning in all processing modes (Pacini, and Epstein,1999), as the use of both intuition and analysis is required for most decision-making tasks (Akinici and Sadler-Smith, 2013). Although findings were evidenced across a range of observed situations, the mixed methods approach and triangulation of the cognitive style assessment with excerpts from the qualitative data gave a clearer picture of the behavioural variations in processing associated with differing conditions. Overall, findings showed that entrepreneurs used both information processing modes, analytical and intuitive, and that these styles were adapted contingent with context and experience.

6.4.1.3 Applying a dual process conceptualisation for outcomes

A curious finding indicated that sometimes entrepreneurs believed they had changed the way that they processed information, which was not consistent with the style assessment results. Prior research by Dutta and Thornhill (2008) showed that entrepreneurs revised their growth intentions depending on the competitive conditions in their environment. Although this study was conducted in relatively stable economic conditions, some entrepreneurs (for example E02, E06,) experienced internal constraints during the two-year period. Qualitative data indicated that in this instance, entrepreneurs focused on more analytical activities, engaging in data analysis and checking, despite their preference for an intuitive style as a mature or intermediate entrepreneur. The examples below indicate this:

“I’ve got things in place now where we monitor much more closely that the sale situation... I’m actually doing quite a lot more reporting and sort of getting the analysis at every level really...” (E02, T3)

“...not very good, we looked at our three months figures... ... purely an analysis really..., what your plan is and where you think you are and your analysis of it...” (E06, T3)

The researcher expected to see an increase in the analytical score at this time point (T3), as each entrepreneur adjusted their style to match the need for more analytical tasks. This was not observed, as both entrepreneurs E02 and E06 showed an increase in their creative and experiential scores. Thus, despite articulating a change to an analytical preference,

both entrepreneurs actually showed an increase in their normal preference for an intuitive style.

This is an interesting observation which highlights the importance of taking a dual process approach for conceptualising information processing modes and explaining behavioural outcomes. Applying a parallel-competitive approach to this observation as recommended by Hodgkinson and Sadler-Smith (2018) and supported by CEST (Epstein, 1985, 1994, 2008, 2010; Epstein et al., 1996; Pacini and Epstein, 1999), resulting behaviours are influenced by a combination of both systems. Normally, this operation between systems occurs at the same time, but the timings of the interaction can be sequential or simultaneous for preferences (Hodgkinson and Sadler-Smith, 2018). This means that non-conscious processing can influence conscious reasoning and vice versa. Thoughts in the rational style influence intuitions but the experiential system continues to influence thoughts and behaviours even if the person is assuming a rational preference (Hodgkinson and Sadler-Smith, 2018). Therefore, both entrepreneurs, although believing that they were operating in a conscious, analytical way, were being influenced by associations in the experiential system related to their previous experiences dealing with similar issues. Intuitions potentially can inhibit or facilitate analysis (Hodgkinson and Healey, 2011) and in the example discussed above, the processing modes were demonstrating dynamic interplay or a versatile style, although the observable outcome was perceived as an analytical preference and articulated by the entrepreneur as one. This example demonstrates the benefits of triangulation, where one data set can be used with the other to corroborate findings for a more fine-tuned understanding of the interplay between styles. It also exemplifies the importance of using dual process conceptualisations for explanatory ability.

6.4.2 The interplay between analytical and intuitive styles

In their latest review of the dynamics of intuition and analysis on entrepreneurial behaviour, Hodgkinson and Sadler-Smith (2018) argued that the interplay between intuition and analysis is a core assumption of dual process theory. This study's findings suggest that this interplay was happening in some instances, as variation was observed in individual entrepreneur's style scores throughout the study. Moreover, it was difficult to

capture cognitive processing as it happened, on a moment to moment basis (Baldacchino et al., 2015). Both novice, intermediate and mature entrepreneurs used intuitive and analytical processing when evaluating opportunities and the temporal nature of the study provided insight into changes between time points that were related to context. This temporal approach of the study supported the notion that the entrepreneurs were cognitively versatile as they evaluated the opportunity and made decisions (Louis and Sutton, 1991; Hodgkinson and Clarke, 2007; Hodgkinson et al., 2009; Sadler-Smith, 2009; Baldacchino et al., 2015). Overall, some interesting observations of different findings alluded to the notion of interplay which are discussed in more detail.

Switching between information processing modes is considered to be cognitively challenging due to an entrepreneur's preference for information processing, as it may involve an "increased level of conscious attention" (Louis and Sutton, 1991, p60). CEST theory acknowledges this conflict as a "struggle between feelings and thoughts" (Epstein et al., 1996, p391). In this study's findings, no mention of a mental struggle was noted in the qualitative findings, although novices spoke of going back to their preferred style, for example, "*I would then analyse it and go back to my comfort zone*" (E03, T1) or "*I always have a safety net so I can always go back*" (E01, T1) or "*seek reassurance with the analytical bit*" (E08, T1). Other examples of interplay between styles were noted as '*jumping*' about, '*stepping stones*' and '*using both*', which suggests that novice entrepreneurs were aware of some movement between their different modes of processing and were demonstrating some interplay, albeit in the early stages of development.

Findings also showed that both modes of processing were observed, which inferred that the entrepreneur moved seamlessly between the two modes, a typical characteristic of parallel-competitive processing (Hodgkinson and Sadler-Smith, 2018). The degree to which either mode is preferred is known to be a function of personality and flexibility of cognitive control (Evans and Stanovich, 2013). CEST theory supports this viewpoint as it states that the "relative contribution of either system is a function of the person and the situation" (Epstein, 2008, p25). At business level, this would enable entrepreneurs to adapt accordingly to context by selecting an appropriate style contingent with the task demands and circumstances, which with experience would be a seamless adjustment.

From a practical perspective this potentially would free up time for the entrepreneur to focus on key criteria necessary for an evaluation of the potential opportunity, without the need for over analysis.

As interplay is critical for reasoning, judgment, decision-making and social cognition (Hodgkinson and Clarke, 2007; Hodgkinson et al., 2009; Dane et al., 2012; Akinci and Sadler-Smith, 2013), it is an important consideration for any research on entrepreneurial cognitions. A proposition put forward by Baldacchino et al. (2015) stated that the study of intuition alongside analysis would potentially show how the two modes of processing interact with each other. By providing insight on whether an intuitive mode was used first by decision makers and then switched to an analytical mode of processing, or whether intuition and analysis operated in parallel on a moment to moment basis (Glöckner and Ebert, 2011) was an interesting question. Although this study has shown that entrepreneurs use more than one style, to determine whether this operated in parallel on a moment to moment basis cannot be statistically proven from the study's data collection, as the analysis was based on retrospective interviews and self-report assessments. Nevertheless, this proposal warrants further discussion as an opportunity to extend understanding on the operationalisation of cognitive interplay.

Certainly, the cognitive maps showed that the process started with intuition followed by a mixture of both analytical and intuitive concepts. Qualitative findings also suggested that the spontaneous response of the intuitive system to the opportunity was followed by a rational or analytical process, moderated by conscious processing to check out the feasibility. This was also evidenced in the maps. The observation of a moment to moment basis was difficult to capture. Hence the structural mental nuances of cognitive interplay were beyond the scope of the data collection techniques employed in this study. Given the ongoing debate in the cognitive psychology literature between different dual process theories: default interventionist (for example, Stanovich and West, 2000; Evans and Stanovich, 2013) and parallel-competitive (for example, Epstein, 1994; Sloman 1996), the researcher concurs with Hodgkinson and Sadler-Smith (2018) that the parallel-competitive conceptualisation allows for a more plausible explanation of cognitive interplay and is certainly recommended as best practice for any future research on

cognitive processes. In the field of cognitive style, to capture this interplay would require a shift towards more diverse designs and analytical techniques in order to contribute towards new and existing theory (Cools et al., 2014).

Additionally, to advance the field Hodgkinson and Sadler-Smith (2018) made several suggestions for the use of different techniques to capture insights of decision-making process using parallel-competitive accounts as the conceptual framework. These included ethnographic techniques, verbal protocol analysis for eliciting first person accounts or eye tracking software (Bendall et al., 2019) instead of self-reporting instruments that have characteristically been used in the field. This study's findings have shown how detailed insight can be achieved through the use of mixed methods as proposed by Cools et al. (2014) and cognitive mapping techniques by Hodgkinson and Sadler-Smith (2018). The temporal nature of the study also captured changes that would not have been possible from cross-sectional studies. Other recommendations could be made for neuroscientific methods, which could indicate a change of brain activation that could determine different thought patterns that take place with interplay. This technology was well outside the scope of the researcher and moreover, as a specialist field of research with a sophisticated technological approach, it is posited that it may be a while before this methodology is incorporated into general entrepreneurship cognitive research. What the findings of this study demonstrate is that the process of using both information modes is typical for information processing and that current research methodology must reflect a versatile approach if it is to extend the field. Additionally, this adds further leverage to encourage researchers to consider methodological diversity and mixed methods approaches to validate this interplay.

6.4.3 The synthesis of a versatile style

The identification of a synthesised, versatile style as a result of this study's findings is unique and significant. The duplex model of cognitive style proposed by Sadler-Smith (2009) was used to underpin the conceptual framework, discussed in Chapter 3. As an outcome of the analysis on cognitive style the study's findings provide empirical confirmation of this model and significantly, the observation of a versatile style.

According to Sadler-Smith (2009, p16), the model comprises of a hierarchical structure and a specialised level, where both intuitive and analytical preferences are stable and a flexible level where the modes were interchangeable, contingent with the situation or context as described in section 2.9.3. Thus, a versatile style is the operational synthesis of both styles, where the analytical and intuitive styles shown in this study both had similar high assessment score. Graphical representation of this versatility has been shown in figure 5.9 in Chapter 5.

Findings indicated that mature entrepreneurs exhibited little difference between the scores for rational and experiential styles in their style scores over time, where the parallel nature of the styles was observable. The researcher posits this is the identification of a versatile style at the specialised level of information processing. Here the rational (analytical) style is present alongside experiential (intuitive) thinking, as Lee-Ross (2014) suggested, seen as a close, parallel imaging of both intuitive and analytical styles in profile. This was a unique finding and named a ‘mirror effect’ by the researcher. It was noted to some extent in all profiles at various times, indicating the dual processing architecture of information processing. A consistent close relationship between the intuitive and rational style was only seen in the profile of more experienced entrepreneurs who were operating in relatively stable business contexts. Others in challenging contexts showed a more significant change of style preference from intuition to analysis. The two examples of mature entrepreneurs E09 and E05, shown in figure 6.3, illustrates this versatility and support this important observation.

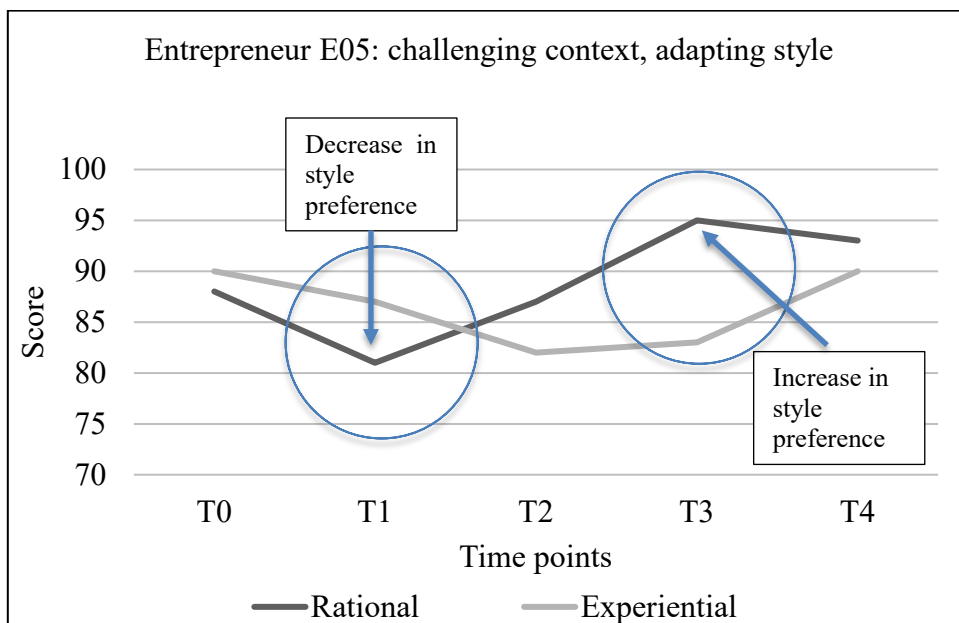
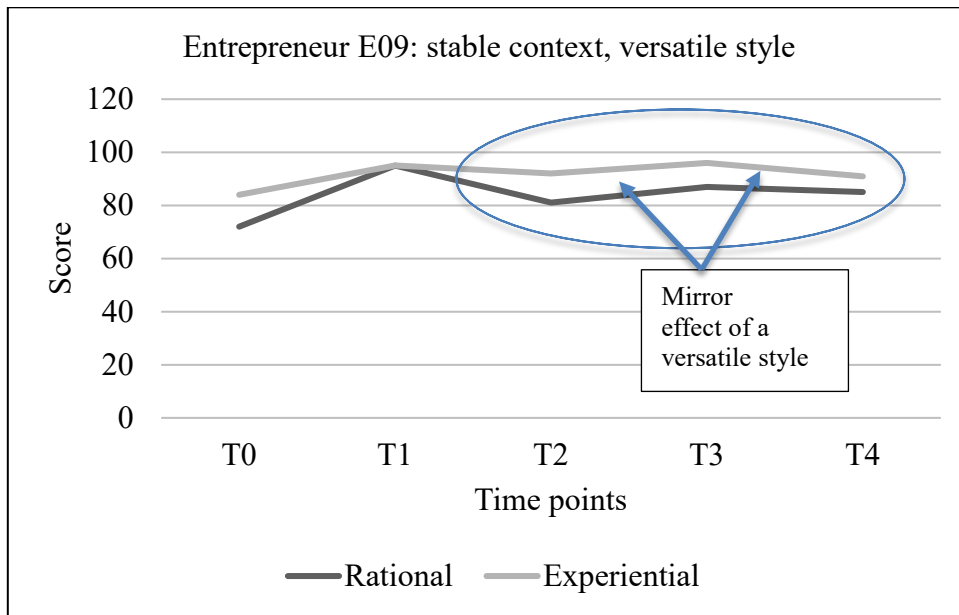


Figure 6. 3 Comparing a versatile style to the adaptation of a preferred style in stable and challenging contexts.

Whilst these results are exploratory they do support the notion that a versatile style is the operational result of stable preferences for intuitive and analytical processing (Sadler-Smith, 2009). This infers that even if an entrepreneur has sufficient experience to draw on for informed intuitive judgments (Dane and Pratt, 2007; Klein 2015) where the

intuitive style was the more dominant style, the analytical style was present alongside (Lee-Ross, 2014) thus exhibiting the ‘mirror effect’.

Interestingly, all entrepreneurs showed some parallel imaging of styles at different time points, which supports the parallel-competitive dual process architecture of processing in operation. Even with novices, this mirroring effect was observed although the difference between the two styles was more evident. Also, novices with the least experience, for example E01 showed a dominant rational style (see figure 6.4), which is indicative of a novice preference for analysis (Gustafsson, 2006), but with some parallel imagery of style. According to CEST, both systems operate in parallel (Epstein, 2008). This exemplifies that style measurement must be in line with dual process theory for explaining this function conceptually.

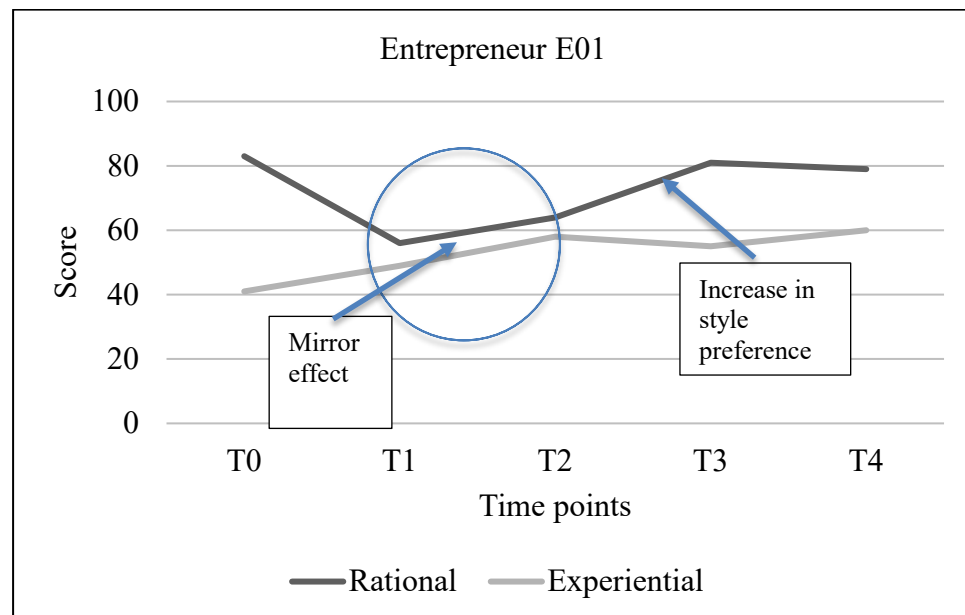


Figure 6. 4 Example of novice style and ‘mirror effect’ between time points T1-T2

These findings demonstrate clear evidence of such a style and provides a new line for future research. Sadler-Smith (2009, p16) posited that a “stable versatile state is an open question” but this study provides evidence of a versatile style. Although versatility has been identified in the entrepreneurship literature for several decades, for example “switching cognitive gears” (Louis and Sutton, 1991, p57), ”balanced and versatile” (Groves et al., 2011, p456), “complementary and may be used simultaneously” (Lee-

Ross, 2014, p12), “used in a complementary and iterative fashion” (Sinclair and Ashkanasy, 2005, p354), adapting style according to the “varying information processing demands as and when required to do so” (Hodgkinson et al., 2009, p288), “intuition can operate in parallel to analytical processing” (Baldacchino et al., 2015, p27) or “intuitive or analytic processing used interchangeably as the situation demands” (Sadler-Smith, 2009, p16), empirical evidence how this versatile style is operationalised is missing from the style and entrepreneurial cognition literature.

Moreover, the development from earlier definitions as “habit of mind” and “active thinking” (Louis and Sutton, 1991, pp55-57) as a means of explaining interpretation and behaviour has emphasised the use of dual process theory, which is increasingly seen as important (Epstein, 1994; Kozhevnikov, 2007; Sadler-Smith, 2009). Citing the parallel-competitive interpretation of dual process theory and CEST as a more insightful, generative framework, Hodgkinson and Sadler-Smith (2018) noted that this conceptualisation facilitated interplay between the two systems as conscious and non-conscious processing. This means that both the experiential and rational processing styles can interact “competitively, cooperatively and collaboratively” (Hodgkinson and Sadler-Smith, 2018, p481) consistent with dual process theories of human cognition.

This has significant implications for future practice. Firstly, based on dual process theory the conceptual explanatory framework that addresses cognitive style is the outcome of two cognitively different modes of processing (for example, Leonard et al., 1999; Sinclair and Ashkanasy, 2005; Kozhevnikov, 2007; Hodgkinson et al., 2009; Cools et al., 2014; Lee Ross, 2014; Sadler-Smith, 2016). This study’s findings provide convincing evidence how entrepreneurs adapt their individual differences to context, resulting in an interaction between style and environmental conditions (Cools, et al., 2014). Thus, the employment of mixed methods designs using the strength of both quantitative and qualitative approaches will provide more robust findings (Cools et al., 2014). Likewise, methodological triangulation will also assist understanding of cognitive style differences in different environments (Priola et al., 2004). As the temporal nature of the exploratory study showed that a versatile style developed over time as a result of experience, this supports Baldacchino et al.’s (2015) suggestion that the relationship between experience

and opportunity identification needs further exploration in order to understand how this occurs. As opportunity identification is a critical process of entrepreneurship (Mitchell et al., 2002), understanding opportunity-related decision-making is also a key part of this process (Shepherd et al., 2014).

Therefore, the construct of a versatile style opens up a new line of research. Findings indicated that cognitive versatility also mediated the relationship between experience and opportunity evaluation and this needs to be explored further. Understanding the importance of this relationship for opportunity-related decisions encourages researchers to consider the benefits of a versatile style, rather than just looking at analysis or intuition on its own (Baldacchino et al., 2015). The entrepreneur's ability to be cognitively versatile and adapt accordingly to different context and situations has far reaching implications in the decision process. These are discussed next.

First, in the small business context, opportunities for growth that show a significant increase in turnover are not an everyday occurrence. Frequently the "don't turn business away" syndrome prevails (Henley, 2018, p5). Qualitative findings suggested that for small business entrepreneurs this is the case, as the responsibility of generating work to meet costs and maintain staff are of primary importance. As a result of this, novice entrepreneurs approached opportunities cautiously compared to intermediate and mature entrepreneurs, who evaluated opportunities that were in line with their strategic intention and planning, rather than opportunities that gave them their 'bread and butter money'. Novices focused more on analytical activities, examining financial impact and resourcing, rather than seeing the bigger picture of the opportunity and what it might bring for the future. This underlines the importance of assisting developing the knowledge and expertise of novices for strategic decision-making effectiveness.

Second, the slow development of a more intuitive style for novices and the versatile style seen in mature entrepreneurs indicated the existence of a cognitive basis for domain-specific expertise and how cognitive differences in information processing influenced behaviour (Dew et al., 2015). The ability to operate both styles in accordance with contextual factors and task demands would be advantageous for opportunity evaluation and decision-making, as this versatile style would make use of previous experience of

successes and failures to support decision-making and promote confidence in what the opportunity might bring. Mature entrepreneurs showed that their initial response was based on a gut feeling, followed by an analytical checking process against their initial response. In other words, a bigger picture assessment from using both styles may result in more successful outcomes of opportunities.

Third, according to Sadler-Smith (2016) intuitive expertise takes approximately ten years to develop. Thus, assisting novices to develop intuitive skills and expertise through practice and feedback (Haynie et al., 2010) would support this process and potentially, shortcut what would naturally occur over time. Providing the right type of experiences (Harteis and Billet, 2013; Sadler-Smith and Burke-Smalley, 2015) would build appropriate domain experience for assisting a balanced approach to information processing. A teaching model is discussed in section 6.7, based on the study's findings that would assist this process. All entrepreneurs mentioned the benefits of discussing what had influenced their decisions. Novices spoke of how it improved their confidence that they were making the right decisions and doing things correctly, whereas mature entrepreneurs explained how it gave them insight into how they thought through their options. For example, when asked how the interview process had helped him, E09 explained on reflection:

“But now I think I have that probably understanding of it's not just intuition ... I am analysing it in my head even though it's not on paper, so I think it's a bit deeper than I first thought. Because when we first discussed it, I was just thinking is that all I do, I go on a wing and a prayer? But when it forces you to think about how you get to that, not necessarily the endgame, but how that process takes place, I do analyse a lot more in my head than I give myself credit for.” (E09, T3)

Fourth, the temporal nature of the study also indicated that commercially, it was some time after the final decision had been made that exploitation occurred. For example, both entrepreneurs E02 and E09's evaluation of a strategic opportunity took nearly a year after the final decision before financial benefits were evident in their business profile. Despite this, all businesses showed episodic growth to a greater or lesser extent over the two-year study. Policy has recognised this and focused more on episodic growth and a critical reassessment of high growth support (Henley, 2018). Thus, a focus on the individual characteristics of the entrepreneur as a first-person influence and the external

environment in which they operate for social and economic influences as a third person contribution to the decision process may provide new insights as to how the evaluation and decision-making process of opportunities influences successful outcomes.

Accordingly, these findings are exploratory and further longitudinal studies between five and ten years would indicate further variance of the impact of different contexts and the impact of developing experience, as an antecedent to opportunity evaluation and its related decisions. The researcher is currently undertaking a longitudinal study with three novices (from this study) to explore the development of a versatile style and the development of an intuitive style for intuitive expertise. This study will also show how individual differences in information processing influences decisions. Additionally, understanding what assists the development of intuitive expertise and what practical scenarios could be used for teaching would be extremely beneficial to practitioners. This is discussed further.

6.4.4 The development of intuitive expertise

Intuitive expertise is defined as a quick and unconscious pattern recognition “born out of intensive experience, practice and feedback” (Sadler-Smith and Burke-Smalley, 2015, p12). Despite a wide range of research that has focused on the importance of prior knowledge for opportunity identification (Baron, 2006; Ucbasaran et al., 2008) and domain specific experience (Westhead et al., 2009), there is very little literature that investigates how information processing assists the development of intuitive expertise. Emphasis is on pattern matching, but specialised knowledge transfer (Baxter, 2015) in the opportunity evaluation stage is poorly explored. Entrepreneurs develop expert intuition as a result of their domain specific experiences. Thus, knowing how, when and why this develops is advantageous for self-development, educators, practitioners and policy makers.

The study’s findings showed that the acquisition of intuitive expertise as a result of experience gave in an increasingly balanced use of all three styles in the novice profiles over time, which inferred they were developing a versatile style as they acquired domain experience. Findings from the qualitative analysis also supported the use of both analysis

and intuitive styles, whereby novices drew on previous knowledge and experience and became less reliant on analysis to support their opportunity-related decisions.

It was assumed at the start of the study that all novice entrepreneurs would have very little domain expertise to generate an immediate pattern matching response evoking a gut feeling, and as a result of this, all would show a higher analytical score. Findings showed that this assumption was incorrect, as previous experience clearly influenced some novices' information processing. Three examples support this point. Entrepreneur E08 had worked previously in the same sector, so commenced with a gut feeling and had higher intuitive scores than the other novices in the sample and a preference for intuition. Similarly, certain situations evoked an intuitive response for E03, related to her previous experience of the market, gleaned from working in the family business. E11, who had plenty of domain experience in other sectors began with a gut feeling, but followed a highly analytical and checking process thereafter, as she had little manufacturing domain experience to draw on. Thus, although novices are often assumed to be more analytical in their style preference, these findings suggest that prior experience triggers the intuitive response, but with insufficient domain and business experience, an analytical preference prevails. This is another example of the parallel-competitive nature of dual processing. Whether entrepreneurs with different domain experiences develop intuitive expertise more quickly than others who have no pre-business and domain experience, such as E011, is a research question. Certainly, findings from this study implied that prior domain and family experience was beneficial for an intuitive preference and was used even in the early stages of business. Findings from cognitive mapping also provided further insight into this, discussed in the next section.

6.5 Cognitive mapping for apprehending opportunity-related decisions

Cognitive mapping techniques were used to illustrate and provide insight into the mental representations of each entrepreneur as they engaged in opportunity-related decisions. This allowed interpretation of the connectivity and complexity of the process (for examples, see Eden 2004; Gómez et al., 2000; Jones et al., 2011; Mojtahed et al., 2014; Stoyanov et al., 2017). Broadly speaking, the cognitive map analysis showed that

opportunity-related decision-making was a top down driven process, commencing with a gut feeling of the perceived opportunity, then progressing through an iterative, staged process for the decision outcome (see figure 6.5, section 6.8.1). The longitudinal approach over five time points illustrated how the thought process developed conceptually, thus adding to the understanding of deep cognitive structures (Krueger, 2007) as it captured the unfolding process over time. This provided novel insights into structure and sequence, as the entrepreneurs evaluated the opportunity, before a final decision was made. Findings showed that there were similarities and differences between map concepts and positions and that both information processing styles were present in the interpretative process. These insights are discussed in turn.

6.5.1 Cognitive maps as mental representations

As well as being an iterative first-person process, contributions from others in the external environment as a third-person input were made to the overall decision. This was not what was expected, as research has emphasised the first-person nature of the process (Haynie et al., 2009; Wood and Williams, 2014; Wood and McKelvie, 2015). Entrepreneurs tapped into other peoples' cognitive frameworks to assist them with their decision-making. The concepts 'Talks to others', 'Talks to team' and 'Team discussion' demonstrated the use of their social capital and networks. Novices used this for gleaning information that was either missing or needed for analysis where other experienced individuals were used as an information source. Mature entrepreneurs used it to validate a decision that they had already made previously, as a checking process (Agor, 1986) to ensure that their initial gut feeling was still correct. These external networks provided access to a wide range of information (Cope et al., 2007). Collectively, this illustrated multilevel contributions to the process (Maine et al., 2015), that is, from the individual, the organisation and the external environment, used for enriching and contributing towards complex representations needed for successful decision-making. This exemplifies why an integrated approach is needed for future research. This observation was significant, as novice and mature entrepreneurs used social capital and networks for different purposes, as access to tangible and intangible resources (Baron, 2007) depending on their experience. Likewise, this shows the input of others to the process

rather than the emphasis being on first person accounts (Haynie et al., 2009; Wood and Williams 2014; Wood and McKelvie, 2015).

According to Wood and Williams (2014), entrepreneurs evaluate opportunities using rule-based processing, applying rules that are learnt or derived from past experiences. These rules are socially learned and then used to guide judgments and solutions (Smith and DeCoster, 2000). Prior research has examined rule-like criteria, for example risk (Keh et al., 2002), knowledge (Haynie et al., 2009), window of opportunity (Mitchell and Shepherd, 2010) or the use of personal rules, such as novelty, resource efficiency (Wood and Williams, 2014) and worst-case scenario (Bryant, 2007). This study's findings showed that entrepreneurs used a very top-down, structured, process to arrive at their final decision, clearly based on what is desirable and feasible "for me (or my firm)" (Williams and Wood, 2015, p220). This subjective approach was the same regardless of experience, although the arrangement of individual concepts differed according to context and experience and resulting in some broad map categories, discussed earlier in section 6.5.3.

Williams and Wood (2015) argued that specific, contextual knowledge is important for opportunity evaluation, particularly for demand and supply side considerations, essential for entrepreneurial action. The centrality scores and map concepts suggested that entrepreneurs spent a considerable amount of time collecting, analysing and evaluating information. Certainly, several entrepreneurs had a 'Plan B' to mitigate risk or planning for worst-case scenario (Bryant, 2007). Many of the concepts in the maps represented knowledge associated with customer demand, the resources required, finance and the people who operationalised the process (Haynie et al., 2009; Wood and Williams, 2014; Williams and Wood, 2015). Despite the fact that prior research points out that a key difference between entrepreneurs can be attributed to prior knowledge (Shane 2000; Krueger, 2007; Haynie et al., 2009) based on the fact that opportunity-related knowledge assists the development of more refined mental templates (Krueger, 2007), this study's findings indicated that there was some commonality of concepts seen across all maps, used for evaluation and opportunity-related decision-making. This insight is helpful for training and mentoring programmes, as it provides details of the contextualised knowledge used in the process.

6.5.1.1 Map density

Opportunity evaluation is an interpretative and reflective process, which results in entrepreneurs evaluating concepts differently according to their own circumstances (Williams and Wood, 2015). This is because entrepreneurs develop different mental templates of opportunity (Baron, 2006) according to experience, education, their information processing style and other personal dispositions (Baron and Ensley, 2006; Mitchell and Shepherd, 2010). Nevertheless, the study's findings provided a more detailed picture of the opportunity decision-making content and what concepts were connected to others in the evaluation process. Similarly, the density of the maps provided some indication of their overall map structure by recording the number of observed links and the total number of concepts in the map.

The density at first glance was low at around 0.02 (Cossette, 2002), which initially suggested that the entrepreneurs' thinking was not particularly complex. A closer look at the maps showed several feedback loops, centred on data analysis, validation, team discussion and talking to others. From this it may be concluded that the entrepreneurs' thinking was actually highly differentiated, structured as key stages in the evaluation process around a central hub of 'Thinks it through' and was also well integrated, as concepts were not only causal (in that one concept caused another to be considered), but also associated with other concepts at different levels in the overall process.

This observation confirmed that the process of making opportunity-related decisions was complex, but also that the arrangement of concepts in the maps exhibited a systematic nature of thinking. As such, an opportunity was not evaluated in a random manner; entrepreneurs followed a chronological process that demonstrated circularity and feedback loops. This finding has been key in the development of a theoretical model, discussed further in section 6.8.1. This also addresses the recommendations for alternative structures to rule-based reasoning (Wood and Williams, 2014) for developing the field. This study's findings arguably reflect a systematic and structured process, but from an information perspective. Further exploratory and exploratory research is needed for understanding how the model could be used in different scenarios and different contexts.

6.5.2 Intuition and gut feelings

The maps showed that an entrepreneur used both intuitive and analytical processing. This was seen in all cognitive maps, but to a lesser extent in novices. Some similarity between Agor's (1986) descriptions and this study's findings were noted, where the commonest pattern that emerged included both intuitive feelings and cross-checking, similar to Agor's (1986, p14) "eclectic" type. Entrepreneurs checked their gut feel, either as a physical check using hard data to confirm the feeling or by reflective thought when evaluating the opportunity. Furthermore, over time novices used a mental process similar to that observed in mature entrepreneurs, where they undertook this as a thinking process, rather than physical checking where information was read or written down. This suggests that both styles are beneficial for decision-making and supports similarities in structure found by Agor (1986) in his early work on intuition, compared to this study. Overall his work provided some important early insights of the bigger picture and are supported by this study's findings.

As noted in Chapter 5, when novice entrepreneurs used gut feelings, it was associated with a previous experience. This infers that past experience in the decision-making process is significant and therefore the relationship between these two styles is a critical question for model development (Sinclair and Ashkanasy, 2005). Feedback from the entrepreneurs showed that they became more aware of their decision-making process after discussing and seeing their cognitive maps and style assessments, which in turn helped them to utilise both types of processing style more effectively. From a coaching and mentoring perspective this would provide added value to business management programmes.

There has been considerable work on the identification of intuition and its relevance to decision-making (Ashkanasy and Sinclair, 2005; Sadler-Smith and Gore 2011; Sadler-Smith and Burke-Smalley, 2015), but very little on its contribution to the evaluation process. Findings from this study provide initial exploratory insights on the presence and use of an intuitive style in the overall evaluation and decision process, based on a dual process conceptualisation. Certainly, the presence of intuition-as-expertise and incubation periods (sleeping on it) were noted from the qualitative interviews. If too much

analytical thinking suppresses creativity and innovation (Sadler-Smith and Burke-Smalley, 2015), then a suitable balance of both styles is needed for evaluating a course of action. Differences between these modes, represented as concepts is discussed next.

6.5.3 Differences between concept positions in maps

Research has suggested that entrepreneurs can be partly differentiated by their cognition (Busenitz et al., 2003; Amato et al., 2018) and this study's findings support this, shown as two broad categories based on the position of the *initial decision* in the cognitive map. All mature and intermediate entrepreneurs commenced their evaluation process with a gut feeling followed by an immediate initial decision, before data collection and analysis. This was expected, as these entrepreneurs were experienced and would therefore be accessing their highly contextual pre-existing schemas (Curşeu, 2008). In contrast, novices, even if they commenced their evaluation process with a gut feeling, undertook extensive data analysis *before* they made an initial decision, demonstrating an analytical processing preference indicated by prior research (Gustafsson, 2006).

Moreover, in some instances, novices commenced with an initial gut feeling but were unable to make an immediate initial decision based on this response. If there was evidence of prior domain experience, for example, novice E08 who had acquired domain experience prior to starting her own business, the process echoed a similar flow as exhibited by intermediates and mature entrepreneurs. From a practitioner perspective this illustrated that not all novice entrepreneurs will be analytical in their decision-making and highlights the contribution that domain expertise makes to the information processing perspective, as well as heterogeneous nature of small business entrepreneurs. For example, E03 showed a gut feel response when the opportunity was linked to knowledge associated with the family business. Likewise, E11 who had worked previously in different sectors began the process with a gut feeling. Moreover, both these novices then went through a lengthy analytical process before making their initial decision. This indicated that they had insufficient domain expertise to make an intuitive decision or where there were non-conscious influences that were affecting conscious reasoning, in accordance with parallel-competitive dual process accounts.

The arrangement of concepts showed that it was specifically the positioning of these key concepts in the cognitive process that resulted in differentiation between entrepreneurs. This provided deeper insight of the micro differences present in deep cognitive structures (Krueger, 2007) and was a key finding, as it emphasised the importance of both the mental representations (as individual concepts) and the way information was processed as links between concepts. Understanding how these concepts are linked in the mental models of entrepreneurs provides a platform for investigating the antecedents to cognitive adaptability and versatility. This insight places emphasis on *how* concepts are linked rather than *what* concepts are variables. Entrepreneurial cognition literature has characteristically explored cognitions from either a process or structural perspective and this has led to two well developed research streams (Sánchez et al., 2011) that mostly looks at these separately, rather than holistically. Looking at a mental map as pieces of a conceptual jigsaw puzzle and under the guidance of practitioner would assist the entrepreneur to self-reflect and consider alternative styles preferences that are beneficial in different contexts. Also, assisting those with little or no experience provides the practitioner with a starting point for measuring progress.

Certainly, this study's exploratory findings indicate that a holistic perspective provided greater insights into how entrepreneurs think through their evaluations, as well as a more fruitful identification of the process as a whole. This emphasises the need for more qualitative research to support exploration of the deep cognitive structures and styles that entrepreneurs rely on when they make opportunity-related decisions. Additionally, more understanding of the dynamics of both intuition and analysis which interact on a competitive, cooperative and collaborative basis (Hodgkinson and Sadler-Smith, 2018) demands a more integrated approach to unravel how both styles interact in opportunity evaluation.

This approach also addresses the common assumption that novices are more prone to analytical decision-making than experts (Gustafsson, 2006). It can be argued that novices or less experienced entrepreneurs exhibit an analytical approach before making their final decision, because running a business and managing finance is inherently an analytical process. Even mature entrepreneurs showed a preference for analytical processing for risky or key financial decisions. Education and business training still encourage analytical

thought, especially for decision-making and financial planning. In order to address this criticism, the researcher has compiled a training framework which develops a more versatile, information processing approach for opportunity-related decisions, incorporating key concepts used in the process (see section 6.7). Furthermore, increased use of different research methods such as cognitive task analysis (CTA) and other more sophisticated techniques such as eye tracking software (Sadler-Smith and Burke Smalley, 2015; Hodgkinson and Sadler-Smith, 2018; Bendall et al., 2019), particularly over time will help to highlight intuition and analysis in situ. This may foster greater understanding of the cognitive, behavioural micro foundations of opportunity-related decision-making as an area for future research.

6.5.4 Map connectivity and new links in novices' mental representations

Every concept that showed a real or possible influence on another concept was linked to that concept, in accordance with cognitive mapping representations (Cossette, 2002). These links could be categorised (Gómez et al., 2000) which was useful and provided insight into how the map was structured, as discussed previously. In addition, all novice entrepreneurs showed an increase in their connectivity year-on-year, which was to be expected, as they were learning and gaining new experiences as implicit knowledge, represented as new concepts and links in their mental model.

The analysis of connectivity, that is, the total number of connections between concepts revealed a unique finding. This was the development of a new link between 'Past experience' and 'Thinks it through' in the mental representations of novice entrepreneurs providing clear evidence how knowledge is "structured at a very deep level" (Krueger, 2007, p124) and importantly, how new knowledge evolves. This finding supported the notion that experts typically organise the structure of content differently (Krueger, 2007) and that expertise appears to be learned (Ericsson et al., 2006; Krueger, 2007; Dane et al., 2012; Sadler-Smith and Burke-Smalley, 2015) and constructed (Krueger, 2007). Moreover, it was noted that after this new direct link between 'Past experience' and the Hub emerged, multiple pathways were provided to other concepts resulting in increased complexity of representations.

Treating links as pathways between different concepts provided some indication how intuitive processing operated in the entrepreneur's mental representations and how these deep structures were constructed and changed. Acquisition of new knowledge forced a new connection and changed in the way concepts were organised (Krueger, 2007). This facilitated aggregation of information (Sadler-Smith and Burke-Smalley, 2015) resulting in more meaningful patterns for matching against similar situations (Baron, 2007; Sadler-Smith and Burke-Smalley, 2015). This amassed expertise, via the 'Past experience' concept, aroused through unconscious thought and a gut feeling as a somatic marker (Sadler-Smith, 2016), which elicited a response for an initial decision. A link was also present from 'Prior expertise' and 'Previous mistakes' to 'Thinks it through' showing that previous experience, expertise and past mistakes were used in the reflective thought process. In addition, some of these intuitive concepts were linked to more analytical concepts, for example, 'Thinks it through' as the Hub was linked to 'Data analysis' or 'Reviews and checks data'. In other words, interplay between the different modes of processing was evident as intuitive concepts linked to analytical concepts. Thus, map connectivity and concept arrangement supported the previous discussion on a versatile style by illustrating that analytical and intuitive concepts were present in mental models and connected by links or pathways to each other.

Using CEST and the dual process theory (Epstein et al., 1996; Pacini and Epstein, 1999; Hodgkinson and Sadler-Smith, 2018) to explain this finding suggests that it was likely that the concept past experience triggered thought both as a sequential interaction (automatic processing influencing conscious reasoning) and in the opposite direction (rational thought triggering associations in the experiential system), in accordance with the CEST theory (Hodgkinson and Sadler-Smith, 2018). This showed a parallel-competitive approach and explained how the dynamics of intuition and analysis could be fruitfully developed for any future research (Hodgkinson and Sadler-Smith, 2018) and for formal entrepreneurship or management education (Sadler-Smith and Burke-Smalley, 2015). Thus, rather than a novice being treated as analytical and a mature entrepreneur as intuitive, it is more appropriate that both styles are used as a foundation for learning and development and entrepreneurs regarded as versatile, the extent of which depends on their experience and domain specific expertise.

Connectivity showed that there was no link evident from ‘Thinks it through’ to ‘Past experience’ in the novices’ maps until the second year of the study. This inferred that until the novice entrepreneur had sufficient tacit knowledge to draw on subconsciously, the link was not present. This supports the fact that intuitive expertise takes approximately ten years or so to develop as a result of intensive practice, feedback and reflection (Sadler-Smith and Burke Smalley, 2015). Dane et al. (2012, p192) noted that as individuals attained a moderate level of domain expertise “the effectiveness on intuitive decision-making on non-decomposable tasks increased”. This study also found that that novice entrepreneurs with a few years of practice had sufficient domain knowledge to make *some* intuitive decisions. The impact of experience has been shown by Curşeu and Louwers (2008) to be fully mediated by cognitive complexity in relation to the decisional situation. Thus, when the link was present it indicated a tipping point for the preference to use an intuitive mode of processing as the more automatic functioning of System 1. As entrepreneurs differ in their preference to apply intuition and analysis (Hodgkinson and Sadler-Smith, 2003; Sinclair and Ashkanasy, 2005; Betsch and Iannello, 2010), this tipping point will vary according to information preference and experience.

Connectivity developed as novices gained experience and confidence in their decision-making. When this link between ‘Past experience’ and ‘Thinks it through’ was present, it created new concept to concept relationships that had not been present before or shortened pathways between existing concepts. For example, where mature and intermediate entrepreneurs used past experience for their initial decision, a link was present between ‘Past experience’, ‘Gut feeling’ and ‘Thinks it through’. Before this link was evident, novices indicated that it was difficult to trust their response to a gut feel for an initial decision. For example, novices E03 and E01 stated:

“Now I think I am changing a little bit on that I do trust my gut feeling a bit more now.” (E03, T1)

“Gut feeling does come into it but I’ve never trusted my gut so much that I wouldn’t go and do some research first.” (E01, T0)

Although there was a gradual change towards an intuitive preference noted during the study for novices, they did not refer consistently to using a gut feel for an immediate initial decision, other than for a very quick low risk operational decision. In view of the fact that intuitive expertise typically takes ten years or more of learning and experience to develop (Sadler-Smith, 2016) this was not surprising, as any change would be observed as a slow, developmental process. As noted by a novice entrepreneur:

“I think with age and experience I’ve started to think I’ve done that before my gut feeling on that was right and I think I wouldn’t be surprised if you did this time in 10 years that I would have switched.” (E03, T1)

Other new links were also noted in year two, from ‘Talks to team’, ‘Financial impact’, ‘People required’, ‘Feedback’ and ‘Planning’. These findings provided a clear indication how new links opened up the cognitive structures at deeper levels, as well as asserting the importance of new knowledge needed for domain specificity and opportunity-related decision-making. The move from a subjective first-person approach to interaction with the external environment for third person involvement as social and knowledge interactions with others or with work teams appears significant for the development of new links and knowledge. This is explored further in the next section.

6.5.5 Developing connectivity in mental representations

The outcome of this new link was likened as ‘opening doors’ to other concepts, where it created accessibility to other concepts through new pathways and as a result, increased complexity of the mental representations. This encouraged highly differentiated thinking (new links to different concepts) and integration (direct and indirect links between concepts) (Curşeu, 2008) and was a significant finding of this study.

Activities that address the development of this link by practitioners and educators would accelerate the development of expertise. Supporting the development of deep knowledge structures is considered key to the development of intuition-as-expertise and makes significant contribution to theory and practice. It provides empirical evidence for propositions made by Krueger (2007, p127) to understand “how entrepreneurs develop and change their deep knowledge structures by which expert entrepreneurs grow”.

According to Ericsson et al. (2006), prolonged deliberate practice may help to enhance cognitive systems so that they can access previously acquired information more quickly, where the acquisition of pattern matching over time would deliver a fast response to associative connections (Baron, 2007). This would reduce reliance on analytical decision-making and encourage intuitive thinking as “trusting my gut” (Dane et al., 2012, p120).

According to Harteis and Billet (2013), the development of expertise implies learning in circumstances of professional practice. This means that a variety of activities are required to develop a broad knowledge corridor (Westhead et al., 2009) for increased connectivity. Without this, entrepreneurs may become constrained by their own limitations and only assess the opportunity in context of what is known to them. This was very noticeable with novices, who used prior success and similar opportunities as a benchmark. Thus, a practitioner needs to encourage participation in a range of different activities that would take the novice entrepreneur outside their comfort zone, such as social networking, mentoring or business events. Where this was happening as a result of the novice’s own initiative or determination to learn (for example, C03) increased confidence in the use of intuitive processing was observed.

Hence, these links had a positive effect on the centrality scores, attributed to increased social interaction between the individual entrepreneurs and others, or a need for new, specific information that was obtained from peoples’ knowledge rather than from their own data search and collection. As posited by Krueger (2007) any insight into differences in the deep cognitive structures of entrepreneurs is beneficial for the field of entrepreneurship, particularly regarding insights into the entrepreneurial mindset. Findings also supported Baron and Ensley’s (2006) research that showed experienced entrepreneurs had richer and more detailed mental models than novices, based on a repertoire of tacit knowledge built from experience.

All in all, the observation of these developing links has provided an explanation how novices process experience and how their deep knowledge structures change over time. However, the researcher offers a word of caution for practitioners who wish to coach for

growth where the focus is on assisting more established business entrepreneurs. Those entrepreneurs who have expertise, show a preference for intuitive processing and are operating in less complex situations may use their implicit representations for opportunity-related decisions, demonstrating a lower score for cognitive complexity as a result of the use of cognitive biases and heuristics. Thus, even though style assessment would indicate a high intuitive preference as expertise is accessed, general heuristics and bias may have a greater impact on their decision process. Complexity results for E04, E06 E07 and E09 supported this, shown previously in table 5.5.

In contrast to this, novices with a preference for an analytical style and with a high knowing style (need for cognition) would engage in effortful activities and thus show a higher complexity score as the findings demonstrated. The more typical heuristics of overconfidence and representativeness would not be so evident. As experience, confidence and new links developed, the benefits of a versatile style and the negative influences of bias and heuristics can be addressed. In addition, the higher complexity scores for mature entrepreneurs E02 and E05 suggested that despite their preference to process information intuitively, a versatile style enabled them to adapt by accessing information they needed at that time. Similarly, entrepreneur E10 also showed a high complexity score, despite a more novice profile due to a business restart, as he was accessing domain experience. The complexity of the cognitive processes associated with evaluating an opportunity indicated a variety of variables that mediated this evaluation process. Thus teaching, training and learning must be appropriately matched to each entrepreneur in context. A teaching framework, as outlined in objective six, was developed to address this differentiation and is discussed in section 6.7.

6.5.6 Cognitive complexity as beneficial for opportunity-related decisions

Cognitive complexity is regarded as an attribute of the cognitive system (Curşeu, 2008). A high cognitive complexity score has been shown to be advantageous for successful decision-making (Curşeu, 2008; Iederan et al., 2009). An entrepreneur who can differentiate a system into many different parts or concepts and make connections between these has high cognitive complexity (van Gestel, 2008) and can evaluate in a more positive way (Iederan et al., 2009). Ultimately, the development of a highly

connected and integrated mental model would increase the ability to adapt to change, show a greater awareness of the environment and make more efficient decisions (Calori et al., 1994). This would be beneficial for evaluating opportunities, assessing a wide variety of information and the opportunity's applicability at multi-levels in the business.

Arguably, cognitively complex entrepreneurs increase their chance of identifying more business opportunities and would be able to undertake a more thorough and detailed evaluation of the opportunity for a successful outcome. On the other hand, novices would be less cognitively complex and thus less able to efficiently spot and evaluate opportunities. Therefore, cognitive complexity mediates the personal characteristics and individual differences of the entrepreneur and the decision outcome (Curşeu and Louwers, 2008).

Aggregating data between the cognitive styles scores and the cognitively complexity results gave interesting insights into the relationship between style and cognitive complexity. Figure 6.1 discussed in the previous chapter compares creative and experiential results at T0 and T4 with connectivity and number of concepts. These results are used to calculate complexity. A high score for cognitive complexity indicates that entrepreneurs are more aware of the impact of their environment, more flexible, can adapt to change, are a more efficient decision-maker and a more frequent innovator (van Gestel, 2008). This infers a rich, structural content with an intuitive style working alongside a rational style. In addition, highly cognitive individuals are more creative (Westhead et al., 2005) and spot more opportunities compared to those with less-detailed cognitive representations (van Gestel, 2008). These two statements have implications for practitioners who are coaching entrepreneurs and their business for growth.

Over the study time period, entrepreneurs with a high creative style score showed higher connectivity if they were actively involved in making an opportunity-related decision. This infers that novice entrepreneurs must be active participants in their decision-making, involving teams and networks. The evaluation process required a high level of differentiated concepts and integration, whilst assessing the feasibility and desirability of what the opportunity would bring for the business. Those entrepreneurs who

demonstrated this, such as E02, E05 and E10 had high cognitive complexity and a high creative and experiential style over the time period. Those who were not active participants in the decision process did not have high complexity scores, for example E11, despite a high intuitive style. Therefore, cognitive complexity mediates the relationship between an intuitive style and opportunity-related decision-making effectiveness.

However, other influences on cognitive complexity were also identified. For example, entrepreneurs E04, E07 and E09 had lower cognitive complexity scores than expected, despite an intermediate or mature profile and a high creative style. A difficult relationship with his partner created an emotional environment for E04 which impacted on his creativity. Emotion is known to disrupt information processing preferences (Curşeu et al., 2008; Sadler-Smith, 2016). Use of general heuristics simplified the mental representations of E09, despite a very high creative processing preference. Another example, E07, focused more on statistical business analysis and was not involved in decision-making by her senior team until the final decision stage. These examples indicate the need for further research to examine the impact of context and emotion on cognitive complexity as a complex construct. It also brings into focus the need to explore these influences over time, as a static design would not have shown these findings.

Novices also had high connectivity as they were processing new information and were developing an intuitive style through experience. Concepts and links showed a slight increase over the two-year period as their mental models became more detailed as a result of experiencing the complexity of the small business environment. Figure 5.19 in the previous chapter showed that even by the end of the study, their connectivity was higher than most mature entrepreneurs. Overall, these findings support the notion that cognitive complexity mediates the relationship between creative and experiential information processing and successful opportunity-related decision-making.

The complexity scores gave a more detailed picture of the micro-level differences between entrepreneurs. For this study the results of absolute complexity (ACMCo) were higher for novices and those entrepreneurs who were engaged in contextually challenging situations, for example, E02, E05 and E10. This value indicated that the

entrepreneur was using many concepts, richly interconnected in different ways. It was expected that mature entrepreneurs in complex and challenging environments would exhibit low complexity as general heuristics would be used as shortcuts for processing information in uncertain and complex situations (Busenitz and Barney, 1997). This was not the case and is discussed further.

Qualitative data indicated that entrepreneur E02, E05 and E10 were making key strategic decisions that were changing the nature and direction of their business. All three were drawing on past experience, but additionally having to find and assimilate information that they were unfamiliar with. These three entrepreneurs were very experienced, confident individuals. Curiously, there was no evidence of oversimplification of their mental model through the use of heuristics, and biases, such as overconfidence (overestimation of one's capabilities) or the representativeness bias (relying on personal experiences to rely on the probability that an event is dependent on previous events). This suggested that they were not only processing information intuitively, but were using more information in an analytical way, demonstrating cognitive versatility. The researcher posits that the evaluation of the opportunity invoked information seeking outside their specific domain, thus information processing was based more outside their own domain experience rather than within it, hence the richly interconnected, high number of concepts. Context here was significant in supporting this explanation and the style assessment showed an increase of the knowing style during the period, pointing to the use of more analytical processing of new information required for the opportunity. Figure 6.3 shows this increase of the knowing style from T1-T3 for entrepreneur E05.

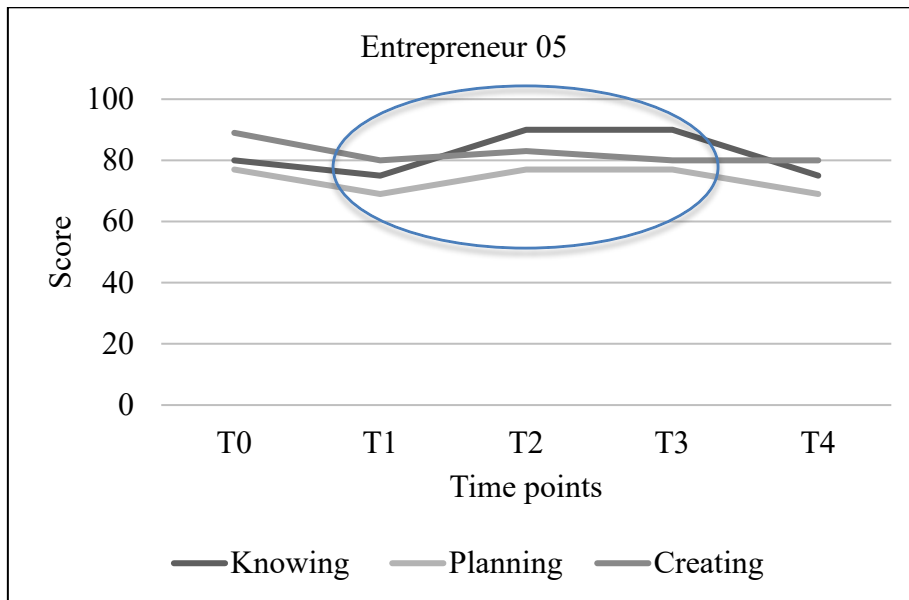


Figure 6. 5 Adaptation of knowing style to context for entrepreneur E05

In contrast, those entrepreneurs who were evaluating opportunities that were within their specific domain had lower complexity scores (for example, E04, E06, E07, E09). As experienced, confident entrepreneurs, their mental maps had fewer links and connections as well as lower complexity scores. In other words, they were using mental short cuts for information processing that simplified their mental models.

One explanation for these differences is that the context of the evaluation opportunity is significant. Those with extensive domain specific knowledge may be more sensitive to the use of cognitive heuristics for decision-making, leading to heuristic processing of information and a decrease in analysis (Curşeu and Louwers, 2008), resulting in simplified representations. Where the information processing required new or different domain knowledge, there was less use of heuristics, which explains why certain entrepreneurs had high scores and others lower. In a similar fashion, novices had little experience and would be using more information and be less sensitive to the representativeness bias because of their lower level of confidence (Curşeu and Louwers, 2008). The complexity of the novices' scores increasing in year two would also suggest that as their experience improved, their cognitive representations became more complex as a result of intuitive expertise. Implicit knowledge representations as contextual domain

schema are beneficial (Curşeu and Louwers, 2008), so this would also explain their increased scores in year two. Unravelling and understanding these micro differences between experience and context is a very difficult differentiation process for educators and practitioners. To help this, future research should look at the differences in the use of heuristics for opportunity-related decisions, to determine the impact of context on differences and similarities in mental representations, as well as how different types of experiences and context were mediated by cognitive complexity.

Gaining experience does not necessarily guarantee increased cognitive complexity. Kuhlmann and Ardichvili (2015) argued that the development of expertise needed to be linked to the right kind of experience, whereby individuals must repeatedly address increasingly difficult and complex issues. In a small business environment, it may be difficult to provide a range of challenging experiences, particularly in the early stages, when business requires steady growth or where risk is high. Gibcus and Hoesel's (2008) research noted that risk awareness in the decision-making process was relatively low, also shown in this study findings by the connectivity analysis. Novices E03 and E08 were engaged in challenging situations and had similar complexity scores to mature entrepreneurs who were actively engaged in their business networks. It can be argued that opportunities to share, discuss and learn new experiences through networking would improve connectivity and assist the development of more complex, differentiated structures needed for expertise. A successful entrepreneur requires complex knowledge representations in many different domains (Curşeu, 2008). For a practitioner, if this were the case, then it implies that learning situations, such as scenarios setting and discussion using alternative experience platforms will help to address any gaps and make the learning activity more appropriate for the individual.

Arguably, if this expertise could be learned through business social networking, management training or mentoring programmes, the entrepreneur would become experienced at an earlier stage of their professional development. The developing link between talking to teams and others helped to develop the complexity of mental representations, indicating that these links are vital for improving connectivity and the development of complex, highly contextual schemas (Curşeu, 2008; Iederan et al., 2009). It was noticeable that those entrepreneurs who used their social capital for networking

had more complex mental representations, providing access to tangible and nontangible resources for information exchange (Baron, 2007). Thus, the ability to make more connections or join the dots (Baron, 2006) created more active pathways.

Finding time for small business entrepreneurs to attend networking and business events is challenging, but this is a fruitful source of expertise and experience that would help to develop domain experience and business knowledge. As a supplementary mechanism for improving the structural complexity of knowledge representations, support networks for small business entrepreneurs is a useful provision for assisting the development of information networks and providing insight into others' experiences. A further insight into the importance of these connections was obtained using the centrality scores of each entrepreneur. This is discussed in the next section.

6.6 The centrality findings and significant links between concepts

Important concepts used during the thinking process, the characteristics of these concepts and the way that they were organised in each structure (Cossette, 2002; Eden, 2004; Chaney, 2010; Curşeu et al., 2008) were determined using a "reachability matrix" (Cossette, 2002, p173). This is where the number of variables directly and indirectly linked to each concept was calculated up to four levels of connections (Cossette, 2002). A concept is particularly significant when it has many links with others (Cossette, 2002, p173). This measure provided a centrality score which allowed the researcher to probe relationships between concepts that the entrepreneur may be unaware of (Cossette, 2002, p173). The importance of concepts by centrality score (see table 5.6) provided valuable insights into how the evaluation process was structured and raised some interesting questions. These are discussed in turn.

First, financial concepts did not have such a high centrality score as expected. Although an assessment of finance was observed in the data analysis and thinking through process, it was not a central concept in the evaluation process. Financial concepts, for example, financial impact, finance investment check, cash flow, next year's budget or costs and checks for profitability all had low scores. This suggested that early on, at opportunity identification stage, some financial evaluation was made and if too costly or financially

risky the opportunity was discarded and no further evaluation took place. This approach was particularly noticeable for novices, associated with lack of confidence, a risk assessment made before an initial decision and a more analytical style. They only pursued ideas that had significant financial credibility. Intermediates and mature entrepreneurs with a high scoring intuitive style briefly assessed the risk, then thought through the supply and demand side issues, as well as regarding the profit potential and consequences if pursued (Bryant, 2007; Wood and Williams, 2014). The idea was only evaluated more carefully if there were serious cash flow issues (or example see figure 5.2, p169). Hence if the gut feel about the opportunity was positive, a decision was quickly made. Described as “damage limitation” (E05) “Plan B” (E02) and “winging it” (E09), adjustments were made in the exploitation stage. The higher the intuitive style, the more this was noted.

Second, the position of validating the decision had a different purpose depending on the level of experience. Intermediate and mature entrepreneurs validated their decision by talking to colleagues and others in social networks before final decision. With novices the initial decision was made after thinking it through, then validated as discussion/feedback with the senior team or with directors prior to the final decision. Some explanation of this difference may be accounted for by confidence. Centrality scores showed that on average confidence was only a second level concept, where novices had a lower score. If one’s belief in confidence is based on abilities, general and future knowledge (Hayward et al., 2009), mature entrepreneurs would have sufficient intuitive expertise to be aware of their own performance and capable of determining their likelihood of future success (Hayward et al., 2009).

Evidence from behavioural decision theory has shown that feedback helps individuals to adjust for success and failure (Griffin and Tversky, 1992). Similarly, Fredrickson’s (2003) broaden and build theory of positive emotions implies that high levels of confidence strengthens emotional resilience to failure (Hayward et al., 2009, p23). Thus, an initial decision would be based on a gut feel and quickly checked out by looking at the data, but for a confident, experienced entrepreneur, talking to others and obtaining feedback would provide validation of their initial response in terms of success or failure. In addition, Curşeu and Louwers (2008) posited that experienced entrepreneurs are more than likely to overestimate their success, which makes them overconfident. This

decreases the probability of using sufficient analytical information processes to assess the opportunity. Validating the decision with others can be regarded as a social response for checking the final decision. It appears that experienced entrepreneurs use a variety of approaches to ensure that their decision is a valid one.

Third, the concept of risk was expected to have a high centrality score, given the challenges of small business and judgments made under uncertainty and complexity (Allinson et al., 2000). Only one participant showed a very high centrality score for risk in terms of successfully turning that idea into an opportunity. This was a mature entrepreneur E02, who during the course of the study was engaged in evaluating several new international opportunities, all of which carried high strategic risk. This implied that the evaluation of risk was determined by context. Similarly, novices showed a slight increase over time in their centrality scores for risk and a significant increase more closely associated with the potential financial impact on their business.

Perceived risk is a significant aspect of evaluation, but the antecedents of risk perception of entrepreneurs are less known (Keh et al., 2002). Centrality scores for risk suggested it was not a critical concept in the evaluation process, unless the opportunity was associated with very different contexts. Risk perception has been shown to have a significant effect on entrepreneurial activities and that cognitive biases, illusion of control and belief in the law of small numbers on opportunity evaluation were mediated by risk perception (Keh et al., 2002). This implies that entrepreneurs believed they were able to influence and control future outcomes. Findings show that this was correct; experienced entrepreneurs stated that the outcome could always be modified and adapted later in the operational stage if the opportunity did not work out as planned, by taking appropriate action even at a late stage. Others had 'Plan B' ready, just in case. Some appeared ambivalent about the outcome, citing that they had done this before. Here, their lower scores for risk may be the result of heuristics or a negative impact of age on cognitive complexity (Curşeu and Louwers (2008), resulting in general heuristics rather than the experience heuristic used for opportunity evaluation.

6.6.1 The centrality of ‘Thinks it through’ as the Hub

The most important concept that emerged was ‘Thinks it through’, which acted as a central Hub in the mental model. A closer look at this concept showed that it had the greatest number of links to other concepts for all the entrepreneurs in the study, including novices by the end of year two. From this Hub the entrepreneur’s thinking used analytical and intuitive information processing to sift through a wide variety of contextual knowledge and related concepts that considered, as discussed previously, the demand and supply resource side of the opportunity and other operational and financial associated concepts. As previous research has shown, prior knowledge influences opportunity-related cognitions (Baron and Ensley, 2006; Haynie et al., 2009). The centrality score and the concepts linked to this suggested that either directly or indirectly, a broad range of knowledge was used to assess the attractiveness of the opportunity. The high centrality score for ‘Thinks it through’ indicated that the central core of the organising framework used both information processing styles, cause and effect relationships and reasoning rules (Williams and Wood, 2015), for assessing feasibility. Again, this emphasised the importance of looking at the evaluation process in an integrated manner, paying attention to the cognitive dynamics and decision-making framework entrepreneurs use for evaluating opportunities (Wood and Williams, 2014).

The centrality of the ‘Thinks it through’ concept in the map framework showed the importance of reflective thought and metacognitive abilities (Haynie et al., 2010). Moreover, most important concepts by centrality score (>10, see table 5.6) indicated how the entrepreneurs structured their thinking and which concepts were actively represented in the overall process. Data and information collection were key concepts, positioned early on in the process for assessing feasibility. Novices collected data for a more detailed analysis if they lacked domain experience. More experienced entrepreneurs (intermediates and mature) collected information to check out their gut feeling response, similar to Agor’s (1986) eclectic category. Data analysis also showed a high centrality score, but was positioned differently according to experience. This was either before or after the ‘Thinks it through’ as a separate concept for novices, due to insufficient relevant mental schemas associated with quick pattern matching (Baron, 2006; Dane and Pratt, 2007; Sadler-Smith and Burke-Smalley, 2015). The ‘Thinks it through’ concept was

connected to both analytical and intuitive based concepts, as the operationalisation of a versatile style (Sadler-Smith, 2009), discussed previously. Here both intuition and analysis were taking part on a moment to moment basis as a seamless integration between the rational and experiential systems (Hodgkinson and Sadler-Smith, 2018).

A focus on links with other concepts indicated how prior knowledge strengthened the relationship between experience and the Hub of 'Thinks it through'. Thus, entrepreneurs with a range of previous experiences, as shown by their high centrality scores for past experience and learning from mistakes, would be more effective in applying impact evaluations of opportunities (Haynie et al., 2009; Mitchell and Shepherd, 2010). Opportunities are more attractive when they are closely related to the existing knowledge entrepreneurs have acquired over time (Haynie et al., 2009; Mitchell and Shepherd, 2010). Certainly, the centrality scores indicated that the use of prior experience and other knowledge concepts was of prime importance for evaluation and opportunity-related decision-making. This suggested that the entrepreneur could make a quicker and more favourable assessments if they had the relevant, previous experience (Baron, 2007; Krueger, 2007; Haynie et al. 2010; Harteis and Billet, 2013; Sadler-Smith and Burke-Smalley, 2015; Williams and Wood, 2015) which arguably could be delivered through development programmes from educators or practitioners. Therefore, access to an inferential bank of knowledge, as well as a broad range of other general knowledge and business associated concepts, allowed for fast linking and higher cognitive complexity. This insight into the centrality importance of knowledge supported previous work on the implications of prior knowledge and the entrepreneurial process (for example, Shane 2000; Baron and Ensley, 2006; Haynie et al., 2009; Mitchell and Shepherd, 2010; Wood et al., 2010; Wood and Williams, 2014). It also contributes towards understanding the differences in deep cognitive structures of expert entrepreneurs (Krueger, 2007).

In view of these findings, the researcher created a teaching model for assisting opportunity evaluation and decision-making effectiveness and a theoretical model for underpinning future research on opportunity-related decisions. This was as a result of insightful key findings from the analysis of style assessments, cognitive mapping complexity and centrality scores. Both models are explained and discussed next.

6.7 A teaching model for opportunity-related decisions

Understanding the importance of connectivity and centrality has positive implications for practitioners and educators who wish to assist and develop experiential learning for cognitive decision-making, beyond the typical cause and effect relationships that develop from practice. Deliberate practice mechanisms to accelerate the development of expertise (Haynie et al., 2010; Baxter, 2015; Sadler-Smith, 2015) are needed for practitioners, given the complexity of individual differences, context and experiences. As such, a learning centred focus should be based on knowledge structures, not just content (Krueger, 2007) and requires a framework that facilitates entrepreneurs actively enquiring, processing and organising new knowledge for changing beliefs and deep mental structures (Krueger, 2007). Thus, a teaching model (as a framework) for assisting opportunity evaluation and the opportunity related-decisions was created to address this, derived from the highest average centrality scores of key concepts identified during the analysis. This addresses objective six of the study.

According to Krueger (2007, p125), it is important “for learners to understand the deep cognitive changes” and for instructors to help “to confront and resolve discrepancies and contradictions in their constructed knowledge base”. The model is based on key concepts identified from this study and provides a framework for structured guidance, as well as assisting the development of new links between concepts for intuitive expertise in the entrepreneurial process (Sadler-Smith, 2016). As proposed by Krueger (2007) changing deep cognitive structures to metacognitive capability through learning-centric approaches must focus on knowledge structure and not just knowledge content. This model is designed to do both by understanding how an expert mind set develops and what specific knowledge is required or must be changed (Krueger, 2007) to achieve this expert status.

6.7.1 The development of the CARVA model

The CARVA model (Collect, Analyse, Reflect, Validate and Act), shown in figure 6.6 depicts the arrangement of commonly identified concepts from this study, used for opportunity-related decisions.

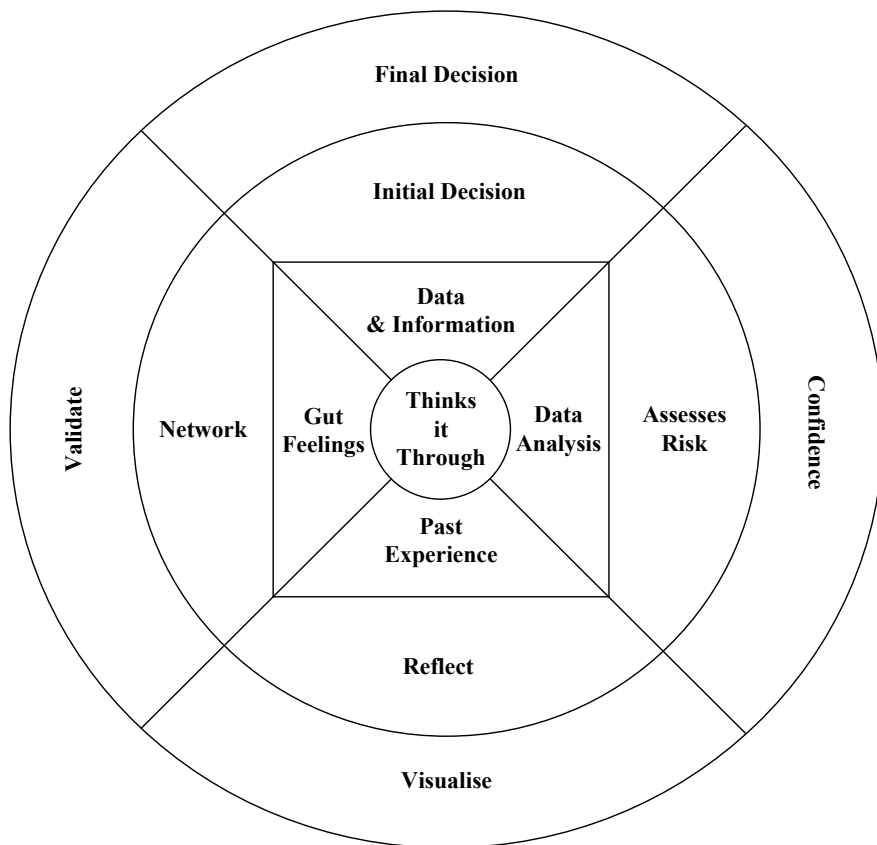


Figure 6. 6 CARVA model for developing opportunity-related decision-making effectiveness.

Positioned at the centre of the framework for this model is the core concept ‘Thinks it through’, known as the Hub. This acts as a conduit for linking concept to concept for high connectivity. The next level of concepts, data and information, data analysis, past experience and gut feelings act as second level concepts and form the framing stage of the evaluation process. The selection and processing of these concepts is contingent with experience, style preference or context. The third level focuses on the assessment of risk and the initial decision, either as an important decision stage for novices or as a validation networking process for mature entrepreneurs. The final level indicates key concepts that are linked to and influence these previous levels, prior to the final decision. Thus, the framework provides four different but linked levels of information processing for informing opportunity-related decisions.

The application of this teaching model begins with an identified opportunity for a decision, either as a group activity in a teaching situation or face-to-face approach for coaching and mentoring. The Hub represents the thinking process of the entrepreneur whilst evaluating whether or not the opportunity is feasible or desirable 'for me' or 'my business' (Wood and Williams 2014, p574). Second level concepts are explored next, using analytical and intuitive information processing that can be linked to previous style assessments if applicable. Here, all four concepts and their contribution to the process are examined in the context of the opportunity, although the order of preference for this is chosen by the individual. This level of processing informs the practitioner or educator what information is used or required. Preferences for intuitive and analytical processing, plus any missing gaps or over simplification and mental shortcuts (heuristics) can be identified for feedback. There may be an initial decision discussed or made at the end of this stage.

Next, reflection on resources required (for example, people, supply/demand, financial) is considered. This will indicate what domain experiences are accessed and where there are gaps as a result of a lack of experience, knowledge or from taking mental shortcuts. This is a reflective process where individuals think through the opportunity using experiential thought, metacognitive processes and pattern matching. Links back to previous level are noted and discussed. Other information sought from internal networks (teams) or external (business and social networks) is examined after this and used to validate the initial decision. The outcomes are visualised and compared to end goals and confidence in the final decision is ratified. This provides a detailed understanding of an individual's mental representation of the evaluation process in context of an identified opportunity. As a result of this, the thinking process can be mapped out from the Hub, similar to the cognitive maps, or alternatively, as a mind map.

The combination of different concepts promotes use of different information processing modes (analysis and intuitive) which stimulates the interplay between the two systems for the development of versatile, cognitive strategies (Louis and Sutton, 1991; Hodgkinson and Clarke, 2007; Hodgkinson et al., 2009) and pattern matching (Baron, 2006, 2007). This strengthens and creates new pathways for increased connectivity,

through provision of deliberate and differentiated practice (Sadler-Smith and Burke-Smalley, 2015; Sadler-Smith, 2016). Repeating this activity with different opportunities and highlighting the right kind of experience assists individuals to address increasingly difficult and complex issues (Kuhlmann and Ardichvili, 2015) and diversity of knowledge. This can be provided as contextual activities, in accordance with trainer/client needs identification as a result of this activity or from using the proposed CARVA model.

6.8 A theoretical model for opportunity-related decisions

Additionally, using findings obtained from style assessments, rich and detailed qualitative description and cognitive complexity and connectivity analysis, a theoretical model of opportunity-related decisions is posited. This is in response to prior recommendations (for example, Barbosa, 2014; Shepherd et al., 2014; Grégoire et al., 2015; Wood and McKelvie, 2015) as there is little research that considers opportunity evaluation and its related decision-making process over time. Hence this model contributes towards future research and theory at the critical bridge between identification and exploitation. This makes an important contribution to the opportunity evaluation literature by providing a theoretical framework that supports the information processing perspective. It also addresses a gap in the entrepreneurship evaluation literature by taking an integrative and temporal approach (Wiklund et al., 2009).

Chandra (2017) developed a time-based process model of international entrepreneurial opportunity evaluation, showing how entrepreneurs refined and revised their evaluation process as they developed experience. Earlier research by Nutt (2008) also showed that action-making steps for decision-making can be replaced with a re-development process if the original idea fails. Both these findings imply that opportunity-related decisions are iterative and can be revised or adapted accordingly.

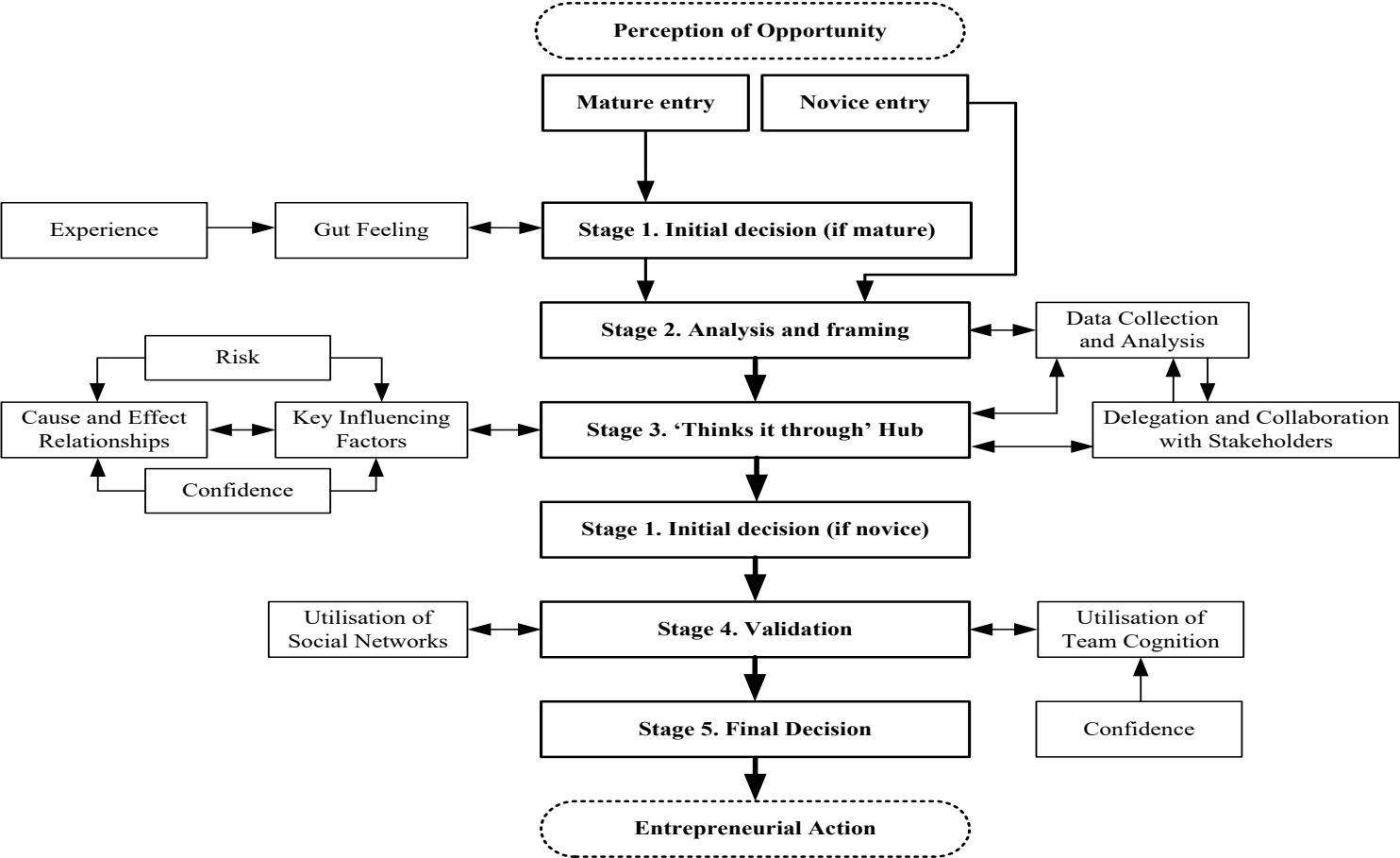
6.8.1 Theoretical model development

The model shown in figure 6.7 comprises of five interdependent sub processes illustrating how entrepreneurs evaluate an opportunity and make opportunity-related decisions, past the start-up stage of their business. These five stages have emerged from the study's findings and illustrate a temporal process. The model combines findings from the three integrated perspectives taken in this study, namely opportunity evaluation, decision-making and entrepreneurial cognition. Five previous research frameworks in the entrepreneurship literature, Andresen et al. (2014), Chandra et al. (2017) Gibcus and Hoesel (2008), Wiklund et al. (2009) and Clarysse et al. (2014) were explored for guidance. Their contribution towards this design is discussed next.

First, Gibcus and Hoesel (2008) conducted two exploratory pilot studies showing that the decision-making process of small and medium sized entrepreneurial businesses proposed three distinct (provisional) stages: emergence of the idea, elaboration of the idea and implementation of the decision. As a result of their first pilot study they discovered that this process comprised of three distinct stages and two critical decision moments, “trigger and informal decision” and “formal decision” (Gibcus and Hoesel, 2008, p92). Findings from this study also noted two trigger moments that were similar, ‘initial’ and ‘final decision’. Although their Stage 1 (emergence of an idea) was outside the framework of this research study, Stage 2 (elaborating the idea) was explored further by providing detailed insight of the process, with particular focus on what occurs between initial and final decision.

Second, Andersen et al. (2014) took a longitudinal, collaborative and process approach based on opportunity recognition and opportunity exploitation. This study identified three interdependent processes that were closely linked to the social movement literature. The complexity and patterns in the collaborative process were expressed as an iterative

Figure 6. 7 A time-based model for opportunity-related decision-making



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Definition: Mature entrepreneur >10 years' experience, Novice entrepreneur < 10 years' experience, Developing expertise -----

staged process from beginning to finalisation of an entrepreneurial venture. This study's findings take a similar approach with three integrated themes from initial to final decision, but identify a key concept as a central hub of the process. The model elements and stage characteristics outlined by Andersen et al. (2014, p717) were adapted for the opportunity-related decision model as a suitable method for representing a complex process. This study's model characteristics for each stage can be seen in appendix 27.

Thirdly, Chandra's (2017) study combined two research gaps in international business, opportunity evaluation and the role of time. Although this work is focused on international entrepreneurial opportunities, the qualitative methodology using retrospective interviews of experienced and novice entrepreneurs had some similarities with this study's methodology. Within case and cross case analysis was conducted for emerging rules, based on three key time-based stages. Findings captured how evaluations changed over time as entrepreneurs learned and revised their rules or made mistakes. These rules were based on heuristics and economic driven criteria, encompassing rule-based reasoning approaches from Wood and Williams (2014) and Wood and McKelvie (2015). Some of the rule definitions, such as outside-opinion rules, option-based rules and emotion rules were identified in this study as coded concepts.

Two other research studies provided background information on small business empirical research and ideas for content and design. Wiklund et al. (2009, p352) proposed an integrated model of small business growth which clarified the benefits for taking this approach. This was helpful for isolating the three perspectives discussed in Chapter 2 and for determining the individual level (the internal cognitive environment) and the external environment (the business and environmental context) for the conceptual framework. Additionally, an ethnographic study by Clarysse et al. (2014, pp5-10) provided empirical evidence on the development of experience and how it impacted on strategic actions over a time, drawing attention to the importance of the accumulation of prior experience and socialisation through the community.

As a result of this and the study's exploratory findings, the model has reconciled and integrated three sub themes in entrepreneurship: opportunity evaluation, decision-making

and entrepreneurial cognition for an integrated and cognitive approach. The model also addresses the temporal nature of opportunity-related decisions. For entrepreneurs who identified an initial decision based on a gut feeling (mature entry point), the process unfolds as a specific sequence of key stages 1-5. These key stages comprise of 1) initial decision 2) analysis and framing of the opportunity 3) evaluating the opportunity by thinking it through 4) validating the decision and 5) making a final decision prior to exploitation. For novice entrepreneurs or those who did not commence with an initial decision (novice entry point), the sequence follows the same stages but in a different arrangement, namely 2, 3, 1, 4 and 5. Only one novice entrepreneur (E11) exhibited a different sequence, due to a lack of domain experience. From this overall analysis, the model's key stage characteristics are shown in figure 6.7, discussed further.

The model shows that the evaluation and decision-making process commences with a response to the perception of the opportunity, which triggers an immediate decision. This is identified as *Stage 1: Initial Decision*. Two concepts influence this decision: gut feeling and experience. Those entrepreneurs who have intuitive expertise (Hodgkinson et al., 2009; Sadler-Smith and Burke-Smalley, 2015; Sadler-Smith, 2016) respond with a gut feeling followed by an initial decision. Entrepreneurs with little or no experience (for example, novices) commence their process at Stage 2, with analysis and framing of the opportunity. These differences in the starting point of the staged model show that past experience mediates the relationship between initial decision and gut feeling. This implies a constructivist approach to learning (Krueger, 2007), where the acquisition of expertise as experiential based implicit knowledge is required to trigger the gut feeling response for Stage 1.

For novices, the initial decision is positioned after Stage 3. Moreover, for mature entrepreneurs who had started a new business (E10) and for Board decisions (E07), findings suggested that although a gut feeling was prompted at entry point, an initial decision was not made until after Stage 3, as made by novices. As there was only one example from the findings of this observation, the researcher noted that this is an area for future research before this variation could be included in the model.

Stage 2: Analysis and framing represents an iterative process of information collection and analysis to assess the feasibility of the opportunity. All entrepreneurs engaged in this stage. As Stage 2 is the typical entry point for novices it emphasises their analytical preference for information processing. The intensity of this analytical process is contingent with context and experience and includes the delegation and collaboration for information. Sources of information used to assist this stage are typically representative of business administration, for example, metric measures, sales reports, accounts or job specifications.

Stage 3: Thinks it through, as the core or Hub, indicated a detailed thinking process. Here the opportunity is thought through or evaluated, linking analytical and intuitive information processing. This is represented as a range of concepts, for example visualisation, past experience, market fit, finance, resources (supply and demand side) and their cause and effect relationships, as well as delegation and collaboration with both internal and external stakeholders. This hub is highly connected to other concepts and facilitates free flow thinking between the mental representations of the domain and the decisional situation. For novices, the initial decision is frequently made after *Stage 3* and then validated with senior teams or directors before making a final decision.

Stage 4: Validation incorporates checking out the initial decision using teams and social networks before a final decision is made. This includes both interpersonal and business networks.

Stage 5: Final decision is where the opportunity is reviewed and a final decision made, prior to entrepreneurial action. Overall the model depicts the differentiated entry levels to the opportunity-related decision process and the iterative sequence and temporal process from initial to final decision, prior to entrepreneurial action and exploitation.

To summarise the design, the model shows the interactive nature of opportunity-related decision-making and information processing that occurs between the internal cognitive environment and external environment. The model is underpinned with a theoretical foundation of CEST and is in line with a more up to date conceptualisation of dual process

theory (Hodgkinson and Sadler-Smith, 2018) and multidimensional style construct measurements (Kozhevnikov, 2007; Cools et al., 2014). It opens up future avenues for evaluation opportunity-related decision research by integrating three different perspectives from the entrepreneurship literature. As a cognitive model for opportunity-related decision-making, it emphasises the importance of activated cognitive representations for entrepreneurial decision outcomes (Curşeu, 2008; Iederan et al., 2009) and includes a temporal element which considers the contribution that past experience makes as intuitive expertise. The model recognises that individual preferences for how entrepreneurs process information will influence interpretation and evaluation of the opportunity. Finally, the model addresses the fragmentation of entrepreneurial decision-making by inclusion of an opportunity evaluation staged model in the entrepreneurial process.

The model shows that as well as a rule-based decision framework, where certain rules are important to the evaluation process (Bryant, 2007; Wood and Williams, 2014), an alternative information processing framework (for example, Pech and Cameron, 2006; Vaghley and Julian, 2010) can be another way that entrepreneurs evaluate an opportunity. A significant part of this model has originated from the cognitive style and concept findings, showing the importance of preferences for processing information (analytic, intuitive or versatile) relative to their specific domain experience and context of the business environment. Furthermore, the model acknowledges the temporal nature of the evaluation process, both as a chronological sequence of mental activities and events and as a developmental process, whereby over a longer of period of time, novice entrepreneurs acquire domain expertise, which increases the complexity of their mental representations. This then provides them with a suitable cognitive ability, cognitive versatility, which allows them to adapt and make appropriate opportunity-related decisions.

The ability to switch between modes of thought facilitates the development of metacognitive knowledge, which influences how information is used in different contexts (Haynie et al., 2010), used to regulate and increase their own performance (Ericsson et al., 2006; Baron, 2007). Domain specific knowledge appears to be vital in the evaluation

process, where lack of this can be used to predict less success (Westhead et al., 2009). Thus, the mental model approach captures the nature of the significant structural relationships that help to shape and form the temporal nature of opportunity evaluation and is based on empirical findings that have addressed the mechanism of how information is processed and structured. This will provide a firm foundation for further exploratory and explanatory research in the future.

6.9 The benefits of a longitudinal, mixed methods approach

Mixed methods have been advocated by cognitive style scholars who advise that this approach will provide greater convergent validity (Cools et al., 2014) and in particular methodological triangulation for a greater insight needed to unpack complex phenomenon (Cools et al., 2014). Certainly, findings have indicated the complexity and iterative nature of this exploratory study and that discussion and verification between qualitative and quantitative data sets has provided viewpoints and insights that would not have been captured by a single methodological approach. The integration of both data sets has resulted in robust findings that have formed the basis for a training activity and a theoretical model to guide further exploratory research for opportunity-related decisions.

The longitudinal nature of this exploratory study has elicited key and unique findings. The contextualisation of style and how it operates in practice has led to understanding the process of evaluation and how cause and effect relationships seen in the mental representations have adapted to differing contexts over time. The temporal approach has clarified how style preferences can be adapted and has identified the synthesis of a versatile style. In addition, the use of cognitive maps over time to show developing links has illustrated the dynamic nature of these mental representations and provided detailed understanding how these micro differences are structured and influenced. The result of this has shown adaption to context as dynamic and ever changing (Haynie et al., 2010). Moreover, learning and development is process driven (Krueger, 2007; Haynie et al., 2010) and thus should be explored over time. It is hoped that the development of links and the operation of a versatile style has formed a future platform for further time-based

research, which will elicit greater understanding of frameworks and rules that highlight subtle nuances between these two constructs. Likewise, moving beyond the focus of a static decision-making process and taking an integrated approach will make significant contribution to future development, as well as enrich and extend current understanding.

6.10 Recommendations for future research

The researcher recommends four significant findings from this exploratory study for future research: 1) the development of an intuitive style for expertise 2) observation of the duality of a versatile style 3) the development of links in the structure of novice mental models and 4) the centrality of the 'Thinks it through' concept as the core of the evaluation process.

First, researchers investigating the development of intuitive expertise must build on understanding how past experience shapes intuitive expertise, using approaches such as cognitive task analysis and tacit knowledge tests (Hodgkinson and Sadler-Smith, 2018) to determine what and how much expertise is needed for effective intuitive decision-making (Dane et al., 2012). Claims regarding the superiority of parallel-competitive dual process theory (Hodgkinson Sadler-Smith, 2018) for entrepreneurial decision making should be further explored in the context of opportunity evaluation, using thinking aloud techniques for first-person accounts (Hodgkinson and Sadler-Smith, 2018), as the cognitive mapping techniques for this study provided some interesting insights into the process. Wood et al. (2014, p265) have also proposed that the mental model theory "provides a suitable explanatory framework for how opportunity beliefs are shaped by individual specific factors." This technique would also indicate whether or not primarily a first or third-person assessments is used (Williams and Wood, 2015) or whether the opportunity evaluation stage is in reality a combination of both. This would provide a deeper understanding how individual and socially acquired knowledge is used in the mental representations for interpretation and evaluation.

Second, the development of versatility and the interplay between styles must be followed over a much longer period of time to demonstrate how a versatile style is operationalised

and what external influences foster a significant change of preference (Harteis and Billet, 2013). It is vital any future research uses a style measurement that reflects a multidimensional approach in line with dual process theory, so that changes in preferences can be mapped over time and context and explained using a parallel-competitive approach. As mentioned previously, this study's data was collected in stable conditions so it is possible that in more competitive external conditions a versatile style would not be evident. Understanding how the analytical and intuitive modes operate under different circumstances and in other industry sectors will support education, training interventions and diversity that can be fine-tuned as needed to support intuitive awareness (Sadler-Smith and Shefy, 2004; Haynie et al., 2010). As noted by Baldacchino et al. (2015), experience and expertise have been shown to be the antecedents of intuitive processing. According to Hodgkinson and Sadler-Smith (2018, p485), the combination of both approaches for decision-making and the development of how these are applied is still not clarified and is an area for future research.

Third, findings from this study observed the developing link between past experience and reflective thought called the Hub, but there may be other important links that develop at an earlier and/or later stage that are also significant for developing the complexity of mental representations. If intuitive decisions are only effective when an entrepreneur has a high level of domain experience, it would be really useful for both practitioners and educators to know what kinds of experience accelerates this development, especially for novice training programmes. Kuhlmann and Ardichvili (2015) showed that the opportunity to identify high value non-routine work promoted the development of expertise in the HRD sector. It maybe that domain expertise can be fostered by encouraging entrepreneurs to tackle increasing difficult and complex issues using both explicit and implicit experiences (Harteis and Billett, 2013; Kuhlmann and Ardichvili, 2015). This could be provided through mentoring and coaching programmes for expertise intervention and development, thus providing an authentic learning environment (Harteis and Billett, 2013), where feedback and guidance for learning can be facilitated. The researcher posits that this is an essential ingredient for expertise development (Hodgkinson et al., 2009; Harteis and Billet, 2013; Haynie et al., 2010; Haynie et al., 2012; Sadler-Smith, 2016). Research in this area would also contribute

towards more tailor-made programmes for application and use of expertise and versatility, accelerating the development of this capability.

Finally, the central Hub identified in the thought process is a significant contribution for understanding how information is processed and organised for opportunity-related decisions. Thus, further exploratory research is needed to determine whether this is innate or learned (Krueger, 2007), using a much larger sample of entrepreneurs with differing levels of experience and context. Experts consistently employ complex cognitive processes (Baron and Ensley, 2006) but understanding how the evaluation structure develops across the entrepreneurship process would further answer the ‘how’ question. Further exploratory research is needed on the operation of the Hub and the interplay of concepts, as well as the structure and arrangement of these in different contexts.

6.11 Contributions to the entrepreneurship literature

This study seeks to contribute to the entrepreneurial cognition literature by exploring how entrepreneurs make decisions on the growth of their business. This is achieved by viewing the process of opportunity-related decision-making through a cognitive style lens over a period of two years. A robust empirical study achieved through the integration of three entrepreneurial literature themes, opportunity evaluation, decision-making and entrepreneurial cognition resulted in unique findings and contributions. These are discussed in detail in the following sections.

6.11.1 Opportunity evaluation and a mental model conceptualisation

Findings from this study have added to the growing body of empirical research on opportunity evaluation (for example, Keh et al., 2002; Autio et al., 2013; Wood and Williams, 2014; Wood et al., 2014; Williams and Wood, 2015; Wood and McKelvie, 2015; Chandra, 2017; Rastkhiz et al., 2018), by providing an alternative information processing framework to rule-based reasoning (Wood and Williams, 2014; Williams and Wood 2015). Although a mental model conceptualisation is frequently used in opportunity evaluation research (Wood and McKelvie, 2015), this study has shown how experience is positioned in cognitive frameworks (Keh et al., 2002), how mental models

vary contingent with experience and how an intuitive style develops as expertise. Given the development in understanding the nature of intuition and its position in the management education curriculum (Sadler-Smith, 2016), capturing how this develops is critical for creativity and innovation education. Similarly, the application of an information processing framework for understanding opportunity evaluation adds to understanding the bridge between identification and exploitation (Wood and McKelvie, 2015) and confirms information processing as a worthwhile structure for future investigation. Thus, advancing understanding how prior knowledge as experience influences opportunity related cognitions (for example, Baron and Ensley, 2006; Haynie et al, 2009) would assist policy and practice for guidance how to support more positive evaluations of opportunity (Wood and Williams, 2014).

The mental model conceptualisation has shown how the process unfolds and what specific concepts are used to evaluate the opportunity. It has also led to the development of a time-based model for opportunity related decision-making, derived from this study's empirical findings. This will contribute to future theoretical model for the opportunity evaluation stage and build on the view of entrepreneurship as three distinct phases (Shane and Venkataraman (2000). This is extremely useful for practitioners and educators as it provides a comprehensive insight of the conceptual structure of the evaluation process and can act as a guide for future learning development. It may help to identify causes of failure when opportunities are not successful as well as missing concepts in the entrepreneur's mental model and the way that they process information for evaluation. Knowledge and insight of this process will assist learning and development. A teaching model, called CARVA (Collect, Analyse, Reflect, Validate and Act) has been proposed to assist this development and provides a tool for practitioner and educator use. The researcher intends to test this in small business prior to commercial release.

This proposed framework illustrates how a variety of factors and influences work together and contribute towards a theoretical and integrated model of opportunity evaluation, as an alternative structure to that recommended by Wood and McKelvie (2015). Similarly, it affords practitioners and educators empirical based guidance how cognitive structures contribute towards understanding how entrepreneurs think and reflect (Krueger, 2007).

Additionally, understanding how an intuitive style develops as a result of experience and the identification of this developing link between the Hub and the concept 'Past experience' in the evaluation process is a significant contribution to the entrepreneurial cognition literature. This will help entrepreneurs understand how they make use of the Hub as a reflective mechanism for assessing appropriate concepts prior to making a final decision on an opportunity. Furthermore, examining the process of evaluation will also indicate to the entrepreneur what opportunities are attractive or not. The CARVA teaching tool is also designed to assist in this process and thus makes a significant contribution by providing practitioner support material for future learning and development.

6.11.1.1 First person evaluation and social networks

This study adds a further contribution to the shift in perspective from third to first-person (Haynie et al., 2009; Wood and Williams, 2014) in the evaluation stage of the entrepreneurial process. As the process unfolds over time the study showed it was mostly a first-person evaluation, empirically measured as first-person cognition using cognitive mapping techniques, hence confirming the important distinction between identification and evaluation (Wood and McKelvie, 2015). As noted by Chittenden al. (2003), sustainable growth and business success is very dependent on the entrepreneur where values, attitudes and motivation shapes strategic decisions and growth. This approach emphasises the importance of knowledge and motivation for entrepreneurial action and the how the individual moves from a third person strategy, "it can be done" to "I can do this", as a subjective first-person stage prior to action (McMullen and Shepherd, 2006, p135). Findings also showed that much of the cognitive processing occurred within the internal environment of the entrepreneur as a first-person information processing and reflective process and thus has highlighted the need for more research on the contribution motivation and context makes to the evaluation stages of the entrepreneurial process.

However, in addition to this, the entrepreneur moved outside their own internal cognitive environment to use others' cognitive processes as a validation of the initial decision. This third person contribution was a significant stage in the overall process and indicated that

the “self-focused individuated images are further shaped by social cognitions” (Wood and McKelvie, 2015, p269). Further exploration of this third-party involvement will contribute to the development of an integrative model and support the holistic approach needed for the bigger picture (Wiklund et al., 2009). Future research must incorporate a multilevel approach to analysis (such as micro, meso and macro) in this stage “to account for individual, firm and contextual level influences” (Wright and Stigliani, 2013, p14) Not only will this provide clarity to the boundaries of the evaluating process and its iterative movement between the internal cognitive and external environments and inclusion of the external environment in the mental representations of opportunity (Keh et al., 2002; Wood et al., 2014) but will address Wiklund et al.’s (2009) call for a more holistic approach to small business growth.

From a policy perspective, this exploratory study has highlighted the important contribution that social networking makes to the decision process, either as a validation process or as an information source for the entrepreneur when evaluating an opportunity. Findings contribute to the continued debate on policy implications by providing evidence to support the need for continuing to develop business initiatives for small business growth and performance. This may help to throw light on how small business networking events and clubs influence opportunity evaluation through knowledge spillovers and information exchange. Additionally, such events also provide a captive audience for practitioners to advertise the benefits of understanding decision-making, whether it be to support high or slower growth firms. As small business entrepreneurs make decisions based on many factors and influences, policy and practice must design better ways to improve engagement for increased knowledge and for understanding how to process and evaluate business opportunities for growth.

6.11.2 Opportunity-related decision-making

Making decisions on the feasibility and desirability of an opportunity involves the entrepreneur as a cognitive processor, where the mental representations of the opportunity evaluation process act as mediators between individual differences, such as cognitive style and the final decision (Curşeu, et al., 2008). This study takes a dual process

perspective, making a theoretical contribution to the opportunity-related decision literature by providing a contemporary account of individual differences and the use of an intuitive, creative style in strategic decision-making. Furthermore, as Curşeu, (2008) argued, the most effective decision-making models consider activated cognitive representations associated with dual process theory. Thus, taking a mental model approach will contribute to a microlevel perspective (George et al., 2016), which has been increasingly called for in recent literature (for example, Wright and Stigliani, 2013; Randolph-Seng et al., 2015; Hodgkinson and Sadler-Smith, 2018). Increased cognitive complexity results in improved decision-making outcomes (Curşeu, 2008), which will improve business performance and growth.

However, Shepherd et al. (2014) noted that fragmentation in the entrepreneurial decision literature has made it difficult to show how it relates to other entrepreneurial constructs, which limits understanding. Additionally, Wiklund et al. (2009) argued that an integrative model of small business growth must consider different levels of analysis, similar to the micro/meso/meta approach posited by Barney and Felin (2013), needed for further explanatory ability. Viewing the mental representations of the entrepreneur by integrating common gaps and recommendations from the three entrepreneurial perspectives provides a holistic perspective and fresh approach to show how the evaluation process for a final decision is structured. This will illustrate the salient concepts that are associated with this stage and contribute towards a more overarching theory for small business growth.

Findings from this study show the iterative nature of opportunity-related decisions which can be used for theory development in the evaluation stage of the entrepreneurial process. This will contribute to policy and practice by providing insight into the structural content of the decision process. Understanding what small business entrepreneurs consider important for opportunity evaluation and the strategic and financial concepts that they reflect on in order to innovate and offer value added products and services to new markets (Chittenden et al., 2003), is much needed to provide appropriate support to those firms who wish to grow. SMEs behave differently from large companies (Vermeulen and Curşeu, 2008; Hulbert et al., 2013), as they are managed by the majority shareholder who is frequently the founder of the business. Thus, the quality of the decision outcome does

not depend on specialist teams or long-term strategic plans, but reflects the cognitive processing of the individual entrepreneur and his/her interaction with the environment. Similarly, “owner-managers tend to be generalists rather than specialists” (Hulbert et al., 2013, p294), which means that they tend to take a more informal intuitive approach to decision-making rather than a systemic approach (Gilmore and Carson, 2007). This emphasises the need to understand the thinking behind opportunity evaluation for a decision outcome made by the individual entrepreneur.

A cognitive focus on how these opportunity-related decisions are made will also increase understanding on exactly how, what and why they reached their final decision. Findings from this study indicated that both analytical and intuitive processing were evident in the evaluation process. Understanding how information can be processed effectively for decision-making will assist practitioners by providing greater insight how better support can be engaged for improved decision effectiveness. Regarding entrepreneurs as “high level information processors” (Vaghley and Julien, 2010, p83) requires a different approach and a move away from the more rational decision-making model associated with finance and planning. Similarly, aggregation of findings showed that cognitive complexity mediated the relationship between an intuitive information processing style and opportunity-related decision-making effectiveness. Although several studies have addressed style in the opportunity process (for example, Barbosa et al., 2007; Armstrong and Hird, 2009; Kickul et al., 2009; Vaghley and Julien, 2010; Randerson et al., 2016), none have specifically examined style in the opportunity evaluation literature. Findings therefore will contribute towards understanding how different ways of information processing may lead to different behaviours, by showing how entrepreneur use both analytical and intuitive processing modes as they make opportunity-related decisions.

Application of the dual process framework and measurement instruments that are compatible with dual process theory adds to the debate between bipolar or multidimensional styles (Kozhevnikov, 2007). The observation of a versatile style, proposed by Sadler-Smith (2009) as a duplex model of cognitive style is supported by dual process theory and advances the field of cognitive style research by providing

empirical evidence of the interplay between the two styles. This is a unique and significant contribution on two counts.

6.11.3 Style versatility

Findings showed that the ability to be cognitively versatile is considered advantageous for opportunity and decision-making (Hugh and Ogilvie, 2005; Sadler-Smith, 2009; Groves et al., 2011; Baldacchino et al., 2015). Demonstrating that this can be observed empirically contributes to further understanding of the nature of intuition, that is, how intuitive capabilities can be enhanced (Sadler-Smith and Shefy, 2004) for a balanced style of thinking (Groves et al., 2011), rather than an over reliance on analysis or heuristics. In the evaluation process this would mean that entrepreneurs need to assess the opportunity using both modes of information processing, which would serve as high level heuristics in complex processes (Armstrong et al., 2012a).

Aggregating findings of style and complexity scores showed that both an intuitive and analytical style played an important role in increasing connectivity. This is an important contribution to the cognition stream as findings suggested that a versatile style was the outcome of considerable domain experience as well as providing empirical evidence of the parallel-competitive nature of dual process theory underpinning versatility (Hodgkinson and Sadler-Smith, 2018). This provides practitioners and educators with a broader field to address for cognitive learning strategies that go beyond the more typical rational decision-making models still seen in business support today. The outcome of a versatile approach would mean entrepreneurs could be trained to partake in intensive practice that enhances the strengths and weaknesses of their cognitive styles and how this can augment their preferred style, thus enhancing their cognitive abilities at an earlier stage in the entrepreneurial process.

From a policy and practice perspective this is critical for developing those slower growth business or novices who wish to achieve higher growth, as it has already been shown that the cognitive complexity of the individual needs to fit the complexity of the environment for positive decision outcomes (Curşeu, 2008) and from this study that an intuitive or

creative style demonstrates. As the important provision of management training programmes is recommended for the development of intuitive expertise through formal management education, practice and feedback (for example, Hodgkinson et al., 2009; Sadler-Smith, 2016; Hodgkinson and Sadler-Smith, 2018) this could be extended for style versatility. As a result of this study's findings and their contribution to the style literature and dual process application in practice, there is a strong case for developing programmes that assist novice entrepreneurs to develop a versatile style, through differentiated practice and feedback as well as the learning the advantages and disadvantages of both information processing modes. The researcher at present is carrying out a 5-year study using three novice case studies to examine the development of a versatile style in order to provide a firmer explanatory framework for future research.

6.11.4 Aggregating findings from style and cognitive mapping analysis

Comparison of the findings between style and cognitive complexity suggested that differences in information processing relating to gathering, assimilating and processing information has an impact on the connectivity of the entrepreneur's mental representations. Those entrepreneurs with a high intuitive score showed higher connectivity if they were involved in evaluating an opportunity and making opportunity related decisions. Thus, their mental models showed many connections and comprised of many concepts. The cognitive maps also indicated the different types of concepts, such as financial, resources, experience etc and the relationships between these. Additionally, novices also had high connectivity as they were processing new information and had a developing intuitive style. Overall, these findings suggest that cognitive complexity mediates the relationship between creative and experiential thinking and successful opportunity-related decision-making.

6.11.5. A mixed method, longitudinal approach

A mixed method longitudinal approach addressed concerns that the opportunity-based decision research has taken a static perspective and ignored how potential evaluations and decisions change over time (Barbosa 2014; Shepherd et al., 2014; Chandra, 2017). This

approach has answered many recent calls noted across a variety of entrepreneurial perspectives and thus overall contributes to combining established methods in new ways, by providing a break away from the more typical quantitative approaches seen in the growth and cognition literature. Taking an integrated approach for this study has addressed the fragmentation issue, which is a criticism in both the decision-making and evaluation literature. (Shepherd et al., 2014; Wood and Williams, 2014; Wood and McKelvie, 2015). Similarly, Cools and Van den Broeck (2008) and Cools et al. (2014) have noted that longitudinal, qualitative work is needed in the field of cognitive style and small business growth, in order to address the dominance of quantitative designs and to show how changes in cognitive states and knowledge bases provide insight into how opportunities mature (Ardichvili et al., 2003). As growth is a dynamic cognitive process, Any significant contribution, either for future research, policy or practice, must reflect this in their choice of methodology and design.

This mixed methods and longitudinal study contributes to the field through the use of “rigorous qualitative methods...and longitudinal studies to complement and enrich findings provided by large quantitative databases and experimental approaches” (Wright and Stigliani, 2013, p16). As argued by Wright and Stigliani, (2013, p14), there is “a need for greater methodological plurality in the study of growth”. The temporal nature of this study contributes by fine tuning how these cognitive representations evolve (Grégoire et al., 2015), through the exploration of mental models over time. As such the dynamic and temporal approach has generated unique insights for further research and theory building through the adoption of alternative methods.

6.12 Limitations of the study

This study is not without limitations. First, data collection was employed in the manufacturing sector when trading was positive and environmental conditions were mostly stable. Thus, any variations in style were noticeable only where the growth opportunity resulted in a clearly observable process change, for example, internal restructuring, relocation or a large-scale new project. Alternative industry sectors and exploratory studies in more competitive or unstable conditions will provide a broader

perspective. More diverse research designs would assist further insight with emphasis on process models, providing alternative perspectives on the nature and structure of opportunity-related decisions. The small sample does not support generalisation of findings to other contexts or industry sectors.

Second, both the growth opportunity and decision process were discussed retrospectively. This meant that there was possible hindsight bias which may skew results. To minimise this as much as possible, the researcher asked questions that covered both past, present and future decisions on the growth opportunity at each time point and referred to these at the next time point interview for cross referencing the data. This facilitated an overview of what was happening and planned for.

Third, using the typical self-reporting instruments (the CoSI and REI) for measuring cognitive styles may cause distortion (Sánchez et al., 2012), but triangulating style assessments with the qualitative data helped to minimise this using within-case checks of the interview data to highlight any anomalies. In addition, Type 1 and 2 processes operate in parallel. Thus, the interaction between the two systems may operate to compute “sensible answers” (Sloman, 2002, p383). Moreover, conducting style assessments and interviews one after the other could be tiring and stressful for the participant, so ensuring that a time interval was left between questionnaire and interview would avoid mental saturation. Measuring the intuitive/experiential system is also difficult as it is an unconscious process, but using valid and recommended instruments in line with dual process theory and orthogonal dimensions of cognitive style provided reliability and validity (Cools et al., 2014; Hodgkinson and Sadler-Smith, 2018).

Fourth, there were differences in style results for analysis and rationality between the two measures at the same time points. This may be due to the fact that the CoSI measure indicated the preference by breaking down the analytical mode into two different dimensions, knowing and planning, thus providing a more fine-tuned response for the analytical score. Also, the task itself is a cognitive process that relies on conscious processing, so the creative style/experiential style may not be captured on a moment to moment basis or may exert a greater preference at that time for data collection. Consistent and rigorous use of both instruments and mixed methods helped to address limitations in

poor analysis and application (Cools et al., 2014). Nevertheless, one of the benefits of the CEST theory (Epstein 1985, 1994, 2008, 2010; Epstein et al., 1996; Pacini and Epstein, 1999) is that even if the entrepreneur was attempting to be completely rational in the activity, the experiential system is an autonomous system and would continue to be influential. Insight from social cognitive neuroscience has shown that intuitions have the potential to inhibit and facilitate analysis (Hodgkinson and Healey, 2011) which provides more explanatory ability for inconsistencies in results. Both the CoSI and REI reflect an individual's differences in the way that they process information and are multidimensional measures. The assessment's predictive capacity may also be limited by the particular task (Sánchez et al., 2012). Furthermore, small variations in preference were not considered to be statistically significant and could indicate either a stable preference, or alternatively, the use of a synthesised style by mature entrepreneurs as discussed earlier.

Fifth, changes to the links in the cognitive maps were only evident in year two, which was near the end of the study and thus did not account for any further changes or developments before or after, which may be significant. The researcher suggests that a longer period of time, for example five to ten years, would capture the development of intuitive expertise and changes in novices' mental models as they developed, thus extending understanding of the construct. This avenue is currently being explored by the researcher. A larger purposive sample would support the differences noted in this study and improve generalisability. Advanced and multilevel techniques are needed to bridge the micro-macro level (Cools et al., 2014). Investigation of nascent and early stage entrepreneurs using mental model techniques would add to understanding the process and help to explain further the development of expertise. Further analysis of the concepts and conceptual clusters could be performed using Decision Explorer. Although this software provides a detailed analysis of a piece of text, the researcher chose to work close to the interview transcripts and manually observe any new concepts or links as they emerged from the data.

Finally, to minimise disruption for the participant time points were kept at six monthly intervals which allowed time for the researcher to analyse and transcribe data. Small entrepreneurial business owner-managers are subject to management and production

pressures, so inevitably cancellations or interruptions had some impact on the time frame. This meant that the continuity of time intervals was not identical across all cases. In addition, sometimes a decision had been made by the next visit and the entrepreneur had moved on, presenting challenges for continuity and understanding the process to final decision. To mitigate this, the author kept email and phone contact with the participant between time points, but was not always aware of progress made towards final decision until the next visit. This also may have added hindsight bias to the data collection. Although time consuming, more frequent visits would help to track progress and capture more subtle, dynamic changes of style over time.

6.13 Chapter Summary

The aim of this study was to explore how entrepreneurs made opportunity-related decisions when evaluating an opportunity for growth. A mixed method, longitudinal approach was taken. This chapter has discussed key insights from the findings in Chapter 5. Recommendations for future research and the limitations of this study are noted. Tracking statistics provided the background detail of each business entrepreneur, showing that growth was episodic over the two-year time frame. A longitudinal approach (McMullen and Dimov, 2013) provided the bigger picture (Wiklund et al., 2009) and elicited some interesting findings, despite the economic stability over the two-year period.

Style assessments (Pacini and Epstein, 1999; Cools and Van den Broeck, 2007) demonstrated that preference changed contingent with context and that entrepreneurs used both information processing modes, but could be high on more than one style, thus demonstrating that styles were orthogonal (Hodgkinson and Clarke, 2007; Sadler-Smith, 2016). This exemplified the need to use measuring instruments that matched a multidimensional rather than bipolar interpretation (Cools et al., 2014). Novices were more analytical than intermediate and mature entrepreneurs (Gustafsson, 2006), but over the time frame showed a developing intuitive style. A synthesised and a versatile style (Sadler-Smith, 2009), noted in mature entrepreneurs as a balance of both styles was a key finding and was supported and explained by dual process conceptualisation (Hodgkinson and Sadler-Smith, 2018).

The map analysis established the structure and arrangement of concepts from initial decision to final decision in the entrepreneur's mental model. Two categories based on the positioning of gut feeling and initial decision indicated clear differentiation between novice, intermediate and mature entrepreneurs. Findings showed that concepts and their links were explored and positioned differently according to experience. Arrangement of concepts also indicated the iterative process between first and third person (Haynie et al., 2009; Wood and Williams, 2014), from the internal cognitive environment to the external environment. For mature and intermediate entrepreneurs this was a validation process, based on their initial decision. For novices this was an information seeking process, tapping into the expertise of others.

Cognitive complexity and connectivity illustrated the micro differences between entrepreneurs. In addition, complexity calculations (Curşeu, 2008) showed how knowledge was represented. From the centrality scores the Hub of the process was identified as 'Thinks it through' This was a unique and important finding which showed how reflective thought for evaluating the opportunity acted as a conduit for linking concept to concept. These linked pathways indicated the structure of the thinking process and how analytical and intuitive concepts were arranged in relationship to each other.

The cognitive mapping analysis and findings confirmed new and different learning experiences which assisted the development of an intuitive style and intuitive expertise (Sadler-Smith and Burke-Smalley, 2015; Sadler-Smith, 2016). A developing link from the Hub to the concept 'Past experience' was observed in year two which increased connectivity between concepts. A teaching framework to assist this development and to increase the complexity of the entrepreneur's cognitive structure in a learning environment. and self-reflection skills and key links between concepts for improved complexity and connectivity. Finally, a theoretical model of opportunity-related decision-making was proposed to act as a framework for future research and explanatory investigation and to promote further integrated and temporal investigations using an information processing perspective.

Chapter 7: Conclusions

“To make an end is to make a beginning.” T.S. Eliot (1888-1965)

7.1 Introduction

Making decisions on business growth is an ongoing, challenging activity for entrepreneurs at any stage of the entrepreneurial process. Despite a prior research focus in the entrepreneurship literature on the predictors of growth, venture creation and why some businesses grow more than others, there is still a focus on the ‘how much’ growth question (Wright and Stigliani, 2013). Overall, there is very little known how established businesses make decisions about future growth opportunities (Vermeulen and Curşeu, 2008). Despite the overabundance of SMEs in the UK, the processes that underpin how entrepreneurial growth is shaped are still under researched (Wright and Stigliani, 2013). This prompted the research question:

“How do entrepreneurs make decisions when evaluating business growth opportunities and what internal and external factors influence their decision-making process?”

7.2 Overview of the research study

The purpose of this final chapter is to provide a summary of the key findings and to review the study’s impact for policy and practice. The study has explored the research question by taking a cognitive perspective, where the focus was on how entrepreneurs made opportunity-related decisions. The conceptual framework was underpinned by a parallel-competitive account of dual process theory (Hodgkinson and Sadler-Smith, 2018) and CEST (Epstein, 1994; Epstein and Pacini, 1999). Recognising that entrepreneurship is a process (Shane and Venkataraman, 2000; Moroz and Hindle, 2012) centred on the identification and pursuit of opportunities (McMullen and Dimov, 2013; Wood and Williams, 2014) and the shaping of opportunity beliefs (Shepherd et al., 2009; Wood et al., 2014), this study has focused attention the opportunity evaluation stage as a critical bridge between identification and exploitation (Wood and McKelvie, 2015), where one’s beliefs about the attractiveness of the opportunity are construed as being feasible and desirable (Haynie et al., 2009; Wood et al., 2014).

As decision-making is a key cognitive activity that involves collecting, sorting and sifting through information, represented as a mental model in the human thought process, this activity is viewed through a cognitive style lens. Using this construct has provided insight as to how information processing takes place and the way that knowledge is constructed and transformed in the deep cognitive structures of individuals (Krueger, 2007). In addition, the decisions made on whether or not an opportunity “is feasible and desirable for me (or my firm)” (Williams and Wood, 2015, p220) are considered major strategic decisions, as the outcome of this decision will impact on growth turnover for the future. Thus, any strategic decision resulting from evaluation of an opportunity represents a core activity of entrepreneurship (Vermeulen and Curşeu, 2008) and warrants further exploratory investigation in order to unravel how this occurs and what influences the process. Hence this study has contributed towards understanding how entrepreneurs evaluate opportunities and has provided some unique insights how these opportunity-related decisions are made.

Key findings have shown that the interplay and adaptation of preferences for information processing as cognitive versatility to be significant (Louis and Sutton, 1991; Hodgkinson and Clarke, 2007; Hodgkinson et al., 2009; Groves et al., 2011; Baldacchino et al., 2015). Moreover, the relationship between past experience and the complexity of mental representations mediates opportunity-related decision effectiveness. Understanding how opportunities are evaluated and the implications of reflective thought as part of the process for making decisions is important for predetermining future strategic goals and growth. This evaluation phase in the entrepreneurial process is critical, as the information processed for decisions and judgments is based on what resources, time and money are required to achieve an outcome for action (Williams and Wood, 2015) and has significant consequences for future planned growth. As Grégoire et al. (2015, p136) noted, understanding how people process information can then be used effectively to explain entrepreneurial decision-making and behaviour.

The mental model conceptualisation is common an approach in opportunity evaluation (Wood and McKelvie, 2015), but research has established opportunity as an unfolding process, where experience and information are used to develop an image of the opportunity for evaluation (Mitchell and Shepherd, 2010; Wood et al., 2014.) The

exploratory findings using this approach have provided several significant insights. These have enriched and extended current understanding of entrepreneurial, cognitive behaviour, associated with making opportunity-related decisions, as well as provide new avenues for future research based on unique findings that emerged as a result of this longitudinal study. These findings are summarised in the context of the study's objectives and are then discussed in terms of the impact they make in the research and the business community.

Identified as a gap by scholars in the field of entrepreneurship (Vermeulen and Curşeu, 2008; Wright and Stigliani, 2013; Williams and Wood, 2014; Wood et al., 2014; Wood and McKelvie, 2015), this study has taken a longitudinal, integrated perspective in order to address fragmentation in the entrepreneurship decision-making literature (Barbosa, 2014; Shepherd et al., 2014). In addition, a focus was placed on businesses past the start-up stage, as an outcome of this study was to produce training/teaching material that would support entrepreneurs in an existing business in order to help them understand the benefits of learning how to make effective decisions.

7.3 The reality of growth in small business

All entrepreneurs stated clear growth intentions at the start of the study, indicating that they had planned growth over the next two years. Growth intentions are a characteristic of entrepreneurial behaviour but can be revised according to the competitive conditions that the business is operating in (Dutta and Thornhill, 2008). In this study, the reality of the stated intention for growth did not necessarily materialise over the time frame of the study, whereby tracking growth analysis, based on sales turnover showed three clear patterns of growth that emerged: little or no growth, planned growth and negative growth. Within these categories, the growth patterns were stochastic and, in some cases, seasonal or indicative of the typical project growth patterns of peaks and troughs in sales turnover. The manufacturing industry was exhibiting stable growth at the start of the data collection (January, 2015), which continued throughout the study time frame. Additionally, as it was only post study that signalled the start of the UK downturn in growth (Enterprise Research Centre, 2018). The data collection period, 2015-2017, thus provided an ideal context for exploring how information was processed for opportunity evaluation, as the

environmental context and business background was not influenced by significant economic or global changes.

Hence, there were clear indications that small business growth profiles were not homogeneous. This has implications for policy and practice, as assumptions cannot be made that growth, even if known to be stochastic, evolves in the same way. Findings inferred that a more fine-grained understanding and a shift to the microfoundations viewpoint (Randolph-Seng et al., 2015; Hodgkinson and Sadler-Smith, 2018) was needed. Therefore, a cognitive lens was used to explore the entrepreneurs' cognitive processes to determine exactly how these decisions were made and the micro-level differences (Curşeu, 2008) observed in the mental models as the evaluation process unfolded.

To consider the influences on small business growth required a different approach. Trends in growth are important for understanding business dynamics as well as important for the UK economy. Moreover, understanding how growth opportunities unfold supports sustainability (Muñoz and Cohen, 2017) and provides insight how opportunities are assessed and considered worthwhile. Furthermore, integrating some of the more dominant perspectives (Wiklund et al., 2009), evident in the entrepreneurial cognitive literature, provided a bigger picture and illustrated relationships between and across perspectives. In support of the integrative design, three important entrepreneurial themes, opportunity evaluation, decision-making and entrepreneurial cognition were chosen, as the literature review had identified gaps and recommendations that were common across all these themes. As entrepreneurs act and make decisions in a holistic fashion, the outcome of their decision was based on a collective assessment of a variety of factors, so this approach was appropriate for capturing a realistic picture how these decisions were made. Thus, the individual entrepreneurs' cognitions were explored over time, to determine how their cognitive processing contributed towards making opportunity-related decisions and how they used their knowledge and experiences to frame the bigger picture and move the evaluation process forward for a final decision.

7.4 Using style assessments for understanding opportunity-related decisions

The first objective was to explore the information processing styles that entrepreneurs used over time in order to determine factors that influenced their opportunity-related decisions. By taking a cognitive perspective, changes in the way entrepreneurs processed information could be directly related to any changes in context or growth profile. Findings showed that there were a number of constraints or limitations that influenced this process, for example, a decrease in sales prompted a more analytical style, supporting prior research by Dutta and Thornhill (2008), who showed that entrepreneurs adjusted their processing mode according to competitive conditions. Additionally, where there was a significant change in context, such as relocation (E08) or internal staffing (E06) style preferences were adapted accordingly. The use of the CoSI measurement for knowing and planning styles (analytical) was advantageous for indicating a preference for a knowing style, such as information for new buildings (E05), improving staff skills (E06), or a planning style, such as relocation (E08), joining a cartel (E10) or improving the production efficiency for new projects (E03).

Taking a multidimensional perspective to cognitive style (Kozhevnikov, 2007; Cools et al., 2014; Kozhevnikov et al., 2014) showed that entrepreneurs could be high on more than one style, which supported the premise that styles were orthogonal in accordance with dual process theory and the parallel-competitive account (Hodgkinson and Sadler-Smith, 2018). In a similar fashion, the REI was used to measure the tendency of people to rely on two types of thought and the way that they engaged and processed information in either a rational and experiential (creative) way. Both the CoSI and the REI are well validated (Akinci and Sadler Smith, 2013) for business and management research.

Prior research has already shown that both intuition and analytical information processing are used in decision-making (Sinclair and Ashkanasy, 2005; Vaghley and Julien, 2010; Lee-Ross, 2014; Baldacchino et al., 2015). The outcome from the study's findings shows that this is correct. Even a small sample of entrepreneurs in this study exhibited the ability to adapt style preference to the situation and this ability was commonly observed in all entrepreneurs over the time frame. In fact, the more domain experience or intuitive

expertise the entrepreneur had, the more they processed information intuitively, which resulted in a balanced use of the two information processing modes known as cognitive versatility (Hodgkinson and Clarke, 2007). This versatile approach of the use of style is potentially critical for survival and success (Groves et al., 2011). In fact, both styles (analytical and intuitive) were used for evaluating a decision and the preference for either analysis or intuition was contingent with experience and context. This supports Sinclair and Ashkanasy's (2005) comments that the dominance of either approach is determined by personal disposition and the decision context.

The second objective was to explore how information processing styles were used in the decision-making process. The ability to use both processing modes and move between them, noted as "switching cognitive gears" (Louis and Sutton, 1991, p57) was an interesting outcome as a consequence of analysing the cognitive style assessments over a period of five time points. Novice entrepreneurs demonstrated a more analytical preference (Gustafsson, 2006) and over time showed a slow increase in their preference to use both styles for decision making. They exhibited an increasing use of an intuitive style as the result of new experiences and stepping outside their comfort zone to try out new ideas and opportunities. Highly intuitive entrepreneurs used visualisation to create a picture in their head of their end goal, which assisted their evaluation (Gibcus and Hoesel, 2008; Wood and McKelvie, 2015). These findings implied some far-reaching consequences for theory and practice.

7.4.1 Using a versatile style for opportunity-related decision-making

Objective three focused on the differences between the styles and thought processes of novice and mature entrepreneurs and the relationship between style, versatility and prior experience. The notion of a developing style was an intriguing one and was explored further, to determine how cognitive versatility was used for decision-making and how entrepreneurs adapted their preferred cognitive style contingent with context. As such, the findings from this study have established a clear foundation for investigating versatility in the context of decision-making and opportunity processes. Although there is still very little empirical evidence that explores versatility (Louis and Sutton, 1991;

Hodgkinson and Clarke, 2007; Hodgkinson et al., 2009; Sadler-Smith, 2009; Groves et al., 2011; Baldacchino et al., 2015; Malewska, 2018), this was surprising, considering the plethora of work on entrepreneurial decision-making and cognition and the increasing use of cognitive psychology to help explain entrepreneurial behaviour. Research on intuition still fails to address the practical aspects of this useful, cognitive agility of information processing. Baldacchino et al. (2015) noted that entrepreneurs used analysis to check that their intuition was correct, similar to Agor's (1986) earlier work on the use of intuition by senior executives. This study's findings showed that this earlier work is still relevant, as both intermediate and mature entrepreneurs checked their initial intuitive feeling against information and data analysis. According to Malewska (2018), their study showed that 72% of the respondents used combinations of the rational and intuitive approach for decision-making processes. This exemplifies the fact that researchers must take stock of the interplay between information processing modes and examine the factors that contribute to its use, rather than focus on intuition alone (Baldacchino et al., 2015).

A unique finding, observed as a versatile style, was evident when there was similarity of style assessment scores for the CoSI and REI. Here the rational (analytical) style was present alongside experiential (intuitive) thinking, seen in the descriptive statistics as parallel imaging between the styles, described as a 'mirror' effect' in this study. This was observed to some extent in all profiles at various times over the time study period and can be explained by a dual process parallel-competitive conceptualisation of interplay between the two modes of processing (Hodgkinson and Sadler-Smith, 2018). A versatile style was consistent in the profile of more experienced entrepreneurs in stable conditions, which supports the proposals made by Sadler-Smith (2009) that a versatile style is the result of stable preferences for intuitive and analytical processing. What conditions prompt the use of this versatility and how this versatility develops is an important new line for research. If a balanced use of style is considered beneficial for decision-making, then the observation of a versatile style in mature entrepreneurs would suggest that this develops naturally from experience. In support of Baldacchino et al.'s (2015) proposals, researchers must focus more on the use of both styles rather than one or the other. As such the interplay between intuition and analysis as a separate research stream is at variance with the focus on intuition (for example, Dane and Pratt, 2007; Gore and Sadler-Smith, 2011; Baldacchino et al., 2015; Elbanna and Fadol, 2016), but more representative

of real life thinking in decisional situations. This study's findings provided some convincing evidence of style versatility and can be observed.

Promulgating the benefits of a versatile style may be challenging in the wider field of business support, as the significance of an ability to use both styles of processing is slow to reach policy and practice initiatives. Although researchers are noting that both approaches are used to identify opportunities and are beneficial (for example, Sinclair and Ashkanasy, 2005; Vaghely and Julien, 2010; Baldacchino et al., 2015), small business support programmes still emphasise planning and finance, despite an increasing trend seen in blogs and business articles on business decisions using intuition, for example, embodied intuition, (Embodied Intuition, 2018) that promotes intuition as assisting analysis in decision-making. Analysis of longitudinal small business support by the Enterprise Research Centre (Enterprise Research Centre, 2018) showed that the most frequent use of support is accountant advice, often for subject matters outside the speciality of their field, which was also noted in this study. Moreover, they suggested that enterprises who wish to achieve profitable growth should “focus on people (for example, skills development) and future business growth opportunities rather than short term marketing and promotional activities” (ERC, 2018, p8). A possible argument for promoting the development of intuition for versatility (Sadler-Smith and Burke-Smalley, 2015) in business support programmes would be the acknowledgment that prior knowledge is needed for the ability to adapt and learn from feedback (Haynie et al., 2009; Sadler-Smith and Burke-Smalley, 2015), and that intuitive expertise can be developed through practical based workshops and training programmes (Sadler-Smith and Burke-Smalley, 2015; Sadler-Smith, 2016).

7.5 Cognitive maps as mental representations of the thought process

Objective four was to examine and visually represent the process of making opportunity-related decisions using cognitive mapping techniques in the context of the small business environment. As argued by Curşeu and Vermeulen (2008, p195), it is a challenge to “gain access into the unseen information processing space of the human cognitive system”. Despite the time-consuming element of analysing interview data across five time points, using in case and within case analysis, the ideographic technique employed to construct

the mental representations of each entrepreneur over a two-year period produced unique insights and significant results. From the cognitive map construction, the antecedents of cognitive complexity were examined and the structure of the evaluation process as it unfolded for opportunity-related decisions was explored, from the initial decision made after the perception of the opportunity, through to final decision before exploitation. This framework of the opportunity evaluation process was defined as the internal cognitive environment (that is, the entrepreneurs' cognitive processes) and the external environment (that is the context) in which the opportunity was being evaluated.

The cognitive maps indicated the structure of the mental representations and showed a differentiation between the positioning of the initial decision, contingent with experience and the arrangement of concepts before the final decision, unfolding as a chronological sequence of key concepts. Novices with little domain experience made their initial decision towards the end of the evaluation, after collecting information and thinking through the implications of the opportunity in the context of the existing business. Intermediate and mature entrepreneurs made an initial decision based on a gut feeling, which was checked out and thought through, then validated with others before making a final decision. Curiously, those novices with some domain experience (from family business, prior industry experience or prior business experience in a different domain) commenced the process with a gut feeling, but did not make an initial decision until much later on in the process. These differences indicated a relationship between experience, the structure of the evaluation process and the role expertise-related heuristic played in the evaluation process. Thus, enhancing the ability to apply expertise-based heuristics as a novice, evidenced as the development of links that changed knowledge structures and increased the complexity of their mental representations, arguably would assist the development of moving from novice to expert in the entrepreneurial process. The findings from this study have established a foundation for future research in this field.

7.5.1 Cognitive complexity

Similarly, context proved to be significant. Entrepreneurs who were experienced and operating in stable conditions demonstrated simplified mental representations, as a result

of general and expertise heuristics. Mature entrepreneurs who were working in challenging situations exhibited high cognitive complexity and were using both analytical and intuitive modes of processing. Novices entrepreneurs also showed high complexity, because they were undertaking an extensive information collection and analysis. Without the activation of holistic schemas from their long-term memory, they relied more on System 2 processing, which is cognitively heavy and more associated with analytical reasoning and information searching (Curşeu, 2008).

These findings showed that opportunity-related decisions were the result of interplay between System 1 and System 2, in accordance with a dual processing parallel-competitive approach (Hodgkinson and Sadler-Smith, 2018) and as posited by Curşeu and Vermeulen (2008). The amount of domain experience (as intuitive expertise) mediates this relationship. Importantly, context also influenced this interplay. In challenging contexts, mature entrepreneurs used both modes of processing and had high cognitive complexity. These entrepreneurs had significant prior knowledge of their market and their customers, had learnt from their mistakes and used their industry expertise, but where the context was less challenging, made quick decisions and had less complex mental models. Those without this domain expertise used more System 2 information processing, where their mental representations were more complex as a result of the higher demands on made the computational resources required for data collection and interpretation.

The outcome from these findings supports key differences how novice and mature entrepreneurs processed information and the underlying importance of domain expertise for developing cognitive complexity. Arguably therefore, although this has implications for venture creation, it also infers that acceleration of expertise through training and feedback would assist strategic choices when evaluating opportunities for more established businesses. Rather than acquiring holistic domain specific schemas in an ad hoc fashion through previous experiences, which may or may not be appropriate or successful, a suitable training programme for small business decision-making would help to mitigate the high failure rate that is seen in small business in the early years (fsb, 2019).

The significance of this is also supported by a unique finding of a developing link that emerged as a result of the longitudinal nature of the study.

7.5.2 Developing links and centrality

This unique finding was pivotal to the research aim and outcome, noted as the central concept or Hub in the evaluation process. This was identified from the connectivity findings, named 'Thinks it through', as it had the most direct links from itself to other concepts. This was a significant finding for both theory and practice as it showed how the deep structures were arranged and organised and more importantly, what conceptual content was used for evaluation and decision-making. Most mental models are considered to be stable structures (Wood and McKelvie, 2015) and analysis across cases indicated that many of the concepts were common across the sample. From a theoretical perspective, this illustrated what knowledge was used, the significance of the concepts in the process and their relationships with others. It adds to previous work on opportunity evaluation using an information perspective (Cameron and Pech, 2006; Vaghely and Julien, 2010). For practitioners and educators, this is a relevant approach as it provides a window into the thinking of the individual, which can be used for feedback, learning and to address gaps in knowledge. Going forward, this approach will have a positive impact on decision-making effectiveness for the individual.

Another significant finding showed the connections between concepts at different levels, illustrating how the entrepreneur thought through different concepts and made their first-person assessment of the opportunity. These connections reviewed cause and effect consequences, associations with other concepts and lessons learned from previous mistakes, which was "subjective, contextual and interpretive" (Williams and Wood, 2015, p221). The outcome of this reflection was the belief that the opportunity was feasible and personal (Wood et al., 2014; Wood and McKelvie, 2015). An influencing factor in this process was prior experience and domain specific knowledge. Where domain knowledge and experience were evident, a direct pathway connected the Hub to past experience, learning from mistakes and expertise. This connection was most probably the link that operationalised the use of intuition and heuristic processing

(Curşeu, 2008), by connecting previously stored information to the Hub, resulting in a cognitive framework (Keh et al., 2002) for assessing feasibility and for making the final decision. Where this link was not present in novices it was noted that analytical processing was preferred before an initial decision was made. In year two, development of this link was likened as ‘opening doors’ to new pathways and increased connectivity and complexity. Coinciding with this was a slow increase in the intuitive assessment score, which suggested an increased preference for using this style for decision-making. The identification of this link makes an important contribution to the entrepreneurial cognition literature as it highlights differences in knowledge structure and development (Wood and Williams, 2014) and provides insight how training and development may be used to engage metacognitive processes that are related to the entrepreneurs’ ability to adapt (Haynie et al., 2010).

The development of this link as a significant finding also helped to explain the use of intuition and heuristic processing, which promotes the benefits of a versatile style. It also showed domain experience as an antecedent to cognitive complexity. By identifying experience as an antecedent in the opportunity evaluation process and for opportunity-related decisions, it extends previous empirical research (Dutta and Thornhill, 2008; Vaghely and Julien, 2010; Wood and Williams, 2012), as well as indicating the positive relationship that experience has on cognitive complexity. The arrangement of concepts and the development of links provided insight into how complex representations evolve, which adds to literature that has investigated the mediating role of cognitive complexity (for example, Curşeu and Louwers, 2008; Iederan et al., 2009).

Dissemination of these findings through relevant channels will inform practitioners and educators how knowledge is constructed for opportunity evaluation. Reflective practice, under the guidance of quality advisors would assist knowledge exchange activity. Findings showed that all entrepreneurs used information exchange and their social capital in the evaluation process, albeit for different reasons, depending on how they used information for validation of the decision. This indicated that networking, team meetings and discussion arenas are suitable platforms for sharing and acquiring knowledge, which would scale up other experiences that may be useful for entrepreneurs in the future. In

particular, networking effectiveness helps to plug resource gaps (Hughes et al., 2015) which will assist the mobilisation of resources required for the opportunity.

These findings will be used by the researcher to develop support material for coaching and mentoring, in order to help novice entrepreneurs to develop their decision-making skills and metacognitive abilities through appropriate practice and feedback. As a result of this study and the insight gained from complexity and connectivity, the researcher devised a teaching model for the evaluation process, based on key concepts from the analysis which has met objective six. The model has been developed as a support teaching framework for practitioners who are coaching for growth or mentoring early stage entrepreneurs in their business, and who have intended planned growth. This framework will be trialled with a sample of business adults in Summer 2019 to determine whether it is fit for purpose, prior to a wider use with adult learners and students.

7.6 Methodological approach to the research question

Small business entrepreneurs frequently operate in unstable conditions (Dutta and Thornhill, 2008; Lee-Ross, 2014), so a longitudinal approach was taken to capture the nuances of behaviour over time. In order to meet the aim of the study it was necessary to gain insight into the thinking behind how an opportunity for growth was evaluated. It is well recognised that capturing the process over time is a challenge (Busenitz et al., 2003), but arguably, research that takes a process perspective illustrates contextual influence on entrepreneurial decision-making (Shepherd et al., 2014; Fletcher and Selden, 2016). This was needed to make a significant contribution to existing literature by examining how contextual factors influenced information processing preferences and the emergence of entrepreneurial behaviour. To achieve this, a new approach was needed, whereby established methods were combined in new ways (Shepherd et al., 2014), and a more diverse design was taken for deeper insight (Cools et al., 2014). This approach also supported contextual and innovative methods recommended to advance the field of cognitive style, which is dominated by quantitative approaches (Cools et al., 2014)

The researcher chose methods that had practical relevance and utilised both quantitative and qualitative approaches (Groves et al., 2011), thus using the strengths of each to

mitigate their weaknesses. The explorative nature of this study into individual processing of information required a constructivist perspective as recommended by Krueger (2007). Ultimately, this guided the researcher towards pragmatism and mixed methods. More importantly, this supported the recommendations made for longitudinal and mixed methods approaches made by Wright and Stigliani (2013) and Cools et al. (2014) who provided inspiration for this study in the first instance.

Notwithstanding, the mixed methods approach enhanced and validated the rich and detailed insights obtained from the qualitative interviews. There were many instances where the style assessments were used to corroborate findings, or vice versa. The researcher noted that this clarified the study's outcome and provided a firm foundation as a result of these exploratory findings for future research. In fact, an outcome of the triangulation between the style assessment and interviews led to the observation of a versatile style. This has been extended as a five-year study with three of the novices from the sample for further research. Findings from this study will enrich understanding how this versatile style develops and provide substantive evidence for the 'how' and 'why' questions (Wright and Stigliani, 2013)

The longitudinal nature of this study was very challenging and time consuming but without doubt gave unique and original insights into the nature of how the opportunity evolved. It also demonstrated how the structure of novices' mental maps developed as a result of experiential learning and acquisition of domain experience. This will be very useful for practitioners and with the teaching framework proposal, will provided a more formalised framework for developing intuitive thought and a means of addressing the benefits of a versatile style for decision-making effectiveness.

7.7 Implications for theory

Objective five of this study was to develop a theoretical model for the process of opportunity evaluation and opportunity-related decisions that considered the iterative, dynamic and temporal nature of the subject matter. A primary contribution to the entrepreneurship literature is that an information processing approach is another way an entrepreneur may evaluate opportunities (for example, Pech and Cameron, 2006; Vaghely

and Julien, 2010; Rastkhiz et al., 2018). This adds an alternative model to the research arena by presenting a different but more nuanced understanding of the information processing perspective (that is the application of both intuitive and analytical styles) in contrast to the rule-based reasoning approach empirically investigated by Williams and Wood (2015) and Wood and Williams (2014). In addition, a deeper insight into how the structure of this process evolves over time is provided from this study and makes a significant contribution to the opportunity evaluation literature, where time-based studies (for example, Autio et al., 2010; Chandra, 2017) are rare. The findings add to the development of theory because they have provided new insight into 1) how mental structures in the evaluation stage are organised and developed, 2) how evaluation unfolds as an iterative staged process and 3) how both information processing modes are beneficial for evaluation, in particular the expertise heuristic for decision-making effectiveness. A model was proposed that showed the iterative nature of opportunity-related decisions and provides a framework for future exploratory and explanatory research.

Findings also indicated that a mental model conceptualisation (Cossette, 2002; Eden, 2004; Curşeu, 2008; Wood and McKelvie, 2015) acted as useful framework for information assessment and for understanding how knowledge was used and exchanged. This was captured as an integrative framework where the individual made a first-person assessment of the opportunity, but also emphasised the environmental contribution as a third person assessment for verification and validation of information and decisions. As such findings showed that the evaluation process was not a totally first-person assessment, as proposed by Haynie et al. (2009). This exemplifies the need to take an integrated approach and supports Wiklund et al.'s (2009) proposal that a more integrated approach is needed to advance theoretical understanding of small business growth and the opportunity-related decision-making processes therein.

Additionally, the mental model conceptualisation provided insight into the mechanisms through which opportunities were identified and evaluated (Baron and Ensley, 2006). Moreover, comparison between novices and mature entrepreneurs showed how these structures developed, which is important for learning. Insight into the complexities and

connectivity in the process and how style reference was contingent with context showed the development of a versatile style and the ability to view the opportunity from multiple viewpoints. This indicates a potential relationship between the use of a versatile style and performance for future research (Groves et al., 2011).

7.8 Implications for practice

Any development of knowledge requires research-based evidence to inform future practice (Cools et al., 2014). Findings from this study have shown the specific content used for evaluation as concepts for opportunity-related decisions. Connectivity has also shown which concepts are dominant in the evaluation process. Taken together, this indicated that experienced entrepreneurs have well developed images of the opportunity and consistently use past experience to help them evaluate the opportunity. Therefore, “knowledge needed for opportunity can be codified and learned” (Wood and Williams, 2014, p595). According to Krueger (2007), moving novice entrepreneurial scripts towards an expert script is essential for entrepreneurial pedagogy and for growing entrepreneurs, but also for helping entrepreneurs in business to grow as professionals. Similarly, Baron and Ensley (2006) argued that understanding the mental frameworks of experienced entrepreneurs suggests that these refined and complex frameworks assists them in recognising opportunities. Hence, it seems reasonable to suggest that this will also apply for the opportunity evaluation stage, that is, the specific knowledge used can be taught and used for improving and refining the mental frameworks constructed for opportunity-related decision-making.

Opportunity has been observed as an iterative and unfolding process from a constructivist perspective (Wood and McKinley, 2010). If style is context dependent and learnable, creativity (which is linked to intuition) can be encouraged (Lee-Ross, 2014). In the entrepreneurship literature, expertise is developed through practice and feedback (Sadler-Smith and Burke Smalley, 2015). Authentic working environments (Harteis and Billet, 2013) provide opportunities for everyday practice and learning, but although this is important, different experiences are needed to extend and develop learning. Experiences with different knowledge networks will provide alternative images of opportunity which

can then be accessed as implicit knowledge schemas and used for future reference in evaluation. Similarly, entrepreneurs must be shown the downsides of developing an intuitive style and its potential perils (Harteis and Billet, 2013).

The developing link between the Hub and past experience in the novices' mental framework, found in the second year of the study, was a unique finding. According to Krueger (2007, p131) moving from novice script to expert script has been used to accelerate student progress in the entrepreneurship programme and understanding the developmental experiences required for an expert mindset is an important research question. Both Hodgkinson and Clarke (2007, p250), Sadler-Smith and Burke Smalley (2015, p15) and Sadler Smith (2016, p221) have promoted the use of management training and business education programmes for assisting novice entrepreneurs in acquiring expert schemas and scripts to help them develop intuitive expertise. This study's findings provide compelling, conceptual evidence of one way that the deep structures for expertise evolves, the importance of experience in bringing about this structural change and the complexity in the mental representations of the novice entrepreneurs. The practical implication of this have been addressed with a teaching model aimed at assisting the development of more complex representations, presented in the previous chapter.

A further implication for practice is that research designs should promote creation of knowledge networks between researchers and practitioners, if the significant findings are used for enriching current practice. More importantly, there is a need to change the perceptions of stakeholders who use a typical rational approach for decision-making, a practice which is still prevalent to date. This study has shown that learning and gaining expertise occurs naturally and therefore working in partnership with educators and trainers can accelerate this naturally occurring learning process. Small business, particularly the SME 10-49 bracket, represents a small slice of the total SMEs at only 3.7% (fsb, 2019), but arguable are significant employers and thus contribute to the economy. Therefore, they hold an important position in the community and thus warrant inclusion into future policy and practice initiatives as a special category of entrepreneurs.

7.9 Chapter summary

Finally, this chapter has summarised the study's aim and objectives and using an integrated framework, explored how entrepreneurs past the start-up stage of their business evaluated opportunities and made opportunity-related decisions. The cognitions of a small sample of entrepreneurs were captured as they assessed the opportunity, using a cognitive style lens as a window into their mental representations. A longitudinal, mixed method approach resulted in unique and significant findings.

The chapter has explained the findings from three key areas and summarised the contributions these have made to theory and practice. A key finding showed the observation of a versatile style in mature entrepreneurs, supported by dual process theory. The study has observed the way entrepreneurs processed information when making these opportunity-related decisions and how style preferences are contingent with context and experience. Differences between novice, intermediate and mature entrepreneurs were explored which showed how experience influenced mental model structure and information processing style.

A focus on the opportunity evaluation stage as the bridge between identification and exploitation (Wood and McKelvie, 2015) contributed to the view of the entrepreneurship process as distinct stages (Shane and Venkataraman, 2000). Findings illustrated how the entrepreneurs shaped their perception of the opportunity and identified a central core concept, 'Thinks it through' as the Hub in the evaluation process. The developing link from this to past experience provided insight how the deep cognitive structure of novices evolves and provided future ideas for training practice. Complexity and connectivity calculations gave deeper insight into the mental representations of each entrepreneur.

An overview of the methodological approach was provided to justify the approach taken for this research study. Following this, implications for theory and practice were summarised and the potential outcomes for future learning programmes discussed for educators, practitioners and future practice. The chapter concludes with a look back over the PhD journey and reflects on the learning process.

7.10 Reflections on the PhD journey

The researcher's journey has been a long but interesting one. The slow progress from a practical, small business owner to doctoral student has been challenging, but enjoyable. Learning and understanding the ramifications of academic research and the associated processes of research methodology, design and presentation has illustrated the importance of robust findings for bringing about change and impact in the small business community. The doctoral process has also helped the researcher understand the importance of research for challenging existing practices and perceptions and for examining important questions about entrepreneurship and the nature of how entrepreneurs grow and develop.

A personal interest in cognitions and psychology has broadened as a result of this research study and inspired the researcher towards developing further practical activities that can be used to enhance and support entrepreneurs develop their decision-making skills in the small business community. Additionally, this research study has highlighted specific teaching activities that can be used for training activities that will aid experiential thinking. The adoption of cognitive mapping techniques and complexity analysis has highlighted for the researcher a key area of interest that will be used for future research and practice.

All learning involves change at a deep cognitive level. This can bring about huge benefits for individuals as they gain knowledge and inspiration. Likewise, it can also be stressful if inappropriate or a cognitive misfit at that particular timepoint. Although at times the researcher felt that she was 'wading through mud', and seemed to take an age to break through the 'doctoral wall', the journey has ended with new horizons, new friends and colleagues and more challenges for the future. Hence, despite the ups and downs of the doctoral learning process, the eureka moments and a desire to achieve have far outweighed the negative moments. Hence, this thesis ends with a simple comment made by Theodore Roosevelt (1858-1919) that effectively sums up the journey. "*Believe you can and you're halfway there*".

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Appendices

Appendix 1 Core articles identified from the literature review

Author	Year	Title	Methodology	Contribution
Julmi, C.	2019	When rational decision-making becomes irrational: a critical assessment and re-conceptualisation of intuition effectiveness	Conceptual	Conceptual explanation and support for the dual process parallel-competitive theory and intuition as a holistic form of information processing as distinct from analysis.
Cunningham, J. and Anderson A.R.	2018	Inspired or Foolhardy: Sensemaking, Confidence and Entrepreneurs Decision-making	Empirical	The role of confidence in how new and experienced entrepreneurs interpret the business environment to inform decision-making.
Hodgkinson, G. P. and Sadler-Smith, E.	2018	The dynamics of intuition and analysis in managerial and organisational decision-making	Conceptual **	A summary of two different categories of dual process theory and their implications for multiple streams of research.
Rastkhiz, S.A. Dehkordi, A.M. and Farsi, J. Y.	2018	A new approach to evaluating entrepreneurial opportunities	Empirical	Fuzzy screening technique to evaluate and select opportunity.
Chandra, Y.	2017	A time-based process model of international entrepreneurial opportunity evaluation	Empirical **	International entrepreneurship opportunities and role of time in the evaluation process.
Zivdar, M., Imanipour, N., Talebi, K. and Hosseini, S.R.	2017	An explorative study of inputs for entrepreneurs' decision-making to create new venture in a high-tech context	Empirical	Process and context approach. Qualitative-exploratory design.
Sadler-Smith, E.	2016	The role of intuition in entrepreneurship and business venturing decisions	Conceptual	Integrates the theories of dual processing and opportunity models. Proposes 6 research ideas for testing.
Baldacchino, L., Ucbasaran, D., Cabantous, L. and Lockett, A.	2015	Entrepreneurship Research on Intuition; A critical analysis and research agenda	Literature Review	Intuition in cognition literature. Cognitive versatility.

Dew, N., Read, S., Sarasvathy, S.D. and Wiltbank, R.	2015	Entrepreneurial expertise and the use of control	Empirical	Relationship between decision making improvements, expertise and control strategies.
Grégoire, D.A., Cornelissen J., Dimov, D. and van Burg, E.	2015	The Mind in the Middle: Taking Stock of Affect and Cognition Research in Entrepreneurship	Literature Review**	Synthesis of the road travelled so far in cognition research.
Klein, G.	2015	A naturalistic decision-making perspective on studying intuitive decision-making	Conceptual	Intuition and decision-making research and building tacit knowledge.
Kuhlmann, D.O. and Ardichvili, A.	2015	Becoming an expert: developing expertise in an applied discipline	Empirical	Grounded theory methods for expertise as gained from years in high-value non-routine work.
Randolph-Seng, B., Mitchel, R.K., Vahidnia, H., Mitchell, J.R., Chen, S. and Statzer, J.	2015	The microfoundations of entrepreneurial cognition research: Toward an integrative approach	Literature Review	Update on the field of entrepreneurial cognition research taking a microfoundations approach.
Sadler -Smith, E. and Burke-Smalley, L.A.	2015	What do we really understand about how managers make decisions?	Literature and conceptual review	Literature update on intuition and important development that have taken place in intuition research.
Wood, M. S. and McKelvie, A.	2015	Opportunity Evaluation as Future Focused Cognition: Identifying Conceptual Themes and Empirical Trends	Literature Review **	Review of opportunity evaluation and integrative framework of the 'Mind in the Middle'.
Williams, D.W. and Wood. M.S.	2015	Rule based reasoning for understanding opportunity evaluation	Literature Review**	Rule based reasoning in opportunity evaluation.
Yang, J. and Zhang, J.	2015	Social Networks, Cognition and Risk Recognition New Ventures: Evidence from China	Empirical	Using cognitive information theory to test a theoretical framework on the interaction between social networks, risk and outcomes.

Andresen, E., Lundberg,H. and Wincent, J.	2014	Processes in collaborative entrepreneurship: a longitudinal case study of how multiple actors exploit a radically new opportunity	Empirical	Longitudinal case study on opportunity discovery, evaluation and exploitation.
Barbosa, S. D.	2014	Revisiting entrepreneurship research from a decision-making perspective	Conceptual **	An overarching framework from a decision point of view.
Cools, E., Armstrong, S. J and Verbrigghe, J.	2014	Methodological practices in cognitive style research: Insights and recommendations from the field of business and psychology	Literature Review**	Content analysis of articles 1986-2010. Dominated field of quantitative, cross sectional and single source designs relying heavily on self-reports, sample surveys and student samples.
Krueger, N. and Welp, I.	2014	Neuroentrepreneurship: What Can Entrepreneurship Learn from Neuroscience?	Conceptual	What neuroscience may bring to the entrepreneurship field and recommendations for future research.
Lee-Ross, D.	2014	Entrepreneurial thinking. A study of cognitive styles in small businesses	Empirical **	Exploratory study on cognitive decision-making styles. Both rational and intuitive styles are used.
Shepherd, D.A., Williams, T.A and Patzelt, H.	2014	Thinking about entrepreneurial decision-making: Review and Research agenda	Literature Review **	First review in the field of entrepreneurship with agenda for future research.
Wood, M. S. and Williams, D. W.	2014	Opportunity evaluation as rule-based decision making	Empirical **	Use of rules influences evaluations and that individual differences augment the effect of the rules on opportunity attractiveness. Rule base decision making.
Wood M. S., McKelvie, A. and Haynie, J. M.	2014	Making it personal: Opportunity individuation and the shaping of opportunity beliefs	Empirical**	Individual cognitive resources play an important part in formation of opportunity beliefs about personal attractiveness for pursuit.
Zahra, A.A., Wright, M. and Abelgawad, S.G.	2014	Contextualisation and the advancement of entrepreneurship research	Conceptual Review	Analyses the role of context in the advancement of entrepreneurship research and gives future recommendations.
Akinci, C. and Sadler-Smith E.	2013	Assessing individual differences in experiential (intuitive) and rational (analytical) cognitive styles	Literature Review	Intuitive and analytical cognitive styles.

Autio, E., Dahlander, L. and Frederikson, L.	2013	Information exposure: Opportunity evaluation and entrepreneurial action: An investigation of an online user community	Empirical	Entrepreneurial action and opportunity evaluation are distinct processes.
Dijkstra, K., Van der Plight, J. and Van Kleef, G.A.	2013	Deliberation versus intuition: Decomposing the role of expertise in judgment and decision making	Empirical	Use of experiments to test what produces better judgments, deliberation or intuition.
Evans, St. B.T and Stanovich, K.E.	2013	Dual-Process Theories of Higher Cognition: Advancing the Debate	Conceptual	Response to 5 lines of argument on dual process theory.
Harteis, C. and Billet, S.	2013	Intuitive expertise: theories and empirical evidence	Literature Review	Elements, theories and empirical evidence on intuitive expertise.
McMullen, J.S. and Dimov, D.	2013	Time and the entrepreneurial journey: the problems and promise of studying entrepreneurship as a process	Conceptual	A shift from entrepreneurship as an act to entrepreneurship as a journey. Subdivide process into variables or events, to see if anything remains constant throughout the process.
Urban, B.	2013	The importance of attributes in entrepreneurial opportunity evaluations: an emerging market study	Empirical	Evaluating opportunities and importance of sector, capital, technology, market, return on investment.
Wright, M. and Stigliani, I.	2013	Entrepreneurship and growth	Literature review**	How cognitive processes shape growth.
Armstrong, S.J., Cools, E. and Sadler-Smith, E.	2012	Role of cognitive styles in business and management: Reviewing 40 years of research	Literature Review	Reviews the development of cognitive style use both empirically and conceptually and makes recommendations for future research.
Dane, E., Rockmann, K.W. and Pratt, M. G.	2012	When should I trust my gut? Linking domain expertise to intuitive decision-making effectiveness	Empirical**	Effectiveness of intuition relative to analysis improves at a high level of domain expertise.
Haynie, M.J., Shepherd, D.A. and Patzelt, H.	2012	Cognitive Adaptability and an Entrepreneurial Task: The Role of Metacognitive Ability and Feedback	Empirical**	Insight of the interplay between knowledge, learning and cognition. Metacognitive ability and feedback promote or impede cognitive adaptability.

Moroz, P. W. and Hindle, P.	2012	Entrepreneurship as a process; towards harmonizing multiple perspectives	Conceptual	Evaluation of published models of entrepreneurship to seek out key commonalities for a single harmonized model.
Wood, M. and Williams, D.W.	2012	Seeing the forest by way of the trees: opportunity evaluation as rule-based processing	Empirical	Testing rule-based processing on a model of entrepreneurial opportunity evaluation, conjoint data of 498 decisions by 62 entrepreneurs.
Gore, J. and Sadler-Smith, E.	2011	Unpacking intuition: a process and outcome framework	Literature Review	Dual process theory and intuition.
Grégoire, D.A., Corbett, A.C. and McMullen J.S.	2011	The cognitive perspective in Entrepreneurship: An agenda for future research	Literature Review	Content analysis of literature 1976-2008 and key conceptual features of cognitive perspective.
Groves, K., Vance, C. and Choi, D.	2011	Examining entrepreneurial cognition: An occupational analysis of balanced linear and nonlinear thinking and entrepreneurship success	Empirical	Two styles, linear and nonlinear provide a versatile balance recommended.
Sánchez, C.	2011	The entrepreneur from a cognitive approach	Conceptual	Highlights important contribution of cognitive psychology to field of entrepreneurship.
Vaghley, I.V. and Julien, P.A	2010	Are opportunities recognised or constructed? An information perspective on entrepreneurial opportunity identification	Empirical **	An information processing stance and a model of human information processing based on a continuum.
Armstrong, S. and Hird, A.	2009	Cognitive style and entrepreneurial drive of new and mature business owner-managers	Empirical	Cognitive styles and entrepreneurial drive. More intuitive entrepreneurs exhibited higher levels of entrepreneurial drive.
Dew, N., Read, S., Sarasvathy, S., and Wiltbank, R.	2009	Predictive logics in entrepreneurial decision-making: differences between experts and novices	Empirical	Experts frame decisions using “effectual logic” and pay less attention to predictive information.
Haynie, J. M., Shepherd, D.A. and McMullen, J. S.	2009	An opportunity for me? The role of resources in opportunity evaluation decisions	Empirical**	Testing a resource-based model for opportunity evaluation using conjoint analysis.

Iederan, O.C., Curşeu, P.L. and Vermeulen, P.	2009	Effective decision-making: the role of cognitive complexity in strategic decisions	Empirical**	Mediating role of cognitive complexity in the relationship between the need for cognition and decision performance.
Hodgkinson, G.P., Sadler-Smith, E., Burke, L.A. Claxton and G. Sparrow, P.R.	2009	Intuition in organisations: Implications for strategic management	Literature Review	Intuition in organisations, dual process theory, development of analytical and intuitive approaches.
Sadler-Smith, E.	2009	A duplex model of cognitive style (in Perspectives on the Nature of Intellectual Styles)	Conceptual and Literature Review**	Proposal of a versatile style and the duplex model.
Dutta, D.K and Thornhill, S.	2008	The evolution of growth intentions: towards a cognition-based model	Empirical **	Entrepreneurs cognitive style moderates the relationship between perception of competitive environment and growth.
Curşeu, P.L., Vermeulen, P.A.M. and Bakker, R.M.	2008	The psychology of entrepreneurial strategic decisions	Literature Review**	Entrepreneurial strategic decision-making characteristics and model.
Curşeu, P.L.	2008	The role of cognitive complexity in entrepreneurial strategic decision-making	Conceptual**	Comprehensive explanation and conceptual review of cognitive complexity.
Brigham, K.H., Castro and Shepherd, D.A.	2007	A Person-Organisation fit Model of Owner-Managers' Cognitive style and Organisational Demands	Empirical	Survey of owner-mangers to examine associations of individual factors, firm characteristics and satisfaction/intention to exit.
Bryant, P.	2007	Self-regulation and decision-heuristics in entrepreneurial opportunity evaluation and exploitation	Empirical	Use of regulation theory and decision heuristics in the opportunity evaluation process.
Cools, E. and Van den Broeck, H.	2007	Development and validation of cognitive styles indicator	Measurement instrument	Development and validation of Cognitive Styles Indicator.
Hodgkinson, G.P. and Clarke, I	2007	Exploring the cognitive significance of organisational strategizing: a dual-process framework and research agenda	Conceptual	Outline of two-dimensional framework for investigating cognitive versatility.

Hughes, M., Hughes, P. and Morgan, R.E.	2007	Exploitative Learning and Entrepreneurial Orientation Alignment in Emerging Young Firms: Implications for Market and Response Performance	Conceptual	Exploitative learning and entrepreneurial learning in young firms.
Kozhevnikov, M.	2007	Cognitive styles in the context of modern psychology: Towards an integrated framework of cognitive style	Literature Review	Cognitive style as heuristics.
Krueger, N. F.	2007	What lies beneath? The experiential essence of entrepreneurial thinking	Literature Review**	Future research propositions, deeply seated beliefs, cognitions and constructivism.
Baron, R.A. and Ensley. M. D.	2006	Opportunity recognition as the detection of meaningful patterns	Empirical	Compared business opportunity prototypes of novices and experienced entrepreneurs. Experienced had richer in content.
Gustafsson. V.	2006	Entrepreneurial Decision-Making	Literature Review	Comprehensive conceptual background on individuals, tasks and cognitions including theory.
McMullen, J.S. and Shepherd, D.A.	2006	Entrepreneurial action and the role of uncertainty in the theory of entrepreneur	Conceptual	Conceptual model of entrepreneurial action at the individual level of analysis.
Pech, R.J and Cameron, A.	2006	An entrepreneurial decision-process model describing opportunity recognition	Empirical	Entrepreneurship decision processes, cognitive theory and a decision process model.
Cope, J.	2005	Toward Dynamic Learning Perspective of Entrepreneurship	Conceptual	Summarises work for a thematic conceptualisation of entrepreneurial learning.
Ardichvili, A., Cardozo, R. and Ray, S.	2003	A theory of entrepreneurial opportunity identification and development	Conceptual	A theory of entrepreneurial opportunity identification and development, personality traits, social networks and prior knowledge as antecedents of alertness to business opportunities.
Keh, H.T., Foo, M.D. and Lim. B.C.	2002	Opportunity evaluation under risky conditions: the cognitive processes of entrepreneurs	Empirical	Cognitive approach to explore how cognitive biases affect opportunity evaluation mediated by risk perception.
Khatri, N. and Ng, H. A.	2000	The role of intuition in strategic decision making	Empirical	Use of intuitive synthesis found to be positively associated with organisational performance in an unstable environment and negatively so in a stable environment.

Smith E. R. and DeCoster, J.	2000	Dual process models in social and cognitive psychology: Conceptual integration and links to underlying memory systems	Literature Review	Conceptual model of the two processing modes in memory for dual processing.
Leonard, N.H. Scholl, R.W. and Kowalski, K.B.	1999	Information processing style and decision making	Conceptual	Comparison of measure Measures conceptually linked through underlying theories.
Epstein, S., Pacini., R. Denes-Raj, V. and Heier, H.	1996	Individual differences in intuitive-experiential and analytical-rational thinking styles	Measurement instrument	Validation of REI and CEST.
Louis, M. R. and Sutton, R.I.	1991	Switching Cognitive Gears: From Habits of Mind to Active Thinking	Conceptual Review**	Proposed framework of cognitive functioning and the shift between processing modes.

** indicates high importance

Appendix 2 Recommendations and gaps identified from three literature streams

Opportunity evaluation theme	Opportunity-related decisions theme	Entrepreneurial cognitions theme	Summary of areas for future research
Collaborative entrepreneurial processes and multiple actors (Andresen et al., 2014)	Research at multiple levels (Wiklund et al., 2009; Barbosa, 2014; Shepherd et al., 2014; Elbanna and Fadol, 2016) Process orientation (Barbosa, 2014)	Social cognitions and others involved in the entrepreneurial process (Randolph-Seng et al., 2015; Wood and McKelvie, 2015) Process orientation (McMullen and Dimov, 2013; Grégoire et al., 2015)	Process oriented
First person rather than third person (Wood and McKelvie, 2015) Individual centred process (Peiris et al., 2013)	Individual attributes linked to entrepreneurial contexts for decision-making (Maine, 2015) The intersection between opportunity and individuals (Busenitz et al., 2003)	Micro, individual-level process perspective (George et al., 2016) Entrepreneurial change at a deep cognitive level (Krueger, 2007)	First person, individual level at deep cognitive perspective
Integrated perspective between mental models, cognitive resource differences and individual differences which moderate contextual variables (Wood and McKelvie, 2015)	Making use of context (Shepherd et al., 2014) Multi-level frameworks linking individuals and contexts (Maine et al., 2015)	Considering contextualized interactions of individual focused research (Barney and Felin, 2013) Context dependency of style (Cools et al., 2014; Lee-Ross, 2014)	Contextual, mental model approach
Different sources of data that can be triangulated (Wood and McKelvie, 2015)	Use of mixed methods, combining established methods in new ways (Shepherd et al., 2014)	Mixed methods (Wright and Stigliani, 2013; Cools et al., 2014; Bendall et al., 2016; Sadler-Smith, 2016) Advances and novel approaches needed (Cools et al., 2014; Shepherd et al., 2014; Sadler-Smith and Burke-Smalley, 2015) Qualitative approaches (Wright and Stigliani, 2013; Cools et al., 2014; Lee-Ross, 2014)	Mixed methods, new approaches

Appendix 3 Commonly used paradigms in social science research

Paradigm	Research methodology	Epistemology	Ontology	Axiology	Method of Data Collection
Positivist	<p>Scientific method, cause and effect relationships An objective search for facts Uses deductive logic, formulation of hypotheses, testing hypothesis Provides explanation and makes predictions based on measurable outcomes Involves the manipulation of one variable to determine whether changes in that cause changes in another Causal comparative</p>	<p>Objectivist Human understanding gained through application of reason Truth or knowledge is out there to be discovered Knowledge generated through laws</p>	<p>Naïve realism There exists a world of material objects These objects are largely perception-independent World perceived directly through senses Tangible Single</p>	<p>Beneficence All research is aimed at maximising good outcomes and to avoid any risk, harm or wrong that could occur during the research</p>	<p>Surveys Experiments Statistical analysis Instrument measurement Quantitative data gathering</p>
Interpretivist/ Constructivist	<p>Understands the subjective world of human experience Understands the viewpoint of the subject being observed Research conducted must be credible, dependable, confirmable and transferable Naturalist</p>	<p>Subjectivist and transactional meaning Interpreted/constructed by researcher Processing of data informed by interaction with participants</p>	<p>Relativist Reality is socially constructed The situation studied has multiple realities Realities can be explored and meaning made/</p>	<p>Balanced Outcome of research will reflect the values of the researcher who presents a balanced</p>	<p>Interviews Narratives Discourses Reflective sessions Ethnographies Grounded theory</p>

	<p>Theory does not precede research</p> <p>Interactive process between researcher and participant</p> <p>Narrative enquiry</p>	<p>Context is vital for knowledge and knowing</p> <p>Cause and effect are mutually interdependent</p>	<p>reconstructed between researcher, subjects of research and participants</p>	<p>perspective of the interactive findings</p> <p>Knowledge is value laden</p>	<p>Case studies</p> <p>Phenomenology</p> <p>Action research</p>
<p>Critical/ Transformative</p>	<p>Dialogic</p> <p>Concerned with power relationships in social structures</p> <p>Examines conditions and individual in a situation based on social positioning</p> <p>Research is constructed not discovered</p> <p>High reliance on praxis</p>	<p>Transactional</p> <p>The researcher interacts with the participants</p> <p>Uncovers agency hidden by social practices leading to social empowerment</p> <p>Focus on feminist, racial, queer, disability</p>	<p>Historical realism</p> <p>Conscious recognition of the consequences of privileging versions of reality</p>	<p>Respects cultural norms</p> <p>Researcher exposes and promotes human rights, social injustices, politics, morality and ethics</p>	<p>Action research</p> <p>Participatory research</p>
<p>Pragmatism</p>	<p>Naturalistic</p> <p>Emphasis on workability</p> <p>A rejection of the positivist notion that social science can uncover the truth</p> <p>Pluralistic approaches</p> <p>Mixed methods</p> <p>Combination of quantitative and qualitative research methods</p>	<p>Relational</p> <p>Best determined by what the researcher deems appropriate for the study (what worldview works best for the purpose)</p> <p>Use of the best approach to gain knowledge for knowledge discovery</p>	<p>Non-singular reality</p> <p>No single reality as all individuals have their own and unique interpretations of reality</p>	<p>Value laden</p> <p>Research that benefits the people</p>	<p>Case study</p> <p>Phenomenology</p> <p>Ethnography</p> <p>Action research</p> <p>Experimental and quasi experimental</p> <p>Causal comparative</p>

Source: McKenzie and Knipe (2006), Plano Clark and Creswell (2008) and Kivunja and Kuyini (2017)

Appendix 4 Mixed method features and their relevance to the study's objectives

Mixed method feature	Explanation of application	Quant. data focus	Qual. data focus	Study's objective	Rationale of choice to meet study's objectives
Aid interpretation	Use of qualitative data to help explain quantitative variables.	X	X	3 1 & 2	Qualitative data to help interpret contextual relationship from quantitative assessments and differences between novice and mature entrepreneurs .
Complementarity	Use of two or more research strategies so that different aspects can be merged. Facilitates qualitative elaboration.	X	X	1 - 4	Quantitative analysis and qualitative analysis merged for a broad and comprehensive understanding .
Development	The use of a quantitative measure developed from prior qualitative findings to inform and develop other methods.	N/A	N/A	N/A	Not appropriate for this study as using pre-existing quantitative measure REI.
Facilitation	Use of one data collection method to aid another.		X	3 & 4	Qualitative content analysis assisting quantitative calculations for cognitive complexity in the decision process.
Generality	Use of independent data to contextualise main study.	X		2, 3& 4	Quantitative analysis of qualitative data for key concepts and links in mental models and versatility.
Initiation	Collection of qualitative data to understand quantitative data after negative results of hypothesis or to discover paradox and contradiction.	N/A	N/A	N/A	Not relevant for this study, generally an uncommon practice, only used when contradictions or recasting of questions are necessary.

Study different aspects	Use of quantitative for macro features and qualitative for micro features.	X	X	1 - 3 5	Quantitative look at information processing styles (assessment outcomes) and qualitative look at concept depth and detail. Examination of the similarities and differences between the two types of data. Identification of key features for theory building.
Triangulation	Use of two or more data sources to corroborate research findings. Results from two or more research methods converge. Correspondence of results from different methods.	X	X	1 - 3 5	Cross checking quantitative data against qualitative data for style synthesis, versatility and changes contingent with external influences. Supports theory building.

Source: adapted from Bryman and Bell (2011) pp631-643, Saunders et al. (2016) p173

Appendix 5 Consent form

STUDY TITLE: How do entrepreneurs make decisions whether or not to grow their business?

Consent form

Issue	Participant's initials
I have read the information presented in the information letter about the study.	
I have had the opportunity to ask any questions related to this study, and received satisfactory answers to my questions, and any additional details I wanted.	
I am also aware that excerpts from the interview may be included in publications to come from this research. Quotations will be kept anonymous.	
I give permission for the interview to be recorded using audio recording equipment.	
I understand that individuals may look at relevant sections of the data collected during the study from De Montfort University and by one External Examiner. I give permission for these individuals to have access to my responses.	

With full knowledge of all foregoing, I agree to participate in this study.
I agree to being contacted again by the researchers if my responses give rise to interesting findings or cross-references.

- No
- Yes

If yes, my preferred method of being contacted is:

- Telephone
- Email
- Other

Participant Name:		Consent taken by	
Participant Signature:		Signature	
Date		Date	

Appendix 6 Research Flyer

PhD Research Overview

My name is Marian Evans and I am a PhD researcher at De Montfort University, Leicester. Over the next 2 years I am undertaking a research study on how entrepreneurs make decisions on the growth of their business. As a mature student and business owner, I work in the manufacturing sector and have both personal and business interests in my study outcomes.

My research requires case studies of SME owner-managers, past the start-up stage, who have grown or are growing their businesses over the next 2 years. My focus is in the manufacturing sector, on small businesses of 10-49 employees in the East Anglia and East Midlands area. I am looking for business owners who would be prepared for me to interview them every six months, for a couple of hours, over a two-year period.

My research will explore how owner-managers make decisions on business growth and how they gather and process information for this decision-making process.

The research will help to further understanding on what influences this process and provide the owner-manager with knowledge about the ways they can improve and develop their decision-making processes.

The visits would be an informal discussion interview on decision-making, including a short questionnaire on cognitive styles. Sales figures and employee numbers are also needed to map any growth of the business over this timeframe. Observation of any key decision-making meetings would also be of value, if possible.

If you would like to contribute towards this research, please give me a call or email me to arrange a convenient time to discuss this further.

Marian Evans
me@prhpartnership.co.uk
(Mobile number)

Appendix 7 Inclusion criteria for sample eligibility

Boundary	Criteria	Justification
SME by EU definition	Small to medium enterprise with 10-49 employees at start of study	Small businesses provide the majority of economic income in UK (House of Commons, 2018). Researcher works in the small business sector.
Manufacturing sector	By definition producing a product that involves the process of converting any raw material, components or parts into finished goods in line with the customer's requirements	Manufacturing growth in UK is needed for economic stability and is an important contributor to GDP (Manufacturing Statistics, 2018) There is little research that uses small manufacturing businesses who are an important part of an integrated supply chain. Researcher previously owned manufacturing company hence understands context.
Established business past start up stage	Managed by the principal founder of the business with a minimum of three years' experience as owner-manager OR director of sole proprietorship/partnership or limited company	Unit of analysis is an individual entrepreneur. Start-up and nascent entrepreneurs' investigations more common in literature. Findings to support practitioners to develop growth strategies for existing businesses.
Entrepreneurial business	Owner-manager as an entrepreneur	Individuals who exploit market opportunity through technical and/or organizational innovation (Schumpeter, 1934).
Two-year study time frame	Commitment to be interviewed and cognitively assessed five times over a two-year period	Data collection requirements for a mixed method, longitudinal, repeated measures study over a two-year period.
Sales turnover and employees' numbers	Release of monthly sales figures/turnover and employee numbers for trend analysis and growth tracking	Data required for tracking statistics to map growth trend over the study time frame for descriptive statistics.
Perception of business opportunity	All entrepreneurs were able to describe a current business opportunity that they were going to evaluate	The study's aim is to explore how businesses make opportunity-related decisions

Appendix 8 Transcript examples across all time points E05

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Coding and relationships	Transcript examples
<p>Past experience, Learning, Gut feelings, Intuitive style, Feeling Confident, Decision type</p>	<p>Yes, but maybe it's not a gut reaction it's pulling from experience and just making a response (T0)</p> <p>It's difficult because you don't have any, you learn by experience and you don't have any experiences when you start out. I was a teacher, I had no experience at all and so all the way through business I have no staff who have got any experience in the business we're working, I have my production manager was a PA, nobody has any experience to fall on, we don't have one person who actually knows in theory what we are doing (T0)</p> <p>Nobody has experiences in our industry to pull on and that's actually been quite a weakness over the years (T0)</p> <p>I know now what we don't want I won't know everything what we do want but I'm clear on what happened in the past (T0)</p> <p>I think we all use our experience don't we that's the only way you learn, no so I do use that a lot (T0)</p> <p>Subconsciously, you don't consciously do it (T0)</p> <p>My past experience told me and I brought that forward so I looked at that, though I know what's going to happen here blah, blah and the first one lasted a week and the second one after about 6 weeks became a bit twitchy and a bit stresses and I know it wasn't working but I thought I'd going to keep, not make any decisions so I said how it's going but I could see by the head in hands...they'd not had the experience of all things I've done with staff so it took them a lot longer to get to the point where I would actually get to the point very, very quickly because [of my past experience] (T0)</p> <p>Oh, if it was somebody else's business you'd have to go through each one in questions and say OK so there's a big cost here, what savings can we make and why to do that. I would do that analytical thinking if I had to but I don't have to do that with my business because I know it inside out so that so that changes your whole decision-making process, I don't know, back to the experience bit (T0)</p> <p>Yes, because I would say that I'm giving you a gut reaction to something but the only reason it is a gut reaction is because I can do it really quickly, I've had the experience in the past to be able to pull on, but that is a subconscious pulling on which I'm saying is a gut reaction (T0)</p> <p>Yes, because the experience was that we'd had parents queuing and being annoyed last year so it's a fear experience on that occasion, the fear of that happening again, that's why I'm feeling strongly about it because that's absolutely not where we want to be, we've got to nail this, so it's an important part of, of our business at the moment in getting that right (T0)</p> <p>You can take a horse to water but you've got to be in that right zone to actually acknowledge it all. These people that go on courses, 99% of them never take up any of the information that's there and you move on but (T0)</p> <p>I have made decision that have been right but wrong at that time almost as we were to we were too ahead of the time we should've let other people get it wrong and built on that experience rather than spending my money to get it wrong (T0)</p> <p>...and also your experience gives you confidence so you then can make the decisions quicker, in that you are saying it's a gut reaction, your confidence, because she's quickly scanned everything that happens in the past and said, yeah, actually this is the right thing, because even if you've had that experience but that hasn't given you confidence for whatever reason you won't make that decision, you sit on the fence for longer, so that experience has given me confidence as a business person to make those decisions (T0)</p> <p>Yes, very quick it is almost instant. I'll have done something about it before Gary has written the email to say hi...I'm very, how do you say intuitive is that the right word, I don't know (T0)</p> <p>Yes, but that's past experience isn't it, it is information you know because you and you don't need it, because you already know it (T0)</p>

Coding and relationships	Transcript examples
<p>Past experience, Learning, Gut feelings, Intuitive style, Feeling confident, Decision type</p>	<p>Because I know the figures I didn't need to spend any more time on it for me, yes I suppose for me I was a quick decision but it was only a quick decision because I know from past experience what the figures[were] so I didn't need to spend any more time on it, for me yes I suppose it was a quick decision because I know from past experience what the figures were because I build up that history of knowledge from past experience (T0)</p> <p>Knowing comes first and I know the answer (T0)</p> <p>I forged ahead, I've got the vision but I have the knowledge around all of that as well so it's the knowledge that is giving me my comfort blanket really (T1)</p> <p>Yes, you think you're doing it intuitively and I may not have exactly been the same circumstances but it was close enough to base that decision, the recent decision on, yes (T1)</p> <p>I come across as organised because I've got the knowledge (T1)</p> <p>I've become a blogger I think I blag and blag it in those meetings and but that's experience and they just think then that I've done it (T1)</p> <p>As I've got older maybe I've got a bit more knowledge and a bit more information, business sense, perhaps as I've learnt along the way (T1)</p> <p>When it's not intuitive really because you know that's it's going to work or not work or you've got experience to draw on whether you actually know or not you can help it you can have a stab at it (T2)</p> <p>I never thought before I just did it. Now I have an awareness and, and whilst I don't consciously think I'm stuck here what are we going to do, right let's think back to what I've done in the past, I don't consciously do that. You've made me aware that I'm doing that and that gives me confidence I think it furthers my confidence, yes it does give me confidence, does that sound strange? (T3)</p> <p>And we've been on the back foot ever since so that's why as a result of that, but not at the time, but my decision making has now completely changed because I'm going to the board meeting with my need to create a firm plan and we're not taking prisoners, we're not going to let you say this is my brain we're not going to let you say yes I've got it under control which is what she said and then she clearly didn't have, she was in tears a lot you know, she got very stressed about it so I need to address that so it won't be what I did wrong it will be what I will do right next time so it's using the experience back to using the experience I had. I haven't had that sort of experience before so I really didn't have a lot to draw on (T3)</p> <p>I don't know whether it's changed it having said that I just turned completely analytical here but that's not well it is as a result of past experience because it's as a result of the accumulations of the past few summers thinking well that point right we managed to fudge it and this year we'll know actually we've got to the stage now a quarter of 1 million was beyond our limits over that very short period of time, we can't wing it's we can't wing it anymore so past experience it's got to the point so it is learning from that now I've got to be analytical I can't be intuitive now I've got to go right okay and that's the first time I've got to that point (T3)</p>
<p>Gut feelings</p>	<p>Yes, but maybe it's not a gut reaction it's pulling from experience and just making a response (T0)</p> <p>...and also your experience gives you confidence so you then can make the decisions quicker, in that you are saying it's a gut reaction, your confidence, because she's quickly scanned everything that happens in the past and said, yeah, actually this is the right thing, because even if you've had that experience but that hasn't given you confidence for whatever reason you won't make that decision, you sit on the fence for longer, so that experience has given me confidence as a business person to make those decisions (T0)</p>

Coding and relationships	Transcript examples
Gut feelings	<p>Well I wouldn't have a gut feeling about something I didn't know anything about so whilst it is gut feeling you've got the knowledge as well (T0) Knowledge based gut feeling – is that a contradiction? (T0)</p> <p>But equally I've made some major cock ups of things because I didn't plan and my research wasn't as good so my knowledgebase wasn't as good as I thought it was so I actually make a decision, I'm just contradicting what I said earlier I made a decision on my gut feeling and this is going to work rather than market research (T1) You see my gut feeling in all of this has already done that for me [planning] (T1) I'm going to gather information and then going to put it to the team. If I feel really strongly about it, really strongly and they can't come up with a good enough answer to change it I'll go with my feeling. If they can come up with a valid, well yes OK I Understand what you're saying however, I'm happy to switch (T2) I could see it drifting on and it didn't feel right, that did not feel right [so I] went to the meeting on Friday, just put it to them, these are the options and they all went mmm, so now they've given me additional information to think about, I've thought about it and thought absolutely, this is the way to do it, this makes perfect sense, this is the way we need to do it, Thursday, Friday, Saturday, Sunday, right, so what do I need to do now so I need to make this happen? (T2) Not being able to think about not being able to think outside the box I don't like to be pushed into a corner so which I don't procrastinate at all I don't believe, this is a bit of a contradiction I suppose I don't I like to look at all the options and then I know which one is right (T3)</p>
Looking at end goal	<p>Well I would start at the end I would say right this is what happened last year, this can't happen again this is how it needs to operate how are we going to achieve that to have an end goal and then flip back (T0). But perhaps on the big ones I do, this is how it looks like this is what it's going to look like, how are we going to get there? (T0) Generally, I would stop at the end so get the overall picture and then say where we're going to go and then working at stages (T1) There wasn't really a game plan, there's never been a game plan, there's more than the plan now because you go on courses, draw experience and think that they tell you you've got to have a plan (T0)</p> <p>So yes, I think that there is a certain amount of clarity, clarity for me, has meant for me a better decision-making process because you're not doing it so much on gut feeling you're doing it on endgame so that's why my circumstances perhaps have changed as I get older (T2) I kind of wish I'd done it years ago actually, not selling but the goal and working backwards and I haven't and it's from this group, it's from that group so they've been quite beneficial (T2) I think I've become erm stronger, could be something to do with this endgame we know where we want to be so actually this bit of kit, how is that bit of kit going to fit into the bigger picture well it's not, okay, well, do we need to be making an investment in it, is the payback enough (T2)</p> <p>Because it's going towards the end game, we wouldn't be doing it if we were just thinking keep going keep going because quite literally we've hated it this summer but have come out the other end and fi have now gone right rather than throwing the towel in. I might just need to get it right next summer, we are going to continue but we're going to get it right you're going to come with me and we're all going to work together to make it right. (T3)</p>

Coding and relationships	Transcript examples
Looking at end goal	<p>I think if somebody came and offered me moment on the table now I think without a shadow of a doubt Gary and I would walk away and that's not likely to happen and that's not something that we're pushing for so we're pushing to develop it further and further (T3)</p> <p>Now I've reached this age I didn't have an endgame I didn't know what I was doing erm it's only really come together in the last 5 years really, it's okay, we're probably going to sell up at the end of it (T3)</p> <p>Everything is geared towards that, it's a new role in effect now, it's almost a two person role and that wasn't here 18 months ago, we didn't have that That's helped because you can see here you want to be so if it's not working okay this is not working but we won't be effort do this next year if this doesn't work with got too get this right so it's all follows definitely the endgame (T3)</p> <p>That is now but it wasn't if you'd asked me 3 or 4 years ago (T3)</p> <p>Yep and again that something that's materialized perhaps as a result of going to events and networking and whatever because I certainly didn't have an end goal for the first 20 years it's only as, you know we were a bit of a slow starter you know, after 7 years, after 10 years we had seven people it's only since perhaps we've got beyond 10 people that it started to become a bit more structured and this process so very much as I've got more experience (T3)</p> <p>This process hasn't changed for a long time I have envisaged the end goal, has become more structured and the bigger perhaps a further away end goal whereas maybe this would have been the next two months work the planning now I'm definitely looking at next year and the entire exit ins five years so this has got further way but the processes stay the same (T3)</p>
Talks to others, Networking, Teams	<p>I need the right person yes, they've got to fit in with the team but this is what we need and I can't mess around and I think as a result of the summer experience over there this is it and that's why I want to do the review quickly because I don't want anybody to forget (T3)</p> <p>I suppose I use it more in things liked networking because I lead some networking groups because I don't lead the group I lead groups within the group and they look to me for answers, for some reason they think I'll know what's going on and I think that confidence comes from past experience and having done something similar and then applying to it (T3)</p> <p>Plugging staff gaps because of my experience on personality types and how things have worked I know what I am looking for when I hire somebody and using this profiling would just confirm or enhance that so it will work long with my past experience and my past experience is what's created it in the first place (T3)</p>
Checking	<p>I've got to get them to make me understand what the significance is to make the decision and I won't let that go until I'm clear so I have to understand it then I will make a very quick decision but I usually understand things quite quickly (T0)</p> <p>will pick up enough, will, will pick up an overview so I don't need to know the details (T0)</p> <p>I think about it I think is reflect on it and I don't reflect on like Gary reflects on absolutely everything, I don't' unless I'm not sure I don't think about it I always make the decision and move on don't give it a second though if it's a bit more flaky I think about it a bit more and I might go back and say, just like I questioned him on those heaters about 5 times as I really wasn't sure (T2)</p> <p>(Asked about going back and checking after a decision) no, not at all, not at all (T2)</p> <p>Unless I'm not confident, like the heaters it is not the right decision in which case prolongs it, I'll think about tit for a bit longer that I would normally whereas with the radiators, yes, the radiators are fine four enough, five enough, whatever, one there, one there, one there, yes that's fine, done, forgotten about. Then I kept going backwards and forwards because I wasn't sure (T2)</p>

Coding and relationships	Transcript examples
Collecting information, Processing information, Data analysis, Planning	<p>I will ask lots of questions so I will have the answers I need to the questions...(T0) I need to get as much possible information about stuff that I don't know (T0) I sat down, printed off my costs, we can make a saving on that and that, whilst it was analysis it only took 10 minutes, actioned (laughs) (T0) Yes, I understand it so that I can make the decision (T0) Fortunately, I pick up things quite quickly so it's not really an issue and I don't need to have an intricate understanding, I just need to understand and have an overview of what it means and so somebody puts xx pages of, read it, scanned through it and I want the next thing (T0) So, Mark loves me, he comes in and says so what does that mean to us and how will that affect us if you do this you will get that and so I'll say right we'll do it this way and that's fine because I understand and I can just make the decision so he just ticks things of straightaway, but that's normal for me (T0) Yes, and I then didn't support that with the planning and the market research and looking into the whole thing properly, I went ahead with it, a bit gung ho really, which has happened has got us to where we are today and we probably wouldn't have done it a whole lot quicker (T1) Before I've made the decision because it might not then go ahead so you could call it market research or whatever and I have actually been bitten by that but that bit I need to make the decision so that we can then actually decide to do the planning (T1) What I was going to say is I don't mind introducing people at that point because I've not made the decisions but, but at this point I don't have to seriously, I have to manage them whereas I'm not managing these people and gaining information form these people at this point I have to manage these people and it's detail and I don't like is so that's the bit I skip (T1)</p> <p>You know what I probably would have done, I probably would have gone to the meeting, done in mind that with them and gone right, let's throw some ideas about, let's think how we're going to do it and then I would a go away and would have researched what they would have talked about, so I would have done it but I would have done the process differently, I'm going to bring in the information, miss out a step really, well I'd do the research beforehand in the process, I think that's what I'm saying, that's how I'm going to do it and I didn't use to bring as much information to the table, I would bring the ideas and a whiteboard and then go right, what is everybody's thoughts and then everybody would give their input (T2) I think that the decision is intuitive a lot of the time first and then move onto the analytics and I'm not, not, it sounds arrogant I'm not very often prove wrong. It's when the decisions not a natural decision that I know. When I know it's the right decision I will then go and get all the information a bit like the move, because o know the decision to move separately wasn't right I haven't done anything about it because I know it wasn't quite coming together, it's when it comes together I think right now I've got them to get them to buy into it (T2)</p> <p>So yes, I think that there is a certain amount of clarity, clarity for me, has meant for me a better decision-making process because you're not doing it so much on gut feeling you're doing it on endgame so that's why my circumstances perhaps have changed as I get older (T2) Because I'm trying to guide them to gathering information so that I can be accurate with my, yes, we can afford to do it this way because if its £3-4000 they might say no, we do it ourselves so I've got that information before, rather than after (T2) I need to get all the information together so I was excited about coming to work today because I've got together all this information because It's the move and it's important because it's got to be right, it's got to be done as seamlessly as possible (T2)</p>

Coding and relationships	Transcript examples
Collecting information, Processing information, Data analysis, Planning	<p>So, I was thinking I'm not sure about this so I sat on the fence for a very long time, humming and haaing and he convinced me it would work and I don't think we've got them set that high and you wouldn't want to work out their long term (T2)</p> <p>Not being able to think about not being able to think outside the box I don't like to be pushed into a corner so which I don't procrastinate at all I don't believe, this is a bit of a contradiction I suppose I don't like to look at all the options and then I know which one is right (T3)</p> <p>Okay I will take all the facts and figures to the board meeting and so, so I know it's desperately wrong but I don't have the solutions I have some ideas but the figures will back it up and it's the figures I look at and I will say to them, they know I bring the figures to the meeting and they know that I look at things differently (T3)</p> <p>I will take all the facts and figures to the board meeting and so, so I know it's desperately wrong but I don't have a solution. I have some ideas but the figures will back it up and it's the figures I look at and I will say to them they know I bring the figures to the meeting and they know that I look at things differently (T3)</p> <p>I'll be bringing the facts to the table, yes, we will talk a little bit about emotion in terms of the talk to the people and then the buy in between the four of us, have we got the right buying this year, yes do we want to grow the schools right okay let's start back at the beginning right now how long are we going to plan (T3)</p>
Planning, Gut feelings, Delegation, Team, Plan B	<p>In fact, the planning tends to be very much secondary (T0)</p> <p>Up until recently I never had a big master plan, always just sort of got on with it which I think has always been a bit of a failure failing. If I's had a plan of where I wanted to be I would probably have got there sooner (T0)</p> <p>There wasn't really a game plan, there's never been a game plan, there's more than the plan now because you go on courses, draw experience and think that they tell you you've got to have a plan (T0)</p> <p>As you do learn more you realise you've got a plan, you've got to have a plan so you start to plan a little bit more as your experiences increases and you go on attending seminars where people mention the planning words and you think all I have got a plan, don't know what I'm doing and you end up where I am now which is which is with the first proper plan, to be hones it's the plan I've got for the next however many years (T0)</p> <p>It sits quite well with me, I'm quite excited by the fact that I've got a plan and I'm quite excited by the fact that I've got support in the plan. I think I'd be a bit wifty wafty if I didn't have this groups and it'll be interesting to see if the group may not work, it may crumble after 3 months so that will be interesting to see how we follow that through (T0)</p> <p>I think for the first time they're going to be saying right this is your goal, this is what you want to achieve in order to sell it and this is what your business is going to look like at that point and that's where I'm at that point now for those headings. I can see clearly that I'm going to need six extra staff and they're going to be here, here and here and this will and this will be full time and this will be blah de blah, that's kind of where I'm going with it, I'm breaking it down to make it more manageable and as you say less fear (T0)</p> <p>Whilst I've got a degree of planning in place I haven't really go any plan in place to manage the whole process I'm going ahead to doing it and the planning is coming after so the planning has been pretty poor really (T1)</p>

Coding and relationships	Transcript examples
Planning, Gut feelings, Delegation, Team, Plan B	<p>I think I've probably learned how to do that I don't think planning has ever been particularly natural to me so I think probably lots of business courses in knowing has taught me how to do that, but not very well (T1)</p> <p>Yes, and I then didn't support that with the planning and the market research and looking into the whole thing properly, I went ahead with it, a bit gung ho really which has happened has got us to where we are today and we probably wouldn't have done it a whole lot quicker (T1)</p> <p>Before I've made the decision because it might not then go ahead so you could call it market research or whatever and I have actually been bitten by that but that bit I need to make the decision so that we can then actually decide to do the planning (T1)</p> <p>But equally I've made some major cock ups of things because I didn't plan and my research wasn't as good so my knowledgebase wasn't as good as I thought it was so I actually make a decision, I'm just contradicting what I said earlier I made a decision on my gut feeling and this is going to work rather than market research (T1)</p> <p>You see my gut feeling in all of this has already done that for me [planning] (T1)</p> <p>I will delegate I sometimes delegate it as well I don't do it myself but I make the decision whereas now for the first time I haven't got the expertise it's a big project (T1)</p> <p>Although I've discussed this with other people I was, my gut feeling was that I wasn't right but I wanted her valuable input (T2)</p> <p>Yes, it's not always an obvious plan B and it's not one you would want to shout out about but, but I've always got it up my sleeve kind of thing so it's certainly involves financials, it involves, what I'm not good at is if it involves people. If the print man fell under a bus tomorrow we would struggle because I haven't got plan b with him, I have but it is not a very good plan B it is more like a plan Z so we sort of scrape by. I'm no very good in plan B's, money plan b is nailed, I'm a bit weak on other plans because I still think the money side is the most important if you can keep that going then you'll get through it (T2)</p> <p>Well I've been flying by the seat of my pants for quite a long time now, it's going to be alright, it's going to be alright, it's going to be alright, now 4 weeks down the line I've got to do a bit of planning (T2)</p> <p>I could see it drifting on and it didn't feel right, that did not feel right [so I] went to the meeting on Friday, just put it to them, these are the options and they all went mmm, so now they've given me additional information to think about, I've thought about it and thought absolutely, this is the way to do it, this makes perfect sense, this is the way we need to do it, Thursday, Friday, Saturday, Sunday, right, so what do I need to do now so I need to make this happen? (T2)</p> <p>Everything is geared towards that, I wouldn't be looking for Stewarts seat is I didn't think we were, it's a new role in effect now, it's almost a two person role and that wasn't here 18 months ago, we didn't have that role now its invaluable we can't do without it and we've got to get the right person in that role so because I can see next summer and the next summer and we've got to get that right, if he's such a key part of where we want to be yes so that's absolutely influencing everything, yes (T3)</p>

**Confidence,
Risk**

...and also your experience gives you confidence so you then can make the decisions quicker, in that you are saying it's a gut reaction, your confidence, because she's quickly scanned everything that happens in the past and said, yeah, actually this is the right thing, because even if you've had that experience but that hasn't given you confidence for whatever reason you won't make that decision, you sit on the fence for longer, so that experience has given me confidence as a business person to make those decisions (T0)

I think it's the increased confidence and knowledge (T0) (changing decision process)

Absolutely, I don't know anything about it, I've build up enough contacts over the years to be able to ask people the right questions, so I've got the confidence that I can do that and if I don't know enough I know somebody who can help me so I think the networks that I've got, I do know lots of people in Peterborough after 20 years and I do go to a lot of events and I'm quite know well known as well so, all that together gives you the confidence you are not on your own. Nobody here might know but I'll always know somebody who might know somebody who know somebody (T1)

But if I've understood it as well I think I've taken on board a lot, I haven't just let it go for over my head which is why I would be confident to do it again (T2)

I always quite confident in my decision making, I'm less because it's tangible I'm less confident when we are I suppose software or website upgrades, websites working fine, people are telling me when need to upgrade but it's going to cost me £20000 but it's financial and its working Ok as it is, yes it can be better but is I worth £20000 at the moment, probably not, so I'm less confident making those decisions (T2))

Unless I'm not confident, like the heaters it is not the right decision in which case prolongs it, I'll think about it for a bit longer that I would normally whereas with the radiators, yes, the radiators are fine four enough, five enough, whatever, one there, one there, one there, yes that's fine, done, forgotten about. Then I kept going backwards and forwards because I wasn't sure (T2)

I think I've got the confidence we've got a couple of new schools already on board for next year and so that we know the turnover is going to go up so even if we stay, we are I know confidence comes from the knowing the full figures and knowing that even if we did what we did last year all the bills will be paid and all the staff will be paid so that's where my confidence comes from, it comes from the figures for me (T2)

The reason I'm doing it now as opposed to right let's have a meeting in December is that it's so fresh in our minds. Normally I would because we'll still busy so normally I wouldn't have review meeting this early I'd let it settle but I'm conscious I don't want anybody to forget this because we need to act for next year....-I've got a meeting tomorrow with the new school so we will be able to see growth for next summer quite early as opposed to well I put it into my figures and hope that it comes off, well know early which will help us that will give me more confidence that I can actually take on people that can do the job so I think in this area production I think it's a temporary, a direct temporary lapse (T3)

I never thought before I just did it. Now I have an awareness and, and whilst I don't consciously think I'm stuck here what are we going to do, right let's think back to what I've done in the past, I don't consciously do that. You've made me aware that I'm doing that and that gives me confidence I think it furthers my confidence, yes it does give me confidence, does that sound strange? (T3)

I suppose I use it more in things liked networking because I lead some networking groups because I don't lead the group I lead groups within the group and they look to me for answers, for some reason they think I'll know what's going on and I think that confidence comes from past experience and having done something similar and then applying to it (T3)

Coding and relationships	Transcript examples
Confidence, Risk	Yes for me it's all about confidence I suppose I can pay everybody's wages over the winter based on what we do in the summer and I've not felt that before so I've gone into a bit of a panic over the winter, not been planning for schools I've been planning what we've got to do for the next month but actually now I can plan for what we can do next year because I can see but it's taken me a long time to get to that and I'm only there now really (T3)
Controlling the decision	<p>So, he said in your situation I would get rid straightway which is where I was going, so I kind, so I kind of guided him, I could have guided him the other way but he didn't convince me otherwise he didn't go around and say actually I know that's fine (T0)</p> <p>I need the buy in so I'm going to have to work harder to explain to them where I will be very biased on where I want to be moving, unless they can come up with something that's a real curved ball that I hadn't thought of we will be, we will be doing it that way, but if they can come up with something then I'm equally happy, always have been equally happy to take it on board and talk round that and work that on through a new way (T2)</p> <p>I've done it pretty much with the building but I didn't really need anybody else's input, they don't need to spend ages discussing what colour up and over door we want It doesn't need to be a consensus. Just make a decision and it will happen, that's how I've been working so far, a lot of the time (T2)</p> <p>I think as I've been quite interested in the whole process and a bit of a control freak to a degree even I didn't have any knowledge I've taken in everything (T2)</p>
Collecting information	<p>It's not that systematic but they have, have Laura. We need to get this information together, they're going stock control at the moment so she's just been over to the other site and got all the information, we've got a meeting on Monday so she will bring it back to use, we make a decision on what we are doing regarding stock this year (T0)</p> <p>I need to get as much possible information about stuff that I don't know (T0)</p> <p>Yes, and generally it's me that will do it. If I've got half an hour I'll look at what people are doing on Facebook competitively and generally you actually come off feeling disappointed, you think maybe nobody's really grasped it. I look at quite a lot of American sites because they tend to be, or they did used to be just a little bit more ahead of us. I don't think they are now, I don't spend hours and hours, don't get me wrong I'm not geeky about it in the slightest but if I've got a spare 10 minutes I might see if I can find a local, somebody that is doing something a little bit different. It might be not always a competitor, it might be something that is loosely related and I think I can apply that to our business so I do that sort of stuff (T0)</p> <p>But its knowledge based (T0)</p> <p>I gather information (T0)</p> <p>So, although he's given me all the information I might still make a wrong decision but I have to rely on him then to correct me which so far, it's never been an issue (T0)</p>

Coding and relationships	Transcript examples
Collecting information	<p>I'll go, I've been to see a chap down the road who has an extension much more than our but he's had an extension built and I went to see what it looked like, what space it had like and then he got some shelving and I gathered his information about shelving and oh, I like your lightning or suspended ceiling, all OK and I've just got his suppliers, did you recommend him, but I know that what I was going for his, going to pick his brains really (T1)</p> <p>I get lots of snippets from different people as well (T1)</p> <p>But I don't like the detail, I've been sent nothing but chartered surveyors forms, signed off two things for the surveyor and architect, I haven't; even read them, scanned them, looked at the price at the bottom, sent it to the builders (T1)</p> <p>I'm going to gather information and then going to put it to the team. If I feel really strongly about it, really strongly and they can't come up with a good enough answer to change it I'll go with my feeling. If they can come up with a valid, well yes OK I Understand what you're saying however, I'm happy to switch (T2)</p> <p>So obviously I guess that says the result of getting information from other people and then it drops into, so a lot of things have dropped into play should I say just dropped for whatever reason (T2)</p> <p>I wouldn't normally have a review meeting this early I'd let it settle but I'm so conscious I don't want anybody to forget this because we need to act for next year and we will also get a lot of schools that want to come to us for next year which is unheard of at this time of the year. Normally they will leave it until February to March I've got a meeting tomorrow with the new school so we will be able to see growth for next summer quite early as opposed to well I put it in my figures and hope it comes off we'll know early which will help us that will give me more confidence (T3)</p>
Talks to others Expertise Networking	<p>It is at the moment I think. I'm part of a group where we meet monthly, now we've only met twice and we're meeting the third time tomorrow, we'll be putting out goals forward and then we would be challenged on them and so forth (T0)</p> <p>He'll challenge me and say have you thought about that (T0)</p> <p>We might tweak it slightly so yes, he does steer, influence a bit but it's not been to be honest It's not made a massive difference I don't think (T0)</p> <p>I'm hopeful that I've got enough people that I can pull in and just send literally, when you came in I was just sending an email to my own financial advisor saying I might need a bit of help here, this is where I've got to, this is where I'm at and what do you suggest, so I'm confident I can ask them and get them to (T1)</p> <p>(on the builder's advice) he's explained everything, he's come up with some good points straightaway and just sort of earned, he's earned his trust (T1)</p> <p>I'll go, I've been to see a chap down the road who has an extension much more than our but he's had an extension built and I went to see what it looked like, what space it had like and then he got some shelving and I gathered his information about shelving and oh, I like your lightning or suspended ceiling, all OK and I've just got his suppliers, did you recommend him, but I know that what I was going for his, going to pick his brains really (T1)</p> <p>I've asked around for quite a lot of expertise in planning, we had some person come in and do some workplace efficiency (T1)</p> <p>Because I don't have the knowledge I just know what I want to achieve, they've got to achieve it for me and I've got to work with them to achieve that but they've got to do it and then them (T1)</p>

Coding and relationships	Transcript examples
Talks to others Expertise Networking	<p>I think probably talking it through with my accountant and my business coach to talk about the best way of achieving what I wanted to achieve without just giving them a pay rise (T1)</p> <p>But that's what I've done with the builder right from the start, they think I'm a real expert in here but I'm not, I'm just asking him a question and I'm picking out of it and relaying back (T2)</p> <p>There been decisions that haven't been outside my comfort zone but hugely outside my knowledge base and the team, the architect, the builders, everybody has been absolutely fantastic and they've all incorporated me into meetings that I needed to be involved, some of which, during which some of the meetings weren't relevant to me but they would always come back and go were talking about soffits and noggins and we're come back to you and explain to you what that means I a minute. S they've been very good so I don't know how much knowledge I'm pulling on (T2)</p> <p>Yes, but the reliance on people as been the reliance on experts, from now on I'm going to be relying on staff here for input and we're all a bit blind leading the blind which is a bit different (T2)</p>
Talks to others	<p>As you do learn more you realise you've got a plan, you've got to have a plan so you start to plan a little bit more as your experiences increases and you go on attending seminars where people mention the planning words and you think all I have got a plan, don't know what I'm doing and you end up where I am now which is which is with the first proper plan, to be hones it's the plan I've got for the next however many years (T0)</p> <p>It sits quite well with me, I'm quite excited by the fact that I've got a plan and I'm quite excited by the fact that I've got support in the plan. I think I'd be a bit wifty wafty if I didn't have this groups and it'll be interesting to see if the group may not work, it may crumble after 3 months so that will be interesting to see how we follow that through (T0) I've had the estate agent in, the commercial agent in this morning talking about what we are going to do with the other side. I gave him my thoughts and then asked him what his work and I made a decision (T0)</p> <p>So, he said in your situation I would get rid straightway which is where I was going, so I kind, so I kind of guided him, I could have guided him the other way but he didn't convince me otherwise he didn't go around and say actually I know that's fine (T0)</p> <p>I don't know anything about it, I've built up enough contacts over the years to be able to ask people the right questions so I've got confidence that I can do that and if I don't know enough I know somebody who can help me so I think the networks that I've got, I do know for lots of people in Peterborough after 20 years and I do go to a lot of events and I quite know, well known as well so all that together gives you the confidence you are not on your own. Nobody here might know but I'll know somebody who might know somebody who knows somebody (T1)</p> <p>'m thinking right, who can I ask, a bit outside his box, a bit outside his remit but I'm thinking he may either know somebody, know somebody who may be able to help me or can help me so I pinged off an email to him but really, I should have been on this, this shouldn't have happened, I never thought of this because I hadn't planned it (T1)</p> <p>I think I've probably learned how to do that I don't think planning has ever been particularly natural to me so I think probably lots of business courses in knowing has taught me how to do that, but not very well (T1)</p> <p>I kind of wish I'd done it years ago actually, not selling but the goal and working backwards and I haven't and it's from this group, it's from that group so they've been quite beneficial (T2)</p>

Coding and relationships	Transcript examples
<p>Talks to others</p>	<p>It would have to be a very good reason why it's not going to happen that way because I've canvassed a lot of people here, now you've just said exactly, you've validated my, we've talked all round on Friday so for just one person saying I think we should do it that way, it's not just me saying that, it's been lost so other input (T2) I think one of my close networking friends, a lot of my stuff is through networking colleagues and it generates a sequence and this is what happened with the build actually (T2)</p> <p>I've got confidence that he will challenge me which is why, but that is why I've chosen subcontractors that I will know will challenge me because another bloke came and said right where do you want your points and I'm thinking I don't really know. I wanted him to work with me and he didn't he went right where do you want your points in, this is not going to work but it was only to get another quote I really know who I was going to use (T2)</p> <p>So obviously I guess that says that the result of getting information from other people and then it drops into, so a lot of things have dropped into play should I say just dropped for whatever reason (T2)</p> <p>I suppose I use it more in things like networking because I lead some networking groups because I don't lead the group I lead groups within the group and they look to me for answers, for some reason they think I'll know what's going on and I think that confidence comes from past experience and having done something similar and then applying to it (T3)</p> <p>Yep and again that something that's materialized perhaps as a result of going to events and networking and whatever because I certainly didn't have an end goal for the first 20 years it's only as, you know we were a bit of a slow starter you know, after 7 years, after 10 years we had seven people it's only since perhaps we've got beyond 10 people that it started to become a bit more structured and this process so very much as I've got more experience (T3)</p> <p>I've got a meeting tomorrow with the new school so we will be able to see growth for next summer quite early as opposed to well (T3)</p> <p>Yes because we talk about it I go to quite a few networking events where we have hot seats and you bring a subject that you've got to be challenged with, quite often I haven't got one but occasionally I do, recruiting is a challenge the profiling thing came up as a result of somebody else asking a question and then the accountant said all we do it like this and it's really worked for us and we're looking for this kind of persons and to be honest whoever even if we like him if he doesn't fit that profile we don't take on whereas I sometimes do because I know they will fit in with the company ethos but then you end up putting in roles that are nice to have but actually we've still got the gap there (T3)</p>
<p>Team discussion and feedback</p>	<p>I'll know straightaway that is they say we can we do it this way, this way, this way, I'll say well we've only got one, whatever I'll have a quick answer for it and a quick discussion of what ifs and or my decision-making on which way would be best, how to evaluate it, it would be very quick fire questions to sort of identify weaknesses in each scenario or the strengths in each scenario so I'd work very quickly on that we just say yes, but if we did that what would happen there and I, is that blockage there and they'll go, come back at me and no because so I would, would be able to quickly ask the questions (T0)</p> <p>So, although he's given me all the information I might still make the wrong decision but I have to rely on him then to correct me which so far, it's never been an issue (T0)</p> <p>I involve other people more so as we've grown, obviously it would have to be me initially but now definitely other people will come there, bring it we'll discuss it and the decision will be made so they bring it now I don't often gather that information (T0)</p> <p>Yes, they've been involved in it, they know what's going on, they know what we were tendering, they know what it's all about (T1)</p> <p>Yes, we're not at that point and I have just literally put an email to 5 people that I want on that team to plan the build so I am at the point of that but I've got plenty of time now I have got plenty of time but I have got time still to do that and I am doing that and I call it the building team (T1)</p>

Coding and relationships	Transcript examples
<p style="text-align: center;">Team discussion and feedback</p>	<p>I think it's the thought of having 5 people know really knowing what they doing either and then they're all coming up with wacky ideas, will we need to have this here, why do you need to have this here, yes because we always have had in the thought of me to chair, that is a nightmare deal, I've got to listen to all their ideas, some of which will be good, plenty of will not be not so good (T1) My email was to get them all together at this meeting site, reluctantly because it's the last thing I thought of, apart from speaking to the builder (T1)</p> <p>I don't think we need to go and think about it during the night, we move something around until we get a decision and a concession if that's going to have its work so I think that will be slightly different decision making, it will be a consensus involving people (T2) Although I've discussed this with other people I was, my gut feeling was that I wasn't right but I wanted her valuable input (T2) I need the buy in so I'm going to have to work harder to explain to them where I will be very biased on where I want to be moving, unless they can come up with something that's a real curved ball that I hadn't thought of we will be, we will be doing it that way, but if they can come up with something then I'm equally happy, always have been equally happy to take it on board and talk round that and work that on through a new way (T2) Because I'm trying to guide them to gathering information so that I can be accurate with my, yes, we can afford to do it this way because if its £3-4000 they might say no, we do it ourselves so I've got that information before, rather than after (T2) I could see it drifting on and it didn't feel right, that did not feel right [so I] went to the meeting on Friday, just put it to them, these are the options and they all went mmm, so now they've given me additional information to think about, I've thought about it and thought absolutely, this is the way to do it, this makes perfect sense, this is the way we need to do it, Thursday, Friday, Saturday, Sunday, right, so I need to make this happen? (T2)</p> <p>I want to do a review quickly because I don't want anybody to forget so that we are all on the same wavelength were all running right okay this didn't work this didn't work what are we going to do differently, our production manager by next year will be oh we will be fine but we won't be fine and we won't be fine again so I don't want that I want to write what your plan. (T3) So the pressure has increased so I've got a big meeting on Thursday to sort of try and not, not going to the detail right okay what happened and why did it happen okay this happened what can we do about it next year to make sure it doesn't happen again and what are we going to put in place so because we can talk about it for hours and the blame gets attributed to it and that's not really helpful (T3) I'll be bringing the facts to the table, yes, we will talk a little bit about emotion in terms of the talk to the people and then the buy in between the four of us, have we got the right buying this year, yes do we want to grow the schools right okay let's start back at the beginning right now how long are we going to plan (T3)</p>
<p style="text-align: center;">Planning the decision</p>	<p>I'm thinking right, who can I ask, a bit outside his box, a bit outside his remit but I'm thinking he may either know somebody, know somebody who may be able to help me or can help me so I pinged off an email to him but really, I should have been on this, this shouldn't have happened, I never thought of this because I hadn't planned it (T1) I've asked around for quite a lot of expertise in planning, we had some person come in and do some workplace efficiency (T1) I'll be bringing the facts to the table, yes, we will talk a little bit about emotion in terms and then the buy in between the four of us, have we got the right buying this year, do we want to grow the schools right okay let's start back at the beginning right now how long are we going to plan (T3)</p>

Appendix 9 Rationale and literature for interview questions

Concept,	Rational for inclusion	Previous literature that informed questions
Q1: Growth intentions and future opportunities	To identify the growth intention of the participant and to understand their growth aspirations /future plans	Krueger et al. (2000); Brigham et al. (2007); Wiklund et al. (2009); Westhead and Wright (2011); Douglas (2013); Wright and Stigliani (2013)
Q2: Decision making – rational or intuitive	To identify and explore decision-making in a broad sense, whether rational or intuitive cognitive styles are present in the process	Pech and Cameron (2006); Dutta and Thornhill (2008); Armstrong and Hird (2012); Armstrong et al. (2012b); Lee-Ross (2014); Shepherd et al. (2014); Wright and Stigliani (2013)
Q3: Information processing style	To explore and examine use preferred styles, whether any style versatility in the decision process.	Kozhevnikov (2007); Akinci and Sadler-Smith (2013); Evans and Stanovich (2013); Lee-Ross (2014); Pennycook et al. (2014)
Q4: Changing your preferred style	Probing for any use of previous experience/learning/development on processing information and external influences	Dane et al. (2012); Dijkstra et al. (2013)
Q5: Use of intuitive style	Exploring the use of intuitive style/gut feelings and flexibility between the analytical and intuitive, dual processing approach	Louis and Sutton (1991); Haynie et al. (2009); Hodgkinson et al. (2009); Sadler-Smith (2009); Vaghley and Julien (2010); Gore and Sadler-Smith (2011); Groves et al. (2011); Akinci and Sadler-Smith (2013); Evans and Stanovich (2013); Lee Ross (2014)
Q6: The decision process: gathering information, decision/choosing alternatives/planning and evaluating the opportunity for final decision	Exploring and examining the decision process, how information is collected and processed information and the stages that followed before final decision. Examining how decisions are evaluated and what cognitive processes are used. Determining whether this is an individual thought process or involves other actors	Keh al. (2002); West 111 (2007); Curşeu et al. (2008); Haynie et al. (2009); Iacobucci and Rosa (2010); Renco et al. (2012); Autio et al. (2013); Wright and Stigliani (2013); Shepherd et al. (2014); Wood et al. (2014); Wood and Williams (2014); Wood and McKelvie (2015)

Appendix 10 Pilot interview questions

Please tell me a little about your business, when and how you started, what you manufacture, number of employees, market share, and sales turnover

1. Do you intend to grow your business?

What future growth plans do you have?

Have you always felt this way about growing your business?

Would you consider yourself to be growth oriented or independence orientated (*explain terms*)?

How do you track your business growth?

Growth Intentions

Each participant will be asked to identify his or her intended growth intention over the next 2 years. There is a proven gap between intention and behaviour, so intention must be measured at the start of the research to establish predisposition. High (growth intended) medium (Stable, maintain growth) Low (no growth)

Considering your business over the next 2 years....

Do you intend to grow in terms of employment? What is your intended increase?

Do you intend to grow in terms of sales revenue What is your intended increase?

How would you describe your business's current growth state?

- Rapidly growing
- Healthy and growing
- Stable
- Declining

How would you like to see your business state in 2 years' time?

- Rapidly growing
- Healthy and growing
- Stable
- Declining

Do you intend to increase market share over the next 2 years?

What percentage increase is your intention?

2. Decision thought making process for growth

What starts the decision-making process?

If you recognise an opportunity, how do you go about deciding whether or not this is viable for your business?

What thinking processes do you go through when making a decision?

(a rational logical order, consider all possible solutions, careful planning or more intuitive, rely on creativity, innovative ideas, collecting ideas and information, spontaneous reactions, gut feelings?)

3. Do you have a preferred way of processing information?

(Knowing, planning and creating styles)

Can you describe your preferred way of making decisions? Do you use the same way of processing information for every situation?

Have you changed the way you process information for decision making during the course of your business growth?

How do you think this preferred way influences your decision-making?

4. Do you change the way you process information according to conditions?

Have you changed the way you process information?

How do you do this?

How do you know what to change?

How does this change affect the way that you make decisions?

5. Have you ever used intuition/gut feeling in your decision-making?

When do you use intuition in your decision-making?

How did this affect your decision-making processes?

Where do you feel your preference lies – intuitive or analytical?

How flexible are you with this?

What influences this flexibility?

6. How do you go about selecting the information you need for a decision?

How do you select what information you need for your decision?

What part do external influences play in this?

How do you collect information for decisions?

What makes you chose particular information?

7. How do you organise this information that you collect?

Do you involve others in this process?

Are you systematic in your information search?

How do you plan collecting information?

How do you evaluate the information you have collected?

8. What do you look for in the external environment to support your decision-making process?

How does the external competitive environment influence your decision-making process?

Do you ever change your options as you process and evaluate information?

How do you do this?

9. What would you say are the key stages of your decision-making process?

Describe these key stages.

10. What part does experience and opinion of others play in your decision-making?

What reliance do you place on past experience?

What reliance do you make on the recommendation from others?

How do you make decisions with other people?

11. Would you consider that the way that you process and evaluate information differs according to different conditions?

Have you experienced any rapid changes of differing conditions in the environment?

Do you change the way you make decisions in different environmental conditions?

Has any prior knowledge played a significant part and if so how?

Has any learning played a significant part and if so how?

Have you changed your way of making decisions at different stages of your business?

Have you made any adjustments to your decision-making processes as a result of this?

Describe what these different conditions have been

12. Industry sector

How does your industry sector impact on your decision-making?

How do adapt and change to these influences?

Appendix 11 Prior experience and growth intentions of participants at T0 interview

Entrepreneur	Prior experience, business background and customer base	Growth intentions 2015 and for future 2-year period.
E01 (N)	Served industry-specific apprenticeship, bought into the established business with a partner when previous directors established their exit strategy. Phased transfer of ownership completed during first year of study. 50-50 shareholder, now majority shareholder (from Sept 2017). Part of the supply chain for larger engineering companies in locality and MoD.	Growth intention high, increase sales revenue by 10%, increase staff by 2, healthy and growing in 2 years' time
E02 (M)	Qualification in design, established own business as designers of lighting and innovative technology. Over 30 years of experience selling and designing in the industry. Established UK and global customer base. New distributorship in New York. Experiencing period of rapid growth. Majority shareholder.	Growth intention high, increase sales revenue by 50%, increase staff by 5, rapidly growing in 2 years' time
E03 (N)	Qualified accountant, joined family business aged 18 from 2011, now a director with future view to running company as part of parents' exit strategy. Experiencing period of rapid growth. Extending customer base beyond East Anglia and local area.	Growth intention high, increase sales revenue by 5-10%, increase staff by 5, healthy and growing in 2 years' time
E04 (I)	Previous experience in the mobile communications and internet industry, established business with partner based on an innovative touch display system. Local and global customer base. Currently stable growth. Business sold and director resigned June 2018.	Growth intention high, increase sales revenue by 5-10%, no planned increase staff by 5, healthy and growing in 2 years' time
E05 (M)	Originally a qualified teacher, established a second job screen printing clothing for schools which grew into a large manufacturing business producing embroidered school uniforms. Customer base with local schools. Majority shareholder.	Growth intention high, increase sales revenue by 12-18%, increase staff by 2-3 + seasonal P/T, healthy and growing in 2 years' time
E06 (M)	Previous experience in the modelling industry, now specialises in quality rapid prototyping supplying sophisticated bespoke designs to several select customers. Established own business. Customers linked to IT and pharmaceutical development in region. Majority shareholder.	Growth intention aimed for stability, no target for increase in sales revenue, increase staff by 3, stable growth in 2 years' time

E07 (M)	Started business in front room whilst caring for family, grew from sole proprietor to limited company business for print manufacture and mailing. Customers based in local region. Majority shareholder.	Growth intention aimed for stability. No target for increase in sales revenue, stabilise staffing, healthy and growing in 2 years' time
E08 (N)	Previous manager in sales, worked with partner in family business, then started own business in a similar field. Specialises in bespoke applications in region and across UK. Sole shareholder.	Growth intention high, Double sales revenue over the next 2 years, increase staff by 4-6, healthy and growing in 2 years' time
E09 (M)	Previous employee of the business, bought company with partner as owner and director. Specialises in bespoke projects for pneumatics and automation. Customers local region and across UK. Majority shareholder.	Growth intention high, increase sales revenue by 100%, increase staff by 2-3, rapidly growing in 2 years' time
E10 (M)	Very experienced in the field, previous manager and director of CNC machining and engineering company, company sold off, so restarted company again with new partner (see below). Part of the supply chain for larger engineering companies in locality. Majority shareholder.	Growth intention high, increase sales revenue by 50% Increase staff by 1-2, Healthy and growing in 2 years' time
E11 (N)	Prior experience as photographer, call centre and banking. No previous experience in engineering. Part of the supply chain for larger engineering companies in locality, as above E10.	Growth intention high, increase sales revenue by 50% Increase staff by 1-2, Healthy and growing in 2 years' time

Definitions:

Novice entrepreneurs (N) = up to 10 years' experience as director

Intermediate entrepreneurs (I) = between 10- and 20-years' experience as director

Mature entrepreneurs (M) = more than 20 years' experience as director.

Source: adapted from Baron and Ensley (2006), Wiklund and Shepherd (2008), and Parker (2014).

Business details

Consent form discussed and signed
Cognitive style assessments completed
Legal status
Name of firm
Name of interviewee and position
Year Established
Number of employees at time of interview
Market sector

Growth intention over the next 2 years:

Intention to grow in terms of employment
Intended increase
Intention to grow in terms of sales revenue
Intended increase
Intention to increase market share over the next 2 years
Intended increase

How would you describe your business's current growth state?
Rapidly growing; Healthy and growing; Stable; Declining
How would you like to see your business state in 2 years' time?
Rapidly growing; Healthy and growing; Stable; Declining

Tracking data for growth

Sales revenue
Employee numbers
Other
Collection date
Other relevant material for analysis
Point of contact details

1. Intention to grow the business

- Q1. What future growth plans do you have?
- Q2. Have you always felt this way about growing your business?
- Q3. Would you consider yourself to be growth oriented?
- Q4. How do you track your business growth?

2. Decision thought making process on decision-making process for growth.

- Q1 What starts your decision-making process?
- Q2. What is the opportunity? How do you decide whether this is viable?
- Q3. What thinking processes do you go through when making a decision?

Probe: *a rational logical order, consider all possible solutions, careful planning and analysis*
More intuitive, rely on creativity, innovative ideas, collecting ideas and information, spontaneous reactions, gut feelings

3. Processing information - cognitive style.

Q1. Do you use the same way of processing information for every situation?

Probe: *Knowing, planning and creating styles*
Planning/searching and reviewing/processing information

Q2. Do you have a preferred way of processing information?

4. Changing the way information is processed during the course of business growth

Q1. Have you changed the way that you process information during the growth of your business?

Q2. How have you changed this?

5. Use of intuition/gut feeling in decision-making

Q1. When do you use intuition in your decision-making?

Q2. How does this affect your decision-making processes?

Q3. Where do you feel your preference lies – intuitive or analytical?

Q4. How flexible are you with using intuition or analysis?

Q5. What influences this?

6. The decision process

6.1. Gathering information needed for evaluating a decision

Q1. Do you involve others in this process?

Q2. Are you systematic in your information search?

Q3. How do you identify what information to collect?

Q4. How do you process this information?

6.2 Choosing alternatives for course of action

Q1. How do you evaluate which alternative to choose?

Q2. Have you ever made a decision and changed your mind?

6.3 Planning and evaluating the decision

Q1. Do you ever change your options as you process and evaluate information?

Q2. How do you make the final decision?

- Q3. How do you evaluate your decision?
Q4. How do you know that you have made the right decision?

6.4 The key stages of the decision-making process

- Q1. Please summarise the key stages of your decision-making processes

7. Potential influences on decision-making

- Q1. How do you use your past experience?
Q2. What reliance do you place on recommendations from others?
Q3. What decisions do you make with other people?

8. Potential influences on decision-making from the external environment

- Q1. How would you describe your business environment?

Probe: *(PESTLE forces)*

- Q2. What do you look for in the external environment to support your decision-making process?
Q3. How does the external competitive environment influence your decision-making process?

Probe: *hostile conditions, benign conditions*

- Q4. How do you change the way you process information according to competitive conditions?

9. Processing and evaluating information according to different conditions

- Q1. Have you experienced any rapid changes or differing conditions in the environment? Can you give any examples?

Probe: *conditions and influences*

- Q2. How has this impacted on the way you process and evaluate information to make decisions?

- Q3. Has any prior knowledge played a significant part and if so how?

- Q4. Has any learning played a significant part and if so how?

- Q5. Do you change the way you make decisions according to different environmental conditions?

Probe: *how the changes take place*

What are these differences – in information processing/decision making/flexibility/adapting

- Q6. Have you changed your way of making decisions at different stages of your business?
- Q7. Can you describe how your decision-making process has changed over time?
- Q8. Have you made any adjustments to your decision-making processes as a result of this? Describe what these have been.

10. Influence of industry sector

- Q1. How does your industry sector impact on your decision-making process?
- Q2. How do you consider you adapt and change to these influences?

Wrap up

- Q1. Are there any other questions you would like to ask or areas that you feel are important that we haven't talked about?
- Q2. Could I contact you on any of the issues discussed for clarification if needs be?
- Q3. If you wish you can have a copy of the transcript or alternatively I can summarise the main points and send this to you.
- Q4. I can send you the style diagnostic assessment results, would you like this as well?
- Q5. If you were facing any key decisions for growth over the next few months, if possible I would like to observe this to see you in action. I will not be participating in the discussion.
Can you contact me by email if this occurs and I will arrange to attend?
- Q6. Can we arrange meet again in 6 months?

Thank you very much for your time.

Field notes

Appendix 13 Second interview guide

Interview 2: Name Date and Time

1. Discussion on Cognitive Style results from Interview 1

Q1. Cognitive style results show that you are

Intuitive
Rational
Knowing
Planning
Creating

Let's discuss these in more detail

Do you feel that this reflects your preferred ways of making a decision?

Can you give me an example of when you use each style?

Q2. Do you have any particular preference for a certain style?

Q3. Does this remain consistent over time or has it changed in your case? (*note experience, outside influences*)

2. Using intuition

Q1. When do you use intuition for decision-making? How do you use this?

Q2. Are there any particular conditions or influences where you use intuition? (*note use of intuitive expertise*)

3. Using analysis

Q1. When do you use analysis for decision-making? How do you use this?

Q2. Are there any particular conditions or influences where you use analysis?

4. Style flexibility/versatility

Q1. Do you use the same style in every decision-making situation?

Q2. When do you move between styles?

Q3. Do you mix and match styles?

Q4. Can you give me any examples?

Q5. How do you think your preferred style fits into your decision-making?

Q6. If you are making decisions outside of your comfort zone/ preferred style do you consider that you make decisions differently?

5. The decision-making process

Q1. How do you select information for planning?

Q2. How do you identify what you need?

Q3. How do you evaluate a decision that you are making?

Q4. How do you know that you have made the right decision?

6. Internal influences

Q1. How does trust influence your decision-making?

Q2. Do you behave differently in your decision-making process when you are stressed?

Q3. How does this influence your decision-making?

Q4. How does emotion influence your decision-making process?

7. External influences

Q1. How do you change your decision according to external influences?

Q2. What would you consider that are the most significant influences on your decision-making process?

Q3. How do you change your decision according to internal influences?

8. Decision types

Q1. Do you make different types of decisions, such as quick decisions, rapid decisions and spontaneous decisions?

Q2. Give examples of these?

Q3. How does your decision-making process vary according to the type of decision?

Finally, are you still intending to grow your business?

What future growth plans do you have? Any changes to your intention?

Appendix 14 Concept definitions and cross-case comparison of concepts

Concept name and explanation	E01	E02	E03	E04	E05	E06	E07	E08	E09	E10	E11
Accountant - consults for data, information and advice		✓	✓		✓	✓				✓	✓
Accounting qualification – qualification in accountancy			✓								
Adds value to business – increases value of business									✓		
Agencies – used for temporary work								✓			
Apprenticeship - qualification	✓			✓							
Architect – source of specific information					✓						
Ask questions – finds out information by questioning others	✓		✓		✓			✓			
Assesses risk – looks at the risk elements the opportunity brings to the business	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Banking experience – previous experience working in a bank											✓
Bank manager – consults for data, information and advice									✓		✓
Books and articles – read for information gathering	✓					✓					
Board and Senior management team development – using business opportunities and decision-making process for developing the board							✓				
Business coach – previous support for personal development		✓			✓						
Business networks – groups of people with similar business/domain experience			✓	✓	✓	✓		✓	✓	✓	
Budgets – costs of resources associated with opportunity		✓	✓		✓		✓	✓			

Concept name and definition	E01	E02	E03	E04	E05	E06	E07	E08	E09	E10	E11
Call centre experience – previous job role											✓
Cash flow – money in/out of the business	✓	✓				✓		✓		✓	
Checks feelings – notes whether the potential decision feels right or not			✓					✓		✓	
Checks profitability – investigates whether the opportunity will be profitable for the business										✓	✓
Checks performance for reports – investigates previous figures to see whether the opportunity viable							✓				
Co-director discussion-discussion with co-director about decision	✓					✓				✓	✓
Collects data and information – for the analysis	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Competitor - seeking information	✓	✓	✓	✓	✓	✓					
Confidence -with the decision made	✓	✓	✓	✓	✓	✓			✓	✓	
Costs – associated with the opportunity related decisions						✓			✓		
Customers – seeking information	✓	✓		✓		✓		✓	✓		
Customer details – information about their history	✓									✓	
Customer feedback – on product service								✓			
Co-/Director discussion – about the opportunity related decisions	✓		✓			✓				✓	✓
Data sources – data used to collect information about the opportunity and for analysis	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Data analysis – analysis of information about the opportunity and its feasibility	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓
Delegation – to others to collect information for analysis		✓	✓				✓			✓	

Concept name and explanation	E01	E02	E03	E04	E05	E06	E07	E08	E09	E10	E11
Demonstrations – product oriented to collect information and to view the market competition				✓							
Design qualification – previous experience and qualification		✓									
Development of Board and Senior Management Team – part of exit strategy							✓				
Domain knowledge > 10 years in industry		✓		✓	✓	✓	✓		✓	✓	
Domain Knowledge < 10 years in industry											
Exhibitions – visited for market knowledge and competition information	✓	✓		✓							
Emotion – as an influence on the decision			✓	✓				✓			
End goal – where the opportunity will take the business		✓			✓				✓		
Exit strategy – planning process for part/retiring/selling business					✓		✓			✓	
Facebook – as a source of data collection and information					✓						
Family business – experience and knowledge gained through living the family business			✓								
Final decision – before exploitation	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Financial impact – the opportunity will have on the business	✓		✓	✓		✓			✓		✓
Finance and/or investment check – to ensure investment/funds/cash is available for resourcing the opportunity	✓	✓	✓	✓	✓		✓	✓		✓	✓
Family and Friends - as a network for talking to regarding decision and as an information source		✓	✓	✓	✓		✓	✓	✓	✓	
Feedback – from team and other individuals			✓		✓	✓	✓	✓			

Concept name and explanation	E01	E02	E03	E04	E05	E06	E07	E08	E09	E10	E11
Management experience <5yrs	✓										
Management experience> 10 years		✓		✓	✓	✓	✓	✓	✓	✓	
Management experience > 10 year									✓	✓	
Management forecasts – used for data and analysis				✓							
Manufacturers – used for information source		✓		✓							
Market potential/fit– feasibility of the opportunity				✓					✓		
Market reports – used to validate analysis				✓			✓				
Market trends – used as indicators on feasibility and opportunities		✓	✓						✓		
Meeting targets – for monthly planning and income	✓		✓								
Message boards – source of information and ideas	✓										
Next year’s budget – assessing finance available					✓						
Observation – watching others for information			✓	✓		✓		✓			
Operational data – data from production				✓							
People required – for the opportunity to be operational/costs involved						✓	✓	✓	✓	✓	
People for knowledge – tapping into others for expertise					✓						
Past experience – using past experience to inform or a knowing/feeling of what has been done before as potential assessment of feasibility	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Performance reports – used for information			✓			✓	✓	✓			
Personal networks – used for advice							✓				
Photography experience – previous experience											✓
Planning – operational planning for feasibility	✓		✓		✓			✓	✓		✓
Plan B – alternative plan if the exploitation goes awry	✓	✓			✓	✓					

Concept name and explanation	E01	E02	E03	E04	E05	E06	E07	E08	E09	E10	E11
Production sheets – used as information source	✓										
P&L account – used for information	✓										
Pros and cons for options – looking at the options and weighing up the alternatives	✓				✓	✓		✓		✓	✓
Production experience – as expertise and domain knowledge	✓	✓	✓	✓		✓			✓	✓	
Product ranges – used for market information			✓								
Profitability – checking out whether the opportunity is feasible						✓				✓	
Previous orders – used as an information source	✓					✓				✓	✓
Qualifications – previously gained from college/university		✓						✓			✓
Quotations – used as an information source								✓			
Previous successes and failures – part of the reflective thought process when considering opportunity										✓	
R&D information – an information source		✓									
Reps – an information source						✓					
Resources – checking availability of resources /costs							✓		✓		
Reward – what the opportunity brings to the business	✓										
Reviews and checks data – an analytical process to check data collection and analysis and to ensure on right track with decision	✓	✓	✓	✓	✓		✓	✓		✓	✓
Sales /marketing experience – source of expertise		✓	✓					✓			
Sales information – used for data and information		✓									
Senior Management Team and Director discussion		✓	✓	✓	✓	✓	✓	✓			
Service contracts – used for information							✓				

Concept name and explanation	E01	E02	E03	E04	E05	E06	E07	E08	E09	E10	E11
SMT/Director feedback – specifically from senior/director team at strategic level		✓		✓	✓						
Subcontractor prices – used for information								✓			
Suppliers – used for information						✓					
Strategic planning – strategic business decisions		✓					✓	✓			
Strategic Consultant – employed to provide strategic advice								✓			
Surveyor – used as an information source					✓						
Teaching experience – source of expertise					✓						
Talks to others – discussing the decision and using others for validation or as information source	✓	✓	✓	✓		✓	✓	✓	✓		✓
Team feedback – on decision and/or data collection and analysis		✓			✓		✓	✓	✓	✓	✓
Team meeting on performance – aligned with production efficiently and strategic direction						✓					
Talks to team/s – about decision and as information/analysis source			✓				✓	✓		✓	
Technical problem solving – source of expertise	✓	✓		✓		✓			✓	✓	
Technical data – used for data collection and analysis									✓		
Thinks it through – the process of reflective thought about the opportunity and /or initial decision made	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Time availability – for the opportunity										✓	
Trust in others – getting opinions on the opportunity and decision and trusting the answer to be right	✓		✓					✓			
Validates decision – test out the decision by asking others	✓	✓		✓	✓	✓		✓	✓	✓	
Visualisation – seeing the bigger picture		✓	✓	✓	✓			✓	✓	✓	
Workload – judging whether the opportunity will fit into existing workload for staff	✓					✓			✓	✓	✓

Appendix 15 First and second coding from T0-T1 interviews showing initial codes and development of thematic coding framework

Description: first coding from T0 interviews	Sources	References	Description: second coding from T1 interviews	Sources	References
Identifying an opportunity	10	14	Assessing the identified opportunity	10	14
Making analytical decisions	8	59	Making analytical decisions	22	311
Making an intuitive decision	7	20	Making an intuitive decision	22	261
Decision-making based on gut feelings	11	47	Feelings and decision making	3	6
			How emotion affects decisions	3	6
Using a creative style	7	21	Using a creating style	7	21
Using a planning style	5	14	Planning a decision	5	14
Using a knowing style	10	36	Needing to know	10	36
			Using a preferred style	4	8
Decision-making stages	8	18	Decision-making stages	8	18
Types of decision made	8	24	Types of decisions made	11	27
Collecting information for decision-making	5	18			
Changing a business decision	8	26	Changing a decision	8	26
			Business changing over time	7	18
Checking the decision	7	14	Checking the decision	7	16
Making a confident decision	4	14	Using confidence in decision-making	7	24
Processing information for an initial decision	6	11	Processing information for an initial decision	7	27
Identifying information needed for making decisions	5	5	Identifying information required	5	5

Using past experience for decision making	11	43	Using past experience for decision making	22	152
Thinking about the decision	6	18	Thinking about the decision	15	40
External influences on the decision	7	41	Using personal networks	5	8
Internal environmental influences	3	6	Family business influences	1	1
Trusting others for advice and information	6	9	Trusting others for advice and information	7	13
Managing people in the decision process	5	8	Involving others in the process	26	97
Financial influences on decisions	7	26	Financial influences on decision-making	7	26
Learning from mistakes	6	17	Learning from mistakes	6	17
Dealing with risk	7	29	Dealing with risk	7	29
Being flexible in the decision-making process	8	22	Being flexible in the decision-making process	17	77
Wanting to be in control of the decision	4	10	Wanting to be in control of the decision	8	19
Growth intentions for the business	6	14			
Reasons for growing	9	17			
Factors that prevent business growth	5	7			
Choosing alternatives for decision-making	3	8			
Deciding on an exit strategy	2	4	Discarded as not a focus of study		

Appendix 16 Cross case analysis from coded transcripts T0-T3 for E01, E06 and E07

Concept coding	E01	E07	E06
Collects data and information	<p>Get a book or read an article on it or something like that Even if it's not familiar research again get a book out or read an article on it or something like that. I'm still relying on some source of information... That's when I need to go and get some fact finding (no personnel experience) If I wanted to make a decision I would start by gathering all the facts so the facts that I need to make a decision on. Then I would probably go away and do some research, research into each o those areas Sometimes you're under the cosh and you have to make a snap decision but I would always prefer to go away and research Go back to the standard gathering of information and trying to figure it out All the monitory costs of it, the extra rent, rates of next door, the electrical consumption, potentially extra wages of having new people Auction...a quick search of what else was for sale at that point of time as well Can I finance it and then can I afford the finance? Have a look at previous jobs</p>	<p>Reports through on their performance We've had a management information system for a number of years Figures from Adam Costs of production I've sort of renewed some of the service contracts Mailing items Just looking at figures and the realities of this I made decision because I couldn't get the information when it starts come through where we've got the system compliance with thinking yes, it's not far off I use data information, yes The management information system is absolutely crucial to the company We've got to listen to the market, the market dictates things, another tune so you can't afford to be so off beat so that you think oh yes, we went for this but Oh! Got Adam to do some figures Getting the KPIs is really good They're actually getting that information [team]</p>	<p>We have a management account every month but you know we don't really get excited about it Because if I didn't have the information...you don't have the information so all you can do is guess what happens or have these gut feelings which are really often way, way out You've got customers, people supply chains. Because if I didn't have the information...you don't have the information so all you can do is guess what happens or have these gut feelings which are really often way, way out Yes, it sort of built up on lots of information that you glean, it's not just data as such. For quite a few years we've looked at RFT, customer on time delivery but we haven't really kind of analysed those figures particularly You do it based on a lot of information that is stored in your head...you just make it on whatever information you have. You know you look at all the factors and then you might look at it again and</p>

Concept coding	E01	E07	E06
<p>Talk to others</p>	<p>Production planning sheets, Profit and loss accounts, Research into those areas, Monthly Turnover forecasts, Quarterly review, Specifications from manufacturers, Cash flow</p> <p>Where I think I've got it figured out in my head I will generally go and talk to someone else because other people, especially people with an outside perspective have a nasty habit of seeing things that I haven't seen Especially if I go away and talk to Ian he's the one of the previous directors, he'll come out and hit me with something that I wouldn't even have considered. That's where I've got to do my research or talk to somebody who has gone through it. When I've come up with the basic idea and something completely obvious when I've discussed it, Maybe get a bit more insight from other people and that changes everything and then make a different decision A lot of time you can talk to people...even your competitors...even some of our customers....so you can get quite a lot of information that way I would always try to talk to someone</p>	<p>He will say Izzie you need to be careful there and I do listen to him and there, let me think, yes.</p>	<p>then you might make a decision and go back and look at it again. I'm basing mine [decision] on a load of data, you know I'm basing it on my understanding of the marketplace, of the customer, of where we all are, all blah, blah, blah, load of things</p> <p>You've got customers, people supply chains. It's good to talk to other people, sort of bounce a few, you might work it all out in your head but you think, but I'm a little sort of late on the reality of that decisions so perhaps really, you know, talk to somebody else about it, you may pick up something Then I got our accountant, a bookkeeper in Yes, I delegate heavily and I'm very good at that</p>

Concept coding	E01	E07	E06
Past experience	<p>someone usually stimulates a little bit more</p> <p>I've sort of learned that people are a pretty valuable resource in decision-making</p> <p>I'll go and read, other people's input, I'll read you know, books and things like that. Articles, if I've got them on the subject matter and draw from other people's experiences</p> <p>Someone that I can talk to and note that their advice is impartial</p> <p>I like to get other people's opinions because sometimes they think of consequences that I don't think of, quite important</p> <p>One of my experienced engineers</p> <p>Speak to the engineers</p> <p>I would have said [past experience] it's quite a big factor, especially if you've got a trusted source.</p> <p>So, if I've come across a situation before I know from past experience that you know say this happened before</p> <p>Meg can give us some prior experience</p>	<p>making, bringing more information to them</p> <p>I've also been giving presentations to the senior managers, to the managers and really love seeing those things come through</p> <p>If we're going to have a board of directors the board of directors are going to need to have the information</p> <p>When you've experienced something especially is it's been painful you need to remember them don't you</p> <p>It's a kind of knowing I think that comes from experience</p> <p>There is a value to it because that something that has been built up over years and therefore you have an experience</p> <p>The experience is necessary</p> <p>Because you've got experience that you're bringing to the table and I just say yes it's a value to that, it's a great value to it</p> <p>I don't consciously think about how I process decisions in that respect</p> <p>I think you learn, you naturally learn from what you've experienced don't you and it sort of builds your kind of knowledge base, your awareness space</p>	<p>Because I've just been buying a piece of equipment and you know, just look at all the pros and cons and understand it</p> <p>I do think about it I do think that wasn't this process, it didn't happen very well or things went wrong</p> <p>I've got ideas in my head but they change like the wind</p> <p>I do think about it sometimes I will go back and say you know what happens here and here</p> <p>Yes, but it's just in your mind isn't it when I have to write it all down it is when I have to write it down that the thinking, that's fun, when you are to say right, sort of put it down into a process.</p> <p>Yes, the problem is that here you are constantly thinking about it</p>

Concept coding	E01	E07	E06
Past experience	<p>Yes, my prior experience was from other people, not from myself, it'd come from Ian and Meg... they are there is I need to run something by them</p> <p>Because I can sort of tap into that and think what did I do in this kind of situation and how did it pan out?</p> <p>Now I'd probably go for prior experience first, whether it's my prior experiences or someone else's</p> <p>I've got more internal knowledge to draw on now than I had when I started, when I started I had zero knowledge so I couldn't possibly make a decision based on no experience</p> <p>I think that goes back to our time on the shop floor for both of us</p> <p>I can sort of tap into that and think what did I do in that kind of situation/</p> <p>I would draw on prior experience if I can't that's where I've got to go and do my research or talk to somebody who has gone through it</p>	<p>The experience is necessary, not necessary, it's valuable</p> <p>I am a great believer that something that didn't work 10 years ago could actually work very well today</p>	<p>No I have to think about it [the decision outcome]</p> <p>Because I am thinking all this, it's going on very fast in my head</p> <p>I</p>
Data analysis	<p>And run the figures on it as it were</p> <p>And figuring out the facts</p> <p>If I have to make something out of the unknown I'll try and analyse it but I think my gut feeling is coming into it more and more</p>	<p>How can you train a board of directors to read and understand and get that empowerment and to have that responsibility and performance if you haven't got the flipping performance figures?</p>	<p>It's good to talk to other people, sort of bounce a few, you might work it all out in your head but you think, but I'm a little sort of light on the reality of that decision so perhaps really, you know, talk to somebody else about it, you may pick up something</p>

Concept coding	E01	E07	E06
<p>Expertise</p>		<p>Bringing in MAS in developing KPIs, developing the meetings</p>	<p>I would ring up the customer and ask every minute detail and check and double check There are lots and lot of options and parameters and things so you're constantly going back and checking on those, have I got that right here, so you're not doubting yourself, you're constantly going over the process analysing it until you think I'm happy with that decision You look at all the factors and then you might look at it again and then you might make a decision and go back and look at it again I took it on {man and machine}, on the, on the basis that if we broke even we'd be happy. We have a management account every month but you know we don't really get excited about it We've analysed it and said yes, let's expand this more My analysis is very quick but it's not necessarily very detailed</p>

Concept coding	E01	E07	E06
<p>Assessing risk</p> <p>Plan B</p>	<p>If it's been done before and it was to successful and a risk then you've got a bit more to think about. That's where your Plan B comes in.</p> <p>If it's been done before and there is minimal risk</p> <p>Have got your past experience first and then after that you would assess the risk maybe.</p> <p>Because I'll always have a safety net so I can always to back</p> <p>I find when it's a more rational and you've got a bit of evidence to support your idea and things like that the risk becomes, there is still risk but it's controlled risk</p> <p>I must admit I've been caught without a safety net or I vow to make a decision without a decision, without a safety net of many times...so sometimes I'll tend not to think of the what ifs.</p>	<p>No I think about how we can mitigate the end results, i.e. if there's a problems say for instance something goes wrong with a job you instantly think right now how are we going to ensure that the client has minimum damage like a damage limitations so that rather than think about what went wrong I think about how do we [make it right?]</p> <p>You're looking at the figures, you're looking at the risks</p> <p>We've got a new insertion machine arriving at the end of August and so that all went through the process, identifying risk</p>	<p>You kind of get a list of options that you will, you know a shortlist of things you're going to try</p> <p>It's just like navigation...you've always got a fall-back position and you've always got Plan B</p>
<p>Thinks it through</p>	<p>If it was a real big deal talking about the big contract or something we definitely have to sit down and think about it</p> <p>It might take place in my mind a lot more rather than physically writing stuff down and researching and documenting things like that</p> <p>I'm still weighing up the pros and cons in my head.</p>	<p>Well I don't know how I go about thinking about it but I do have what I call my snowflakes which is all my thoughts coming down into me and I don't consciously think those thoughts into me they come, I call it my snowflake moments</p>	<p>When you've got more strategy, you are listening more than just collecting information so this thinking is going to be you're collecting data if you like...if you're making a strategic decision you're more listening to</p>

Concept coding	E01	E07	E06
Thinks it through	<p>I've made up my mind in what I think I need to do and you see someone more successful that you that's take a different route it would be worth my while to go back and investigate that a bit further</p> <p>And looked at the pros and cons I would say an analysis...</p> <p>I would just think about it over and over again in my head until I reached a decision and that goes with talking to other people and getting their views on it, getting their input, their considerations because if you can have you considered everything, have you weighed up the pros and cons, then you can make a decision on that.</p> <p>I'm still relying on some source of information, whether it is my previous experience or whether that is an article, I'm still weighing up the pros and cons in my head</p> <p>Once I've got all that in front of me I literally just stare at it while I think something out</p> <p>I'll always give myself the opportunity to go away and get my head straight about what I need to know before I'll go and make a decision. I will go away now and sit down and figure it out before I will actually do anything</p>	<p>And that's usually because you haven't thought through the ramifications because you only see the first circle so you make the decision and then you think suppose I spend a lot of time thinking but I don't sit in the corner and just think if that makes sense</p> <p>I don't consciously probably think about that, erm, they kind of formulate and then I think OK that could be really good for us</p> <p>I suppose thinking about each and every aspect of it, it's not just making the decisions, it's what are the ramifications going to be on the first circle and also on the third and fourth circle</p> <p>I do enjoy thinking but as I've said I don't sit in the corner of the room and say that is my think time it just happens and I do enjoy that.</p>	

Concept coding	E01	E07	E06
<p>Checking</p> <p>Confidence</p>	<p>I would say if I've convinced myself I'm going to do something then it will be just a safety check But I don't feel that I'll ever get away from double checking I will check but I feel like...it's not this be all and end all thing whereas [now] it's another thing to be done or not done</p>	<p>I suppose sometimes the decisions you make are unpleasant but I wouldn't say that's a lot of confidence it's just thinking ugh, you have to do that</p>	<p>Whereas if you've got actual data, although data can be pretty useless as well, but we've got a lot more solid information and ideas of what you would be doing...then you can feel a lot more confident that's what we're going to do ...sort of looking at data is much better because you can be more confident in the decisions that you are making I can't see how you can have a decision that isn't confident. If you're going to make a decision it's going to have to be wrapped up in confidence isn't it?</p>

Concept coding	E01	E07	E06
<p>Validating a decision</p> <p>Gut feeling</p>	<p>I would always try and validate my decision so far and come to a decision and [if i] haven't got anything tangible that is a good idea I'll always come back and do some research in the internet or whatever it is to try and validate the decision I've made is a good decision I think I've made my mind up and then sleep on it</p>	<p>Whether it's strategic, you're looking at the strategic, you're looking at the figures, you're looking at the risks, you're looking at the possibilities, you're looking at the people and then you're putting that all into the mixing bowl so then you have an operational thing where you're got to make some decisions You're making decisions and you're doing stuff without actually consciously thinking about why did I make that decisions or how did I come to that results?</p> <p>If anybody ever asks me, listen to your gut because if you start excluding that you're kind of deafening your ears to something that you need to hear I said my gut was right on this the actual figures are coming out You push ahead with the visions and then you can bring the gut in as you are going It's kind of knowing I think that comes from experience, isn't it, you think right, this is how we tackle this one and then you run with it, but your gut is something inside that tells you, it's speaking to you, it's not your heart speaking to you. I think we all have gut and some people are attuned to their gut</p>	<p>I would ring up the customer and ask every minute detail and check and double check There are lots and lot of options and parameters and things so you're constantly going back and checking on those, have I got that right here, so you're not doubting yourself, you're constantly going over the process analysing it until you think I'm happy with that decision You look at all the factors and then you might look at it again and then you might make a decision and go back and look at it again</p>

Concept coding	E01	E07	E06
<p>Gut feeling</p> <p>Trust</p> <p>Reviews and checks data</p> <p>Visualisation</p>	<p>We've just got a gut feeling I think it's just because we've got prior experience I've never trusted my gut so much that I wouldn't go and do some research first Sometimes I just get the feeling, I get a feeling about something I just have to go away and have to make sure that it's the right decision to make before I go with my gut I would have trouble trusting my instincts because it's not a reliable source of information if you asked me</p> <p>People are difficult because I find it difficult to trust them That was a massive leap of faith I think I was always too scared to make those decisions in the past</p> <p>You can see it happening as an idea in your head... I visualize sort of getting £50,000 grand a month or whatever it may be but it's always the discussions of how you're going to achieve that</p>	<p>I and I would say they're very wise to be attuned to their gut I think we all have gut and some people are attuned to their gut and I would say they're very wise to be attuned to their gut It's kind of knowing I think that comes from experience, isn't it, you think right, this is how we tackle this one and then you run with it</p> <p>I said my gut was right on this the actual figures are coming out You push ahead with the visions and then you can bring the gut in as you are going</p>	<p>I think some of that is kind of subconscious...you've got your conscious mind and you're working it all out but in actual fact it's probably you're subconscious that it giving you the answer It's not like you can do sums and look at the answer I think It's your subconscious that will come out and say that is what we'll be doing And you've had a gut feeling that you're not making any money You think we're No table of figures entries found. it my gut feeling because you only remember the bad things you don't remember the good things</p> <p>I took it on {man and machine}, on the, on the basis that if we broke even we'd be happy</p>

Concept coding	E01	E07	E06
Planning	I'd say planning style would be reserved more for my routine tasks	<p>I suppose sometimes the decisions you make are unpleasant but I wouldn't say that's a lot of confidence it's just thinking ugh, you have to do that</p> <p>You're looking at the figures, you're looking at the risks</p> <p>We've got a new insertion machine arriving at the end of August and so that all went through the process, identifying risk</p>	Yes, I know what we need to happen but I'm rubbish at sort of writing down and sharing it with everybody

Appendix 17 Final coding

Coding description for sub theme 1	Sub theme 2	Coding names	Sources	References	Memo notes
Making a decision	Collecting information for an initial decision	Collecting information	41	183	Novices using people as information source
	Processing information for an initial decision	Processing information	36	191	Link to style preferences
		Decision types	35	90	Relationship with gut feelings
		Changing a decision	12	35	Novice/mature differences
	Assessing the risk	Risky decision type	17	59	Novice/mature differences and relationship with style, previous experience
		External risk factors	20	41	Style relationship
	Planning how the opportunity will operationalise	Planning the decision	30	79	Has different meanings at different stages of the process/style relationships
Thinking it through	Visualising the process	Visualising the process	11	26	Associated with intuitive style/creativity
	Thinking about the decision	Thinking it through	32	100	Positioning of this varies with validation, past experience and styles
	Checking the decision	Checking process	33	156	Differences between novices and mature position in the process
	Validating the decision	Looking at the end goal	16	27	Relationship with people for validation and use of networks

Feelings about the decision	Feeling confident in making that decision	Feeling confident	27	92	Relationship between confidence, emotion and motivation
		Emotion	3	7	
		Motivation	5	17	
	Trusting others as an information source	Trusting others	18	30	Novices and mature differences
	Controlling the decision process	Controlling the decision	13	20	Locus of control linked to employee responsibility
		Locus of control	8	19	
Using a gut feel	Gut feelings	34	153	Frequently used but differently depending on circumstances and experiences	
External influences	Customers and their needs	Customers	10	41	Drives growth and decision process
	Competition in the market	Competition	13	46	Acts as a driver
	Financial influences	Financial	31	113	High priority in the process
	The changing business environment	Hostile conditions	13	31	Linked to style preferences and experience
		Market influences	10	42	Moderating influence
		New products	7	29	Link to customer and competition
		Technology	4	11	Link to innovation

Using people in the decision-making process	Using teams for information and advice	Talking to others (internal to business)	40	139	For information acquisition, checking and validation. Differences between novices and mature, styles
		Talking to others (external to business)	35	127	For information acquisition, checking and validation
	Using networks for information and advice	Internal teams	14	51	As validation, positioning varies in process depending on experience
		Networks	7	18	As validation in mature
Developing a versatile approach	Preference for an analytical style	Analytical style	42	434	Dominant in the evaluation process, positioning varies in mental model depending on experience/style
	Preference for an intuitive style	Intuitive style	44	353	Some cross over with gut feelings
	Ability to use both styles	Style versatility	36	132	Present in the evaluation process, positioning varies according to style type and experience
Learning by doing	Using past experience	Using past experience	36	216	Relationship between confidence and learning and domain expertise
		Learning from mistakes			Different experiences, linked to reflective thought

Miscellaneous/ Business details and growth tracking		Factors that prevent growth	5	7	Used to establish growth intentions and growth for tracking during time frame
		Growth intentions	6	10	
		Growth reasons	12	23	
		Tracking growth	9	12	Stress related comments of a personal nature not analysed
		Working with partner	3	8	
	Family business	1	1	Not relevant	
Coding for cognitive mapping	Used for content analysis of concepts for mental model construction	Mapping the process		1938	Map structure variations and differences between novice and mature in pathways of thinking/styles

Appendix 18 Cognitive Style Indicator (CoSI)



Cognitive Style Indicator (CoSI)*

Eva Cools
Herman Van den Broeck

Year of birth: 19...

Gender: MF

Please indicate to what extent the following statements typify you. There are 5 possibilities.

- 1 = totally disagree
- 2 = disagree
- 3 = neutral
- 4 = agree
- 5 = totally agree

1	I like much variety in my life.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2	I study each problem until I have understood the underlying logic.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3	I prefer well-prepared meetings with a clear agenda and strict time management.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4	I like to contribute to innovative solutions.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5	New ideas attract me more than existing solutions.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6	I make definite engagements which I follow-up meticulously.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7	I try to avoid routine.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8	I want to have a full understanding of all problems.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

	—	—	—	—	—	
9	Developing a clear planning is very important to me.	1	2	3	4	5
10	A good task is a well-prepared task.	1	2	3	4	5
11	I prefer to look for creative solutions.	1	2	3	4	5
12	I always want to know what should be done when.	1	2	3	4	5
13	I like to analyse problems.	1	2	3	4	5
14	I like to extend the boundaries.	1	2	3	4	5
15	I make detailed analyses.	1	2	3	4	5
16	I prefer clear structures to do my job.	1	2	3	4	5
17	I am motivated by ongoing innovation.	1	2	3	4	5
18	I like detailed action plans.	1	2	3	4	5

Appendix 19 The Rational Experiential Inventory

Name:

Gender:

Age:

Rate the following statements about your feelings, beliefs and behaviours using the scale below. Work rapidly; first impressions are as good as any.

1= Definitely false

2= Mostly false

3= Undecided or equally true and false

4= Mostly true

5= Definitely true

- 1 2 3 4 5 1. I'm not that good at figuring out complicated problems
- 1 2 3 4 5 2. If I were to rely on my gut feelings I would often make mistakes
- 1 2 3 4 5 3. I prefer complex to simple problems
- 1 2 3 4 5 4. I generally don't depend on my feelings to help me make decisions
- 1 2 3 4 5 5. I have no problems in thinking things through clearly
- 1 2 3 4 5 6. When it comes to trusting people, I can usually rely on my gut feelings
- 1 2 3 4 5 7. Thinking is not my idea of an enjoyable activity
- 1 2 3 4 5 8. I like to rely on my intuitive impressions.
- 1 2 3 4 5 9. I am not a very analytical thinker
- 1 2 3 4 5 10. I believe in trusting my hunches
- 1 2 3 4 5 11. I enjoy solving problems that require hard thinking
- 1 2 3 4 5 12. I think it is foolish to make important decision based on feelings
- 1 2 3 4 5 13. I suspect my hunches are inaccurate as often as they are accurate
- 1 2 3 4 5 14. I usually have clear explainable reasons for my decisions
- 1 2 3 4 5 15. Knowing the answer without having to understand the reasoning behind it is good enough for me

1= Definitely false

2= Mostly false

3= Undecided or equally true and false

4= Mostly true

5= Definitely true

- 1 2 3 4 5 16. I would not want to depend on anyone who described himself or herself as intuitive
- 1 2 3 4 5 17. Using logic usually works well for me in figuring out problems in my life
- 1 2 3 4 5 18. I enjoy intellectual challenges
- 1 2 3 4 5 19. I can usually feel when a person is right or wrong even if I can't explain how I know
- 1 2 3 4 5 20. I often go by my instincts when deciding on a course of action
- 1 2 3 4 5 21. My snap judgments are probably not as good as most people
- 1 2 3 4 5 22. Reasoning out things carefully is not one of my strong points
- 1 2 3 4 5 23. I don't like situations where I have to rely on intuition
- 1 2 3 4 5 24. I try to avoid situations that require thinking in depth about something
- 1 2 3 4 5 25. I trust my initial feelings about people
- 1 2 3 4 5 26. I have a logical mind
- 1 2 3 4 5 27. I don't think it is a good idea to rely on one's intuition for important decisions.
- 1 2 3 4 5 28. I don't like to have to do a lot of thinking
- 1 2 3 4 5 29. I don't have a very good sense of intuition
- 1 2 3 4 5 30. I am not very good at solving problems that require careful logical analysis
- 1 2 3 4 5 31. I think there are times when one should rely on one's intuition
- 1 2 3 4 5 32. I enjoy thinking in abstract terms
- 1 2 3 4 5 33. Using my gut feelings usually works well for me in figuring out my problems in my life
- 1 2 3 4 5 34. I don't reason well under pressure

- 1= Definitely false**
- 2= Mostly false**
- 3= Undecided or equally true and false**
- 4= Mostly true**
- 5= Definitely true**

- 1 2 3 4 5 35. I tend to use my heart as a guided for my actions
- 1 2 3 4 5 36. Thinking hard and for a long time about something gives me little satisfaction
- 1 2 3 4 5 37. I hardly ever go wrong when I listen to my deepest gut feelings to find an answer
- 1 2 3 4 5 38. I am much better thinking out things logically than most people
- 1 2 3 4 5 39. Intuition can be a very useful way to solve problems
- 1 2 3 4 5 40. Learning new ways to think would be very appealing for me

Source: Pacini, R. and Epstein, S. (1999)

Appendix 20 Style assessment scores for all participants T0-T4

E01	CoSI	T0	T1	T2	T3	T4	REI	T0	T1	T2	T3	T4
	Knowing	90	95	95	80	75	Rational	83	56	64	81	79
	Planning	71	83	74	69	74	Experiential	41	49	58	55	60
	Creating	66	74	74	71	74						
E02		T0	T1	T2	T3	T4		T0	T1	T2	T3	T4
	Knowing	90	85	85	80	80	Rational	82	91	89	89	85
	Planning	66	74	69	63	60	Experiential	70	82	86	92	84
	Creating	89	94	91	94	94						
E03		T0	T1	T2	T3	T4		T0	T1	T2	T3	T4
	Knowing	90	85	75	60	60	Rational	85	78	87	89	85
	Planning	57	51	37	43	54	Experiential	58	65	70	83	73
	Creating	62	66	74	77	77						
E04		T0	T1	T2	T3	T4		T0	T1	T2	T3	T4
	Knowing	56	65	75	70	75	Rational	76	66	79	78	75
	Planning	57	54	71	63	62	Experiential	79	75	58	75	75
	Creating	86	71	83	86	89						
E05		T0	T1	T2	T3	T4		T0	T1	T2	T3	T4
	Knowing	80	75	90	90	75	Rational	88	81	87	95	93
	Planning	77	69	77	77	69	Experiential	90	87	82	83	90
	Creating	89	80	83	80	80						
E06		T0	T1	T2	T3	T4		T0	T1	T2	T3	T4
	Knowing	90	85	75	65	85	Rational	96	96	97	82	99
	Planning	66	43	46	46	51	Experiential	70	66	63	70	69
	Creating	89	83	89	89	94						
E07		T0	T1	T2	T3	T4		T0	T1	T2	T3	T4
	Knowing	80	95	80	75	85	Rational	86	86	81	83	90
	Planning	60	77	69	57	71	Experiential	74	69	63	72	72
	Creating	89	91	86	77	86						
E08		T0	T1	T2	T3	T4		T0	T1	T2	T3	T4
	Knowing	40	75	55	40	45	Rational	61	73	59	61	72
	Planning	63	83	60	57	66	Experiential	78	88	82	81	85
	Creating	71	80	91	74	66						
E09		T0	T1	T2	T3	T4		T0	T1	T2	T3	T4
	Knowing	75	70	80	85	70	Rational	72	95	81	87	85
	Planning	54	71	74	66	69	Experiential	84	95	92	96	91
	Creating	91	100	100	100	97						
E10		T0	T1	T2	T3	T4		T0	T1	T2	T3	T4
	Knowing	75	75	75	70	70	Rational	65	64	65	68	70
	Planning	77	77	69	66	74	Experiential	72	69	71	74	75
	Creating	68	69	71	74	74						
E11		T0	T1	T2	T3	T4		T0	T1	T2	T3	T4
	Knowing	75	75	60	65	65	Rational	75	61	67	64	66
	Planning	86	86	74	83	83	Experiential	83	77	80	83	89
	Creating	77	80	77	83	83						

Appendix 21 Ethics application



Tracking No:
Date approved:
Initials:

Faculty of Business and Law
Application to Gain Ethics Approval for Research Activities

All research activity conducted by members of staff or students within the Faculty of Business and Law requires ethics approval. To gain ethics approval this form should be completed and submitted to the appropriate designated officer (see below). Students should complete this form in consultation with their supervisors.

Applicant	
Last Name: EVANS	First Name: MARIAN
DMU Email Address: P11232571@myemail .dmu.ac.uk	Staff/student no. P11232571

SECTION 1. The Research										
Title: How do entrepreneurs make decisions whether or not to grow their business?										
Aims of the research: To explore how cognitive style influences the decision making process for growth in a small business environment and whether entrepreneurs synthesise different styles in different environmental conditions.										
Principal data collection methods (delete as applicable)										
<table> <tr> <td>a) Interviews</td> <td>yes</td> </tr> <tr> <td>b) Questionnaires</td> <td>no</td> </tr> <tr> <td>c) Observation</td> <td>yes</td> </tr> <tr> <td>d) Documents/archives (inc. doctrinal law)</td> <td>yes</td> </tr> <tr> <td>e) Other (please specify)</td> <td>_____</td> </tr> </table>	a) Interviews	yes	b) Questionnaires	no	c) Observation	yes	d) Documents/archives (inc. doctrinal law)	yes	e) Other (please specify)	_____
a) Interviews	yes									
b) Questionnaires	no									
c) Observation	yes									
d) Documents/archives (inc. doctrinal law)	yes									
e) Other (please specify)	_____									
Participants										
Will your research involve human participants? If YES then proceed to section B. If NO then proceed to section A.										
A – No human participants										
I confirm that my data collection technique is documentary and will not involve human participation:										
Signature of Researcher: Date:										
In these circumstances you can omit the remaining sections of the form. Please forward to the appropriate designated officer for approval										
B – Human Participants										
What is the research population? 6-8 owner managers of Manufacturing SMEs in two regions										
How will participants be selected? Non probability, purposive sampling using gatekeepers and personal networks										

SECTION 2. Research ethics and the protection of participants' interests.		
<i>NB. Participants should suffer no harm as a result of participation in the research</i>		
Please confirm the following by deleting as applicable. <i>[If you are not able to confirm any of the statements please provide further information in the section below].</i>		
Participation in the research will be:	Voluntary	yes
	Based on informed consent	yes
Participants' identities will be protected via:	Confidentiality with respect to the data	yes
	Anonymity in terms of any reported findings from the research	yes
The research process will:	Respect the privacy of individuals and avoid undue intrusion	yes
	Avoid emotional harm or upset to those taking part	yes
Data from the research will:	Be stored securely in line with data protection principles	yes
	Not passed on to third parties	yes
The research be conducted with integrity including:	Fair and honest treatment of the data	yes
	Open dealing with participants	yes
	Declaring any sponsorship or vested interests	yes
	Avoiding any plagiarism	yes
The research complies with the law in all relevant respects		yes
Further comments relating to the checklist above		

SECTION 3. Additional Codes of Ethics	
Which Code of Research Ethics will be adhered to during the course of your research? Examples of Codes can be found at http://www.dmu.ac.uk/research/ethics-and-governance/regulatory-codes-and-legislation.aspx	
Name: RESPECT The Respect code of Practice for Socio-Economic Research	Web address: http://www.respectproject.org/code/respect_code.pdf
Some types of research activity require additional advance ethical approval to be given from the relevant governing body. For example, advance NHS approval is required where participants include NHS patients or social care users. It is the responsibility of the researcher to ascertain whether such approval is required and to obtain this where necessary.	
My study requires additional approval	no
I have obtained additional approval from	
Reference number:	Date of approval:

SECTION 4. Declaration and Signatures

I have read the *Responsibilities of the Researcher* guidelines at <http://www.dmu.ac.uk/research/ethics-and-governance/responsibilities-of-the-researcher.aspx> and I will comply with them.

Signature of Researcher  Date: 25.06.14

Students Only:

This form **must** be agreed with your Supervisor prior to authorisation by the Designated Officer and a copy of the research proposal (Application for Registration (RDC:R) form) must be attached to this application.

Programme of Study: Research Degree

Name of Supervisor: Martin Beckinsale

Signature of Supervisor:  Date: 16/7/14

Signature of Designated Officer: Date:

Designated officers:

Staff:
Head of Research

Dr Steven Griggs

Research Students:
Faculty Head of Research Students

Prof Gavin Dingwall

LBPB 5017 Dissertation Module Students:
Module Leader

Dr Hulya Oztel

Other Masters Students:
Marketing (MARK5020, MARK5056, MARK5073):
Public policy (POPP5026):
Law (PLAW5612):
Law (LLMP5272):
Accounting (ACFI5027):
HRM (HRMG5060):
Housing (BEHS5923, BEHS5410)
GDL Project:

Dissertation Module Leaders:
Anne Broderick
Rob Baggott
Caroline Coles
Ian Kilbey
Michelle David
Julia Pinton
Peter King
Graham Hipwell

Undergraduate Students:
Accounting
Economics
Enterprise
Human Resource Management
Law
Marketing
Politics and Public Policy
Retail Management
Strategy and Management

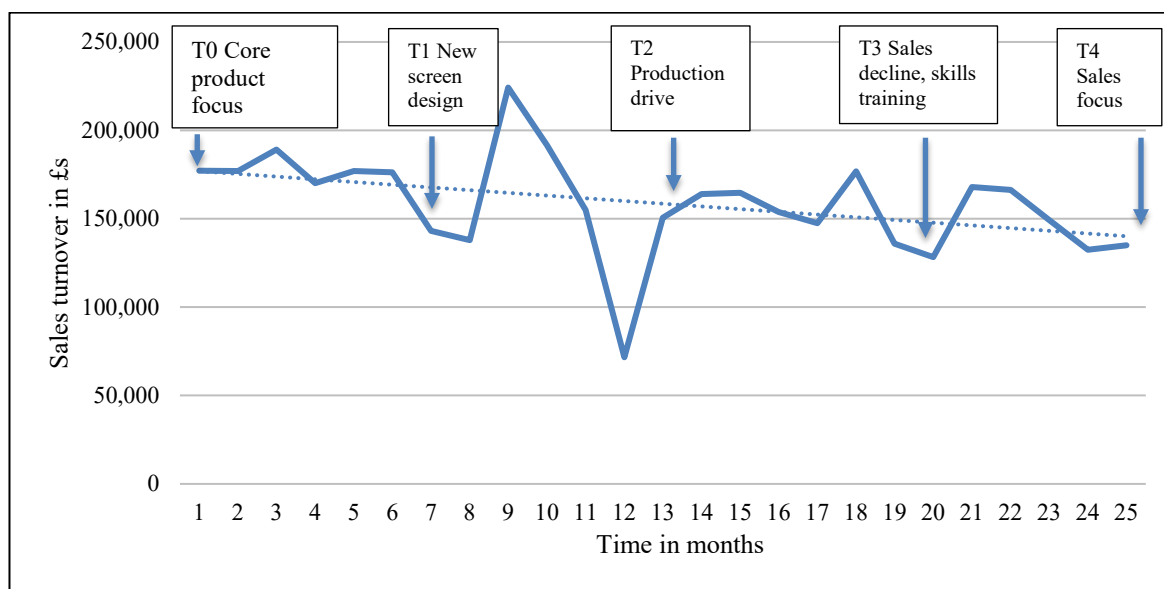
Module Leaders:
Lisa Wakefield
Ashley Carreras
Edwina Goodwin
Phil Almond
Ian Kilbey
Lynn Stainsby
Chris Goldsmith
Anne Broderick
Martin Beckinsale

Appendix 22 First level links of concepts to Hub or "thinks it through"

Concept with first level link to Hub	Entrepreneur reference number
Assesses risk	E01, E02, E04, E05, E06, E07, E08, E09
Collects data and information	E02, E03, E04, E05, E08, E09, E10
Observation	E04, E08
Data analysis	E01, E02, E03, E04, E05, E06, E07, E08, E09, E10
Pros and cons for options	E02, E05, E06, E08, E09, E10,
Resources	E01 (workload), E06 (workload), E08 (Yr. 2 people required), E07 (people required, resources) E09 (people required, workload, technical), E10 (people required)
Reviews and checks data	E02, E06, E09, E11
Finance checks	E01 (check), E03 (impact), E05 (check, costs), E06 (check), E08 (check, cashflow), E09 (impact, costs)
Plan B (damage limitation)	E02, E05
Strategic planning	E01 (targets), E03, E05 (budget), E07 (exit, planning), E09 (future, business value)
Planning	E09 (project), E11(ops)
Refers to past experience	E01(yr2), E02, E03 (yr2), E04, E05, E06, E07, E08 (yr2), E09
Learning from mistakes	E01, E02, E03, E04, E05, E06, E07, E08, E09, E10
Visualisation	E02, E03, E04, E08, E05, E09, E10,
Confidence (as a feeling)	E01, E06, E09
Feelings (is it right?)	E08
Talking to others	E01 (questions), E03 (listens to views, talks to others), E07 (talks to others, Snr. team discussion), E08 (asks questions), E10 (Co-director discussion), E11(Yr2, team)
Feedback	E02 (team), E05 (ops), E07 (team delegation), E08, E10, E11 (yr2)
Validates decision	E02, E04, E05, E09,
Initial decision	E01, E06, E10,
Final decision	E11
Observation	E04, E08

Appendix 23 Growth profiles of entrepreneurs not shown in Chapter 5: E03, E04, E05, E07, E08, E09, E10 and E11.

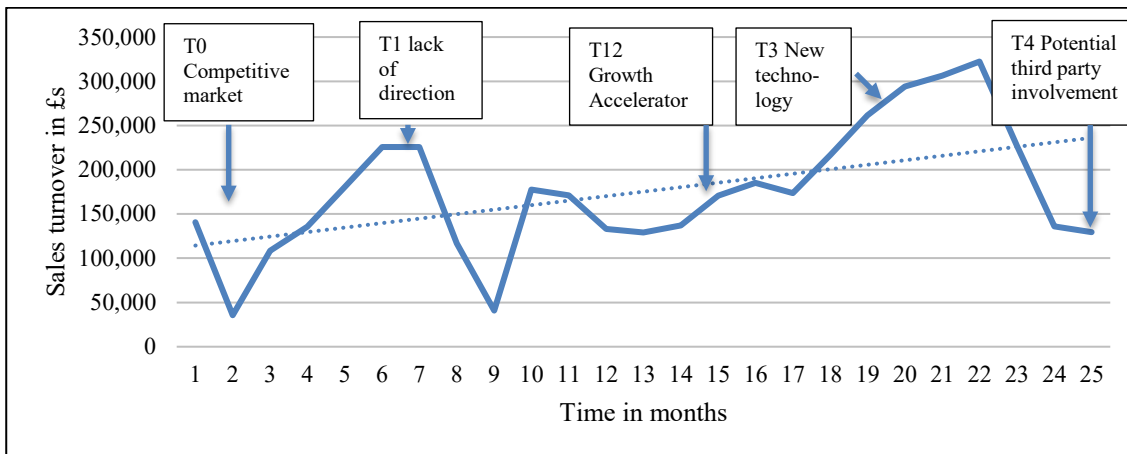
Novice entrepreneur E03



E03 Summary of key events noted from interview at each time point				
T0: Month 1	T1: Month 7	T2: Month 14	T3: Month 20	T4: Month 26
Establishing infrastructure and developing core products.	New screen design. Possible mezzanine. Considering move to ease production.	Production drive and efficiency. New textures and designs for new product look.	Down in sales. Big buyer events. Skills matrix training. Efficiency improving.	Dwindling sales team. Extending fabric range. Running sales and marketing. Trialling software for follow-up leads.

This business showed negative growth year-on-year of -7.67%

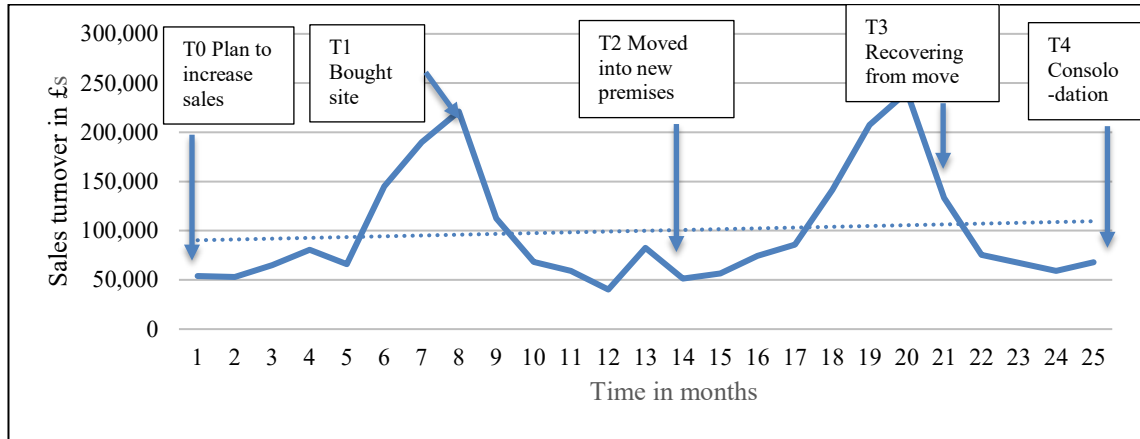
Intermediate entrepreneur E04



E04 Summary of key events noted from interview at each time point				
T0: Month 2	T1: Month 7	T2: Month 15	T3: Month 20	T4: Month 25
Difficulties with product in market, competition stiff, looking for new ways to improve efficiency.	No real direction, business not doing well as result of this.	Bought in Growth Accelerator package to assist strategic direction.	Business improved and money back in, incorporating new technology into design.	Looking at third party involvement for technology development, in process.

This business showed planned growth year-on-year of +51.3%

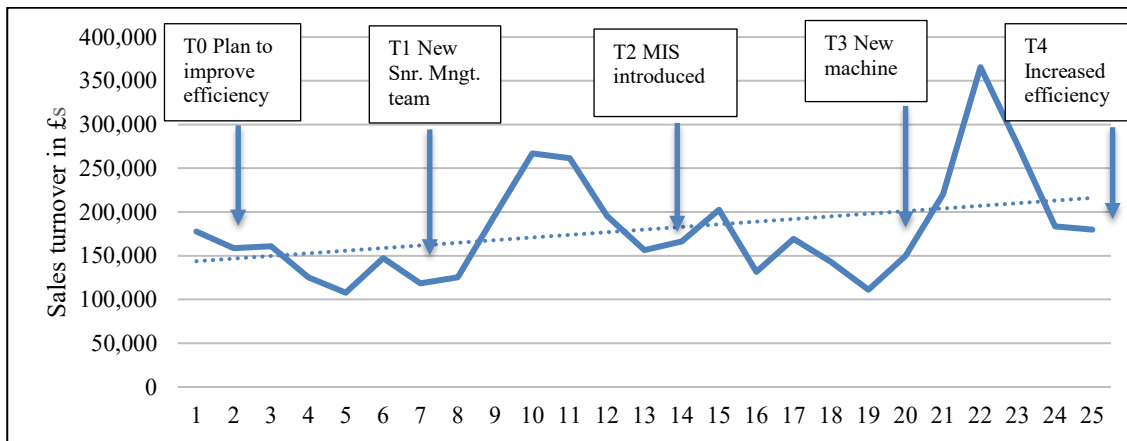
Mature entrepreneur E05



E05 Summary of key events noted from interview at each time point				
T0: Month 1	T1: Month 8	T2: Month 14	T3: Month 21	T4: Month 26
Seasonal business doing well, plans to increase sales to build up for future exit strategy.	Buying site and building factory instead of renting two units. Set up Senior Mngt team.	Moved into new premises, setting up production line and organising production flow.	Move stretched production of seasonal sales, move been difficult for team.	Focus on consolidation and looking for ideas that will even out seasonal growth.

This business showed planned growth year-on-year 10.48%

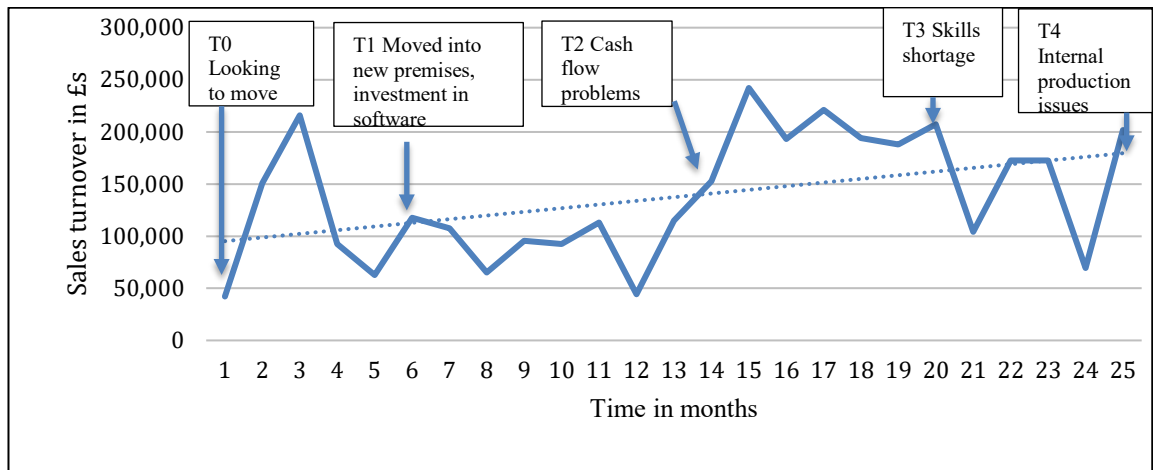
Mature entrepreneur E07



E07 Summary of key events noted from interview at each time point				
T0: Month 2	T1: Month 7	T2: Month 14	T3: Month 20	T4: Month 26
Business not doing so well, staff problems and a need to improve efficiency.	Established Senior Mngt. team. Using statistical programme for KPIs.	Moved onto shop floor and introduced MIS programme. Feels rejuvenated.	Senior Mngt. team is working well. Responsible and making changes. New printing machine.	Production efficiency has increased. Senior Mngt. team going well. Still working in production office.

This business showed planned growth year-on-year of 11.48%

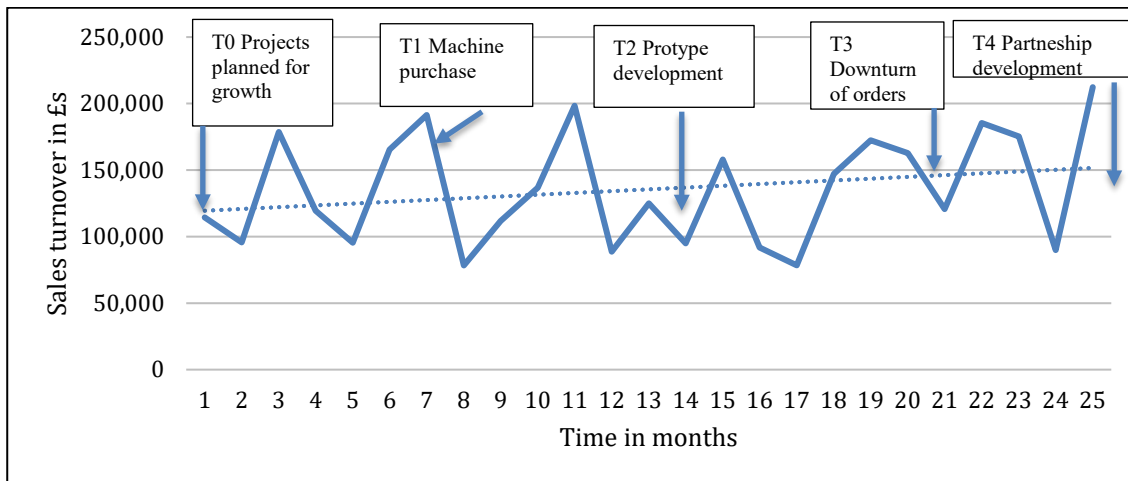
Novice entrepreneur E08



E08 Summary of key events noted from interview at each time point				
T0: Month 1	T1: Month 6	T2: Month 14	T3: Month 20	T4: Month 25
Looking for new premises.	Moved in, Network rail project, investment in new software, managing new site.	Network project progressing, some move problems and cash flow hiccup.	Skills shortage, project waiting for sign off, mezzanine, new production manager	Mezzanine completed, skills shortages, Network rail project stopped, internal issues

This business showed planned growth year-on-year of 89.7%

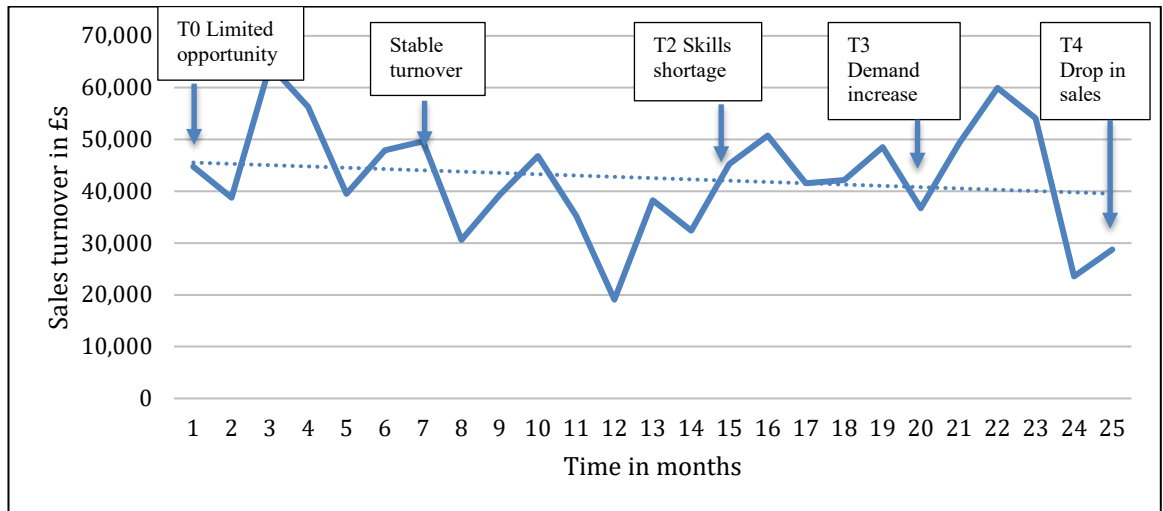
Mature entrepreneur E09



E09 Summary of key events noted from interview at each time point				
T0: Month 1	T1: Month 7	T2: Month 14	T3: Month 21	T4: Month 26
Project and products have been working on coming to fruition.	Machine purchase to open up another avenue. Possible purchase of next door.	Product development and prototype for commercial development.	Down turn on orders (cost of oil). No outcome from purchase of next door.	New equipment development in place and return on new machine. Partnership development.

This business showed planned growth year-on-year of 11.7%

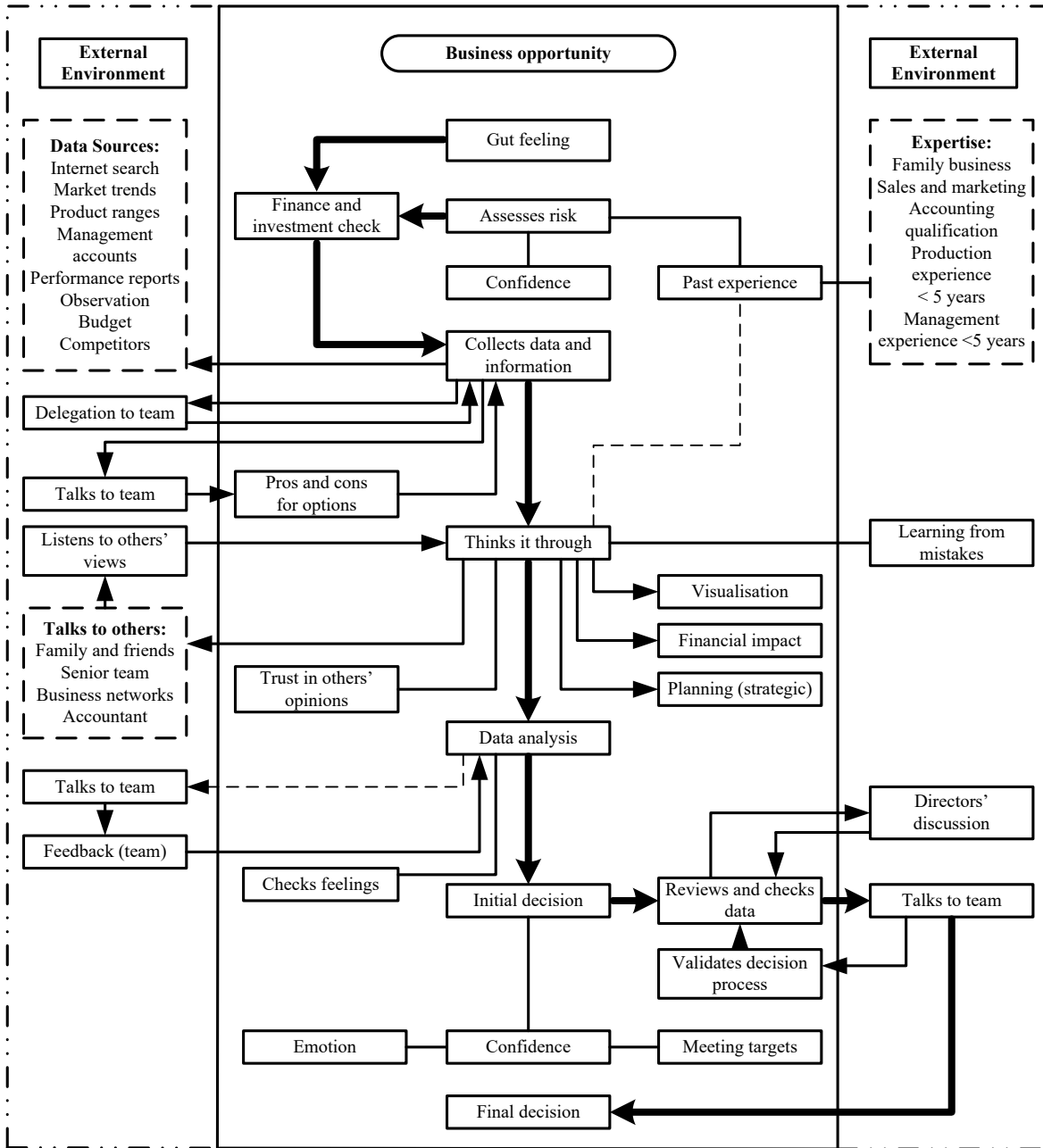
Mature entrepreneur E10 and Novice entrepreneur E11



E010 and E11 Summary of key events noted from interview at each time point				
T0: Month 1	T1: Month 7	T2: Month 14	T3: Month 20	T4: Month 25
Bought machine and then cancelled order. Competition is difficult and opportunities limited.	Stable turnover at moment but limited by finance. Business is getting established on quality reputation.	Lost some staff, skills shortage not helping. Thinking of cartel with other local businesses.	Work has picked up and money back in. Looking to increase staff for capacity, having to work in business to meet demand.	Drop in sales again but looking for new orders. Staff stable. Have some regular customers and new contract.

This business showed negative growth year-on-year of -2%

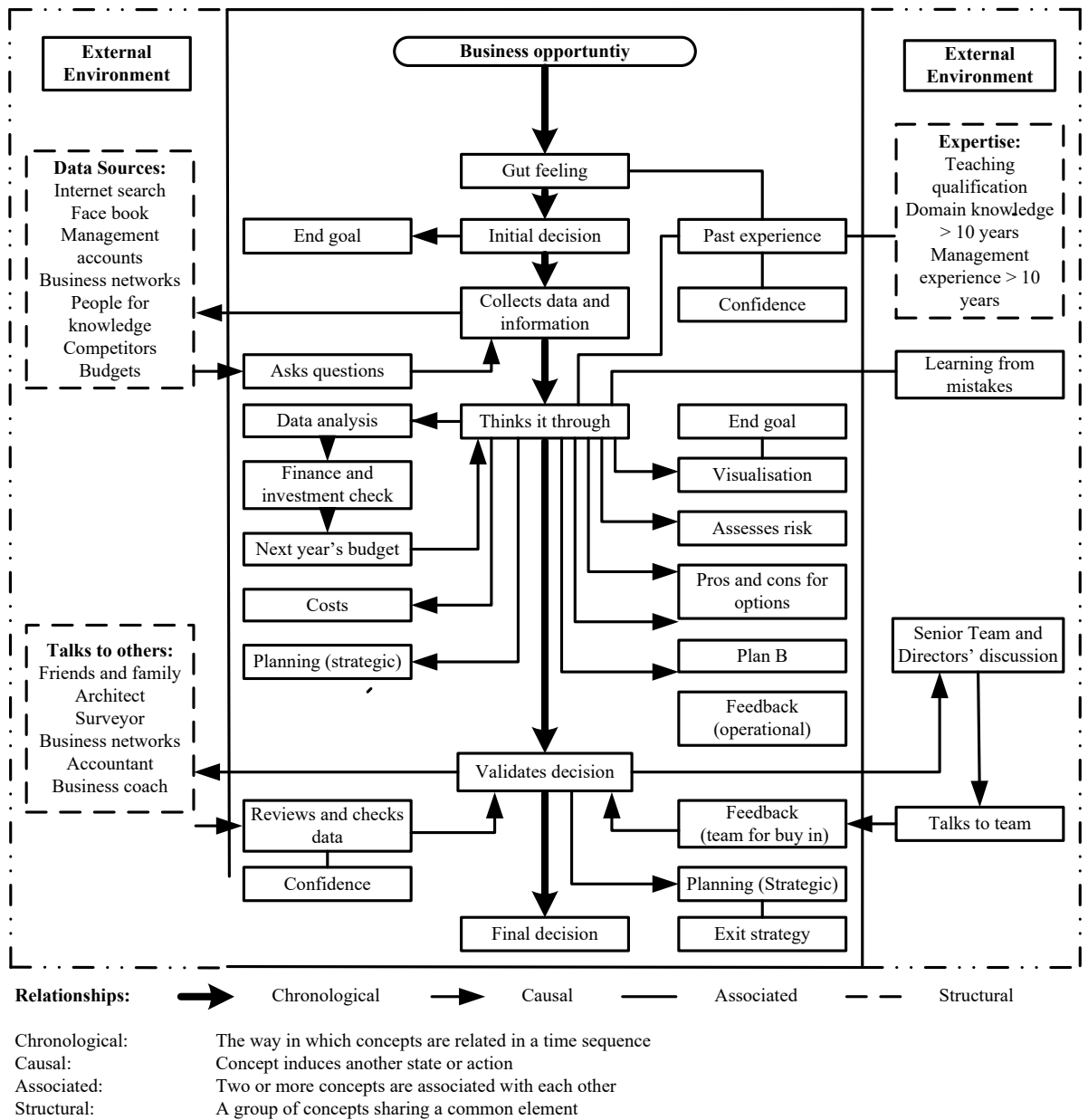
Novice entrepreneur E03



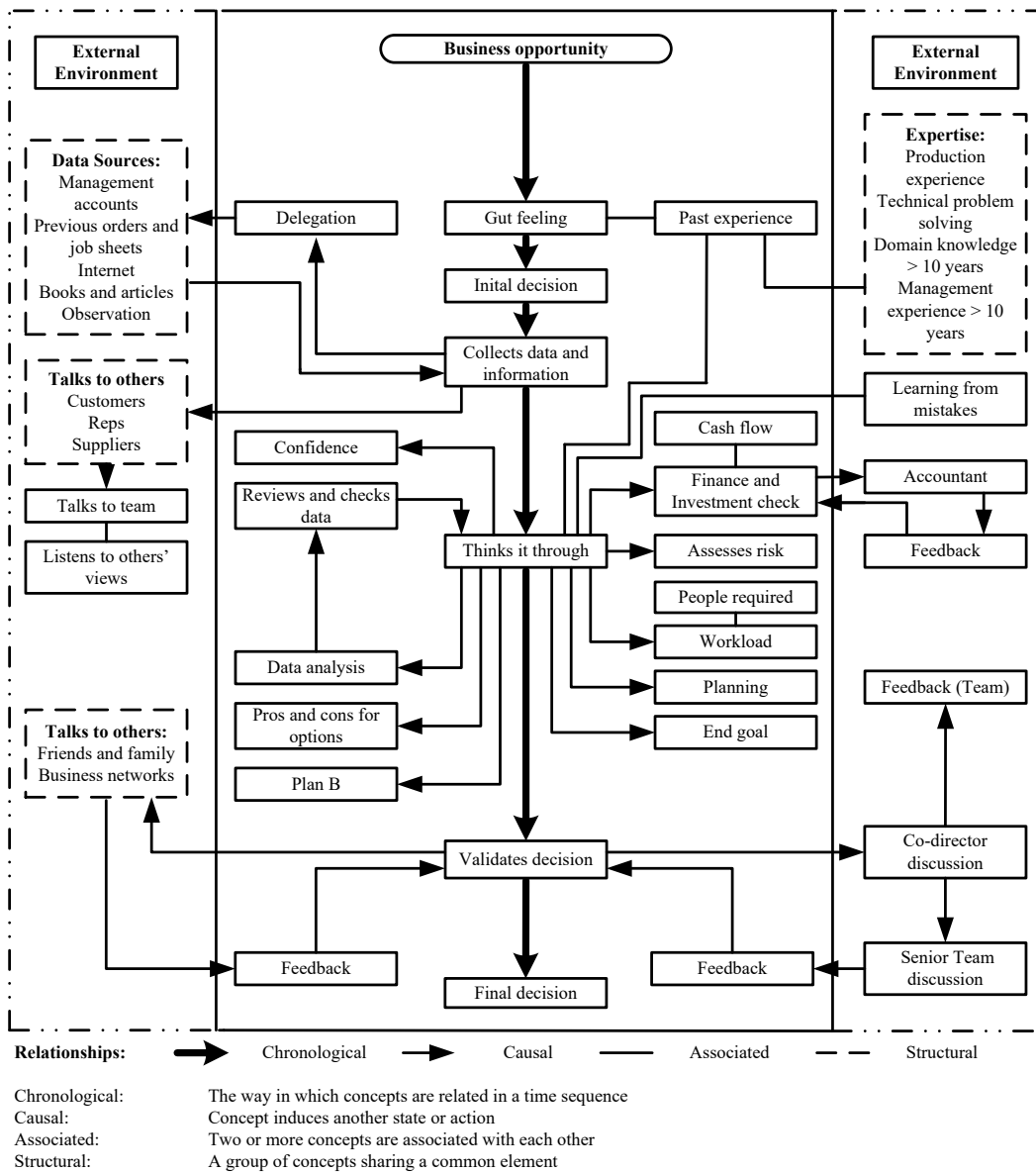
Relationships: Chronological Causal Associated Structural Developing

- Chronological: The way in which concepts are related in a time sequence
- Causal: Concept induces another state or action
- Associated: Two or more concepts are associated with each other
- Structural: A group of concepts sharing a common element
- Developing: A developing link between two concepts that emerged over time

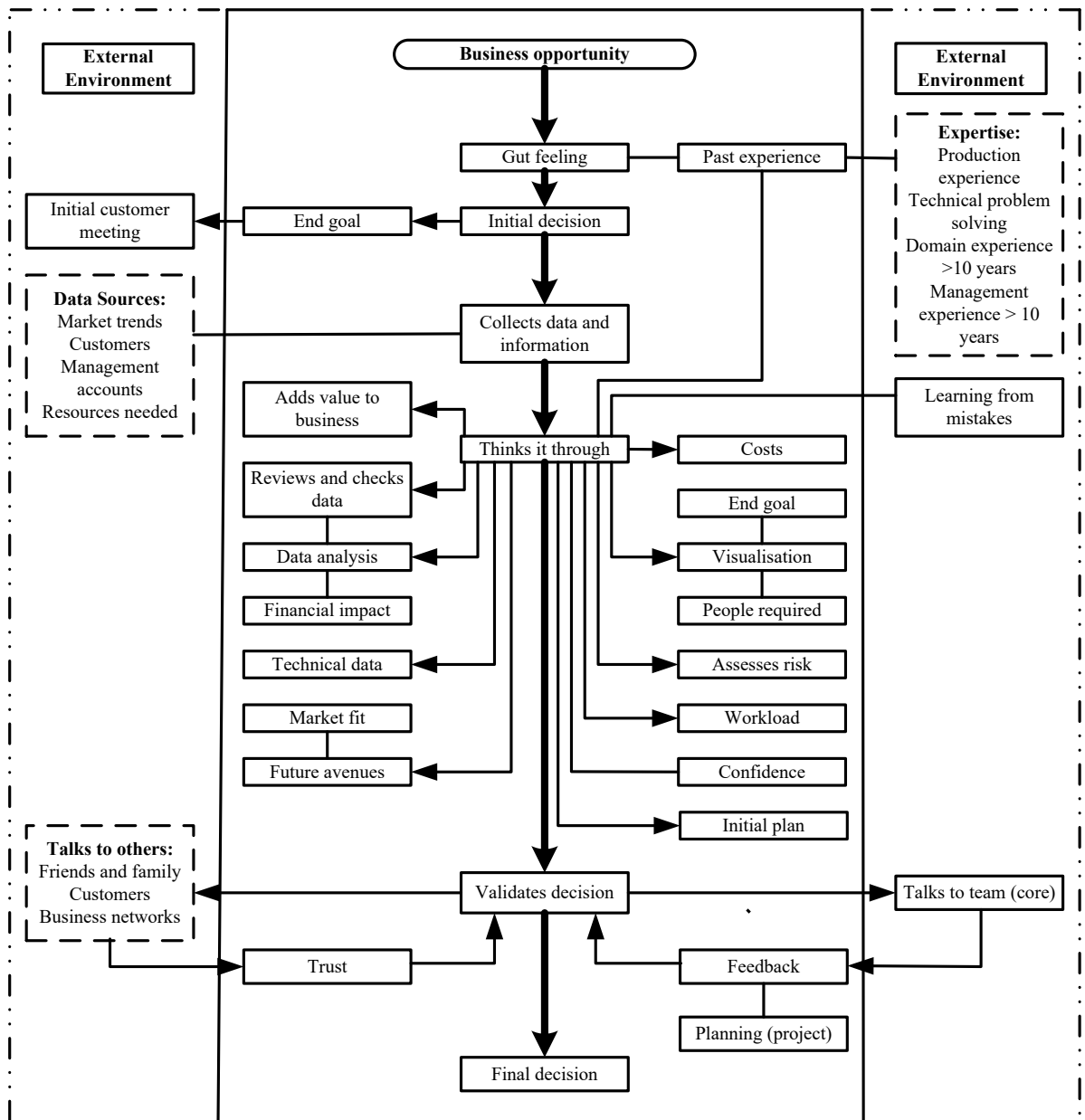
Mature entrepreneur E05



Mature entrepreneur E06



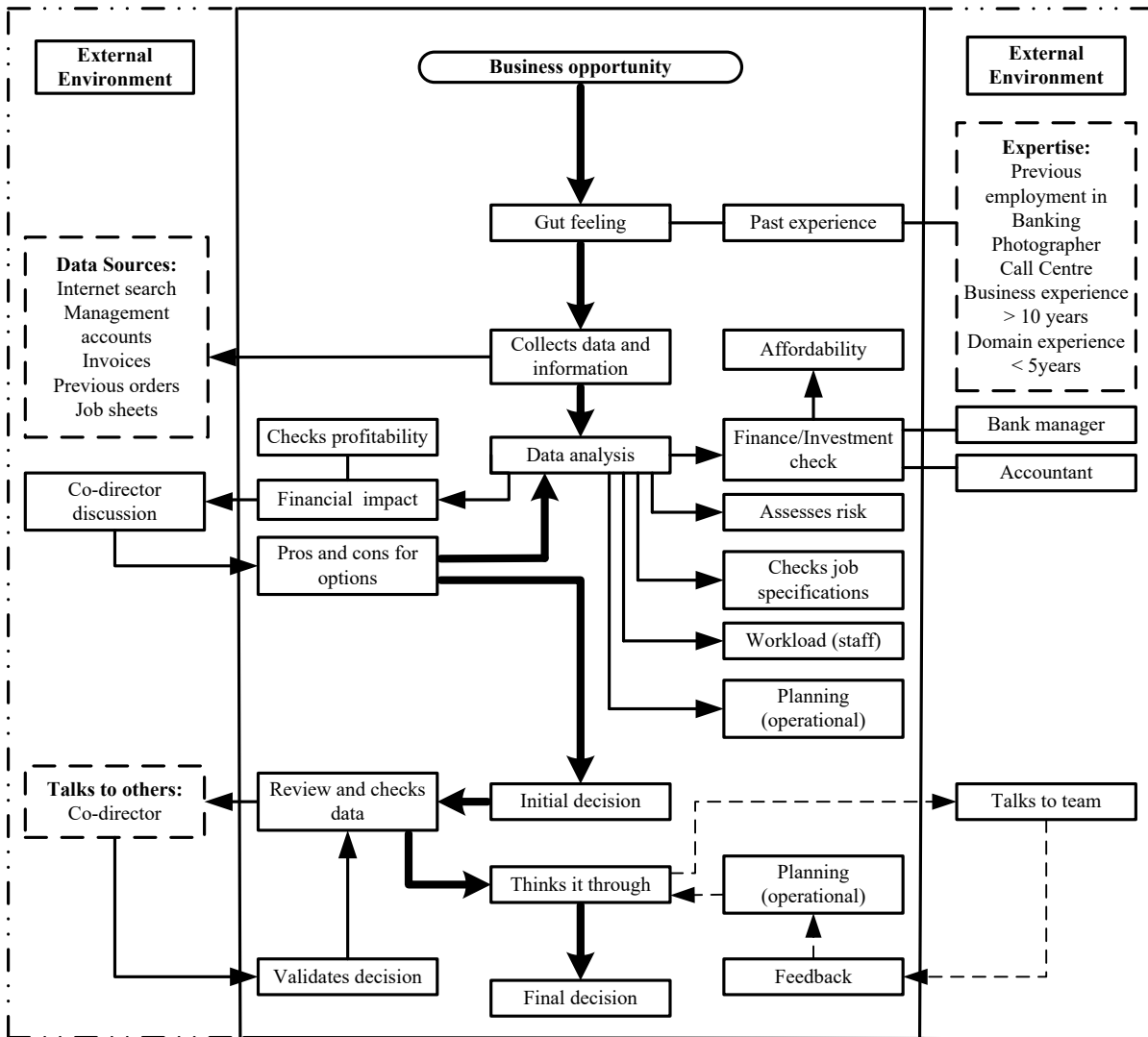
Mature entrepreneur E09



Relationships: **→** Chronological **→** Causal **- - -** Associated **- - -** Structural

Chronological: The way in which concepts are related in a time sequence
 Causal: Concept induces another state or action
 Associated: Two or more concepts are associated with each other
 Structural: A group of concepts sharing a common element

Novice entrepreneur E11



Relationships: Chronological Causal Associated Structural Developing

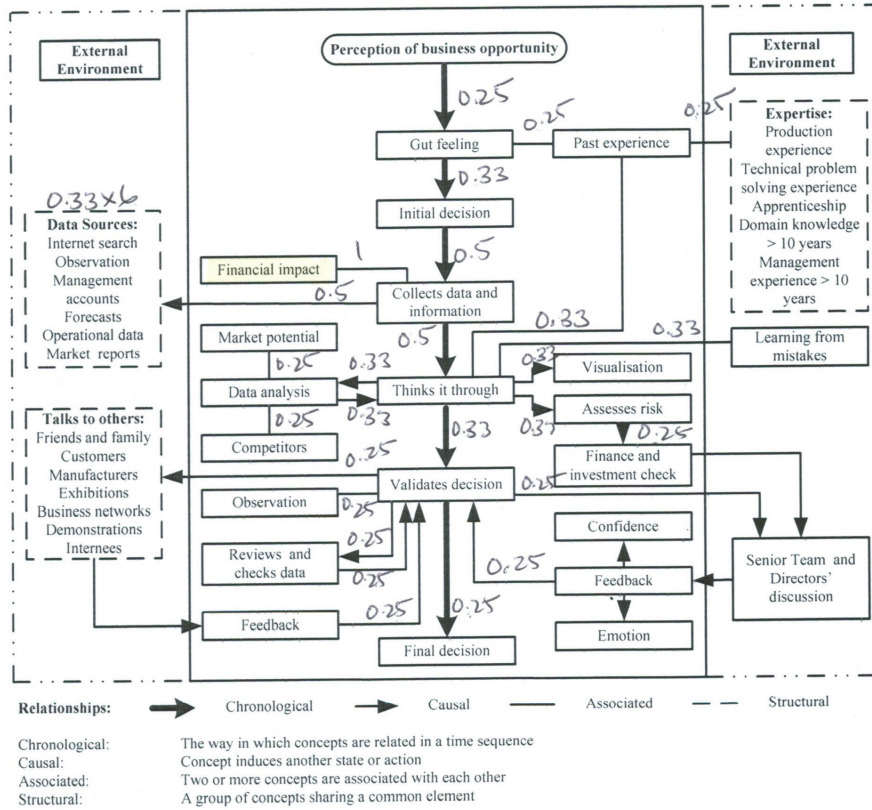
- Chronological: The way in which concepts are related in a time sequence
- Causal: Concept induces another state or action
- Associated: Two or more concepts are associated with each other
- Structural: A group of concepts sharing a common element
- Developing: A developing link between two concepts that emerged over time

Appendix 25 Concept linking words and associated transcript examples

Concept links	Transcript example
Sales – team feedback	“We have part of our sales meeting which is based on, okay, what industry gossip has anyone found, anything interesting about one of our competitors, about any new products that are coming into the market, you know anything that might influence us and that we should be aware of” (E02)
Data sources - collects data and information	“We budget cash flow we look at it monthly, quarterly” (E02)
Reviews and checks data - thinks it through	“I do look at the figures, I make sure it stacks up but I’ve really made that decision in my head already, it’s really just a backup looking at the figures, but I have to say that and I guess you would expect it over 30 years” (E02)
Past experience - confidence	“You just go on that great experience I think, and I think that’s a confidence thing as well and I think that comes in” (E02)
Investor - assesses risk	“I’m very aware that he is still a shareholder in this business so if it was just me I would probably be less risk averse than I am” (E02)
Reviews and checks data - validates decision	“But before you actually commit hundred percent you need to look at the figures” (E02)
Collects data and information - asks questions	“...would be very quick-fire questions to sort of identify the weaknesses in each scenario or the strengths in each scenario so I’d work very quickly on that to collect information” (E05)
Gut feeling – past experience	“I’m giving you a gut reaction to something but the only reason it is a gut reaction is because I can do it really quickly, I’ve had the experience in the past to be able to pull on, but that is a subconscious pulling on which I’m saying is a gut reaction” (E05)

Collects data and information - data sources	“I’ll look at what people are doing on Facebook competitively” (E05)
Talks to others - validates decision	“...if I don’t know the answer I definitely, you know that don’t you, I’d go out and find somebody. I have about five people I draw on and the accountant is one of them.” (E05)
Thinks it through - past experience	“I go back and think about all the things but I also think but why did I arrive at that is it because I’ve done that before. Is it because of my experience in this?” (E09)
Thinks it through - visualisation	No, because I visualise, I do visualisation..., because I can very much see the things that I’m trying to work through ...I would do a lot of that reasoning in my head” (E04)
Assesses risk - data sources - data analysis - financial impact	“but where there is any sort of risk I will do my best to be informed especially things like erm, employment law, things like that, big monetary decisions things like that. I do my best to chew over them for as long as possible before I end up making a decision” (E01)
Talks to team - data analysis	“...so, we’re now having monthly meetings, we’re all getting around the table and looking at ways of continual improvement, we’re recording them ... we are recording why it is not right first time and how we can improve that” (E06)

Appendix 26 Example showing manual calculations for centrality scores



E04. Financial Impact:

$$1 + 0.5 \times 3 + 0.33 \times 14 + 0.25 \times 14$$

$$1 + 1.5 + 4.62 + 3.5$$

$$= \underline{10.62}$$

Appendix 27 Stage based characteristics of the model for opportunity-related decision-making

Model stages	Stage characteristics of the opportunity related decision-making model	References
1. Initial Decision	<ul style="list-style-type: none"> • Antecedents of entrepreneurial opportunity identification • <i>Perception of opportunity</i> previously identified as desirable and feasible for me or my business • <i>Gut feeling</i> response to opportunity based on past experience and pattern matching, drawdown on intuitive expertise. A developing process for novices mediated by <i>experience</i> • Role of <i>confidence</i> of ‘having done that before’ (or something similar) • <i>Assessment of risk</i> by novice entrepreneurs based on not <i>trusting</i> their <i>gut feeling</i> • Positive indication of feasibility triggers formulation of <i>initial decision</i> for analysis and checking 	Krueger and Kickul (2006); Douglas (2013); Harteis and Billet (2013); Shepherd et al. (2014); Wood et al. (2014); Wood and Williams (2014); Ardichvili (2015); Wood and McKelvie (2015); Zivdar et al. (2017)
2. Analysis and Framing	<ul style="list-style-type: none"> • Collection of <i>data and information</i> to support and check opportunity and initial decision • <i>Iterative process</i> between collection and analysis for reviewing results, a cognitively heavy analytical process for novices • <i>Team meetings and delegation</i> to obtain appropriate information; a developing process for novices • <i>Analytical information processing</i> of opportunity for <i>options</i> of choices • Reassurance sought by novices for clarification from <i>internal and external</i> stakeholders • Resulting <i>framework</i> of opportunity for conceptualising evaluation 	Gustafsson (2006); Baron (2007); Vaghely and Julian (2010); Hulbert et al. (2013); Wood and Williams (2014); Wood and Williams (2014); Wood and McKelvie (2015)
3. ‘Thinks it Through’ Hub	<ul style="list-style-type: none"> • Iterative process of <i>reflexive and reflective thought</i>, cognitively versatile • Mental representations and visualisation of opportunity and its potential for ‘me and my business’ based on previous <i>analysis and framing</i> 	Cossette (2002); Keh et al. (2002); Baron (2007); Bryant (2007)

Model stages	Stage characteristics of the opportunity related decision-making model	References
3. 'Thinks it Through' Hub	<ul style="list-style-type: none"> • <i>Delegation</i> and collaboration with <i>internal and external</i> stakeholders for further information and/or clarification of potential decisions • Evaluation of key concepts of <i>risk, financial investment and cash flow, operations (demand and supply side), resource allocation, workload and contingency planning</i> as an <i>iterative process</i> between the entrepreneur and key stakeholders for information and clarification • Determination of <i>cause and effect relationships</i> and review of <i>previous analysis</i> supporting <i>confidence</i> in decisions and metacognitive thinking • Strategic decision-making through collaboration with <i>finance professionals and investors</i> for <i>market fit</i> and further opportunities • Resulting process of <i>validation</i> 	Curşeu (2008); Hodgkinson et al. (2009); Haynie et al. (2010); Urban, 2012; Wood and Williams (2014); Maine et al. (2015); Sadler-Smith and Burke-Smalley 2015); Wood and McKelvie (2015); Sadler-Smith (2016)
4. Validation	<ul style="list-style-type: none"> • Additional checks of opportunity decisions made in previous stages, both mentally and through <i>discussion with others</i>, if novice or opportunity carries <i>high risk</i> • Internal and external reactions sought from <i>social networks and talking to others</i> outside the business environment as a <i>validation process</i> for <i>initial decision</i> already made • Decisions discussed with <i>senior management team and/or directors</i> that facilitates information exchange, open dialogue and <i>feedback</i> prior to <i>final decision</i>, maximising input from <i>team</i> cognitions • Collaborations <i>with others</i> moderated by <i>trust</i> of individuals' opinion and established <i>confidence</i> in outcome of the opportunity 	Busenitz et al. (2003); Pech and Cameron (2006); Hayward et al. (2009); Andresen et al. (2014), Randolph-Seng et al. (2015); Cunningham and Anderson (2018),
5. Final Decision	<ul style="list-style-type: none"> • Final review and <i>checking of data</i> with <i>team and/or Director</i> if a novice or the opportunity is high risk • <i>Final decision</i> outcome for entrepreneurial action identified as desirable and feasible for me, or my business 	Wood and McKelvie (2015); Wood and Williams (2014)

Adapted from Andresen et al. (2014). Words in *italics* indicate concepts present in cognitive maps and connectivity calculations.