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What Do the Best Strategic Thinkers Do?

A Case Study of Cognitive Elements in Strategic Thinking

by

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Abstract

Purpose

The purpose of this study is to better understand the concept of strategic thinking. There is a lack of scientific knowledge and consensus in the area of strategic thinking. This is, however, important since organisations are exposed to environments with high levels of uncertainty and complexity these days. To remain competitive in such volatile environments, the need for employees and managers with the ability to think strategically has never been greater than now. Having stated that, strategic thinking regardless of its substantial need still lacks consensus about its definition and what it entails in academia. Moreover, there is no externally validated tool that measures the ability of strategic thinking. Thus, we will contribute towards validating the Cognitive Process Profile assessment as means of accurately measuring strategic thinking ability.

Research Questions

1. What are the most important cognitive elements of strategic thinking?
2. Is the CPP assessment a valid tool to measure strategic thinking?

Methodology

To answer our research questions, we collected data via three data collection methods to collect both qualitative and quantitative data. Our data collection methods were a self-completion voting questionnaire, several 360-degree semi-structured telephone interviews and the Cognitive Process Profile (CPP) assessment. For the data analysis, we used SPSS Statistics.

Findings

Our findings show that the most important cognitive elements of strategic thinking are creative, visionary, rule oriented and quick insight learning. These elements facilitate one's ability to think strategically. Conversely, being flexible and process oriented may hinder strategic thinking capabilities. Finally, we show that the CPP assessment is a valid tool to measure strategic thinking.

Keywords

Cognitive Elements, Cognitive Process Profile, CPP Assessment, Core Concepts, Processing Competencies, Strategic Thinking

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List of Abbreviations

CIP	Cognadev Information Processing
cLOW	Current Level of Work
CPP	Cognitive Processing Profile
RO	Requisite Organisations
SPSS	Statistical Package for the Social Sciences
SST	Stratified System Theory
VSM	Viable Systems Model

1 Introduction

1.1 Background

These days, organisations are exposed to environments with high levels of uncertainty and complexity (Barton, Grant & Horn, 2012). The reasons for this phenomenon are eclectic. An increase in globalisation is one main driving factor, thus interrelated specialised tasks are being undertaken in different countries (Gupta, 2016). Another driver is the acceleration of technological advancements in recent years, such as the internet, digitalisation and artificial intelligence, therefore increasing the level of complexity drastically (Brynjolfsson & McAfee, 2016). Due to this, the rivalry between industries and its impact has been felt more and more as competitors no longer only come from domestic markets. Consequently, to deal with the challenges of remaining competitive in such an environment, it requires organisations to have employees and managers with the ability to think strategically. Bonn (2001) underpins this argument by stating that thinking strategically is crucial to remaining competitive in an increasingly changing and global environment, and the need for it has never been greater than now. However, identifying individuals with a high potential for thinking strategically is a challenge for organisations themselves as well as how to develop their capacity to take advantage of their full potential.

Although it is well-known that strategic thinking is needed (Bonn, 2001), organisations still have difficulties with finding the right individuals for this, since it is not easy to identify and measure. Bonn (2001) stated that there “is no agreement in the literature on what strategic thinking is” (p.63). Still, no consensus on the definition has yet to have been reached. For this reason, academic thinkers started to explore strategic thinking as a concept in order to help organisations to deal with this issue (Sandelands & Singh, 2017) of increasing importance by finding a definition based on the literature available. Moreover, Maretha Prinsloo (2007), with her company Cognadev UK Ltd. (2016), claim that they have developed a tool, the Cognitive Process Profile (CPP) assessment, which can measure the ability to think strategically by measuring and assessing cognitive constructs of individuals. Both the core concepts of strategic thinking identified by Sandelands and Singh (2017) and the CPP assessment serve as the foundation for this study.

This study is part of a large-scale research study project on strategic thinking at the Lund University School of Economics and Management. There are three sub-projects with different focuses. The first sub-project aims to define the concept of strategic thinking. The second sub-project aims to evaluate to what extent strategic thinking as an ability in an individual can be measured. Finally, the third sub-project aims to determine how and to what extent the ability of strategic thinking can be taught or developed. All three sub-projects explore what strategic thinking entails and how it can be developed.

This thesis belongs to the second sub-project mentioned above. Its goal is to evaluate if and to what extent the ability to think strategically in an individual is measurable. In order to produce valid results, five teams each with two members gather data from different companies separately. The research questions and methodology of the study were agreed upon in several meetings with the other teams

in the spring of 2018. These meetings were arranged to align the research questions and the methodology for further research and comparison between the five thesis papers of this sub-project.

1.2 Problem Discussion

The contemporary literature still lacks a precise definition of what strategic thinking is and what it entails, as well as a consensus about which cognitive elements are essential for the ability to think strategically. Sandelands and Singh's (2017) found that there had not been a definitive list of themes and concepts they could refer to as well as a proven tool to measure the ability to think strategically. To shed light on this area, Sandelands and Singh (2017) claim that they have identified fifteen core concepts of strategic thinking. It is still unknown which of these core concepts are the most important for strategic thinking.

Since there is no consensus on what strategic thinking is and what it entails, there is no tool yet to be validated which can accurately measure strategic thinking capabilities. Cognadev UK Ltd. (2016), however, claims that their tool, the CPP assessment, can measure strategic thinking. The company builds their tool based on their own modified theories about strategic thinking. As this is one of many perspectives on strategic thinking, the problem of a lacking consensus becomes even more complicated. Therefore, the validity of the CPP assessment constitutes another problem we would like to address with our thesis.

1.3 Research Purpose and Research Questions

The purpose can be summed up in the question, "*what do the best do?*" With our study, we wish to find out what the best strategic thinkers do, in order to identify which elements of strategic thinking are the most important. Thus, shedding a little more light on the foggy world of literature on strategic thinking. In doing this, we shall also see whether or not the CPP assessment can accurately measure strategic thinking capabilities in individuals.

Research Questions:

1. What are the most important cognitive elements of strategic thinking?
2. Is the CPP assessment a valid tool to measure strategic thinking?

We aim to answer the first question by illuminating the most important cognitive elements of strategic thinking. Therefore, we investigate which are the most outstanding and therefore the most essential core concepts of Sandelands and Singh (2017). Simultaneously, we shall do the same with the CPP assessment. The CPP assessment measures fourteen processing competencies of strategic thinking (Cognadev UK Ltd., 2016). By scrutinising the data of the top strategic thinkers from both methods, we wish to isolate the most outstanding elements.

Additionally, with our second research question, we want to determine whether or not the CPP assessment is a valid tool to measure the ability to think strategically. We will achieve this by comparing the data of the selected individuals who are perceived as the best strategic thinkers within the participating company with the CPP assessment results. Also, we compare their results with data from a normative and a contrast sample.

1.4 Outline

Chapter two constitutes our theory section. In this chapter, we debate how strategic thinking is described in the best available knowledge. Moreover, it describes the underlying theory of the CPP assessment. A discussion of the last years' thesis of Sandelands Singh and (2017) and their findings of fifteen core concepts of strategic thinking is addressed. Chapter three outlines the chosen methodology of this study. The research onion by Saunders, Thornhill and Lewis (2009) provides a framework that we use to approach this study appropriately to receive and analyse valid data. Here, we discuss the research philosophy, research approach, research strategy, choices, time horizon, data collection methods and data analyses. Also, each data collection method contains an evaluation of reliability, replicability and validity, as well as risks, critical reviews and limitations we consider by conducting our data collecting method. In chapter four, we present the data resulting out of the data collection methods from chapter three. Furthermore, we present our results from the analysis of the collected data. Then, in chapter five, we will discuss our findings. Finally, a conclusion in our sixth chapter summarises all of our findings and gives our recommendations for further studies.

2 Theory Section

This theory section provides an overview of the best available knowledge of strategic thinking. In subchapter 2.1, the literature review will explore strategic thinking. Then, in subchapter 2.2, the underlying theories of the CPP assessment are presented, and we will see how these theories relate to the literature on strategic thinking.

2.1 Literature Review

We provide the reader with a brief background of strategy. The ambiguity of consensus on strategic thinking will be discussed as well as different definitions of the term. We want to echo the most important theories and discuss them critically. Thereafter, we shall also discuss Sandelands and Singh's (2017) fifteen core concepts of strategic thinking.

2.1.1 Strategic Thinking

To define what strategic thinking is, it is important first to define strategy. The word strategy comes from the ancient Greek word *strategos* which was a term used for a chief magistrate or military commander (Sloan, 2013). Strategy also has a foundation in Chinese writings from the 5th century BCE, in particular, *The Art of War* by Sun Tzu (Haycock, 2012). Ancient strategy is often seen as the duality of strategic vision and strategic execution (Haycock, 2012). This ancient duality of strategic vision and strategic execution is mirrored in the modern concepts of strategic thinking and strategic planning.

This pre-modern view of strategy remained prevalent until the late 19th century and early 20th century when the term strategy was beginning to be used in a business context (Sloan, 2013). Watkins (2007a) defines strategy in a business context as a set of guidelines and principles that influence decision making in an organisation. It should be made aware that a strategy is not vision or goal, it is a blueprint for how to reach that vision or goal (Watkins, 2007a). Mintzberg (1987) succinctly provides five definitions of strategy as plan, ploy, pattern, position and perspective. However, stepping back from a business context, Gaddis (2018) defines strategy as the “alignment of potentially unlimited aspirations with necessarily limited capabilities” (p.21). In essence, this refers to the allocation of scarce resources in the best way to achieve goals. This definition is the most suitable one we could find for strategy. Therefore, strategic thinking should be how one makes strategic decisions.

However, the definition of strategic thinking has been widely debated in research papers and articles for decades. In the literature, the concepts of strategic planning and strategic thinking are often used interchangeably. Often authors do not distinguish between strategic thinking and planning, thus there is no consensus in the literature on what strategic thinking is (Bonn, 2001). Since there is a considerable volume of literature on the topic of strategic thinking, we have selected a number of papers, books and articles for critical review.

When reading literature on strategic thinking, it is clear that many authors do not distinguish between strategic thinking and strategic planning (Heracleous, 1998). Generally speaking, the relationship

between strategic thinking and planning can be categorised in three ways or *Types* as we choose to describe them here. *Figure 2.1* shows these relationships as described in the literature. *Type 1* shows the views held by Mintzberg (1994a,b) and Liedtka (1998), that strategic planning and strategic thinking are two different and entirely separate things. *Type 2* shows the views of Bourgeois and Eisenhardt (1988), Eden (1990), Porter (1991), Zabriskie and Huellmantel (1991) and Wilson (1994). These authors argue that strategic planning and strategic thinking are the same thing, that strategic thinking is a function of strategic planning. Finally, there is *Type 3*. Here authors such as Argyris (1991), Heracleous (1998), Bonn (2001, 2005), Graetz (2002) and Haycock (2012) contend that strategic planning and strategic thinking are on a spectrum and thus interconnected.

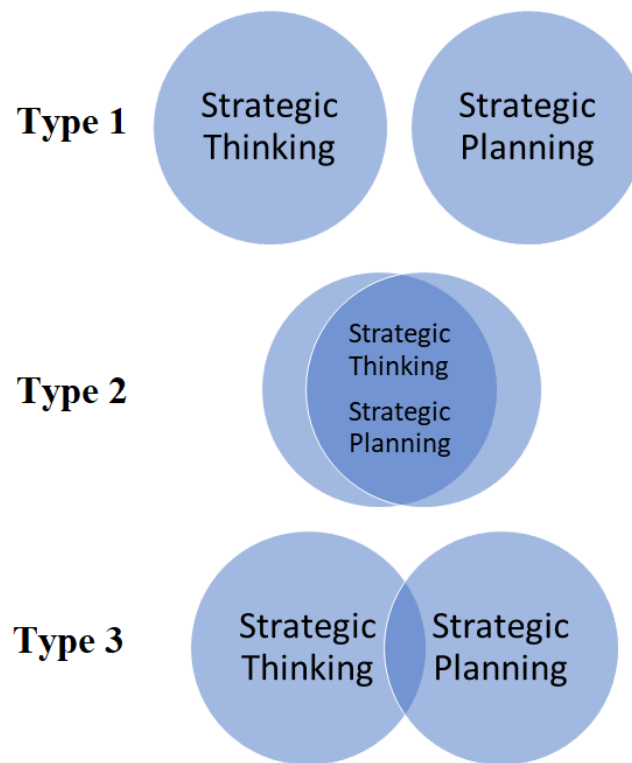


Figure 2.1: Overview of the three Types of strategic thinking based on the literature

Not all literature on strategic thinking actually discusses strategic thinking. For example, Allio (2006) writes about strategic thinking, but most of the time is referring to strategic planning. Allio (2006) writes about long-term planning, analysis and corporate culture. These are no doubt important aspects of strategy, but they are not describing strategic thinking, they are tools. Watkins' (2007b) guide, *Learning How to Think Strategically*, takes a step closer into the realm of strategic thinking. Watkins (2007b) talks about apprenticeships, immersion and case studies to learn about strategic thinking. In essence, Watkins (2007b) says that you will learn to think strategically via osmosis. However, Watkins (2007b) fails to describe what strategic thinking is, therefore making it difficult to understand what the reader is meant to learn. Articles in this style are common in the field of strategic thinking and will not be considered for this literature review.

Bourgeois and Eisenhardt (1988) propose a strategic decision-making tree for executives to use when in times of uncertainty. It may be telling of the prevailing knowledge and thinking of the time, but what could have been a paper (Bourgeois & Eisenhardt, 1988) about strategic thinking ends up describing a process for forming a strategy, i.e. strategic planning. In a similar vein, Eden (1990)

attempts to formulate a guideline for the strategic thinking process by using computers and cognitive mapping. Heracleous (1998) describes Eden's (1990) cognitive mapping approach to strategic thinking as convergent and analytical. Bourgeois and Eisenhardt (1988) and Eden (1990) are describing *Type 2* strategic thinking.

Similarly, Nasi (1991 cited in Liedtka, 1998) says that strategic thinking includes strategic planning, as well as strategic analysis and strategic leadership. Essentially, Nasi (1991 cited in Liedtka, 1998) argues that everything that can be considered as strategic is strategic thinking. However, if we use this definition and those coming before to describe strategic thinking it does not tell us anything. She agrees with what Mintzberg says about strategic thinking. Liedtka (1998) criticises these broad views of strategic thinking as meaningless. However, since so many authors support this *Type 2* style of strategic thinking, it should not be dismissed so easily.

Wilson (1994) argues that strategic planning has evolved into strategic thinking. He claims that his observations agree with Mintzberg's views on strategic thinking. However, Mintzberg (1994a) states that strategic planning should, in fact, be called strategic programming, as it formalises predeveloped strategies. Wilson (1994) says that since there is a multitude of strategic methodologies to pick and choose from, planners need to mix methods appropriate to the situation. Clearly, what is being discussed here is strategic execution or, strategic planning. Therefore, Wilson's (1994) views fall into *Type 2* strategic thinking.

Mintzberg (1994b) states that "strategic planning is not strategic thinking" (p.107). Here they are different stages in developing strategies, where strategic thinking comes before strategic planning which is the delivery of existing strategies (Mintzberg, 1994b). Mintzberg (1994b) makes the distinction that strategic planning is an analytical process to deliver on predetermined strategies. On the other hand, strategic thinking is viewed as a more creative process that leads to an "integrated perspective of the enterprise" (Mintzberg, 1994b, p.108). Mintzberg (1994b) even claims that strategic planning may have an adverse effect on strategic thinking. This is *Type 1* strategic thinking; where strategic thinking precedes strategic planning and are two separate ideas.

Liedtka (1998), in favour of Mintzberg's views, argues that there are five important elements of strategic thinking. These elements are "*System Perspective, Intent Focused, Intelligent Opportunism, Thinking in Time and Hypothesis-Driven*" (Liedtka, 1998, p.122). It should be noted these elements relate to strategic thinking in the context of an organisation. According to Liedtka (1998), the system perspective is, in other words, a holistic view of the internal and external contexts of the organisation. Intent focused, as described by Liedtka (1998), refers to strategic intent. In this case, Liedtka (1998) defines it as a focused journey of discovery to a unique goal or destination. Intelligent opportunism somewhat goes against the previous element of intent. Liedtka (1998) says that intelligent opportunism is the ability to adapt and be flexible, thus meaning that the intention has to be somewhat broad and vague, hence the journey of discovery. Next is thinking in time, which is using an organisation's history to steer its course to the desired destination (Liedtka, 1998). Finally, the last element is hypothesis-driven. This means to think scientifically to accommodate creative and analytical thinking which then allows for critical review (Liedtka, 1998). *Figure 2.2* outlines Liedtka's (1998) ideas. These guidelines do not describe a decision-making tree like Bourgeois and Eisenhardt (1988) and Eden (1990), but instead, nudges to help frame one's thoughts to think strategically.



Figure 2.2: Five Elements of Strategic Thinking (Liedtka, 1998, p.122) [own representation]

Heracleous (1998) discusses all the views presented so far in his literature review on strategic thinking. There is Mintzberg (1994a,b), stating that strategic thinking and strategic planning should be viewed as separate modes of thinking (Heracleous, 1998). With Liedtka (1998), this makes up *Type 1* strategic thinking. Secondly, the understanding that strategic thinking is analytical is described (Heracleous, 1998). This is the *Type 2* style of strategic thinking which is supported by Porter (1991) and Zabriskie and Huellmantel (1991), Bourgeois and Eisenhardt (1988) and Eden (1990) perspectives on strategic thinking. Their methods and tools are clearly exercises more aligned with strategic planning than strategic thinking as they are convergent and analytical (Heracleous, 1998). Finally, Heracleous (1998) discusses Wilson's (1994) view that strategic thinking has evolved from strategic planning.

Liedtka (1998) and Mintzberg (1994a,b) agree that strategic thinking is a synthetic and divergent, whereas strategic planning is analytical and convergent. However, Porter (1991), when discussing his five forces of market analysis describes it as strategic thinking. Heracleous (1998) states that, according to Porter, the value chain and diamond model of national competitive advantage and strategy are strategic thinking as well. Similarly, Zabriskie and Huellmantel (1991) outline a six-step model for thinking strategically and systematically to develop a strategic plan. These six steps are; setting the purpose, determining the strategic questions, making decisions based on informational input, linking strategies to the financial plan, annual budgets and acquiring strategic skills. Setting the purpose involves establishing an economical and profitable fit between production in the present and possible business climates in the future (Zabriskie & Huellmantel, 1991). Next is determining the strategic questions that need to be answered. Zabriskie and Huellmantel (1991) provide guidelines for setting these questions; examples include Porter's Five Forces. Step three says to make decisions, based on the answers to the strategic questions developed in step two, by gathering as much internal

and external information as possible (Zabriskie & Huellmantel, 1991). Step four and five are there to ensure the implementation of strategies by making financial plans (Zabriskie & Huellmantel, 1991). Finally, step six insinuates that managers progressing up the corporate ladder develop naturally into better strategic thinkers (Zabriskie & Huellmantel, 1991). This final step emulates Liedtka’s (1998) view of a strategic thinker as a learner. However, this is all that they have in common. Unlike Liedtka (1998), the authors describe a step by step guide on what to do in order to think strategically, not how to. *Figure 2.3* displays the six steps for leading strategically (Zabriskie & Huellmantel, 1991).

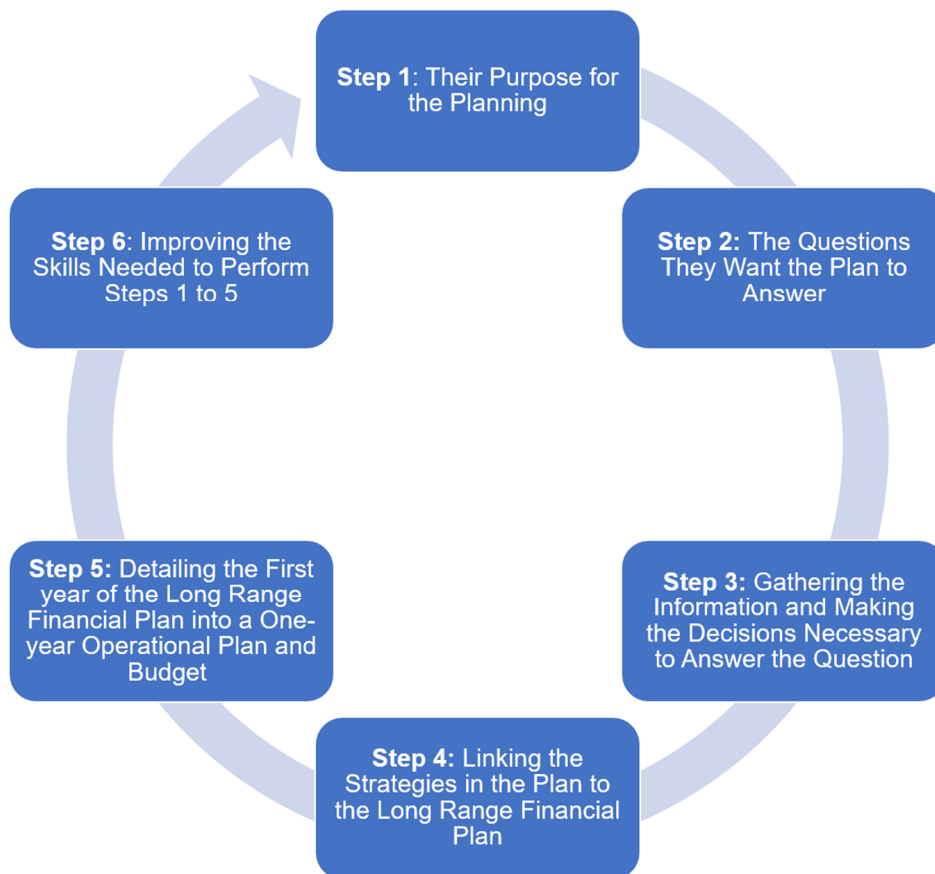


Figure 2.3: Six Steps for Leading Strategically (Zabriskie & Huellmantel, 1991, p.27) [own representation]

Heracleous (1998) agrees that strategic planning and strategic thinking are different, like Mintzberg (1994a,b) and Liedtka (1998). However, unlike *Type 1*, believes that they are not separate but related. He prefers to use Argyris’ (1991) analogy of single loop and double loop learning (Heracleous, 1998 p.483). According to Argyris (1991), single loop learning is where problems and tasks are repeated with no variation in the method or goal. Argyris’ (1991) example of this is resetting a thermostat when a room gets too cold. Double loop learners ask, “why am I to reset the thermostat?” (Argyris, 1991 p.2). Double loop learning, effectively, is how one behaves; the cognitive rules governing behaviour (Argyris, 1991). Heracleous (1998) goes as far to say that double loop learning is analogous to strategic thinking, using the examples of Henry Ford’s production line and Ray Kroc’s adaption of the production line to hamburger making. Mintzberg (1994b) calls this creative way of thinking as left-handed thinking. Confusingly, Haycock (2012) refers to this same mode of thinking as right-brained thinking.

Graetz (2002) acknowledges this right-brained/left-handed way of thinking but argues a whole-brained approach to strategic thinking instead. Her criteria for strategic thinking are creativity, plausibility and consistency, or in other words analysis and synthesis. Graetz (2002) argues in favour of Heracleous (1998) that strategic thinking and strategic planning are both distinct, yet interconnected processes. This whole-brained view of strategic thinking is based on a balance between the four characteristic quadrants of the Herrmann Brain Dominance Instrument (Herrmann, 1999). *Figure 2.4* shows an adapted version of the Herrmann Brain Dominance Instrument (Herrmann, 1999) as seen in Graetz (2002).



Figure 2.4: Herrmann Brain Dominance Instrument (Herrmann, 1999) quadrants as in Graetz (2002, p.459) [own representation]

Bonn (2001) agrees with Argyris (1991) and Heracleous' (1998) views rather than Mintzberg's (1994a,b) views on strategic thinking being double loop learning. Bonn (2001), though, takes this a step further by distinguishing between strategic thinking on an individual level and an organisational level. At the individual level, Bonn (2001) describes the main elements of strategic thinking are; a holistic understanding of the organisation, creativity and vision for the future. In essence, these behaviours are atypical of those who are single loop learners or operational thinkers, in other words, those who prefer certain, structured and detailed work environments. Bonn (2005) updates her main elements of individual strategic thinking as systems thinking, creativity and vision. This relationship can be seen in *Figure 2.5*. Here, systems thinking shares the same definition as holism. Bonn (2001) says that strategic thinkers should lift themselves out of the realm of operational thinking to be more effective strategic thinkers, which as we will see complies with Cognadev UK Ltd.'s (2016) views.

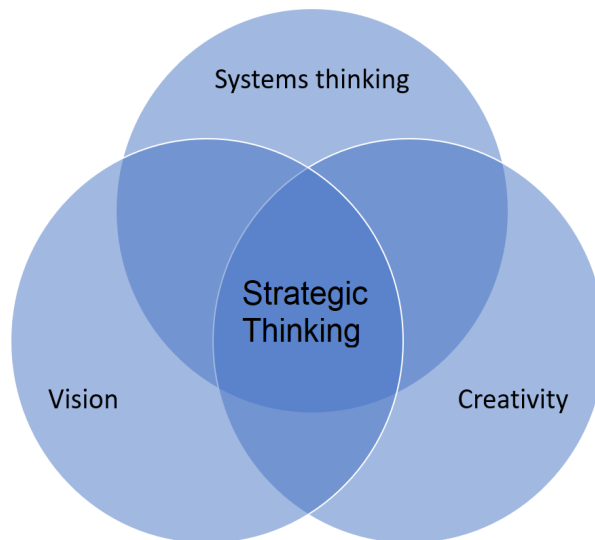


Figure 2.5: Relationship Between Systems Thinking, Creativity and Vision (Bonn, 2005, p.340) [own representation]

On the organisational level, the main elements of strategic thinking are; encouraging strategic dialogue and to taking advantage of the creativity and inventiveness of employees (Bonn, 2001). In her 2005 paper, Bonn develops this idea further by exploring organisational and group contexts separately. The macro-environment, organisational level characteristics that affect strategic thinking are culture, structure and reward and compensation (Bonn, 2005). However, this does not tell us anything about strategic thinking, just the optimum environment for strategic thinking to take place. When Bonn (2001) talks about the group context, she identifies heterogeneity and conflict as the two main areas of focus. Heterogeneity refers to the fact that more diverse teams reduce blind spots, groupthink and an overall broader perspective on the decision-making process (Bonn, 2001). Conflict is both seen as potentially positive and negative. Cognitive conflict or task conflict is seen as positive as it helps critical evaluation, to focus on key tasks and allows for more divergence in group discussions (Bonn, 2001). On the other hand, relationship-related conflict is seen as negative because more time is spent avoiding or resolving personal conflicts than the task (Bonn, 2001).

To summarise, there are three different *Types* of strategic thinking. *Type 1* says that strategic thinking and strategic planning are two separate entities and fields that are unrelated. *Type 2* says that strategic thinking and strategic planning are synonymous with each other. Authors here hold the view that strategic thinking is an analytical activity. *Type 3* says that strategic thinking and strategic planning are different but interconnected. Graetz (2002), who is one proponent of this thinking, shows this relationship, with the traits she believes to be indicative strategic planning and strategic thinking. *Figure 2.6* shows the relationship between these traits. As we will see, the theory and presentation of the CPP assessment most closely fits with *Type 3* strategic thinking.

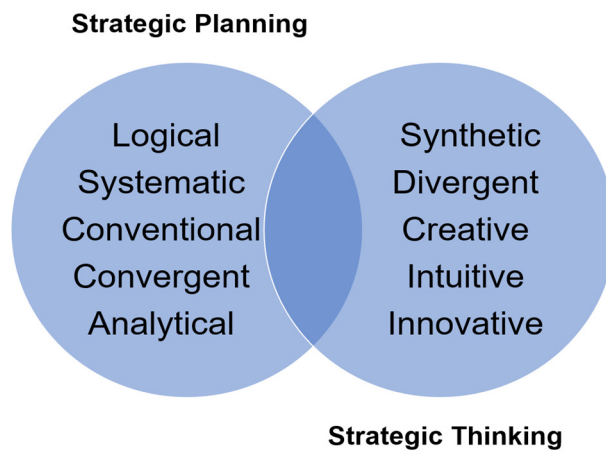


Figure 2.6: Reimagining of Graetz's (2002, p.457) Framework of Strategic Planning and Strategic Thinking [own representation]

2.1.2 Core Concepts by Sandelands and Singh (2017)

While debating the meaning of strategic thinking, the sources above point out very few of the cognitive elements of strategic thinking. Sandelands and Singh's (2017) thesis identified the fifteen core concepts of strategic thinking. These fifteen core concepts are based on multiple sources (Sandelands & Singh, 2017). They will form the basis of the 360-degree semi-structured telephone interviews to answer our first research question. These core concepts were chosen because they are based on a wide variety of sources that span all three *Types* of strategic thinking. The fifteen core concepts are illustrated in *Figure 2.7*.

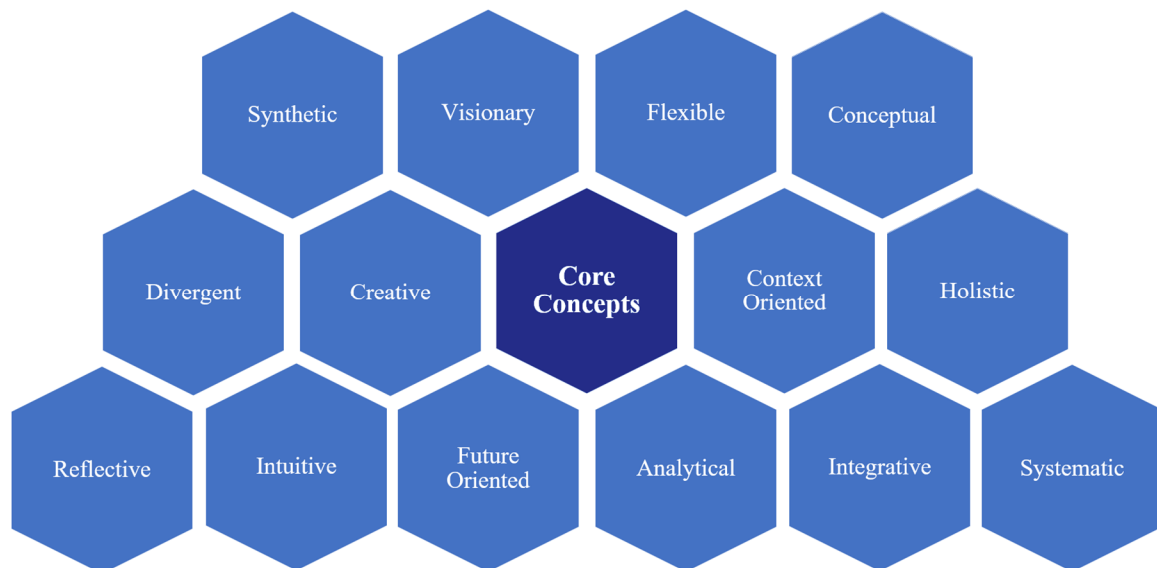


Figure 2.7: Sandelands and Singh's (2017, p.26) Core Concepts of Strategic Thinking [own representation]

The definitions for each of these core concepts can be found in *Table 2.1*. However, these definitions are too brief and do not give a clear picture of what they are trying to say. For example, according to the authors, being future oriented means, "Being forward thinking" (Sandelands & Singh, 2017, p.27). This does not give an indication whether this is regards to the short term or the long term or both. The definitions provided for synthetic and integrative are very similar; "refers to the ability to synthesize

(blend) ideas, information, or processes” (Sandelands & Singh, 2017, p.27) vs “the ability to combine concepts, thoughts, or ideas” (Sandelands & Singh, 2017, p.27). The same can be said for the definitions of context oriented and process oriented. The ability to recognize the environment of operation (e.g. individual, organisational) (Bonn, 2005) vs cognitive activities demonstrative of self-awareness, and awareness of the wider environment (Olson & Simerson, 2015). This fact became very clear to us when conducting the 360-degree semi-structured telephone interviews. In the former case, the definitions are provided by the authors, which brings up the question: why are these two separate concepts? Fewer but more detailed concepts would provide a clearer picture of what cognitive elements are involved in strategic thinking. Combining core concepts provided by Sandelands and Singh (2017) would be a start to reduce the overlap in definitions.

Table 2.1: Overview of Sandelands & Singh’s (2017) Core Concepts

Core Concept	Definition	Sources
Creative	The ability to “search for new approaches and envision better ways of doing things” (Bonn, 2005, p.338)	Bonn (2001, 2005); Graetz (2002); Heracleous (1998); Hussey (2001); Liedtka (1998, 2011); Mintzberg (1994a,b); Nuntamanop et al. (2013); Olson & Simerson (2015); Rowe et al. (1986)
Visionary	To have “a sense of direction and provides the focus for all activities within the organisation” (Bonn, 2001, p.65)	Bonn (2001, 2005); Dragoni et al. (2011); Liedtka (1998, 2011); Mintzberg (1994a,b); Nunatamanop et al. (2013); Rowe et al. (1986); Thompson & Strickland (1996)
Analytical	To be able to “demonstrate a logical and reason-based approach” (Sandelands & Singh, 2017, p.27)	Allio (2006); Andrews (1971, 1980); Bourgeois & Eisenhardt (1988); Hussey (2001); Nuntamanop et al. (2013); Olson & Simerson (2015); Thompson & Strickland (1996)
Intuitive	The ability to react instinctively (Olson & Simerson, 2015)	Graetz (2002); Liedtka (1998, 2011); Mintzberg (1994a,b); Nuntamanop et al. (2013); Olson & Somerson (2015)
Conceptual	“Forming ideas or concepts to provide answers to experiences, observations etc.” (Sandelands & Singh, 2017, p.27)	Andrews (1971); Kim & Mauborgne (2005); Nuntmanop et al. (2013); Saloner et al. (2001); Thompson & Strickland (1996)
Reflective	“An ability to draw upon and learn from past experiences” (Sandelands & Singh, 2017, p.27)	Argyris (1991); Bonn (2001, 2005); Bowman (2016); Frederick (2005); Schoemaker et al. (2013)
Flexible	“Displaying adaptability, able to handle change” (Sandelands & Singh, 2017, p.27)	Fiol & Huff (1992); Hitt et al. (2001); Nuntamanop et al. (2013); Rowe et al. (1986); Steptoe-Warren et al. (2011)
Synthetic	“Refers to the ability to synthesize (blend) ideas, information, or processes” (Sandelands & Singh, 2017, p.27)	Bonn (2001, 2005); Bowman (2016); Hampden-Turner (1993); Liedtka (1998, 2011)
Divergent	“The ability to think in a different manner or ways” (Sandelands & Singh, 2017, p.27)	Bonn (2001, 2005); Chevallier (1974); Heracleous (1998); Schoemaker et al. (2013)
Systematic	The ability to examine how different concerns are connected, affect and influence one another (Liedtka, 1998)	Bonn (2001, 2005); Crawford (2013); Liedtka (1998, 2011); Olson & Simerson (2015)
Context Oriented	The ability to recognize the environment of operation (e.g. individual, organisational) (Bonn, 2005)	Bonn (2001, 2005); Liedtka (1998, 2011); Linkow (1999); Olson & Simerson (2015)

Future Oriented	“Being forward thinking” (Sandelands & Singh, 2017, p.27)	Allio (2006); Bonn (2001, 2005); Hamel & Prahalad (1994); Linkow (1999)
Process Oriented	Cognitive activities demonstrative of self-awareness, and awareness of the wider environment (Olson & Simerson, 2015)	Bonn (2001, 2005); Hampden-Turner (1993); Liedtka (1998, 2011); Olson & Simerson (2015)
Integrative	“The ability to combine concepts, thoughts, or ideas” (Sandelands & Singh, 2017, p.27)	Bonn (2001, 2005); Kaufman (1991); Liedtka (1998); Mintzberg (1994a,b)
Holistic	The realisation that a scenario must be viewed as a whole, rather than within separate parts (Kaufman, 1991)	Bonn (2001, 2005); Kaufman (1991); Liedtka (1998)

2.2 Underlying Theory of the CPP Assessment

The CPP assessment is an essential tool used in this study as it is part of how we want to answer our research questions. Therefore, this subchapter deals with the CPP assessment and its underlying theory. First, provided is a summary of what the CPP assessment is and which cognitive constructs it assesses. Then, there will be an introduction to the underlying theoretical models that the CPP assessment is based on.

Maretha Prinsloo of Cognadev UK Ltd. developed the CPP assessment, which is a digital problem-solving assessment tool. It was developed due to criticisms of the traditional Intelligence Quotient tests, and there also was a need for a tool to assess adults in a work context (Cognadev UK Ltd., 2016). It externalises and dynamically tracks an individual's cognitive processes to yield an indication of their thinking preferences, capabilities and potential for growth (Cognadev (Pty) Ltd., 2018). According to Cognadev UK Ltd. (2016), the CPP assessment measures an individual's intellectual functioning regarding constructs such as:

- Judgement
- Decision-making
- Strategising
- Generalist versus specialist orientation
- Creativity
- Complexity preferences
- Problem-solving
- And other thinking abilities

The CPP assessment contains a series of problems in an unfamiliar environment where the test-taking individual faces issues to solve (Prinsloo, 2007). Meanwhile, the behaviour of the user and his/her actions are continuously monitored and measured with an advanced mouse tracking system (Prinsloo, 2007). It records and externalises the user's thinking at a micro level with 10,000 separate measurement points (Cognadev UK Ltd., 2016; Prinsloo, 2007). *Figure 2.8* depicts one of several problems the test taker may solve when taking the CPP assessment.

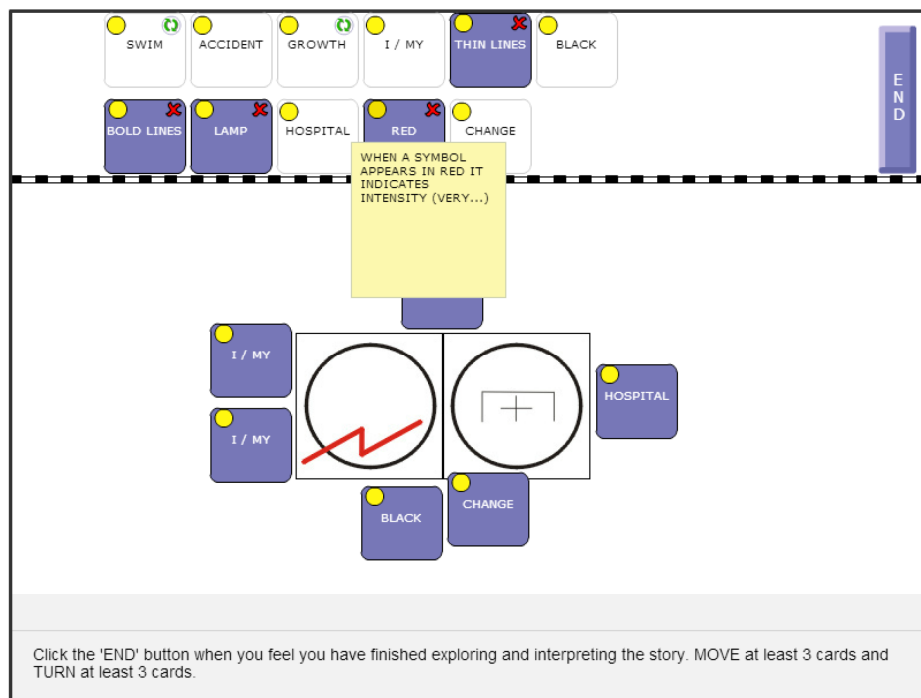


Figure 2.8: Example of a problem from the CPP assessment (Cognadev UK Ltd., 2016, p.8)

The CPP assessment’s design has been developed to measure various constructs beyond the well-known and traditional Intelligence Quotient and includes (Cognadev UK Ltd., 2016):

- “Work-related processing aspects indicating the Levels of Work complexity an individual is cognitively equipped to deal with” (Cognadev UK Ltd., 2016, p.9)
- Cognitive styles of problem-solving in new and unfamiliar situations
- Strengths and weaknesses
- Speed and timing
- Potential for learning
- Combinations of the individual’s profile
- Guidelines for development

The cognitive assessment of the CPP is based on three theoretical models which are (1) Prinsloo’s holonic Cognadev Information Processing (CIP) which is linked with (2) Jaques’ Stratified System Theory (SST), also known as Requisite Organisations (RO) model, and (3) Beer’s Viable Systems Model (VSM) (Cognadev UK Ltd., 2016). Cognadev emphasises that “the CPP assessment is not based on a phases or stages model of intellectual functioning” (Cognadev UK Ltd., 2016, p.24).

Cognadev Information Processing

The CIP is a theoretical model that Cognadev (Pty) Ltd. (2018) describes as processing categories depicted as “overlapping fields of matrix” (p.3). Each field “includes and transcends the previous one(s)” (Cognadev (Pty) Ltd., 2018, p.3). Furthermore, the CIP distinguishes between performance processes and metacognitive processes. Performance processes are to “recall, explore, analyse, structure, and transform” (Cognadev UK Ltd., 2016, p.25) information. This information is guided by specific metacognitive criteria such as “self-awareness, self-monitoring, learning, strategising, using judgment and intuition” (Cognadev (Pty), 2018, p.3).

Figure 2.9 describes the CIP theoretical model. Cognadev (2018) states that the CIP is a “holonic structure” (p.3) that categorises functional processes. Therefore, each successive process builds on and surpasses the previous processes (Cognadev (Pty), 2018). For example, exploration processes such as scanning, selecting and hypothesising are reliant on the ability to retain and recall information, i.e. the memory process (Cognadev UK Ltd., 2016). These processes continue through analyses, by identifying relationships and applying rules (Cognadev UK Ltd., 2016). This is followed by the structuring process which is defined by ordering and conceptualising (Cognadev UK Ltd., 2016). The final process is transformation, where the final structure may be restructured or reconceptualised (Cognadev UK Ltd., 2016).

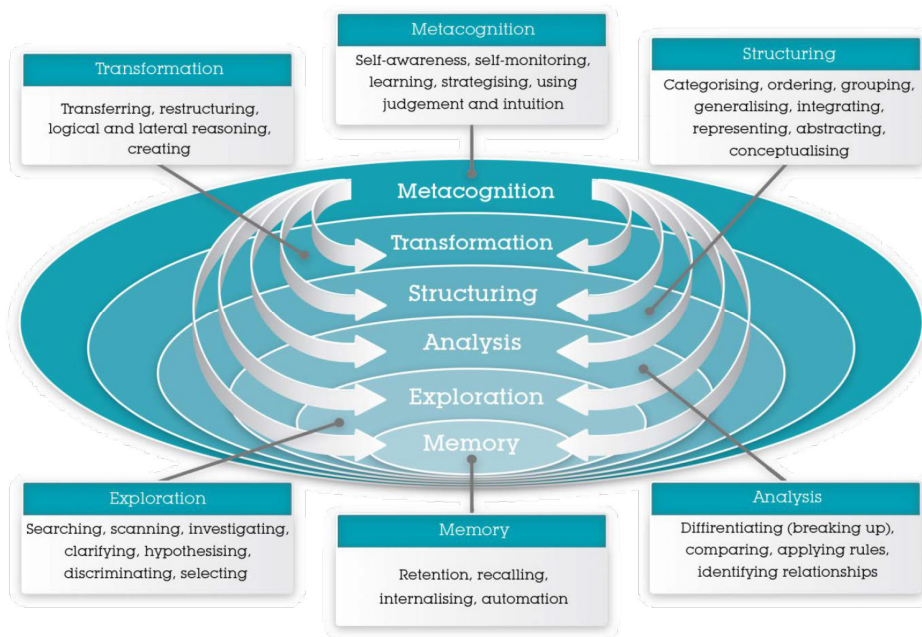


Figure 2.9: CIP theoretical model (Cognadev UK Ltd., 2016, p.25)

It should be noted that the processes discussed are performance processes (Cognadev (Pty), 2018). However, these performance processes are not linear or hierarchical but integrated and highly dependent on each other (Cognadev UK Ltd., 2016). The metacognitive process guides the application of these performance processes through self-awareness, intuition, judgement and learning (Cognadev UK Ltd., 2016).

Stratified System Theory / Requisite Organisations / Viable Systems Model

The CPP assessment uses a modified version of the SST/RO/VSM theories. The original model describes seven levels of work task complexity, but the CPP assessment reduces this number down to five and describes the levels in different terms (Cognadev UK Ltd., 2016). Figure 2.10 illustrates the complexity of work.

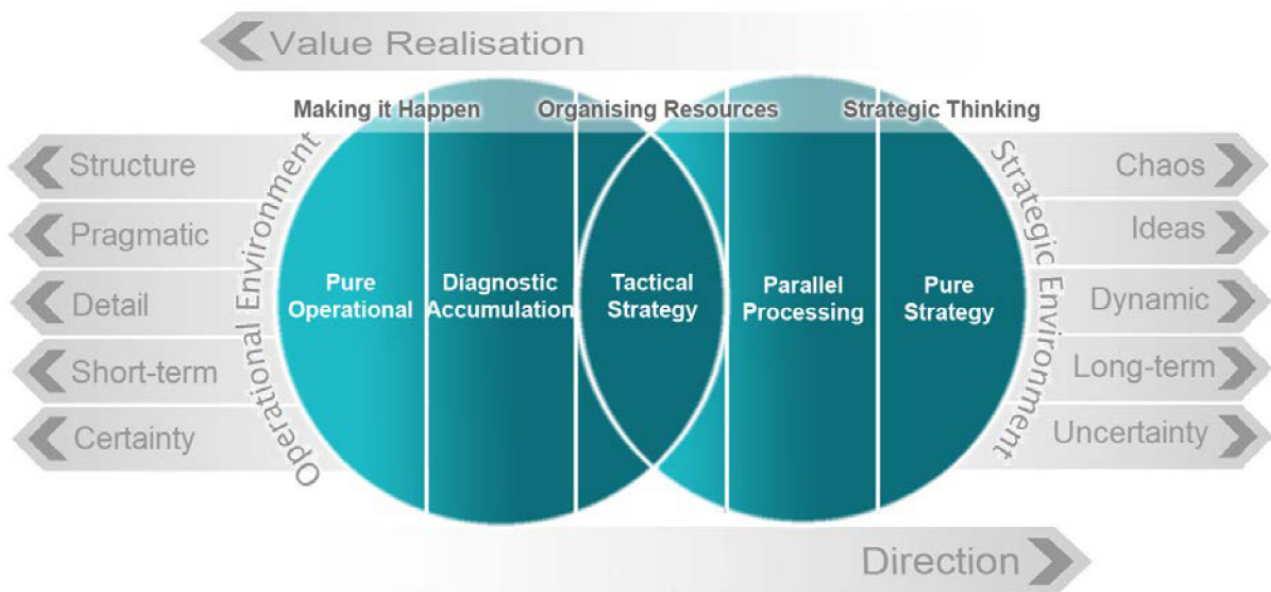


Figure 2.10: Complexity of Work (Cognadev UK Ltd., 2016, p.12)

These five work environments are described as (Cognadev UK Ltd., 2016, p.12):

1. Pure Operational - This environment is one where there is a structured work environment and methods, rules, goals and outcomes are clearly defined. There is routine to the precise and accurate work that is delivered. Examples of these work environments include clerical work and manual labour (Cognadev UK Ltd., 2016).
2. Diagnostic Accumulation - A typical work environment here is one that understands service and technical needs. Problems are both diagnosed and prevented or in other words, situational problem-solving. Teachers and technical specialists/professionals fall into this category (Cognadev UK Ltd., 2016)
3. Tactical Strategy/Alternative Paths - This level is indicative of project management. Here functional strategies are formulated, and systems are evaluated and implemented. Often theoretical guidelines are followed. Examples include management of operating systems at all levels (Cognadev UK Ltd., 2016)
4. Parallel Processing - Here, the environment is more involved with formulating broad business strategies. The integration of dynamic systems is common, and the monitoring of interacting projects also takes place here. General management, CEO and chief technical specialists are examples of parallel processing (Cognadev UK Ltd., 2016).
5. Pure Strategic - This environment is where unified systems are constructed. Many variables are taken into account including, the environment, social issues and economic issues. Philosophical trends in industry are also thought of at this level. Examples are CEOs and chairs of large multinational corporations and philosophers (Cognadev UK Ltd., 2016).

The CPP assessment measures fourteen cognitive styles of an individual which indicates how this person deals with unfamiliar information (Cognadev UK Ltd., 2016). Additionally, a fifteenth element can be generated which is referred as *Balanced Style* (Cognadev UK Ltd., 2016). This additional style is realised when an individual, Cognadev UK Ltd. (2016) states, displays flexibility

in applying analytical, integrative and learning cognitive styles. It should be noted that particular style preferences may be developed “due to personality and emotional factors, cultural values, educational exposure, learning opportunities, work experience and fields of interest” (Cognadev UK Ltd., 2016, p.20). These fifteen stylistic preferences, according to Cognadev UK Ltd. (2016, p.21-23), are the following:

- | | | |
|---------------------------------|------------------------------------|------------------------------|
| 1. <i>Logical Style</i> | 6. <i>Memory Style</i> | 11. <i>Structured Style</i> |
| 2. <i>Analytical Style</i> | 7. <i>Learning Style</i> | 12. <i>Holistic Style</i> |
| 3. <i>Explorative Style</i> | 8. <i>Metaphoric Style</i> | 13. <i>Intuitive Style</i> |
| 4. <i>Trial-and-Error Style</i> | 9. <i>Reactive Impulsive Style</i> | 14. <i>Integrative Style</i> |
| 5. <i>Reflective Style</i> | 10. <i>Quick Insight Style</i> | 15. <i>(Balanced Style)</i> |

Based on the stylistic preferences, the CPP assessment measures an individual’s processing competencies. These stylistic preferences are based on quantitative data gathered from measuring fourteen processing competencies from 1 - 100. These processing competencies are described in *Table 2.2* using the definitions found in *The Technical Manual for the CPP Assessment* (Cognadev UK Ltd., 2016, p.27).

Table 2.2: The processing competencies of the CPP assessment (Cognadev UK Ltd., 2016, p.27)

Processing Competencies		Definition
Memory	Use of memory	Reliance on memory
	Memory strategies	Effectiveness of memory strategies
Exploration	Pragmatic	Practical orientation. Determining relevance in structured contexts
	Exploration	The effectiveness, depth and width of exploration
Analysis	Analysis	Working systematically, independently. Detailed and precise in differentiating between, and linking, elements
	Rules	A focus on rules
Structuring	Categorisation	Creating external order, categories and reminders. Structuring tangibles
	Integration	Synthesis of ambiguous/discrepant/fragmented information
	Complexity	The preferred level of complexity and the unit of information used
Transformation	Logical reasoning	The disciplined, logical following through of reasoning processes
	Verbal conceptualisation	Unusual/flowery/creative or abstract verbalisation and conceptualisation
Metacognition	Judgement	Capitalising on intuitive insights to clarify unstructured and vague information
	Quick insight learning	The tendency to grasp new concepts and acquire knowledge and understanding relatively quickly
	Gradual improvement learning	A preference for practical or experiential learning

These processing competencies are all important aspects of strategic thinking. However, only some of these processing competencies tend to facilitate growth in strategic thinking (Cognadev UK Ltd., 2016). These facilitating competencies are in the categories of structuring, transformation and metacognition. Therefore, those with higher levels of work, tend to score more prominently in these processing competencies.

Figure 2.11 shows the distribution of the work categories amongst the general corporate population as well as the general management population (Cognadev UK Ltd., 2016). These work categories can be divided between operational and strategic (Cognadev UK Ltd., 2016). Those in the operational domain tend to prefer work environments that are structured, pragmatic, detailed and short-term oriented as well as certainty (Cognadev UK Ltd., 2016). Those in strategic domain tend to prefer work environments that are chaotic, ideas focused, dynamic and long-term oriented as well as greater uncertainty (Cognadev UK Ltd., 2016). The CPP assessment tests what kind of work environment an individual is currently comfortable working in, as well as their potential (Cognadev UK Ltd., 2016). This is determined by measuring (Cognadev UK Ltd., 2016, p.12):

- Stylistic preferences
- Units of information measuring complexity capabilities
- Various work-related preferences and capabilities
- The person's judgement capability

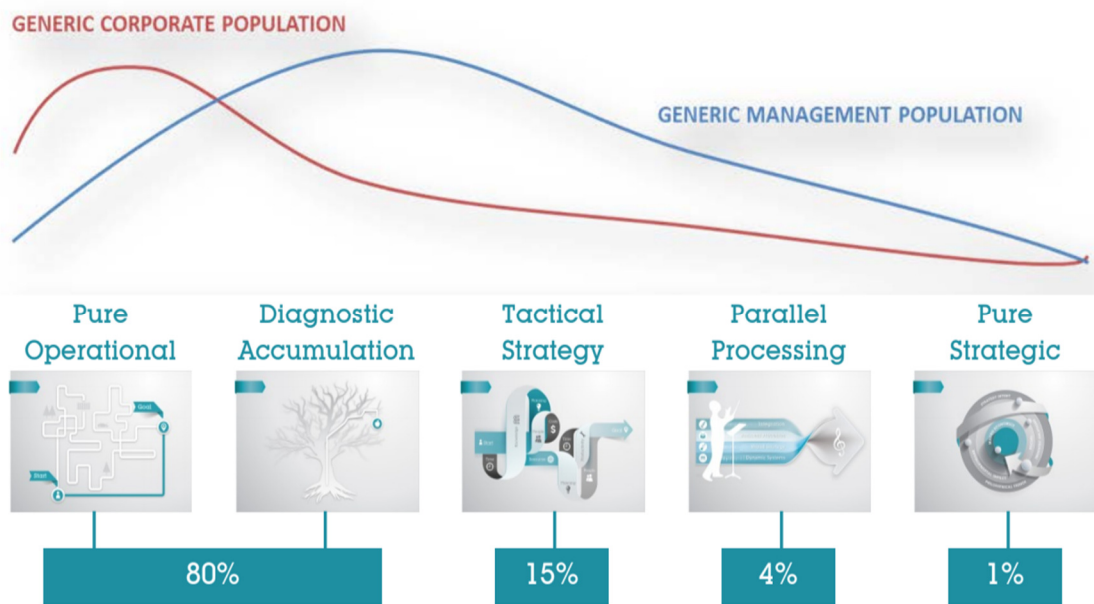


Figure 2.11: SST Distribution Curve (Cognadev UK Ltd., 2016, p.14)

The results of the CPP work environments is shown as in Figure 2.12. The graph shows the required level for each work environment with the green line. Where the red line intersects the green line shows the individual's current work environment, whereas where the blue intersects the green line shows the potential work environment. Therefore, Figure 2.12 shows that this individual has a current work environment (3) of tactical strategy/alternative paths and a potential work environment (4) for parallel processing.

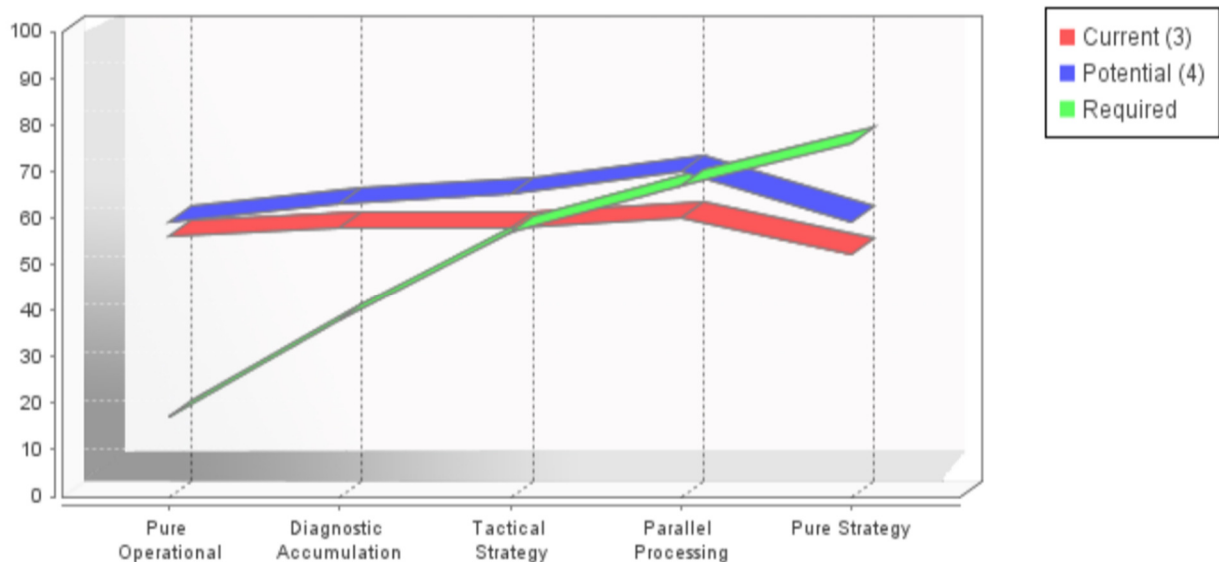


Figure 2.12: CPP Work Environment Results (Cognadev UK Ltd., 2016, p.13)

The literature revealed that there are many, often contradicting views, on strategic thinking. These views were then categorised into three *Types*. These are:

- *Type 1* - Strategic thinking comes before strategic planning and is thus two separate things (Liedtka, 1998; Mintzberg, 1994a,b)
- *Type 2* - Strategic thinking is a function of strategic planning, i.e. they are the same thing (Bourgeois & Eisenhardt, 1988; Eden, 1990; Porter, 1991; Wilson, 1994; Zabriskie & Huellmantel, 1991)
- *Type 3* - Strategic planning and strategic thinking are separate, yet interconnected ideas (Argyris, 1991; Bonn, 2001, 2005; Cognadev UK Ltd., 2016; Graetz, 2002; Haycock, 2012; Heracleous, 1998)

Type 1 and *Type 2* strategic thinking appear to be more prevalent ideas in the 1980's and 1990's. The more contemporary literature is more aligned with *Type 3* strategic thinking. These *Types* are indicative of shifts in the prevailing consensus on what strategic thinking is. *Type 3* strategic thinking is a blend of *Type 1* and *Type 2*. It proposes that strategic planning and thinking are on a spectrum and thus interconnected.

The presentation of the working levels from Cognadev UK Ltd. (2016) in *Figure 9* reflects *Type 3* strategic thinking. The levels progress from purely operational to purely strategic. The pure operational level is home to structure, detail and pragmatism which resembles strategic planning. The CIP model's base levels of memory, exploration, analysis and structure mirror concepts found in strategic planning. Strategic thinking concepts appear closer to the pure strategic end of the spectrum. Where, according to the CIP model, the transformation of information and metacognitive awareness are more and more common.

The fifteen core concepts by Sandelands and Singh (2017) summarise the qualities strategic thinkers should possess according to the vast amount of literature on strategic thinking. The definitions provided in 2.1.2 are the same that Sandelands and Singh (2017) used. Our critical analysis was born out using these concepts and definitions in the 360-degree semi-structured telephone interviews.

3 Methodology

In this methodology section, we discuss our approach to conducting this study by using the research onion framework by Saunders, Lewis and Thornhill (2009). Before addressing the data collection methods in detail, it is important to discuss the outer layers of the research onion (Saunders, Lewis and Thornhill, 2009). The research onion depicts several layers starting with the research philosophy, research approach, research strategy, research choice, time horizon and research technique and procedure (Saunders, Lewis & Thornhill, 2009). *Figure 3.1* shows our research onion with all layers and our stances.

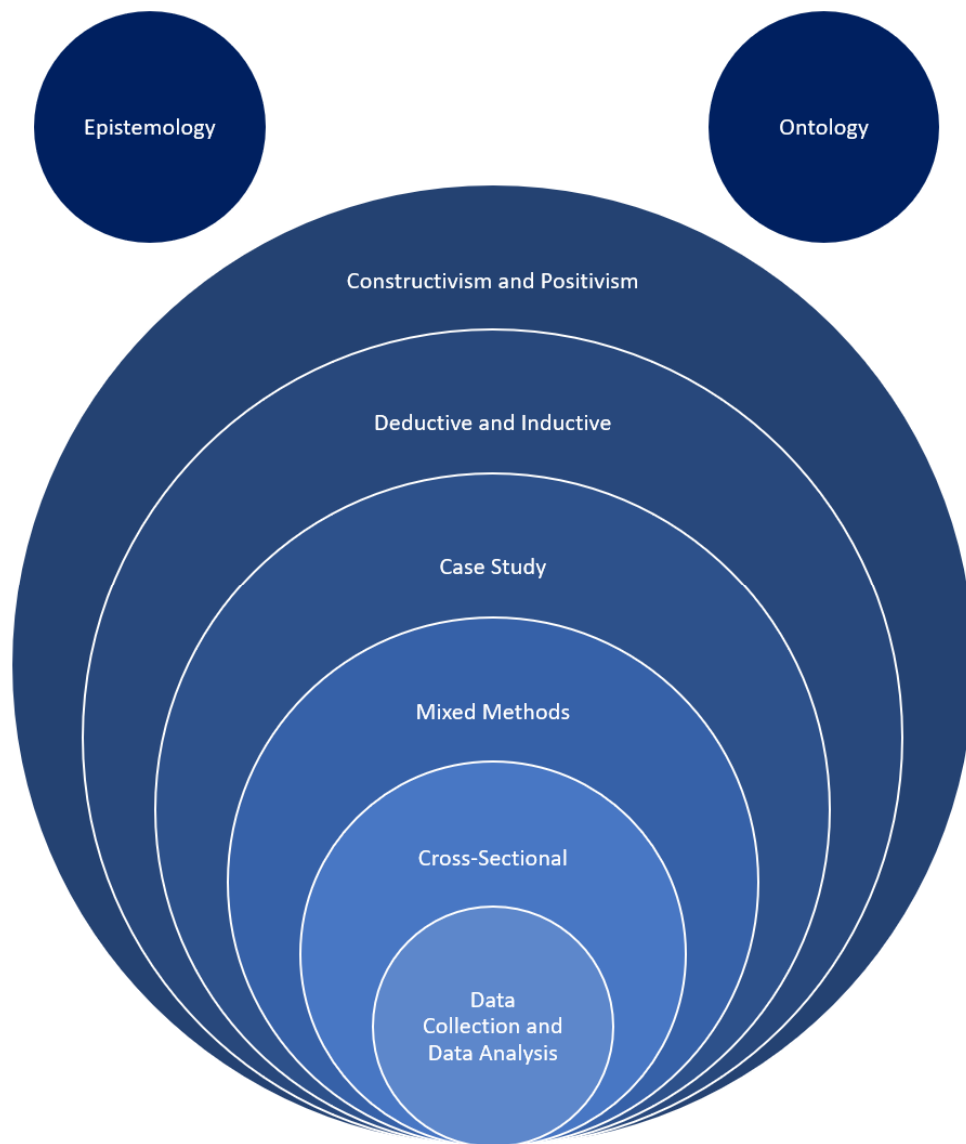


Figure 3.1: Research Onion (Saunders, Lewis and Thornhill, 2009) [own representation]

3.1 Research Philosophy

The outer layer of a research onion addresses the research philosophy we adopt for this study (Saunders, Lewis & Thornhill, 2009). According to Saunders, Lewis and Thornhill (2009), the research philosophy contains essential assumptions of how we as authors view the world. Since this study addresses the phenomena of people's social coexistence and relationships (Williams, 2000), the reality is extremely complex and not based on concrete science.

With our study, we examine two research questions with different natures. We thus need to adopt several research philosophy positions. On the one hand, for the self-completion voting questionnaire and the 360-degree semi-structured telephone interview, we view the results from an ontological perspective and a constructivist stance of philosophy. Saunders, Lewis and Thornhill (2009) describe the ontological perspective as the concerns about the nature of reality. It raises the question of how the world works, how society is built and how it affects everything around us and deals with differences of reality and the perception of reality (Saunders, Lewis & Thornhill, 2009). The constructivism stance believes that the social phenomena are constructed by the actors of the sociality (Saunders, Lewis & Thornhill, 2009). Therefore, the reason why we adopt this position is that the perception of the individuals participating in our study construct their own personal views of what strategic thinking is and therefore, make judgements based on this personal perception.

On the other hand, for the results of the CPP assessment, we adopt a view from an epistemological perspective with a positivist stance. As Saunders, Lewis and Thornhill (2009) state, epistemology is concerned with the question of what the acceptable knowledge is. Positivism in this sense is concerned with generating a hypothesis which can be scrutinised against the world's accepted knowledge. Cognadev UK Ltd. (2016) claims that the CPP assessment can measure an individual's ability to think strategically. Therefore, we test whether or not this tool is valid.

3.2 Research Approach

This study is based on a combined research approach with both an inductive and a deductive research approach. When examining our research questions, we find that with our first question, "*what are the most important cognitive elements of strategic thinking?*" we require an inductive approach. Whereas, with our second question, 'is the CPP assessment a valid tool to measure the ability of strategic thinking?' we find that we need to take a deductive approach. This is because with our first question we are exploring which cognitive elements are important. Conversely, the second question is to evaluate the validity of the CPP assessment.

3.3 Research Strategy

As the involvement of many individuals based on a real-life context (Saunders, Lewis & Thornhill, 2009), the research strategy of this thesis is a case study. With our data and results, we draw

conclusions in order to be able to answer our research questions. This is an embedded single case study according to the dimensions of case study research outlined by Yin (2017). Our case study is part of a larger multiple case study project. Case studies can be used as an exploratory device (Yin, 2017), in this case, into the field of strategic thinking. The methodological strategy for this case study involves collecting empirical data from the CPP assessment, as well as the self-completion voting questionnaire and the 360-degree semi-structured telephone interview, in the context of the participating organisation (Yin, 2017). These multiple sources of data will be triangulated (Saunders, Lewis & Thornhill, 2009). The qualitative data collected from the 360-degree semi-structured telephone interviews will be used to triangulate and confirm the quantitative data collected from the CPP assessment.

3.4 Research Choices

The research choice of this study is a mixed-method approach. First, quantitative data is collected through these data collection methods (Saunders, Lewis & Thornhill, 2009, pp.146-147);

1. Self-completion voting questionnaire
2. 360-degree semi-structured telephone interview
3. CPP assessment

Secondly, qualitative data is collected with the 360-degree semi-structured telephone interviews. As Bryman and Bell (2011) state, reliability, replication and validity are three of the most prominent criteria when it comes to the evaluation of business and management research. We addressed all three criteria in each data collection method in subchapters 3.2.1 to 3.2.3.

3.5 Time Horizon

The overall time horizon of this study spanned over seven months starting in October 2017. In the beginning, most of the work was based on agreeing on similar steps within the large-scale project group such as common contact letters to find companies to participate for the data collection as well as agreeing on steps for the methodology to keep them comparable. The collection of data began in April 2018 where the three data collection methods, explained in detail in the following subchapter, were conducted. Finally, the analysis of the collected data was carried out at the end of April 2018 to mid-May 2018.

The time horizon constituted one of our main limitations in this project. Due to technical complications with the participating company, we had only one month to gather and analyse all the data collected from the CPP assessment and 360-degree semi-structured telephone interviews. Having more time would have been beneficial for us and the quality of the analysis.

3.6 Data Collection Methods

To collect both qualitative and quantitative data, the data collection technique of this study is based on three methods shown in *Figure 3.2*. First, was administering a self-completion voting questionnaire to identify ten individuals out of 90 who came across as the best strategic thinkers amongst all the individuals involved. This technique provided quantitative data. Secondly, with regards to the selected individuals, we conducted 360-degree semi-structured interviews to collect qualitative and quantitative data. Finally, those ten voted individuals took the CPP assessment. The results of the CPP assessment yielded quantitative data.



Figure 3.2: Overview of our data collection methods

3.6.1 The Self-Completion Voting Questionnaire

The self-completion voting questionnaire constituted the first method of data collection in this study. Its purpose was to identify no more than ten individuals who came across as the strongest strategic thinkers amongst their peers. These ten individuals should then participate in the next two data collection methods.

The tool chosen for the self-completion voting questionnaire was SurveyMonkey. The SurveyMonkey survey we conducted is presented in *Appendix A*. SurveyMonkey is a free online survey tool for data collection and analysis (SurveyMonkey, 2018). SurveyMonkey (2018) claims to value data protection with world-class data security standards.

The cooperating company provided a list of 90 individuals who worked in managerial positions or exerted managerial tasks. We sent the survey to all the individuals on the list provided by the participating company. They all had the opportunity to vote for a maximum of ten individuals whom they perceived as the best strategic thinkers. Furthermore, these individuals should have been familiar with whom they voted for. This was an essential criterion since the voters should not have voted randomly or voted for an individual due to their position, for example, the head of strategy.

Reliability, Replicability and Validity

The reliability of the self-completion voting questionnaire in this study is based on our trust. There is no other feasible alternative that we can use in order to identify the best strategic thinkers within the partaking company. Thus, we have to trust everyone to partake in the self-completion voting questionnaire so that the top ten are in fact the best ten strategic thinkers in the company. Therefore, consistent results can be gathered if this study is to be repeated with the same company in the future.

Regarding the replicability, we can assume that if we conducted the self-completion voting questionnaire again, all partaking people would vote for the same individuals as best strategic thinkers again. However, it should be noted once again that there is no other feasible alternative and we hence have no choice than to trust the results of the self-completion voting questionnaire. Moreover, when talking about the validity of this method, we can only stress once again that there are no feasible alternatives. Therefore, the results represent the perception of all partaking individuals and should be accepted as reality.

Risks and Critical Review

When looking at the self-completion voting questionnaire from a critical perspective, we did face some risks which could have influenced the results negatively. First, when we sent the link to our survey to all individuals on the provided list, the recipients could have opened the link several times. As a consequence, they may have voted several times. The outcome would have been a list of ten individuals who were not the best strategic thinkers. However, with SurveyMonkey, we had the advantage of being able to see the voters IP addresses. This allowed us to see each respondent and the corresponding IP address. Therefore, we could see if individuals voted several times for the same individuals and we could thus delete such responses to increase the quality of the data.

Moreover, individuals might have voted for those who held higher positions in the hierarchy. The same could be said for people who worked in the strategy department since they associated this department with the ability to think strategically. This too would have had an impact on the results. Consequently, the true best strategic thinkers may not have appeared in the list of the ten individuals we received.

Another potential risk was that individuals only voted for themselves. Voting only for oneself could engender having non-strategic thinkers in our sample. This was an inevitable risk which we could not eliminate due to the anonymous nature of the voting system. Even though this was possible, it would not significantly affect the results of this case study, since that would only constitute a small anomaly compared with the first critical point.

Finally, the low participation rate may have distorted the results and therefore revealed to us individuals who were not the best strategic thinkers in reality. If only a small number of people voted, the overall result would not represent the opinion of all individuals within the company. To increase voting participation, several friendly reminders were sent out to help increase the number of voters that participated in our study.

Limitations

If more time had been available, we could have waited until everyone completed the self-completion voting questionnaire. The questionnaire also assumed that everyone who took part at least knew of each other. For example, if an individual were new to the company, they would most likely vote for those in the strategy department due to not knowing everyone yet. Finally, we would have had everyone in the company take part in the self-completion questionnaire to gather more data.

3.6.2 The 360-Degree Semi-Structured Telephone Interview

To gather additional data on the ten perceived strategic thinkers, we combined 360-degree feedback and semi-structured telephone interviews. The reason for doing this was that in the scope of this sub-project, all the case studies agreed on having the same, or at least a very similar, set of questions for this stage of the project. Our 360-degree semi-structured telephone interview was based on a survey from Google Forms. It served as a guide so that there were the same conditions for each interview. Furthermore, with the semi-structured telephone interview, we aimed to minimise confusion and random responses to questions due to a lack of knowledge about specific terms and definitions. Therefore, we chose to speak directly with the participants, instead of sending a link to an online survey tool. This was to ensure that we collected the most accurate data possible.

Bracken, Rose and Church (2016) define 360-degree feedback as a process that collects, quantifies and reports the observations of colleagues, named as the rater, about an individual, called the ratee. The raters give feedback on an individual's competencies and performance (Karkoulian, Assaker & Hallak, 2016; Sikes et al. 2015). The outcome was a data-driven collection of the rater's perception about the ratee, which was further analysed and compared to multiple ratees. This facilitated the sustainable creation of an "individual, group, and/or organisational changes in behaviour valued by the organisation" (Bracken, Rose & Church, 2016, p.764). According to Sikes et al. (2015), the 360-degree feedback offers an authentic evaluation of performance and competencies and can thus encourage the person evaluated to improve skills and to develop further. As the 360-degree feedback aims to achieve a well-rounded understanding of the performance of the employee (Mondy & Martocchio, 2016), the method diminishes bias as it allows people working together with the employee to give a precise reflection of his or her performance (Karkoulian, Assaker & Hallak, 2016).

In this case study, the 360-degree interviews took the form of semi-structured telephone interviews, lasting no more than twenty minutes as to avoid survey fatigue (Zenger & Folkman, 2012). The interviews were conducted with a pre-established list of questions (see *Appendix B*), where some had predetermined responses (Easterby-Smith, Thorpe & Jackson, 2015). These kinds of interviews should produce highly reliable and valid results as long as a standard rating scale is used throughout (United States Office of Personnel Management, 2008). Therefore, for this study, we used the rating scale of 1 to 5, with 1 indicating a low score and 5 indicating a high score.

The individuals who were selected from the self-completion voting questionnaire, referred to as the ratee, selected individuals to take part in the 360-degree semi-structured telephone interview, who is referred to as the rater. Consequently, the raters were not anonymous to the ratee, going against Zenger and Folkman's (2012) guidelines for 360-degree interviews. However, it was made known that all results would be completely confidential. The raters were given a questionnaire that included some basic background information about their relationship to the ratee in question. The raters were also asked to rate on a scale of 1-5 their perception of the ratees ability to think strategically. The questions on strategic thinking were based on empirical research conducted by Sandelands and Singh (2017) as Zenger and Folkman (2012) suggest. These results were compared to the results of the ratee's CPP assessment.

In our case study, the ratees were supposed to select one supervisor, one colleague and one subordinate. We aimed to interview three raters per ratee, but we accepted two raters if that is all that

is applicable. Bracken, Rose and Church (2016) state that those giving the feedback should be only colleagues and thus exclude friends and family. According to Bracken, Rose and Church (2016), only colleagues should rate, and it should be based on behaviours as opposed to traits, values, attitudes as friends and family as they are not directly involved in the work environment. *Figure 3.3* illustrates the 360-degree semi-structured telephone interview.

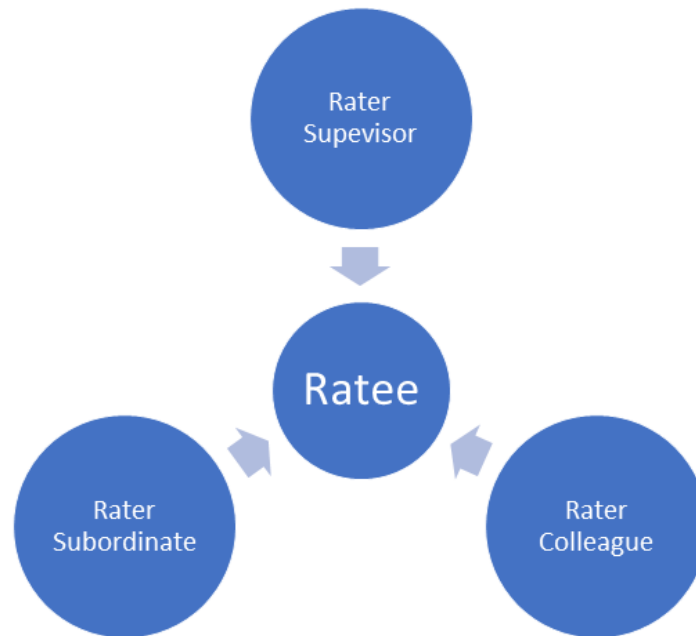


Figure 3.3: Perspectives of our 360-degree semi-structured telephone interview

We used Google Forms to collect the answers from the telephone interviews with the raters. We, the interviewers, entered the data into these forms so that the data was easily transferable to Microsoft Excel and SPSS as well as other programs for statistical analysis.

For the design of the survey, the most important things we believed to take into account were survey fatigue and taking the time to explain how the data will be used properly. For this reason, the survey was concise and on average took less than twenty minutes per survey to complete. It should be noted that the data collected was purely for this thesis. The kind of questions we asked were based on properties not tested by the CPP. These included the fifteen core concepts of strategic thinking outlined by Sandelands and Singh (2017) as well as other concepts discovered through our literature review. The reason for this was to collect more data than the CPP assessment evaluated.

The results of the 360-degree semi-structured telephone interview took into account that a score of 4 or 5 is high, 3 is medium, and 1 or 2 is low. We derived useful quantitative data from this. The metrics used in the 360-degree semi-structured telephone interview were based on the core concepts outlined by Sandelands and Singh (2017). The qualitative questions were used to provide context for these data points. These included questions such as; “*how well do you know this person?*” etc.

We expected that people’s perception of certain behaviours of the individual would support their selection from the self-completion voting questionnaire. The results of the 360-degree semi-structured telephone interview, in combination with the self-completion questionnaire, was used to answer our first and second research questions (1) “*what are the most important cognitive elements of strategic thinking?*” and (2) “*is the CPP assessment a valid tool to measure strategic thinking?*”.

We assumed that the fifteen cognitive elements in the 360-degree semi-structured telephone interview which are frequently scored as high are key elements managers perceived as essential attributes of strategic thinkers.

Reliability, Replicability and Validity

Likewise, as the self-completion voting questionnaire, the reliability of the 360-degree semi-structured telephone interview is also based on our trust. We have to consider the answers of the raters as facts that we need to trust. Regarding the replicability, we can assume that replication of 360-degree semi-structured telephone interview would give us the same answers as before all partaking people would evaluate the best strategic thinkers in the same way they did it before. The validity of this thus also based on trust. We have to look at all results as a representation the perception of all partaking individuals which are supposed to be accepted as reality.

Risks and Critical Review

The 360-degree semi-structured telephone interview entailed risks and, therefore, the questions we asked were under the most scrutiny. The questions were based on the core concepts outlined by Sandelands and Singh (2017). This was to support the selection of the ratees from the self-completion questionnaire. This could have only been accomplished if the questions were clear and the answers received were consistent with the rating scale (United States Office of Personnel Management, 2008). However, problems may have arisen if the raters misunderstood the terms and definitions used during the 360-degree semi-structured telephone interviews. This is why we conducted these interviews over the telephone, so we could explain terms to the raters as the need arose, which it frequently did.

The company we were working with for this case study is based in Sweden, and as such, most of the employees are Swedish. The 360-degree semi-structured telephone interviews, like the CPP assessment and the self-completion questionnaire, were conducted in English. We do not doubt the English capabilities of all those involved, but there may have been some ambiguities, again, when it came to defining terms. Even with the explanation of terms over the phone, there may have still been some misunderstandings that may have affected the data collected.

We stated that we would like to interview three raters per ratee. In the case of most the ratees involved finding a supervisor, colleague and a subordinate was not an issue. However, in some cases, the ratee had no subordinates or no supervisor. This was resolved by only interviewing two raters. We decided not to add another rater for these people as the time limit for collecting the data was running out.

Some of the raters selected did not respond at all to our email requests and telephone calls to take part in the 360-degree semi-structured interviews. Therefore, some ratees only had one or two raters take part in these interviews. In hindsight, we would have asked the ratees to select several potential raters for each of the categories of supervisor, colleague and subordinate. This would have increased our chances of getting three responses per ratee, and it would have provided a certain degree of anonymity.

Limitations

The main limitation of the 360-degree semi-structured telephone interviews was that the ratees selected who their raters would be. Ideally, we would have intimate knowledge of the company, and

it is individuals in order to have selected the raters ourselves. The ratees are likely to be biased and selected raters who would answer the questions in their favour. 360-degree feedback, in general, should be anonymous, but in the case of this case study, it was not possible.

Some 360-degree semi-structured telephone interviews may be rushed due to time pressures. Thus, not allowing enough time for some terms present in the questionnaire to be properly defined, therefore producing inaccurate data. Care was taken to provide definitions on the telephone. These interviews should have been held in person, face to face, but time limitations and clashing schedules made this impossible.

3.6.3 The CPP Assessment

As Cognadev UK Ltd. (2016) claims the CPP assessment can measure an individual's ability to think strategically, it constitutes an essential tool for this study and is, therefore, a part of our data collection method. The ten most voted individuals in the first data collection method self-completion voting questionnaire conducted the CPP assessment. This showed us whether or not all of the selected individuals scored highly, and were, according to the CPP assessment, truly strong strategic thinkers. Data from a normative group and a contrast group gave us an additional indication of how these individuals compared when it came to strategic thinking.

To arrange appointments for the conduction of the CPP assessment, we contacted the individuals who ranked the highest via email. We told them that they came across as strong strategic thinkers among their peers within the company and that we would like to conduct the CPP assessment with them. For this purpose, we offered them several slots on different days to make it as convenient as possible for them so that the testing would be compatible with their time schedules. Additionally, the individuals could have chosen between being tested with a supervisor physically present or being tested remotely. Some of the individuals might have been travelling a lot and thus could not participate physically due to their absence. The remote testing time slots allowed for this possibility.

It was vital that information provided to the participants did not reveal anything about the nature of the CPP assessment. A reason for this is that the CPP assessment, in particular, aims to measure how an individual acts and solves problems in unfamiliar environments and situations. Any information about this might have distorted the results of the CPP assessment and thus the results of this study. Therefore, we only provided the most essential information such as requirements about having a computer with a stable internet connection, preferably with Google Chrome or Internet Explorer installed, Flash Player installed, headphones as well as a signed consent form. If a participant chose to take the remote option, a quiet place to take the assessment was suggested to avoid distractions.

The results of the CPP assessment legally to the individual who participated. Therefore, a consent form signed by the individual was needed to allow us to use the data from the CPP assessment in this study. The consent form we used is a document collectively created by the students of sub-project two (see *Appendix C*). The individuals were asked to sign the consent form before taking the CPP assessment to ensure this.

As an outcome of the CPP assessment, we receive the data anonymously from Cognadev. These data consist of (1) the fourteen cognitive styles, and (2) the fifteen t-scores of the information processing constructs. The cognitive styles indicate an individual's most preferred ways of thinking and are rank

ordered from 1 to 14 with 1 being the least preferred style and 14 being the most preferred style. The most preferred styles give some indication of how an individual acts in unfamiliar environments (Cognadev UK Ltd., 2016).

Moreover, data from a normative group and a contrast group served as a comparison for the data we collected. Cognadev UK Ltd provided this data. With that, we wanted to eliminate the risk that the results of our participating individuals indeed indicated an outstanding ability to think strategically and not only being voted for due to their position. Nevertheless, using the results of the CPP assessment as comparable data from individuals with zero or merely a few votes in the same company would have been much better. However, this is due to our limitations, which will be described below. Furthermore, this could not have been done from an ethical point of view since we would have had to tell those individuals that they came across as weak strategic thinkers among their peers.

Reliability, Replicability and Validity

Cognadev UK Ltd. (2016) addresses the CPP assessment's reliability and validity in *The Technical Manual for the CPP Assessment*. Cognadev argues that the reliability of the CPP assessment lies within its novelty. During the assessment, an individual is faced with a series of entirely novel cognitive tasks (Cognadev UK Ltd., 2016). However, what happens with an individual's attribute indications second or third time around on this test? To answer this question and prove the CPP assessments reliability, Cognadev UK Ltd. conducted multiple studies with various samples which they present in the CPP assessment manual.

The analysis of these studies showed that retests, with different retest-duration groups (≤ 6 months, >6 months but ≤ 1 year and >1 year), regarding the CPP cognitive styles, levels of work and processing competency scores were good in study one and excellent study two (Cognadev UK Ltd., 2016). Moreover, a long-term retest-duration study (>5 years) also showed excellent retest reliabilities (Cognadev UK Ltd., 2016). Consequently, it can be stated that the CPP assessment replicability and thus reliability is, given these facts, proven.

As mentioned earlier, Cognadev UK Ltd. (2016) addresses the validity of the CPP assessment. Cognadev UK Ltd. (2016) says that for the CPP assessment "reliability and validity are necessarily intertwined" (p.29). Cognadev UK Ltd. has undertaken numerous studies to prove the validity of the CPP assessment, details of which can be found in *The Technical Manual for the CPP Assessment*. However, we wish to independently validate the CPP assessment as one of our research questions.

Risks and Critical Review

Even though A potential risk is if an individual took notes, it might distort the results and the validity of the CPP assessment (Cognadev UK Ltd., 2016). As mentioned before in the theory section, two central elements are the use of memory and memory strategies. Note taking is a process to memorise information. However, the CPP assessment is not able to track processes outside of the computer. Therefore, it was vital to ensure that no individual took notes, memorised information or processed information anywhere except in the CPP assessment environment. The risk was minimised by having a qualified supervisor accompany the assessment. However, this could not have been applied to the remote sessions. Nevertheless, we emphasised the importance of this, and it might have reduced it to some extent.

Another risk was that an individual had already taken the CPP assessment in the recent past. Cognadev UK Ltd. (2016) notes that novelty is the fundamental concept behind the CPP assessment. Conducting the CPP assessment several times may distort the results as well since the novelty is lost (Cognadev UK Ltd., 2016). The CPP assessment is available on the market and can be taken by individuals who pay for it. We were aware that we conducted the CPP assessment with individuals who at least partly work in strategic oriented context. Therefore, those individuals did not want to come across as weak strategic thinkers. All we could do about this was to stress how important it was that the test had not been taken before.

Cognadev UK Ltd. (2016) underpins the CPP assessment's reliability with its novelty. Taking away the novelty destroys the validity of the CPP assessment (Cognadev UK Ltd., 2016). In research of what happens if an individual takes the CPP assessment two or three times, Cognadev UK Ltd. (2016) states that the memory fades away the memory which would perhaps take months or even years.

Nonetheless, the CPP assessment remains an abstract and artificially simulated environment which does not even cover the entirety of the complexity and uncertainty of reality and of an individuals behaviour in reality. Therefore, even if the CPP assessment confirms that all of the individuals were relatively strong strategic thinkers, the reality might still look different. For instance, many people would agree that Steve Jobs is a strong strategic thinker. However, there is an unknown likelihood that his CPP assessment results indicate that he is an average strategic thinker though. Consequently, the CPP assessment might be able to indicate if an individual is a strategic thinker, but it is still an assessment that primarily shows tendencies, and thus it cannot be generalised as an entirely valid tool.

Limitations

There were several limitations to the CPP assessment. Firstly, we could only assess ten individuals from the company. In an ideal case study, we would test everyone, but due to the high cost per test, we were limited to a maximum of ten. Secondly, the test can take up to three hours to complete. This was a considerable time commitment to make, especially for those who had a busy work schedule. Due to these busy schedules, not everyone could have been tested at the same time and place. Therefore, the individuals who took the CPP assessment earlier than other selected individuals may have discussed the CPP assessment to other individuals taking the CPP assessment at a later date. Thus, possibly affecting the scores of those who took the CPP assessment later. We did take measures to prevent this, but since we were not present every day at the company, it is impossible to know if details of the assessment were leaked.

All CPP assessments must be overseen by a qualified supervisor, who needs recognition from Cognadev UK Ltd. This means that supervisors needed to adjust their schedules to accommodate those who were taking the assessment. The supervisor accompanies the participants during their CPP assessment by giving them an introduction and to assist if problems arise. Furthermore, the person checks if the participants obey the rules such as not taking notes or talking to other participants to solve the problems in the CPP assessments collectively.

Finally, it should be noted that the CPP assessment is the only one of its kind currently available. The CPP assessment is the only test that claims to measure one's cognitive ability for strategic thinking. Therefore, our study aims to see if the CPP assessment is valid with the fifteen core concepts of strategic thinking as outlined by Sandelands and Singh (2017).

3.7 Data Analysis

For the data analysis of our study, we use the Statistical Package for the Social Science (SPSS) Statistics by IBM. SPSS Statistics is a software package that manipulates, analyses and presents data statistically (Landau & Everitt, 2004). It is a standard and widely used tool in social and behavioural sciences (Landau & Everitt, 2004). By using it, we intend to scrutinise our collected data to answer our research questions.

Spearman Correlation Coefficient

Pallant (2013) argues that correlation analysis is used to “describe the strength and direction of the linear relationship between two variables” (p.133). She further says that there are many different statistics present. However, the most appropriate tool to use depends on the nature of the data. The Pearson correlation coefficient is designed to analyse interval level variables (Pallant, 2013). By contrast, the Spearman correlation coefficient is used for ordinal level or ranked data (Pallant, 2013).

As the sample size of our data is small and the nature of the data is ordinal, we use the Spearman ranking correlation coefficient in SPSS Statistics. The Spearman correlation coefficient is the most appropriate analysis tool to compare the answers of our question “*how would you rate this person's ability to think strategically?*” from 1 to 5 with the current level of work (cLOW) of the participants.

The Spearman correlation coefficient gives us two important results. The first result is the correlation (ρ), the second result is the significance (α). According to Cohen (1988), the correlation should be interpreted as shown in *Table 3.1*. The limit for significant results is deemed as significant with $\alpha < 0.05$ (Pallant, 2013).

Table 3.1: Interpretation of Spearman's correlation coefficient (Cohen, 1988, pp.79-81)

Interpretation	Correlation (ρ)	Significant (α)
Small	0.10 to 0.29	< 0.05
Medium	0.30 to 0.49	< 0.05
Large	0.50 to 1.00	< 0.05

Independent-Sample T-Test

The independent-sample t-test compares mean differences between two groups by using a measure of the spread of scores (Saunders, Lewis and Thornhill, 2009). The important results when conducting an independent-sample t-test are the mean and the standard deviation (σ).

Mann-Whitney U Test

The Mann-Whitney U test is a non-parametric test used to test the homogeneity of two independent samples and constitutes an alternative to the independent sample t-test (Pallant, 2013). In contrast to the t-test, the Mann-Whitney U test compares medians instead of means (Pallant, 2013). According to Pallant (2013), the Mann-Whitney U Test “converts the scores on the continuous variable to ranks

across the two groups” (p.235) and “evaluates whether the ranks for the two groups differ significantly” (p.235).

We used the Mann-Whitney U test to see which core concepts by Sandelands and Singh (2017) were significantly different to identify outstanding core concepts between two groups within our sample. Additionally, we conducted the same procedure to identify outstanding processing competencies of the CPP assessment by comparing two groups of our sample with each other, as well as comparing our sample with two other samples.

The Mann-Whitney U Test gives out significances as results. High significances shall be interpreted as more homogeneous whereas low significances are less homogenous. Results with $\alpha < 0.05$ are deemed as significant (Pallant, 2013).

Data Comparison

The limitations of our research did not allow us to compile data of a control group within the participating company. For the 360-degree semi-structured telephone interviews, we only had the data collected from peers of our participating individuals. Therefore, we could not compare these data with other individuals. However, regarding the CPP assessment, data from a normative sample and a contrast sample served as alternative data sets. These data are courtesy of Cognadev UK Ltd.’s data pool. They shared specific characteristics with the individuals participating in our study. These are described as the normative sample and the contrast sample in the following.

The normative sample consisted of 2662 individuals selected by certain criteria. The criteria were individuals with managerial task fields and strategic roles, aged between 30 to 55 years, and a 60 percent male and 40 percent female mix. *Table 3.2* summarises the normative group sample.

Table 3.2: Characteristics of the normative sample

Sample Size	2662
Age	30 to 55
Gender	1716 Male and 946 Female
Task Field	Managers with strategic roles

On the contrary, the contrast sample was a set of 55 individuals also selected by similar criteria as the normative group. However, the contrast group’s criteria differ to the normative group regarding the task field. In contrast, the task field is managerial but without strategic roles. In *Table 3.3*, this information is summarised.

Table 3.3: Characteristics of contrast sample

Sample Size	55
Age	30 to 55
Gender	23 Male and 22 Female
Task Field	Managers without strategic roles

4 Findings

4.1 Presentation of Collected Data

In this subchapter, we present our data collected with our data collection method as described in our methodology chapter 3. Detailed 360-degree semi-structured telephone interview results and CPP assessment results for each individual is presented in *Appendix D*. It should be noted that we only use summarised tables and graphs in this chapter for illustrative purposes. It provides the foundation for our data analyses in subchapter 4.2 and the discussion in chapter 5.

4.1.1 Self-Completion Voting Questionnaire Results

The self-completion voting questionnaire gave us an indication of who came across as a strong strategic thinker within the participating company. As mentioned in the limitations of the methodology, we could only proceed with the ten most voted individuals. Therefore, the results provided us with a list of the top ten individuals shown in *Figure 4.1* as potential individuals to take part in the next steps of our study.

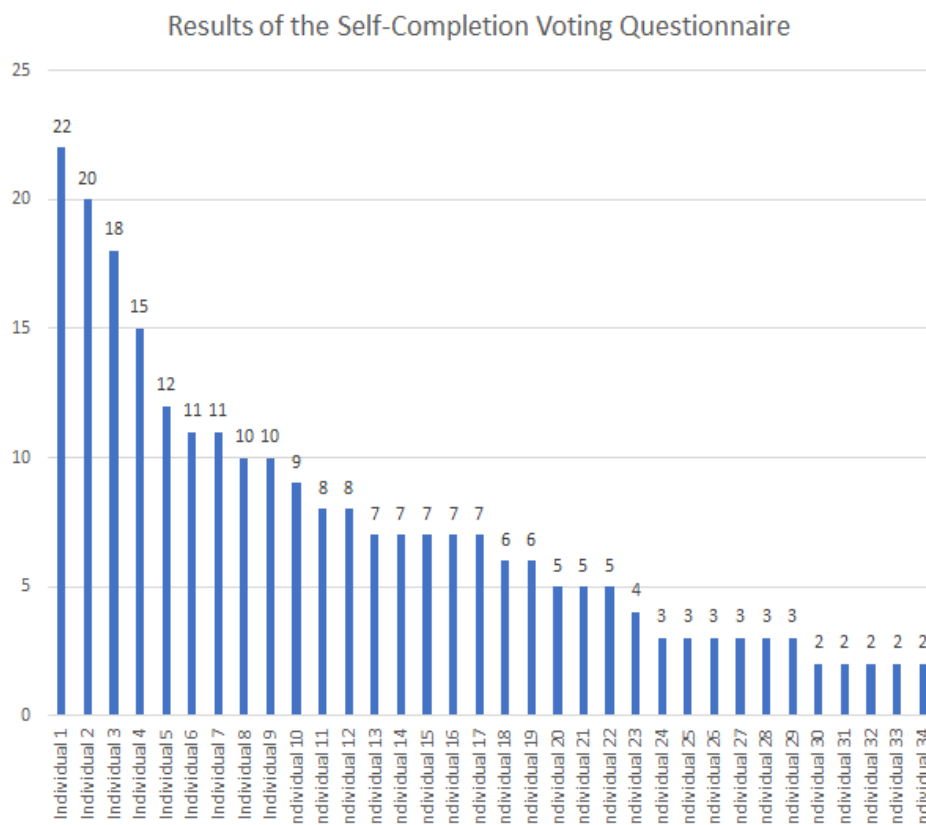


Figure 4.1: Distribution of votes per individual

In total, 40 out of 90 individuals participated in the self-completion voting questionnaire. This resulted in a participation rate of 44.44%. A reason for the low response rate was a very short time

frame for the self-completion voting questionnaire we had to set due to several complications with the voting tool for the participants in the beginning. An example of this being the company involved had a firewall preventing our original survey tool, Google Forms, from being used. As a result, the list only represented the opinion of 40 individuals within the company.

When looking at the graph, one got the impression that Individual 1, 2, 3 and 4 stood out and all the other individuals have fewer votes. Hence, we believed, based on the data, that the top four individuals came across as the best strategic thinkers. We then reached out to the ten most voted individuals for scheduling dates for the CPP assessment as well as getting the contact details of their superiors, colleagues and subordinates for the 360-degree semi-structured telephone interview.

However, due to unforeseen circumstances, some of the individuals in the top ten, as indicated by the self-completion voting questionnaire, could not participate further in this study. Reasons for this include that some of the individuals were about to leave the company. This is shown in *Figure 4.2*. The orange bars indicate the individuals who should have participated, but for various reasons could not. Therefore, we included other individuals just outside of the top ten to participate instead. However, other circumstances only allowed for a group of nine individuals to partake in the next stages of the study.

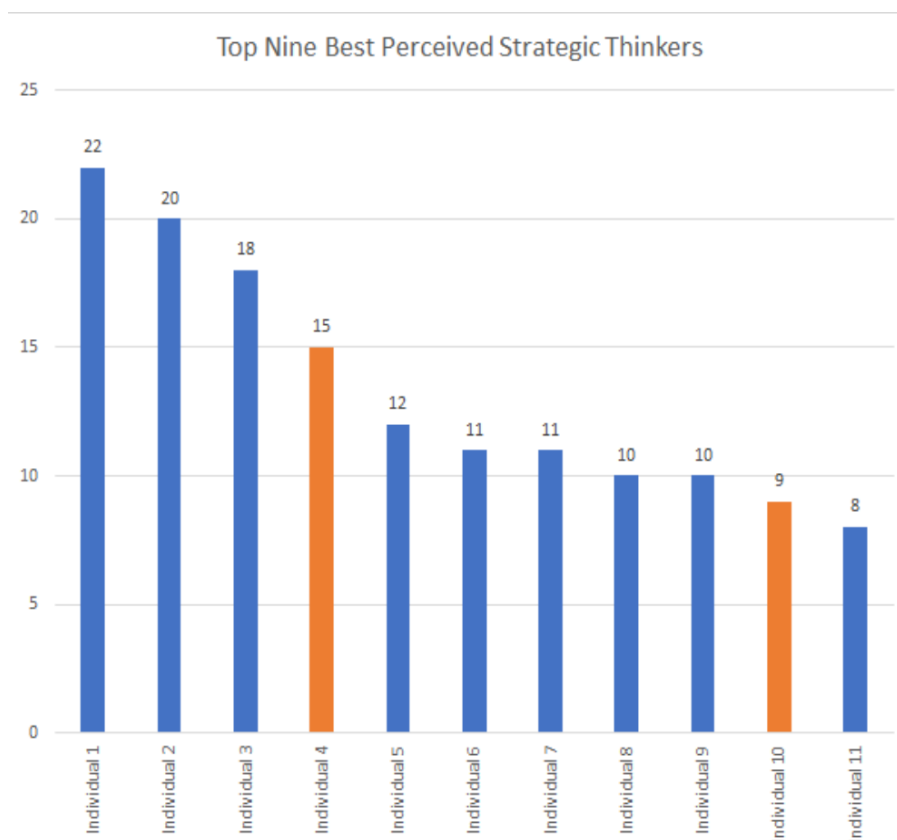


Figure 4.2: Depiction of the top nine most voted individuals who participated in our study

The nine most voted individuals who were able to participate in our study served as our sample group. The minimum age was 35, and the maximum age is 61. Eight out of nine individuals were male, leaving only one female participant. All individuals worked within managerial task fields, both with and without strategic roles. In summary, *Table 4.1* shows our sample of individuals.

Table 4.1: Characteristics of our sample

Sample Size	9
Age	35 to 61
Gender	8 Male and 1 Female
Task Field	Managers with and without strategic roles

To give an overview of all samples mentioned in the methodology and our sample, *Table 4.2* includes our sample, the normative sample and the contrast sample. We compared and analysed the data of all three groups to make conclusions about our sample by using statistical tools in SPSS Statistics, which will be described in detail in subchapter 4.2.

Table 4.2: Overview of all samples

Sample Group	Our Sample	Normative Sample	Contrast Sample
Sample Size	9	2662	55
Age	35 to 61	30 to 55	30 to 55
Gender	8 Male and 1 Female	1716 Male and 946 Female	23 Male and 22 Female
Task Field	Managers with and without strategic roles	Managers with strategic roles	Managers without strategic roles

4.1.2 360-Degree Semi-Structured Telephone Interview Results

The findings from the 360-degree semi-structured telephone interviews allowed us to gauge the level of strategic thinking within our sample. However, since there were not three raters for every case, the results should be interpreted carefully. For example, Individual 1 was rated by three peers. Individual 5 and 7, however, were only rated by one person. Reasons for this were the fact that some individuals did not have supervisors, colleagues or subordinates to rate or missing responses on the part of the raters. On average, the raters have worked with the ratees for 4 - 5 years. Results of more than one rater are displayed as an average. Consequently, these results only represented the impression of fewer than three raters and should be interpreted more critically. The average answers of our 360-degree semi-structured telephone interview questions are presented in *Table 4.3*.

Table 4.3: Summary of answers regarding the 360-degree semi-structured telephone interview questions

Question	Average
<i>How well do you know this person? (1 to 5)</i>	3.87
<i>How many years have you been working together?</i>	4 - 5 years
<i>How would you rate this person's ability to think strategically? (1 to 5)</i>	4.22

Table 4.4 summarises the results found by the 360-degree semi-structured interviews, as well as the self-completion voting questionnaire. These results include the number of votes, number of raters, average level of perceived strategic thinking and the average scores for each of the core concepts of

strategic thinking outlined by Sandelands and Singh (2017). Furthermore, the order of the table is ranked by the number of votes each individual received. For example, Individual 1 received 22 votes and therefore was perceived as the strongest strategic thinker among their peers. We interpreted the results of the self-completion voting questionnaire as the overall perception of everyone within the company. It should be noted that the perceived levels of strategic thinking rarely match the total average score of the fifteen core concepts.

Table 4.4: Average scores of the 360-degree semi-structured telephone interview

Core Concepts by Sandelands & Singh (2017)	Individual								
	1	2	3	5	6	7	8	9	11
Number of Votes	22	20	18	12	11	11	10	10	8
Number of Raters	3	2	3	1	2	1	2	2	2
Perceived Strategic Thinking Ability	4.67	4.50	4.33	3.00	4.50	4.00	4.50	4.00	4.50
Creative	3.67	4.00	3.67	2.00	3.00	2.00	4.50	3.50	3.50
Analytical	4.00	4.50	4.67	3.00	4.00	4.00	5.00	4.00	4.50
Conceptual	4.33	4.00	4.33	4.00	4.00	3.00	4.50	4.00	3.50
Context Oriented	4.00	4.50	4.00	4.00	5.00	3.00	4.50	4.00	4.00
Divergent	4.33	4.50	4.00	3.00	2.50	4.00	4.00	4.00	5.00
Process Oriented	2.33	2.00	3.67	4.00	4.00	4.00	4.50	4.50	4.50
Flexible	3.00	2.50	3.67	4.00	3.00	2.00	3.50	4.50	3.00
Future Oriented	4.33	3.50	4.33	4.00	4.50	4.00	4.50	4.40	4.50
Visionary	5.00	3.05	3.33	2.00	3.50	2.00	4.00	4.00	3.50
Holistic	3.67	4.00	4.67	4.00	5.00	4.00	4.00	4.00	4.00
Reflective	4.00	3.50	4.33	2.00	4.50	4.00	4.50	4.50	4.00
Intuitive	3.00	2.50	2.67	3.00	3.00	3.00	4.00	4.50	3.00
Integrative	4.00	3.50	3.67	3.00	3.50	3.00	4.00	3.50	5.00
Synthetic	4.00	4.00	3.33	2.00	4.00	3.00	4.00	4.50	3.50
Systematic	3.67	3.50	5.00	4.00	4.00	4.00	4.50	3.50	5.00
Total Average Score Core Concepts	3.82	3.67	3.96	3.20	3.83	3.27	4.27	4.10	4.03

4.1.3 CPP Assessment Results

In *Table 4.5*, we summarised the data measured and generated by the CPP assessment. Included are the fourteen processing competencies. These results come courtesy of Cognadev UK Ltd.

Table 4.5: Results of the CPP assessment

CPP Processing Competency Scores	Individuals									
	1	2	3	5	6	7	8	9	11	
Use of Memory	47	69	54	65	67	41	62	43	58	
Memory Strategies	44	50	61	39	78	32	74	49	65	
Pragmatic	78	58	64	49	49	56	71	61	71	
Exploration	72	47	65	34	59	45	70	59	76	
Analysis	61	63	61	33	64	54	70	60	45	
Rules	50	65	61	38	84	40	70	45	69	
Categorisation	47	71	71	56	70	53	69	40	75	
Integration	66	50	64	44	65	48	64	54	70	
Complexity	70	52	52	43	53	42	63	63	74	
Logical Reasoning	66	43	49	36	61	48	67	55	68	
Verbal Conceptualisation	45	32	56	30	64	45	47	35	35	
Judgement	67	50	44	32	52	52	62	65	79	
Quick Insight Learning	68	57	55	46	61	38	60	58	83	
Gradual Improvement Learning	66	69	62	37	38	54	70	46	77	
cLOW	4	2	3	2	3	2	3	2	4	
Potential Level of Work	4	3	3	3	3	2	4	3	5	

The cLOW of the individual with the most votes in the self-completion voting questionnaire (Individual 1) was 4. Their potential level of work was also 4. Thus, Individual 1 seemed to be perceived as one of the best strategic thinkers within the company and the CPP assessment results confirmed that this individual was indeed more strategic than operational.

The results of Individual 11 reveal an interesting finding. In the self-completion voting questionnaire, Individual 11 was voted for by ten people within the company. This means that Individual 11 did not come across as a salient strategic thinker. However, this individual had the highest score of our sample with cLOW of 4 and potential level of work of 5. Overall most of the individuals have a cLOW of 2, with a potential level of work of 3. *Figure 4.3* shows the distribution of current and potential working levels of our sample.

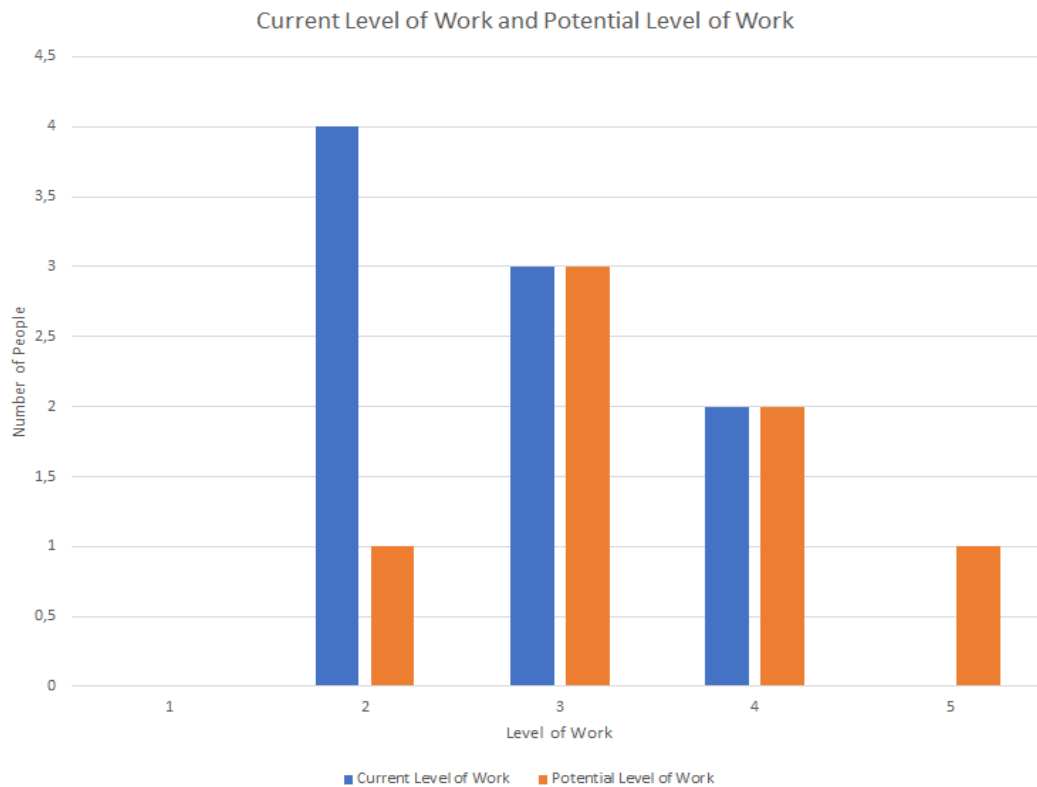


Figure 4.3: The current and potential levels of work for our sample group

4.2 Analysis of Collected Data

In this section, we analyse the collected qualitative and quantitative data which is presented in subchapter 4.1 in order to answer our research questions. Therefore, the next two subchapters are focused on one research question each. First, we begin with the analysis to answer our first research question “*what are the most important cognitive elements of strategic thinking?*”. Then, we continue with an analysis of the data to answer our second research question “*is the CPP assessment a valid tool to measure the ability of strategic thinking?*”.

4.2.1 Analysis of the Cognitive Elements of Strategic Thinking

To answer our first research question, we looked at both the data from the 360-degree semi-structured telephone interview and the CPP assessment. Each method measured different cognitive elements. The 360-degree semi-structured telephone interview provided ratings for the fifteen core concepts by Sandelands and Singh (2017) whereas the CPP assessment measured the processing competencies outlined in our theory section.

Comparing the core concepts and the processing competencies with each other were difficult due to the differences in definitions. Therefore, we decided to look at both methods separately to identify outstanding elements in each method. In the following, we started with identifying outstanding core concepts by Sandelands & Singh (2017) with the aid of the results of our 360-degree semi-structured telephone interviews.

Core Concepts by Sandelands and Singh (2017)

Our sample consisted of nine individuals and the data gathered from close peers of the individuals. These peers evaluated our nine individuals, and their answers represented the data used to answer our first research question. However, this was the only sample we had collected 360-degree semi-structured telephone interview data for.

Table 4.6 shows the average ratings of the question, “how would you rate this person’s ability to think strategically?” from the 360-degree semi-structured telephone interviews. This question was asked to corroborate the results of the self-completion voting questionnaire. The TOP and LOW groups were determined by calculating an average of the all the ratings collected for each individual. Those whose total average rating was ≥ 4.50 were put in the TOP group. The LOW group was made of average scores of < 4.5 . This made it easier to identify which core concepts of strategic thinking (Sandelands & Singh, 2017) were better developed in those individuals who rated better.

Table 4.6: Ratings based on the question “how would you rate this person’s ability to think strategically?”

Group	Average rating
TOP	≥ 4.50
LOW	< 4.50

Since we did not collect data from a control group from the company we worked with, we instead separated our sample of nine. These two groups were the TOP and LOW group, based the data presented in Table 4.7. This allowed us to compare the two groups to identify outstanding core concepts by Sandelands and Singh (2017). We assumed that the identified outstanding core concepts were important and therefore, facilitating strategic thinking.

Table 4.7: Separation of the TOP and LOW groups

Individual	TOP Group					LOW Group			
	1	2	6	8	11	3	7	9	5
Strategic	4.67	4.50	4.50	4.50	4.50	4.33	4.00	4.00	3.00

Averages of the TOP and LOW groups scores for each of Sandelands and Singh’s (2017) core concepts of strategic were made. This was to see if there was a clear difference in scores for each core concept. Table 4.8 shows the averages of each core concept for each of the groups. A positive contrast (where the TOP group scored higher than the LOW group) was seen in creative, analytical, conceptual, context oriented, divergent, visionary, reflective, integrative and synthetic. A negative contrast (where the LOW group scored higher than the TOP group) was seen in process oriented, flexible and intuitive. A contrast of 0.00 (or close to 0.00) was seen in the core concepts of future oriented, holistic and systematic.

Table 4.8: Averages and contrasts of core concepts between the TOP and LOW groups

<i>Core Concept</i>	<i>TOP Group Average Scores</i>	<i>LOW Group Average Scores</i>	<i>Contrast Between TOP and LOW Groups Average Scores</i>
Creative	3.73	2.79	0.94
Analytical	4.40	3.91	0.48
Conceptual	4.07	3.83	0.23
Context Oriented	4.40	3.75	0.65
Divergent	4.07	3.75	0.32
Process Oriented	3.47	4.04	-0.57
Flexible	3.00	3.54	-0.54
Future Oriented	4.27	4.21	0.06
Visionary	3.90	2.83	1.07
Holistic	4.13	4.17	-0.03
Reflective	4.10	3.71	0.39
Intuitive	3.10	3.29	-0.19
Integrative	4.00	3.29	0.71
Synthetic	3.90	3.21	0.69
Systematic	4.13	4.13	0.00
<i>Total Average</i>	3.91	3.63	0.28

Figure 4.4 displays the averages graphically for each group in comparison to each other. It was found that the TOP group did not score higher than the LOW group in all the core concepts. Instead, there were core concepts where the TOP group lower than the LOW group.

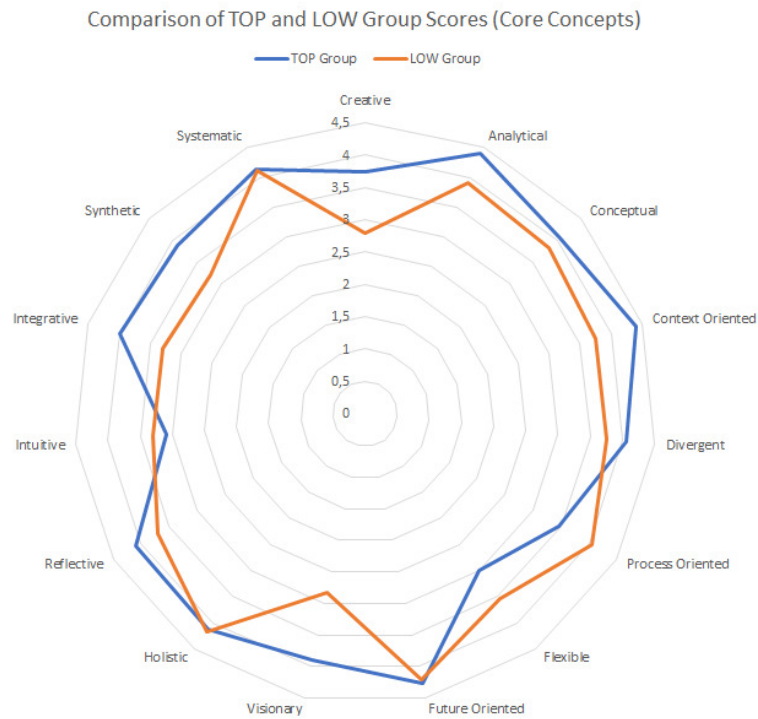


Figure 4.4: Contrasts in core concepts between TOP and LOW groups

To make the differences more visible, we illustrated the contrasts in another way. Figure 4.5 graphically displays the contrasts between the TOP and LOW groups. The red line marks a contrast of 0.00. The contrast illustrates very clearly is that creative and visionary are the most outstanding core concepts.

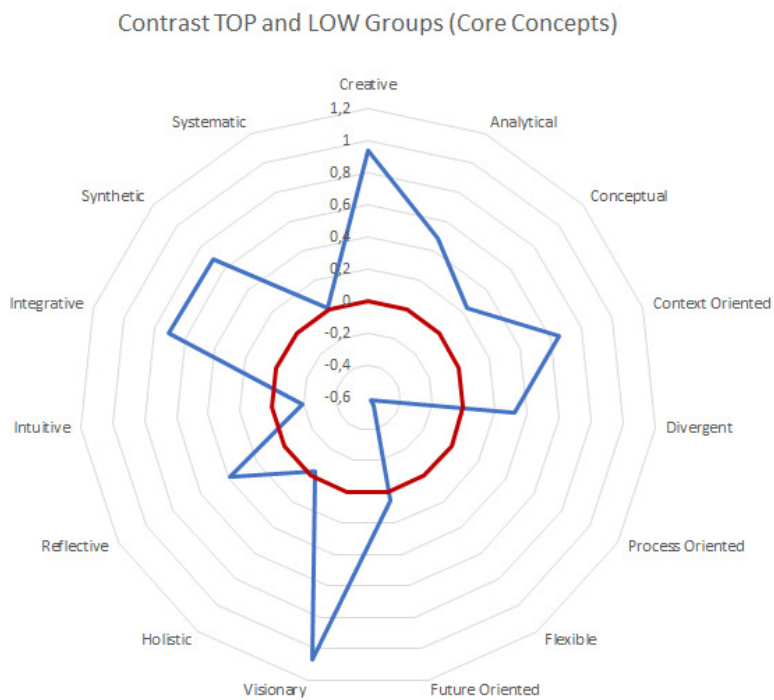


Figure 4.5: Contrast between TOP and LOW groups. Red Line = 0.00 contrast

To underpin our results with statistical analysis, the Mann-Whitney U Test was used to find the significance (α). *Table 4.9* shows the significance of the differences in the scores of the core concepts. According to our analysis, we found no significant differences in scores of the *TOP* and *LOW* groups.

Table 4.9: Significance of the differences the TOP and LOW groups in the core concepts

<i>Core Concepts</i>	<i>Significance (α)</i>
<i>Creative</i>	<i>0.190</i>
<i>Analysis</i>	<i>0.413</i>
<i>Conceptual</i>	<i>0.556</i>
<i>Context Oriented</i>	<i>0.111</i>
<i>Divergent</i>	<i>0.286</i>
<i>Process Oriented</i>	<i>1.000</i>
<i>Flexible</i>	<i>0.286</i>
<i>Future Oriented</i>	<i>0.556</i>
<i>Visionary</i>	<i>0.111</i>
<i>Holistic</i>	<i>0.730</i>
<i>Reflective</i>	<i>0.905</i>
<i>Intuitive</i>	<i>1.000</i>
<i>Integrative</i>	<i>0.111</i>
<i>Synthetic</i>	<i>0.286</i>
<i>Systematic</i>	<i>1.000</i>

Processing Competencies of the CPP assessment

In this part, we tried to identify outstanding processing competencies in the CPP assessment. As before, we divided our sample of the nine individuals by using the same criterion as the 360-degree semi-structured telephone interviews, as seen in *Table 4.6*.

Table 4.10 shows each group's average for each of the processing competencies measured by the CPP. The contrasts of the averages of the *TOP* and *LOW* groups are shown as well. Several processing competencies had a relatively large difference of scores. These processing competencies are; quick insight learning, memory strategies and rules. The processing competencies that had a relatively low difference were analytical, pragmatic and verbal conceptualisation.

Table 4.10: Averages and contrasts of processing competencies between TOP and LOW groups

<i>Processing Competency</i>	<i>TOP Group</i>	<i>LOW Group</i>	<i>Contrast Between TOP and LOW Group</i>
Analytical	61	52	9
Categorisation	66	55	11
Complexity	62	50	12
Exploration	65	51	14
Integration	63	53	11
Judgement	62	48	14
Quick Insight Learning	66	49	17
Gradual Insight Learning	64	50	14
Logical Reasoning	61	47	14
Memory Strategies	62	45	17
Use of Memory	61	51	10
Pragmatic	65	58	8
Rules	68	46	22
Verbal Conceptualisation	49	42	7

Figure 4.6 shows the comparison of the processing competencies found in the CPP assessment between the TOP and LOW groups. As shown the TOP group consistently scored higher than the LOW group. Unlike the scores from the 360-degree semi-structured telephone interview results, the TOP group consistently scores higher than the LOW group across all variables.

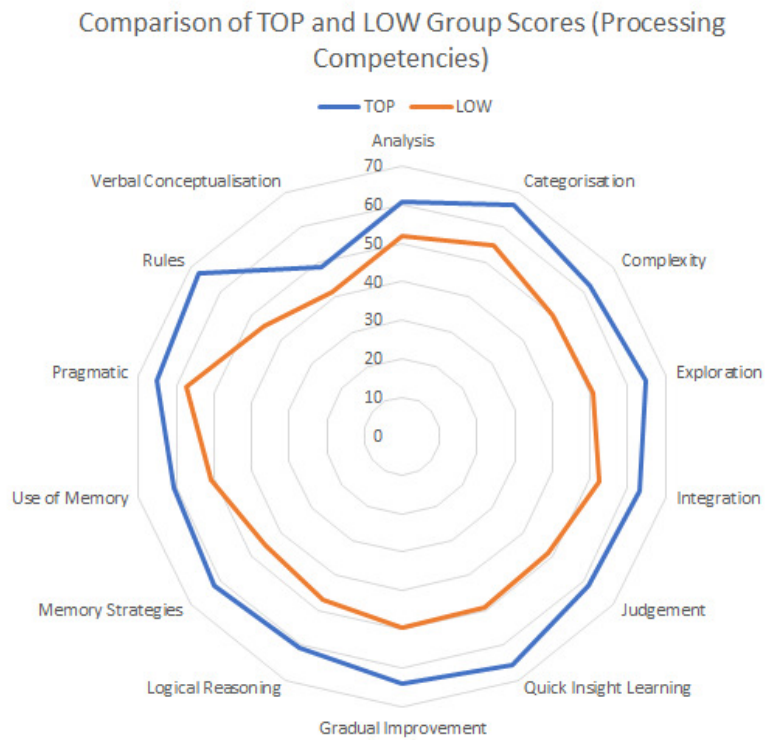


Figure 4.6: The differences in the processing competencies of the TOP and LOW groups

Figure 4.7 graphically displays the contrasts found in each of the processing competencies measured by the CPP assessment.

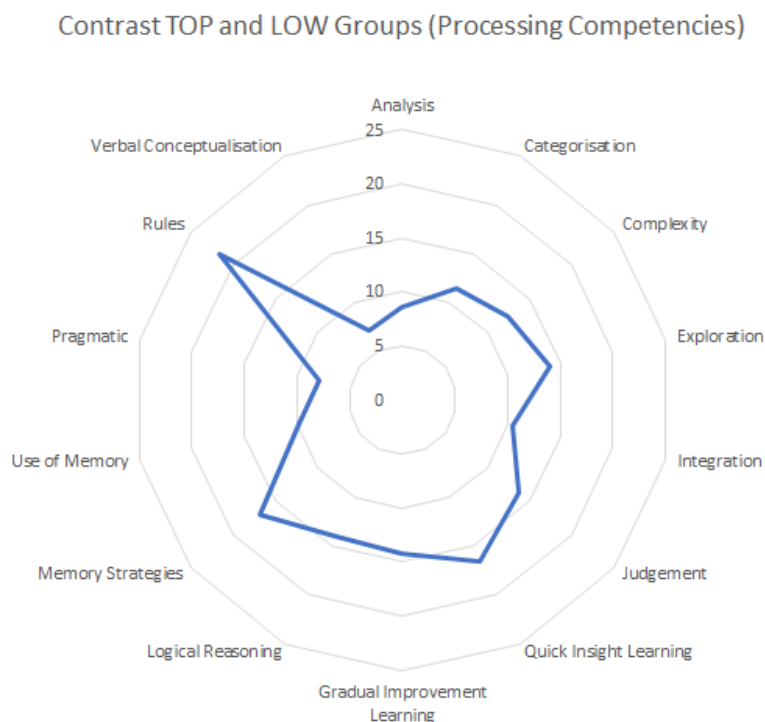


Figure 4.7: The contrasts in processing competencies between the TOP and LOW groups

Table 4.11 shows the significance (α) between the scores of the *TOP* and *LOW* groups. The Mann-Whitney U test was again used to find the levels of significance. The processing competencies of quick insight learning and rules were found to be significant.

Table 4.11: Significance of differences in processing competencies

<i>Processing Competencies</i>	<i>Significance (α)</i>
<i>Analysis</i>	<i>0.111</i>
<i>Categorisation</i>	<i>0.286</i>
<i>Complexity</i>	<i>0.111</i>
<i>Exploration</i>	<i>0.111</i>
<i>Integration</i>	<i>0.063</i>
<i>Judgement</i>	<i>0.190</i>
<i>Quick Insight Learning</i>	<i>0.032</i>
<i>Gradual Learning</i>	<i>0.111</i>
<i>Logical Reasoning</i>	<i>0.111</i>
<i>Memory Strategies</i>	<i>0.111</i>
<i>Use of Memory</i>	<i>0.190</i>
<i>Pragmatic</i>	<i>0.286</i>
<i>Rules</i>	<i>0.032</i>
<i>Verbal Conceptualisation</i>	<i>0.413</i>
<i>Balance</i>	<i>0.111</i>

Unlike the 360-degree semi-structured telephone interview, we could compare the data of our sample with a normative and contrast sample. Therefore, we conducted the Mann-Whitney U test with all processing competencies of the CPP assessment. Thereby we compared our whole sample, the *TOP* group of our sample and the *LOW* group of our sample with both the normative and contrast samples. Interestingly, there are many significant differences in the *LOW* group whereas; the *TOP* group showed less significant differences. Table 4.12 shows our results of data analysis by conducting the Mann-Whitney U Test with all processing competencies of the CPP assessment.

Table 4.12: Significance of differences between sample groups

Processing Competency	Mann-Whitney U Test Significance (α)					
	Our Sample vs Contrast Sample			Our Sample vs Normative Sample		
	Whole Sample	TOP group	LOW group	Whole Sample	TOP group	LOW group
Pragmatic	0.794	0.532	0.270	0.801	0.332	0.481
Analytical	0.358	0.938	0.187	0.893	0.557	0.390
Rules	0.481	0.333	0.022	0.816	0.170	0.060
Categorisation	0.384	0.138	0.738	0.259	0.076	0.773
Quick Insight Learning	0.266	0.795	0.039	0.577	0.403	0.076
Integration	0.315	0.856	0.072	0.455	0.642	0.101
Complexity	0.061	0.678	0.011	0.164	0.973	0.040
Logical	0.044	0.775	0.002	0.067	0.788	0.014
Verbal Conceptualisation	0.005	0.082	0.011	0.003	0.066	0.016
Use of Memory	0.870	0.603	0.405	0.834	0.575	0.346
Memory Strategies	0.275	0.796	0.042	0.323	0.642	0.045
Exploration	0.629	0.482	0.124	0.769	0.371	0.150
Gradual Improvement Learning	0.885	0.259	0.131	0.895	0.140	0.146
Judgement	0.505	0.697	0.140	0.595	0.579	0.156

4.2.2 Evaluating the Validity of the CPP Assessment

To be able to answer the question, “*is the CPP assessment a valid tool to measure strategic thinking?*”, we compared the current levels of work of our sample with the results of the 360-degree semi-structured telephone interview. We speculated that if an individual scored highly in the CPP assessment, the results from the 360-degree semi-structured telephone interviews should confirm the CPP assessment, with high ratings too. Therefore, we calculated the Spearman correlation coefficient to see if the correlations prove this assumption.

For this, we compared the average ratings from the question, “*how would you rate this person's ability to think strategically?*” from 1 to 5 (with 1 being low and 5 being high). Then, we put these average scores in relation to the CPP assessment cLOW. The result was a positive correlation coefficient of $\rho = 0.748$ and a significance of $\alpha = 0.021$. This means that there is a large and significant correlation

between the perceptions of those close to the individuals and the results of the CPP assessment. *Table 4.13* summarises this.

Table 4.13: Spearman correlation coefficient and significance of strategic thinking ability and CPP cLOW

Individual	1	2	3	5	6	7	8	9	11	Correlation	Significance
Strategic thinking ability	4.67	4.50	4.33	3.00	4.50	4.00	4.50	4.00	4.50	$\rho = 0.748$	$\alpha = 0.021$
CPP cLOW	4	2	3	2	3	2	3	2	4		

Figure 4.8 illustrates the significant correlation graphically. With this, we can say that the individuals who participated in our study are indeed perceived as strategic thinkers in reality.

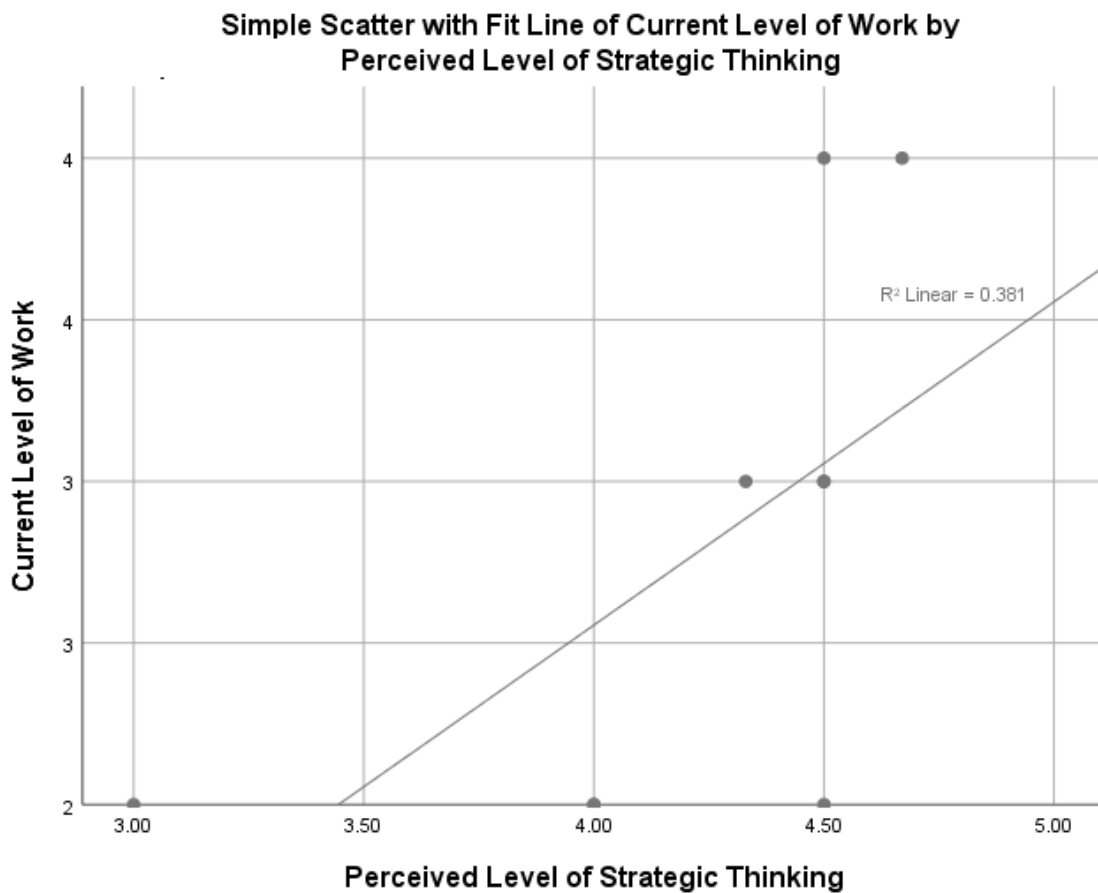


Figure 4.8: Correlation of cLOW and the perceived level of strategic thinking

Moreover, we wanted to test if the individuals in our sample scored higher in the CPP assessment than other people with similar characteristics such as age and position. As mentioned in our methodology, it is a possibility that the individuals of our sample are more strategic than others in the company, but not compared with individuals with similar characteristics in the general population. Therefore, we used the independent t-test to compare our sample with (1) the normative sample and (2) with the contrast sample to see whether or not that can be stated.

As a result, our sample performed merely slightly lower than both other samples. When comparing the whole normative sample with our sample, the mean cLOW of our sample is 2.78 and the normative sample 2.86. The standard deviations are $\sigma = 0.833$ and $\sigma = 0.864$ respectively. In contrast, when comparing nine random individuals out of the normative sample, both means are 2.78 and therefore equal. The mean cLOW of our sample is 2.78 and the normative sample 2.86. Here, the standard deviation is $\sigma = 0.833$ in our sample and $\sigma = 0.972$ in the normative sample. The results of this are presented in *Table 4.14*.

Table 4.14: Independent t-test of our sample with the normative sample

Variable	Scope	Group	N	Mean	Std. Deviation (σ)
cLOW	Whole Sample	Our Sample	9	2.78	0.833
		Normative Sample	2,662	2.86	0.864
	Random Sample	Our Sample	9	2.78	0.833
		Normative Sample	9	2.78	0.972

The performance of our sample in comparison with contrast sample is lower than compared with the normative sample. Our results indicate that the contrast sample mean is 2.96 whereas our sample is 2.78. The standard deviation is $\sigma = 0.833$ in our sample and $\sigma = 0.793$ in the contrast sample. The results of nine random individuals of the contrast sample are equal, 2.78 with a standard deviation of $\sigma = 0.833$ in our sample and $\sigma = 0.972$ in the random sample. This is shown in *Table 4.15*.

Table 4.15: Independent t-test of our sample with the contrast sample

Variable	Scope	Group	N	Mean	Std. Deviation (σ)
cLOW	Whole Sample	Our Sample	9	2.78	0.833
		Contrast Sample	55	2.96	0.793
	Random Sample	Our Sample	9	2.78	0.833
		Contrast Sample	9	2.78	0.972

In summary, we can say that the CPP assessment indicates an individual's ability to think strategically. Within our sample, the cLOW was significantly correlating with the perception peers had about the individuals. However, it should be noted that the CPP data of our sample did not represent the best strategic thinkers with similar characteristics. In other words, we identified the best strategic thinkers of our sample, but their performance is compared with similar people not outstanding.

5 Discussion

The purpose of this study was to understand strategic thinking and cognitive elements of strategic thinking better. With identifying the most important cognitive elements of strategic thinking, we aimed to shed light on this yet vague area of academia and enlighten the ambiguity of the vast amount of literature addressing this field. Simultaneously, we wanted to explore whether or not strategic thinking could be accurately measured with the CPP assessment. By doing that, we asked two questions that guided our research into strategic thinking, and they will be discussed here.

5.1 Identifying the Most Important Cognitive Elements

From the analysis from the 360-degree semi-structured interviews, we found that not all the core concepts outlined by Sandelands and Singh (2017) appeared to be important in strategic thinking. The analysis of our sample found that being creative and visionary were indicated to be most important, seemingly facilitating strategic thinking. This unsurprising as people often associate these cognitive elements with being strategic. In Sandelands and Singh's (2017) thesis, they found that most authors agree on creativity being an important cognitive element (Bonn, 2001, 2005; Graetz, 2002; Heracleous, 1998; Hussey, 2001; Liedtka, 1998, 2011; Mintzberg, 1994a,b; Nuntamanop et al., 2013; Olson & Simerson, 2015; Rowe et al., 1986). Moreover, visionary as a cognitive element is supported a lot in the literature as well (Bonn, 2001, 2005; Dragoni et al., 2011; Liedtka, 1998, 2011; Mintzberg, 1994a,b; Nunatamanop et al., 2013; Rowe et al., 1986; Thompson & Strickland, 1996). Having empirical data underpinning this as evidence is positive, although it needs to be tested on a much larger scale to be confirmed.

We believe that the cognitive elements that were indicated as facilitating, creative and visionary, may have been rated more highly as they are more visible in individuals. Is it truly possible to know if someone is synthetic or divergent? Most of the core concepts scored within a similar range in each of the *TOP* and *LOW* groups, suggesting that either these core concepts are hard to recognise in people, or that they are neither facilitating or detrimental to strategic thinking. However, we found no significance in these results.

Conversely, being flexible and process oriented were seen as not important cognitive elements. The results even indicate that these core concepts may even hinder the ability to think strategically. Flexibility is seen as a desirable characteristic to possess, often being asked about in job applications and interviews. However, when looking through the lens of strategic thinking, we are given the indication that these cognitive elements are not important.

What was interesting about the results was the fact that the *TOP* group scored a lot higher in the rules processing competency. When analysing the results of the CPP assessment, we found that the *TOP* group scored higher in all the processing competencies. According to Cognadev UK Ltd. (2016), a focus on rules is more prevalent in people whose working levels are closer to the operational end of the spectrum. This difference was found to be significant. The other significant difference was in

quick insight learning. The *TOP* group scored higher on average, but this was expected as it is a facilitating processing competency.

When comparing our sample to the contrast and normative groups provided by Cognadev UK Ltd., we found that verbal conceptualisation scored lower in our sample group. These differences were found to be significant across the whole sample. We assumed these significant differences were because the contrast and normative groups were mostly made up of native English speakers. Our sample were not native English speakers.

When dividing our sample into the *TOP* and *LOW* groups, we found that there are many significant differences in the *LOW* group when compared to the contrast and normative groups. Interestingly, when comparing the *TOP* group to the contrast and normative groups, we found no significant differences. This tells us that our *TOP* group is relatively average when it comes to strategic thinking. When answering our second research question we found that our sample group was, in fact, a very average group when it came to current levels of work.

Therefore, we can say that the core concepts; creative and visionary, and the processing competencies; quick insight learning and rules, appear to be the most important elements of strategic thinking. However, these findings are just an indication, since our sample group was too small to ascertain any concrete facts. Also, we were limited by the fact that our sample group was reasonably unremarkable when it came to strategic thinking. If our sample had been larger, or better strategic thinkers, we might have been able to indicate more, or different core concepts and processing competencies which are the most important for strategic thinking.

Table 5.1: Overview of the important facilitating and hindering elements of strategic thinking

<i>Important Facilitating Elements</i>	<i>Hindering Elements</i>
Creative	Process Oriented
Visionary	Flexible
Rules	
Quick Insight learning	

5.2 The CPP Assessment as a Valid Measurement of Strategic Thinking

Our data analysis showed that there is an indication that the CPP assessment can pick up something that is related to the ability of strategic thinking. The large correlation with a strong significance between the results of the question “*how would you rate this person's ability to think strategically?*” and the cLOW of the CPP assessment provided evidence for this statement. Having stated that, it is important to keep in mind that the size of our sample was relatively small. A larger sample size would increase the meaningfulness of our results. However, this was due to our limitations not feasible.

It should be noted that most of the individuals perceived to be the strongest strategic thinkers were mostly in positions higher up the hierarchy. This raises the question if the individuals were selected

because of their position or because their peers thought that they were, in fact, the strongest strategic thinkers? With the open question, “*why do you think [individual] was nominated as a strategic thinker?*” from the 360-degree semi-structured telephone interviews, we tried to see if this was the case. 28% of the responses referred to the individual’s position, being an executive etc. The rest of the responses were in reference to the individual’s professional experience or to their personal traits, such as possessing a holistic view or being able to think outside of the box. This is promising as the raters, for the most part, did not take into account hierarchical position, but instead qualities more associated with the core concepts and processing competencies explored in this thesis. It should also be noted that on average the raters knew the ratees for 4 - 5 years. Therefore, we can say with a high degree of certainty that the best strategic thinkers were in fact correctly identified by the self-completion voting questionnaire.

Moreover, the analyses of our sample compared with the contrast sample and the normative sample with the independent t-test have given us indications that our sample is almost alike as the normative sample with similar characteristics as the individuals in our sample had. Also, our sample was slightly below the average of the contrast group. Even if we only compared the best strategic thinkers of our sample according to the CPP assessment cLOW’s, they were merely as good as the average in both other samples.

Consequently, we can state that the CPP assessment picks up indications of how well an individual's ability to think strategically is. The best strategic thinkers of our sample are most likely the best strategic thinkers within the participating company. However, when our sample was compared to the other samples, they were found to have been slightly below average regarding strategic thinking capabilities.

6 Conclusion

In conclusion, we found from our first research question that being creative, visionary, following rules and having quick insight are the most important elements of strategic thinking. We even found that the core competencies of being process oriented and flexible may be a hindrance to the development of strategic thinking. This is because individuals who were not perceived to be the strongest strategic in the 360-degree semi-structured interviews scored higher in these core concepts than those perceived as the strongest strategic thinkers.

From the literature review, we found that the main ideas on strategic thinking could be put into three different categories. Maretha Prinsloo and Cognadev seem to align with *Type 3* strategic thinking, which is what the CPP assessment measures. From our research, we have found that ideas, seemingly from both ends of the strategic spectrum are important elements of strategic thinking.

In this study, we also found that the CPP assessment is, in fact, an accurate tool to measure strategic thinking capabilities. We compared ratings from the 360-degree semi-structured telephone interviews and current levels of work found by the CPP assessment. These findings had a large correlation, and thus, those individuals who received a high rating from the 360-degree semi-structured telephone interviews tended to also achieve a higher level of work in the CPP assessment.

An indication of the importance of the findings

The findings reading our first research questions help to understand the cognitive elements of strategic thinking better. A vast number of different elements identified by Sandelands and Singh (2017) based on a large amount of literature published by many authors as well as various elements measured by the CPP assessment increased the level of ambiguity of the most important cognitive elements facilitating strategic thinking. With our study, we isolated promoting cognitive components based on all elements available in the literature.

Implications or practical applications of the study

The value of the CPP assessment as a valid tool to measure the ability of strategic thinking would have a tremendous impact on organisations. Instead of using inaccurate tools, they could identify the right individuals for strategic positions with a straightforward two hours test. These strategic minds could thrive in their strategic positions by using their advantages correctly to help the organisation steer successfully through this volatile world we are living in. Furthermore, if the third subproject of our overall project finds indications that strategic thinking can be developed, it would be even more interesting to be able to identify the best strategic thinkers to improve their ability further.

Recommendations for further research

At this point, we would like to express how interesting it would be to see if this way of analysing the data would also show significant correlations in other case studies to validate our findings further. We propose the following:

1. Another study repeating our process regarding the question “*what are the most important cognitive elements*” with a larger sample size find that the same elements are facilitating and hindering?
2. Another study repeating our process regarding the question “*is the CPP assessment a valid tool to measure the ability of strategic thinking*” with a larger sample size get the same results as we did?

With our first recommendation, we suggest that the process of our study should be conducted again with another company to see if the results would be the same or at least similar. It should be noted that a larger size of the sample would be important as well as having a control group within the same company. That would increase the validity of this study tremendously. Secondly, we would also recommend conducting the process of our study regarding our second research question. Even though our study indicated a significant correlation, we need to be aware of our small sample size. A larger sample size would also, in this case, increase the validity of our findings massively. Moreover, a control group within the company would increase the validity even further.

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Appendix A

Self-Completion Voting Questionnaire [names have been redacted]

1. Information

- a. We kindly ask you to select the people (max 10) you perceive to be the best strategic thinkers in your company.

Please be aware that the order of the names are alphabetical. Furthermore, we ask you to keep your answers confidential so as not to influence other participants.

For your interest, out of all the names proposed, ten will be asked to participate in the next stage of the study. We apologise for any spelling mistakes regarding names, if present, in advance.

Thank you for your participation!

2. Please select those who you think are the best strategic thinkers (max 10)

- a. Individual 1
- b. Individual 2
- c. Individual 3
- d. Individual 4
- e. Individual (...)
- f. Individual (...)
- g. Individual (...)
- h. Individual 90

Appendix B

360-degree semi-structured telephone interview form [names have been redacted]

1. Who is evaluating?
 - a. Short answer text
2. Who is being evaluated?
 - a. Individual 1
 - b. Individual 2
 - c. Individual 3
 - d. Individual 5
 - e. Individual 6
 - f. Individual 7
 - g. Individual 8
 - h. Individual 9
 - i. Individual 11
3. Why do you think (...) was nominated as a strategic thinker?
 - a. Long answer text
4. What is your relationship to this person?
 - a. Supervisor
 - b. Colleague
 - c. Subordinate
5. How well do you know this person?
 - a. Scale from 1 to 5 with 1 being *Somewhat* and 5 being *Very well*
6. How many years have you been working together?
 - a. <1 year
 - b. 1-3 years
 - c. 4-6 years
 - d. 7-10 years
 - e. 10+ years
7. How would you rate this person's ability to think strategically?
 - a. Scale from 1 to 5 with 1 being *Low* and 5 being *High*
8. How would you assess the individual's ability on these styles? (Scale from 1 to 5 with 1 being *Low* and 5 being *High*)
 - a. Analytical
 - b. Creative
 - c. Analytical
 - d. Conceptual

- e. Context Oriented
- f. Divergent
- g. Process Oriented
- h. Flexible
- i. Future Oriented
- j. Visionary
- k. Holistic
- l. Reflective
- m. Intuitive
- n. Integrative
- o. Synthetic
- p. Systematic

Appendix C

Page 1

INFORMATION SHEET

Research Project:

As part of our Master of Science in Management studies at Lund University School of Economics and Management, we are conducting a research project. With this information sheet, we would like to invite you to participate in the third part of the data collection process.

The aim of the research project is to investigate what the cognitive elements of strategic thinking are, how strategic thinking is perceived, and to measure the validity of the Cognitive Process Profile (CPP) test in testing strategic thinking ability in individuals.

Why have I been chosen?

We are particularly interested in the managerial point of view in strategic thinking. Thus, our sample of the case study consists of mostly individuals in managerial positions.

What would happen if I participate?

1. You are asked to take part in a 360-degree feedback telephone interview.
2. You are asked to take part in a CPP test (Cognitive Process Profile assessment)

Do I have to participate?

You do not have to participate, and you are free to withdraw from the project at any time. However, your participation is highly valued.

What happens to the results of the case study?

The results of this case study will be analysed and presented in our master's thesis. All personal information will be kept strictly confidential and the data collected will be anonymous in the published thesis.

What are the possible disadvantages and risks of taking part?

There are no disadvantages or risks of taking part in this project.

What are the possible benefits of taking part?

You will be supporting research concerning strategic thinking at Lund University School of Economics and Management.

In addition, you will discover your cognitive style, strengths, and potential for growth. You will also take an active role in defining the field of strategic thinking.

Who is conducting this research?

We, Danjel Düpmann and Matthew Foster, will be conducting this research under the supervision of Stein Kleppestø, Associate professor at Lund University, Sweden.

What should I do next?

If you agree to participate, please read and sign the attached consent form. Please scan and send the signed consent form back to us on this email address: da0384du-s@student.lu.se or ma4321fo-s@student.lu.se

Alternatively, you can sign this at the CPP Cognitive Process Profile testing occasion.

If you have any further questions or concerns about the investigation, please do not hesitate to contact us anytime.

WRITTEN CONSENT TO PARTICIPATE IN A RESEARCH STUDY

Background Information

Name: _____

Age: _____

Gender: _____

Statement by participant

- I confirm that I have read and understood the information sheet/letter of invitation for this study. I have been informed of the purpose, risks, and benefits of taking part.

Title of study: The Cognitive Elements of Strategic Thinking - A Managerial Case Study of Company X

- I understand what my involvement will entail and any questions have been answered to my satisfaction.
- I understand that my participation is entirely voluntary, and that I can withdraw at any time without prejudice.
- I understand that all information obtained will be confidential.
- I agree that research data gathered for the study may be published provided that I cannot be identified as a participant.
- Contact information has been provided should I (a) wish to seek further information from the investigator at any time for purposes of clarification (b) wish to make a complaint.

Name of Participant _____

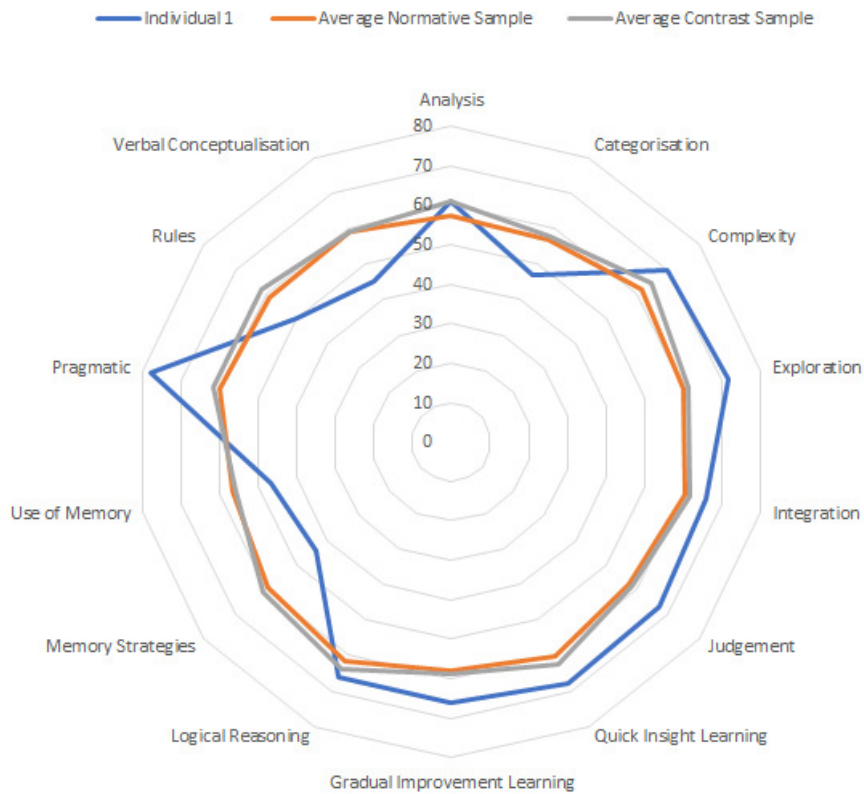
Date _____ Signature of Participant _____

Appendix D

Individual 1

Question	Rater			Average
	Supervisor	Colleague	Subordinate	
Why do you think (...) was nominated as a strategic thinker?	A lot of vision and that they need to act differently in the future	Has changed a lot within the organisation, excellent to create material for long-term changes	Top management executive	
How well do you know this person? (1 to 5)	4	4	4	4
How many years have you been working together?	4 - 6 years	4 - 6 years	4 - 6 years	4 - 6 years
How would you rate this person's ability to think strategically? (1 to 5)	4	5	5	4.67
<i>Creative</i> (1 to 5)	4	3	4	3.67
<i>Analytical</i> (1 to 5)	4	3	5	4.00
<i>Conceptual</i> (1 to 5)	4	5	4	4.33
<i>Context Oriented</i> (1 to 5)	4	3	5	4.00
<i>Divergent</i> (1 to 5)	5	4	4	4.33
<i>Process Oriented</i> (1 to 5)	3	1	3	2.33
<i>Flexible</i> (1 to 5)	4	4	5	4.33
<i>Future Oriented</i> (1 to 5)	4	5	4	4.33
<i>Visionary</i> (1 to 5)	5	5	5	5.00
<i>Holistic</i> (1 to 5)	4	4	3	3.67
<i>Reflective</i> (1 to 5)	4	4	4	4.00
<i>Intuitive</i> (1 to 5)	4	3	2	3.00
<i>Integrative</i> (1 to 5)	4	3	5	4.00
<i>Synthetic</i> (1 to 5)	4	4	4	4.00
<i>Systematic</i> (1 to 5)	4	2	5	3.67

Individual 1's Processing Competencies Compared to the Normative and Contrast Sample

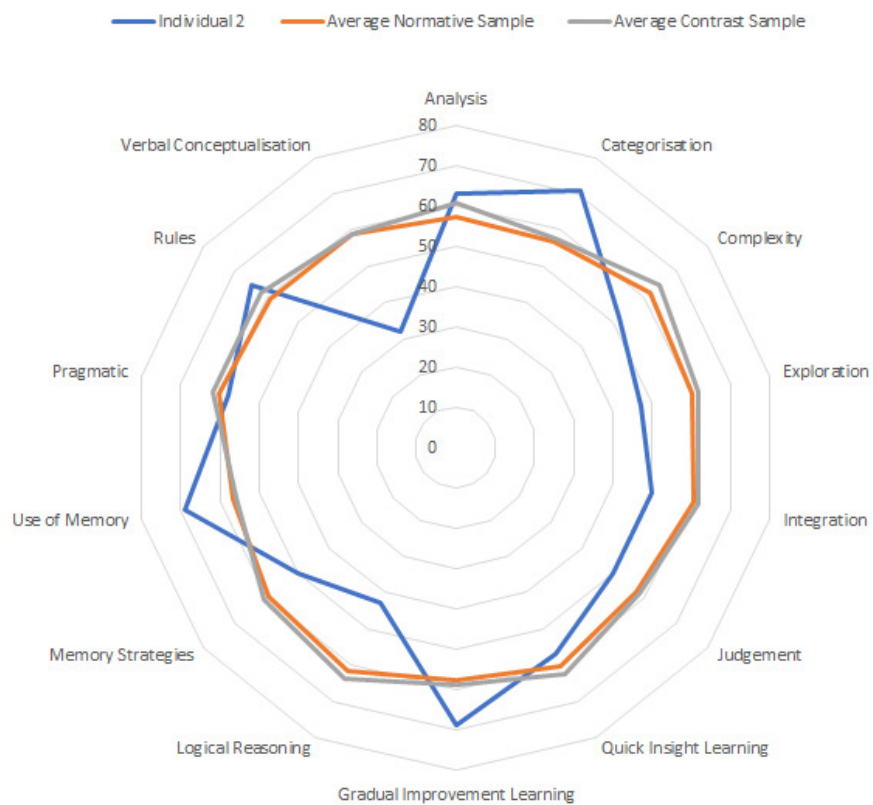


Individual 2

Question	Rater			Average
	Supervisor	Colleague	Subordinate	
Why do you think (...) was nominated as a strategic thinker?	Broader perspective for things, rational reasoning in discussion	Analytical, connected to strategic point of view and he can see different points of view		
How well do you know this person? (1 to 5)	5	5		5.00
How many years have you been working together?	1 - 3 years	4 -6 years		3 - 4 years
How would you rate this person's ability to think strategically? (1 to 5)	4	5		4.50
<i>Creative</i> (1 to 5)	3	5		4.00
<i>Analytical</i> (1 to 5)	4	5		4.50
<i>Conceptual</i> (1 to 5)	4	4		4.00
<i>Context Oriented</i> (1 to 5)	4	5		4.50
<i>Divergent</i> (1 to 5)	5	4		4.50

<i>Process Oriented</i> (1 to 5)	1	3		2.00
<i>Flexible</i> (1 to 5)	2	3		2.50
<i>Future Oriented</i> (1 to 5)	2	3		2.50
<i>Visionary</i> (1 to 5)	3	4		3.50
<i>Holistic</i> (1 to 5)	4	4		4.00
<i>Reflective</i> (1 to 5)	3	4		3.50
<i>Intuitive</i> (1 to 5)	3	2		2.50
<i>Integrative</i> (1 to 5)	3	4		3.50
<i>Synthetic</i> (1 to 5)	4	4		4.00
<i>Systematic</i> (1 to 5)	3	4		3.50

Individual 2's Processing Competencies Compared to the Normative and Contrast Samples



Individual 3

Question	Rater			Average
	Supervisor	Colleague	Subordinate	
Why do you think (...) was nominated as a strategic thinker?	The position - executive	Reflective, different perspectives, personal traits and due to his position	Structured, target oriented, consistent and able to stick to the plan	
How well do you know this person? (1 to 5)	3	4	3	3.33
How many years have you been working together?	1 - 3 years	1 - 3 years	1 - 3 years	1 - 3 years
How would you rate this person's ability to think strategically? (1 to 5)	5	4	4	4.33
<i>Creative</i> (1 to 5)	3	4	4	3.67
<i>Analytical</i> (1 to 5)	5	5	4	4.67
<i>Conceptual</i> (1 to 5)	5	3	5	4.33
<i>Context Oriented</i> (1 to 5)	4	5	3	4.00
<i>Divergent</i> (1 to 5)	4	4	4	4.00
<i>Process Oriented</i> (1 to 5)	4	4	3	3.67
<i>Flexible</i> (1 to 5)	4	3	4	3.67
<i>Future Oriented</i> (1 to 5)	4	4	5	4.33
<i>Visionary</i> (1 to 5)	4	2	4	3.33
<i>Holistic</i> (1 to 5)	5	5	4	4.67
<i>Reflective</i> (1 to 5)	4	5	4	4.33
<i>Intuitive</i> (1 to 5)	3	2	3	2.67
<i>Integrative</i> (1 to 5)	4	3	4	3.67
<i>Synthetic</i> (1 to 5)	4	3	3	3.33
<i>Systematic</i> (1 to 5)	5	5	5	5.00

Individual 3's Processing Competencies Compared to the Normative and Contrast Samples

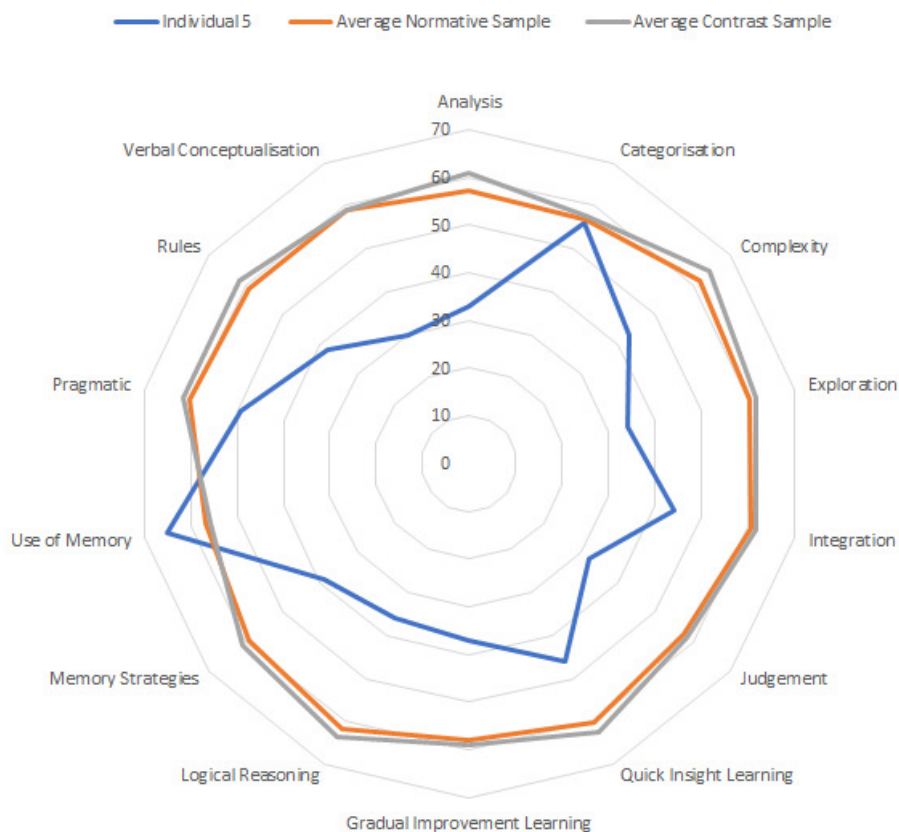


Individual 5

Question	Rater			Average
	Supervisor	Colleague	Subordinate	
Why do you think (...) was nominated as a strategic thinker?	Capability and background of good business knowledge and challenger view/mindset - critical thinking - can look from the outside			
How well do you know this person? (1 to 5)	2			2.00
How many years have you been working together?	7 - 10 years			7 - 10 years
How would you rate this person's ability to think strategically? (1 to 5)	3			3.00
<i>Creative</i> (1 to 5)	2			2.00
<i>Analytical</i> (1 to 5)	3			3.00
<i>Conceptual</i> (1 to 5)	4			4.00

<i>Context Oriented</i> (1 to 5)	4			4.00
<i>Divergent</i> (1 to 5)	3			3.00
<i>Process Oriented</i> (1 to 5)	4			4.00
<i>Flexible</i> (1 to 5)	4			4.00
<i>Future Oriented</i> (1 to 5)	4			4.00
<i>Visionary</i> (1 to 5)	2			2.00
<i>Holistic</i> (1 to 5)	4			4.00
<i>Reflective</i> (1 to 5)	2			2.00
<i>Intuitive</i> (1 to 5)	3			3.00
<i>Integrative</i> (1 to 5)	3			3.00
<i>Synthetic</i> (1 to 5)	2			2.00
<i>Systematic</i> (1 to 5)	4			4.00

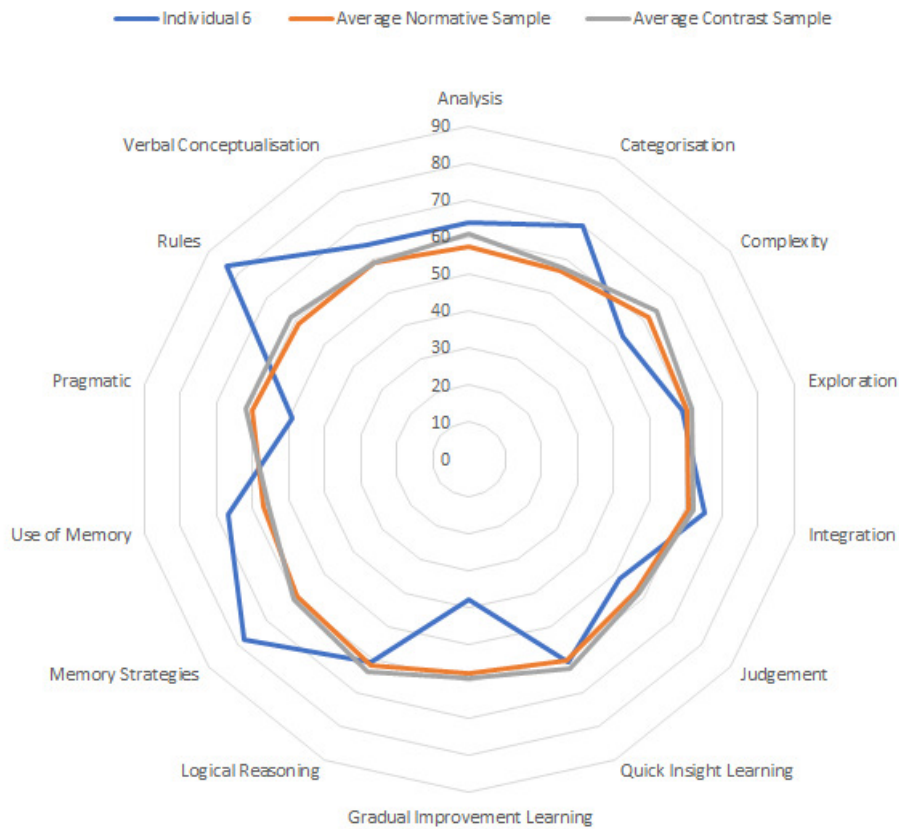
Individual 5's Processing Competencies Compared to the Normative and Contrast Samples



Individual 6

Question	Rater			Average
	Supervisor	Colleague	Subordinate	
Why do you think (...) was nominated as a strategic thinker?	Position, how he is doing it	Years of experience, different tasks over the years		
How well do you know this person? (1 to 5)	3	5		4.00
How many years have you been working together?	1 - 3 years	4 - 6 years		3 - 4 years
How would you rate this person's ability to think strategically? (1 to 5)	4	5		4.50
<i>Creative</i> (1 to 5)	2	4		3.00
<i>Analytical</i> (1 to 5)	4	4		4.00
<i>Conceptual</i> (1 to 5)	4	4		4.00
<i>Context Oriented</i> (1 to 5)	5	5		5.00
<i>Divergent</i> (1 to 5)	2	3		2.50
<i>Process Oriented</i> (1 to 5)	4	4		4.00
<i>Flexible</i> (1 to 5)	2	4		3.00
<i>Future Oriented</i> (1 to 5)	4	5		4.50
<i>Visionary</i> (1 to 5)	3	4		3.50
<i>Holistic</i> (1 to 5)	5	5		5.00
<i>Reflective</i> (1 to 5)	4	5		4.50
<i>Intuitive</i> (1 to 5)	2	4		3.00
<i>Integrative</i> (1 to 5)	3	4		3.50
<i>Synthetic</i> (1 to 5)	4	4		4.00
<i>Systematic</i> (1 to 5)	4	4		4.00

Individual 6's Processing Competencies Compared to the Normative and Contrast Samples

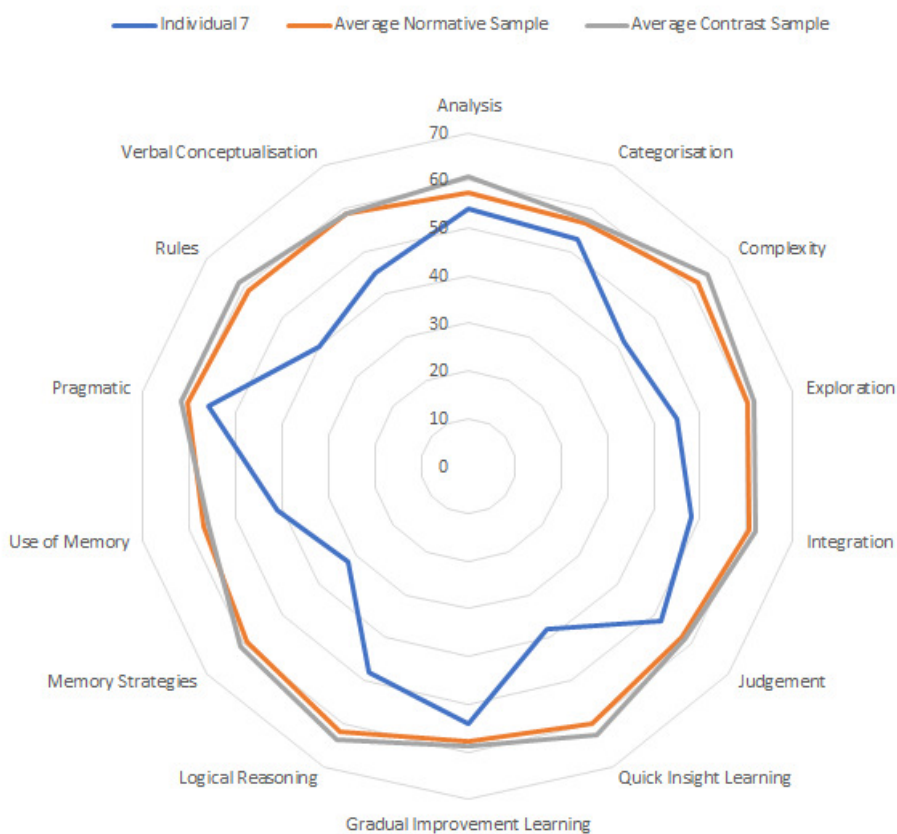


Individual 7

Question	Rater			Average
	Supervisor	Colleague	Subordinate	
Why do you think (...) was nominated as a strategic thinker?	Emphatic competence, is able to see a couple of steps further, out of the box thinking			
How well do you know this person? (1 to 5)	4			4.00
How many years have you been working together?	1 - 3 years			1 - 3 years
How would you rate this person's ability to think strategically? (1 to 5)	4			4.00
<i>Creative</i> (1 to 5)	2			2.00
<i>Analytical</i> (1 to 5)	4			4.00
<i>Conceptual</i> (1 to 5)	3			3.00
<i>Context Oriented</i> (1 to 5)	3			3.00
<i>Divergent</i> (1 to 5)	4			4.00

<i>Process Oriented</i> (1 to 5)	4			4.00
<i>Flexible</i> (1 to 5)	2			2.00
<i>Future Oriented</i> (1 to 5)	4			4.00
<i>Visionary</i> (1 to 5)	2			2.00
<i>Holistic</i> (1 to 5)	4			4.00
<i>Reflective</i> (1 to 5)	4			4.00
<i>Intuitive</i> (1 to 5)	3			3.00
<i>Integrative</i> (1 to 5)	3			3.00
<i>Synthetic</i> (1 to 5)	3			3.00
<i>Systematic</i> (1 to 5)	4			4.00

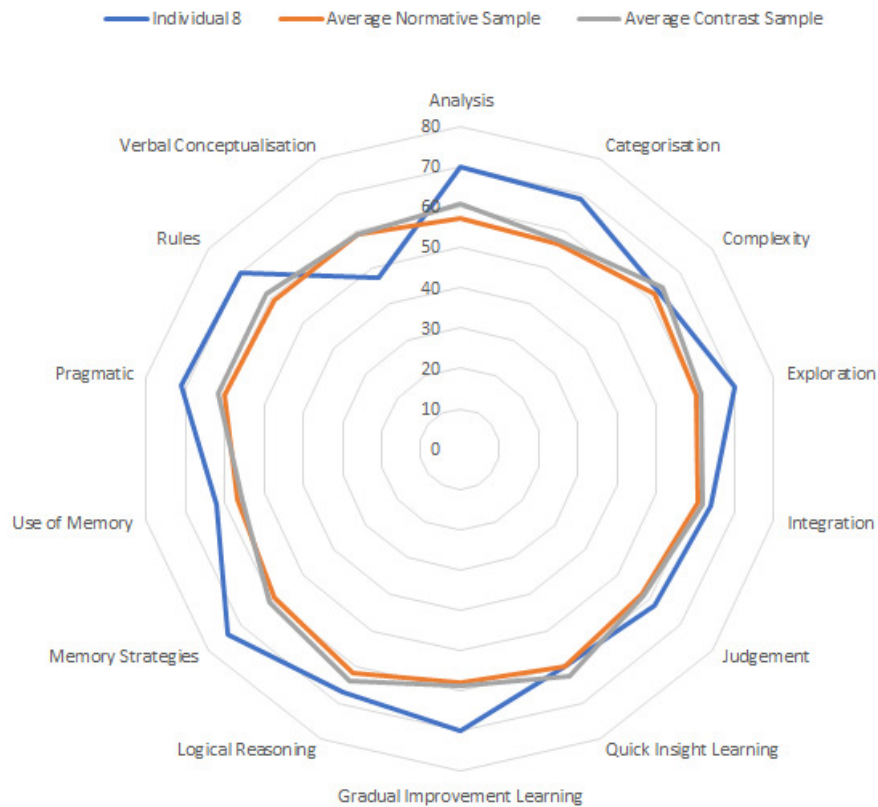
Individual 7's Processing Competencies Compared to the Normative and Contrast Samples



Individual 8

Question	Rater			Average
	Supervisor	Colleague	Subordinate	
Why do you think (...) was nominated as a strategic thinker?	Clear in communication, ambition,	Essential to the application area, very skilled and competent, people listen to his opinion		
How well do you know this person? (1 to 5)	5	4		4.50
How many years have you been working together?	4 - 6 years	+10 years		7 - 8 years
How would you rate this person's ability to think strategically? (1 to 5)	5	4		4.50
<i>Creative</i> (1 to 5)	4	5		4.50
<i>Analytical</i> (1 to 5)	5	5		5.00
<i>Conceptual</i> (1 to 5)	4	5		4.50
<i>Context Oriented</i> (1 to 5)	5	4		4.50
<i>Divergent</i> (1 to 5)	4	4		4.00
<i>Process Oriented</i> (1 to 5)	5	4		4.50
<i>Flexible</i> (1 to 5)	4	3		3.50
<i>Future Oriented</i> (1 to 5)	5	4		4.50
<i>Visionary</i> (1 to 5)	4	4		4.00
<i>Holistic</i> (1 to 5)	4	4		4.00
<i>Reflective</i> (1 to 5)	5	4		4.50
<i>Intuitive</i> (1 to 5)	4	4		4.00
<i>Integrative</i> (1 to 5)	4	4		4.00
<i>Synthetic</i> (1 to 5)	4	4		4.00
<i>Systematic</i> (1 to 5)	5	4		4.50

Individual 8's Processing Competencies Compared to the Normative and Contrast Sample

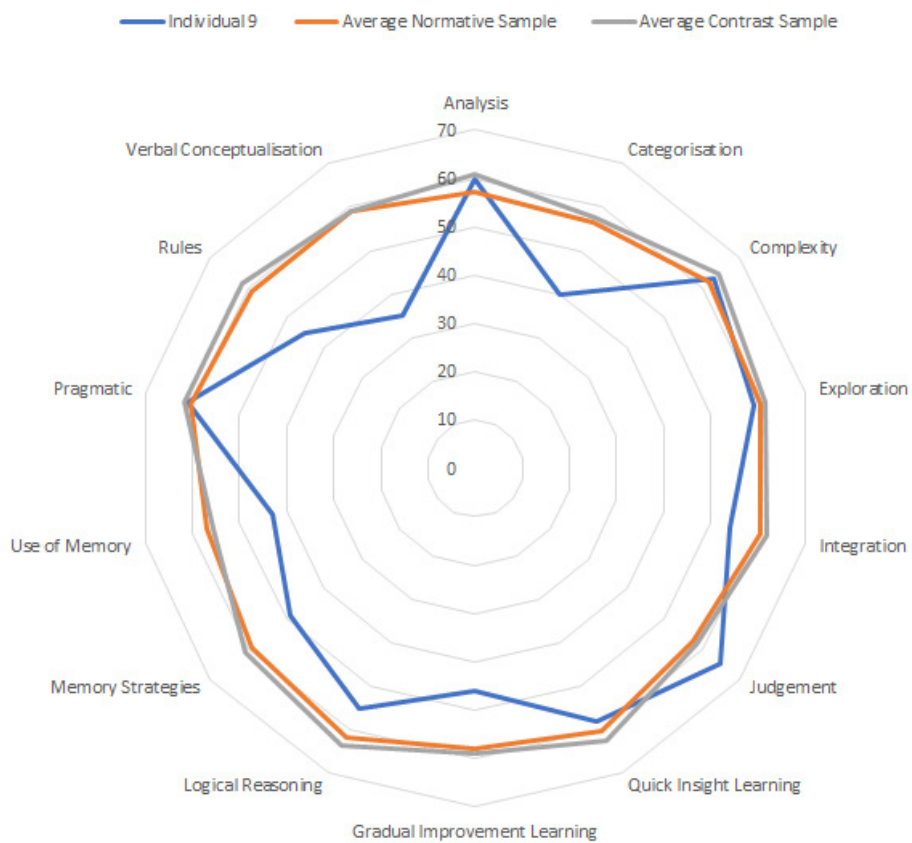


Individual 9

Question	Rater			Average
	Supervisor	Colleague	Subordinate	
Why do you think (...) was nominated as a strategic thinker?	Smart guy, able to see non obvious, brilliant		Quick insights, holistic picture	
How well do you know this person? (1 to 5)	4		4	4.00
How many years have you been working together?	1 - 3 years		1 - 3 years	1 - 3 years
How would you rate this person's ability to think strategically? (1 to 5)	3		5	4.00
<i>Creative</i> (1 to 5)	3		4	3.50
<i>Analytical</i> (1 to 5)	4		4	4.00
<i>Conceptual</i> (1 to 5)	4		4	4.00
<i>Context Oriented</i> (1 to 5)	3		5	4.00
<i>Divergent</i> (1 to 5)	3		5	4.00
<i>Process Oriented</i> (1 to 5)	4		5	4.50

<i>Flexible</i> (1 to 5)	4		5	4.50
<i>Future Oriented</i> (1 to 5)	4		5	4.50
<i>Visionary</i> (1 to 5)	3		5	4.00
<i>Holistic</i> (1 to 5)	4		4	4.00
<i>Reflective</i> (1 to 5)	4		5	4.50
<i>Intuitive</i> (1 to 5)	4		5	4.50
<i>Integrative</i> (1 to 5)	3		4	3.50
<i>Synthetic</i> (1 to 5)	4		5	4.50
<i>Systematic</i> (1 to 5)	3		4	3.50

Individual 9's Processing Competencies Compared to the Normative and Contrast Samples



Individual 11

Question	Rater			Average
	Supervisor	Colleague	Subordinate	
Why do you think (...) was nominated as a strategic thinker?	Top management executive		Holistic view, forward thinking	
How well do you know this person? (1 to 5)	5		3	4.00
How many years have you been working together?	7 - 10 years		1 - 3 years	5 - 6 years
How would you rate this person's ability to think strategically? (1 to 5)	4		5	4.50
<i>Creative</i> (1 to 5)	3		4	3.50
<i>Analytical</i> (1 to 5)	4		5	4.50
<i>Conceptual</i> (1 to 5)	3		4	3.50
<i>Context Oriented</i> (1 to 5)	4		4	4.00
<i>Divergent</i> (1 to 5)	5		Don't know	5.00
<i>Process Oriented</i> (1 to 5)	5		4	4.50
<i>Flexible</i> (1 to 5)	3		3	3.00
<i>Future Oriented</i> (1 to 5)	4		5	4.50
<i>Visionary</i> (1 to 5)	3		4	3.50
<i>Holistic</i> (1 to 5)	3		5	4.00
<i>Reflective</i> (1 to 5)	4		4	4.00
<i>Intuitive</i> (1 to 5)	3		3	3.00
<i>Integrative</i> (1 to 5)	5		Don't know	5.00
<i>Synthetic</i> (1 to 5)	3		4	3.50
<i>Systematic</i> (1 to 5)	5		5	5.00