LUND UNIVERSITY
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What Do the Best Do?

An Explorative Study of Strategic Thinking at Company X

By

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Abstract

Purpose: The purpose of this thesis is to improve our understanding of strategic thinking by identifying patterns of cognitive elements in individuals perceived to be strong strategic thinkers.

Research Questions: in order to fulfill our purpose we formulated two research questions:

Research Question 1: What are the common traits and cognitive elements found in the perceived best strategic thinkers?

Research Question 2: How do the perceived best strategic thinkers differ to the perceived non-best strategic thinkers?

Approach and Method: A pragmatic, deductive approach was adopted to answer the research questions. A quantitative method was utilised to conduct the study. We first created a Voting Questionnaire to identify the perceived best strategic thinkers at Company X (in this study they have been classified as the "test group"). Next, we tested the top voted individuals (the "test group"), as well as the rest of the individuals in the study (classified as the "control group" - the non-best), using the Cognitive Process Profile (CPP) assessment tool. Lastly, we created a 360 Degree Feedback Survey to be completed by three people (at the same company) per best perceived strategic thinker. Results from these data collection tools were analysed and used as a basis for our discussion.

The CPP leverages a theoretical model created by M. Prinsloo (cited in Kleppestø, 2017) to monitor and measure an individual's information processing competencies, current level of work, and preferred cognitive styles. The parameters of the 360 Degree Feedback Survey, on the other hand, were established from concepts, traits and cognitive elements present in the literature we reviewed (these traits and cognitive elements are presented in our literature review, Chapter 2). Together, along with the Voting Questionnaire, these tools provided the data we analysed. With the use of SPSS, we looked for patterns and significant and/or indicative similarities or differences within the test group and between the test group and the controls group. In addition, the current level of work of Company X was compared to the CPP results of a large and similar normative group (2662 individuals). This contextualised Company X and allowed us to study the company from a new angle.

Limitations: This thesis was conducted in a limited time frame, restricting the possibility to explore in more depth or to conduct the study under more ideal terms and conditions. For instance, the small number of individuals at Company X (33), who took part in the study, were potentially too small to draw strong indications or conjectures. Further, since we utilised methods based on perceptions/subjective opinions (Voting Questionnaire and the 360 Degree Feedback Survey), the results may have been influenced by a number of biases (such as hierarchy, motivation, etc.)

Findings: There were no strong conclusive results obtained from the analysis of the data. The individuals of the test group (perceived best strategic thinkers) did not show striking similarities in terms of traits and cognitive elements. Having said that, while the CPP showed that the test group work relatively well in complex and unfamiliar environments, the 360 Degree Feedback Survey confirmed the same indication. However overall, there were still no significant similarities overall. Further, when comparing the test group to the rest of the company who were tested (the control group), no significant differences were found - the current level of work of the two groups are very similar. Given these inconclusive results, we decided to conduct one further comparison - comparing current level of wok of all the tested individuals at Company X with a normative group (CPP results of a very similar group of individuals). From this, we discovered that although Company X did not come across as highly strategic in their thinking, when compared to a normative group, Company X demonstrated to be much more strategic.

Conclusions: there were no significant similarities between individuals of the test group (the best perceived strategic thinkers) and no differences when compared to the control group (the non-best perceived strategic thinkers). These conclusions were drawn from the CPP results and the 360 Degree Feedback Surveys, which measured traits and cognitive elements. We believe that these results were influenced by limitations and as such, weakened the potential for more conclusive, positive and true to life results. We therefore suggest further studies to be conducted, in line with our recommendations which we have shared in this thesis (See Chapter 7). Such recommendations could enable further studies to provide more conclusive results and conjectures on strategic thinking.

Keywords: **Cognition, Cognitive Process Profiling, CPP, Strategic Thinking, Strategy, Strategic Competencies, Work Environment**

Acknowledgements

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1. Introduction

1.1 Background and Problem Discussion

There is widespread belief in the business community that we are living in times of great uncertainty. This owes to developments in technology and globalisation which have created a highly dynamic and competitive climate. (Reeves & Deimler, 2011; Bonn, 2001). Destabilising forces include, lowered transportation and communication costs, the internet, liberalisation of markets, and the breaking down of national borders. All sorts of entities, private and governmental, are facing these challenges. (Christensen & Kowalczyk, 2017; House of Commons Public Administration Committee, 2012). Consequently, strategy can no longer be sustained by "long-term defensible positions", but rather, ongoing adaptation and improvement which "surprise and confound the competition" (Eisenhardt & Brown, 1998, pg. 787).

In order to achieve ongoing adaptation, senior people in organisations need to detect threats and opportunities, as well as act upon them in a timely manner (Davis, 2002). However, in such an unpredictable climate, this is extremely challenging (Grewal & Tansuhaj, 2001). To cope with such complexity and ambiguity, strategic thinking has been put forward as a critical competency (Bonn, 2001; Zabriskie & Huellmantel, 1991). Yet, despite its acknowledgment, there is a striking lack of it at senior levels in organisations, both public and private (Christensen, 1997; Mintzberg, Ahlstrand & Lampel, 1998; House of Commons Public Administration Select Committee, 2010-11). Further, while there is little consensus on how exactly to define strategic thinking, or what precisely it entails (Liedtka, 1997; Bonn, 2001; Tovstiga, 2015; Sarker et al. 2018), the cognitive aspects have yet to be fully explored (Bonn, 2005; Sarker et al. 2018). This is likely to be a result of the few existing and concrete means to scrutinise and measure cognitive elements and strategic thinking abilities in individuals (Kleppestø, 2017; Steptoe-Warren et al., 2011, cited in Goldman & Scott, 2016). Fortunately, this particular gap in knowledge could be remedied with the introduction of the CPP assessment tool. This technique is a promising and potentially viable tool to meet such ends (Kleppestø, 2017).

1.2 Aims

By the end of this study, we aim to propose key traits and cognitive elements associated with strategic thinking. In order to do so, we hope to find patterns and similarities between the individuals of the test group - the perceived best strategic thinkers at Company X. Further, we hope to establish conjectures or indications which explain what sets the test group apart from the control group (the tested perceived non-best strategic thinkers). If this is possible, we may better fulfill the purpose of this thesis, as well as the purpose of Project 2, which is to better define what the "best do" (see section 1.5 for more details).

1.3   Purpose

As previously mentioned, there is a need to better define and harness strategic thinking (Bonn, 2001; Liedtka, 1998; Tovstiga, 2015). For if we are able to do so, we can turn this enigma into a tangible asset. The overall purpose of this thesis, therefore, is to improve our understanding of strategic thinking by identifying patterns of cognitive elements in individuals perceived to be strong strategic thinkers. Furthermore, we aim to utilise the results of our case study to help push research on the topic of strategic thinking, which has yet to be explored in depth.

1.4   Research Questions

Based upon findings from the literature (problem areas needing further exploration), as well as our aims and purpose with this thesis, we have formulated the following research questions we wish to explore:

Research Question 1: *What are the common traits and cognitive elements found in the perceived best strategic thinkers ?*
Research Question 2: *How do the perceived best strategic thinkers differ to the perceived non-best strategic thinkers?*

1.5   About our Study

This thesis is part of a large-scale research project in cooperation with Stein Kleppestø, associate professor at LUSEM. The overarching research project has been divided into three subprojects, each researching strategic thinking from a different angle. Project 1 will research what we mean by strategic thinking, Project 2 will study what do the "best" do, and project 3, will answer the question, can it be

developed? This thesis is a case study belonging to subproject 2 and is one of 5 multi-case studies. Each case study has investigated an organisation with similar aims and methodology.

1.6   Outline of the Thesis

This thesis is divided into 7 chapters. While Chapter 1 serves as an introduction to the importance and aims of this study, Chapter 2 presents existing literary theory on strategic thinking. Chapter 3 introduces and the CPP and discusses its relevance to this study. Chapter 4 describes and explains in detail what tools we used to collect data, why we used these specific tools and how they are relevant in this study and in answering our research questions. While Chapter 5 presents and analyses the data collected, Chapter 6 discusses the data as a whole and presentes interpretations and conjectures. Lastly, Chapter 7 brings our thesis to a close, stating our main conclusions and suggestions for further research.

2. Literature Review

2.1   Introduction

The aim of this chapter is to contextualise strategic thinking within the broader theory of strategy, discuss current schools of thought, and present the most notable strategic thinking concepts, cognitive elements, and traits emerging from literature. From this, we will present our understanding of strategic thinking and what this implies in relation to our research questions.

2.2   Strategy

Authors often refer to strategy as a linear process, made of subsequent stages (Rumelt, 2011; Kvint, 2015; Bruce & Langdon, 2009; Chevallier, 2016). This step by step process would imply that strategists (people who formulate and implement strategy) are methodical, working in framed and fixed structures. However, according to Mintzberg (1994) this is erroneous. In fact, the implementing part of strategy is more associated with strategic planning - a different activity requiring a different thought process. It concerns the execution of a vision, which is a more fixed and certain task. As such, a step by step process, which is meticulous, methodical and short-term, is appropriate. (Mintzberg, 1994). However, formulating a strategy involves strategic thinking. Strategic thinking is the activity or thought process which *conjures* the vision (Goldman & Scott, 2016). Creating direction towards a distant and unknown future, is far more complex and uncertain. Consequently, literature implies that strategic thinking requires flexibility, it involves long-term thinking, and is about seeing the big picture rather than the details.

Further, if we consider Mintzberg & Waters' (1985) idea of deliberate (intended strategy) and emergent strategy (the one actually realised), it is made further evident what sets strategic thinking apart from strategic planning.
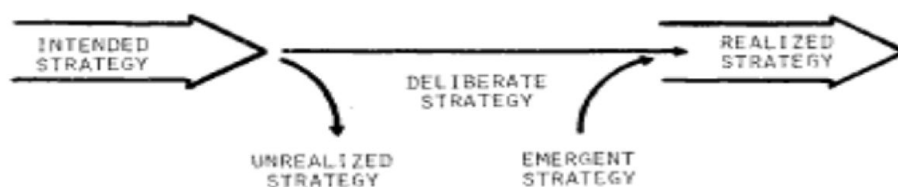
Figure 1. Types of strategies (Mintzberg & Waters, 1985)

While strategic thinking creates the overarching strategy, improves and adapts it to new developments that arise, the former takes place around the overarching strategy, supporting and implementing the changes (Mintzberg & Waters, 1985). Similarly, Freedman (2015, xi) argues that due to "the inherent unpredictability of human affairs" strategy is never truly defined from the outset, instead, through appraisal and modification, the strategy evolves. Thus, "the picture is one that is fluid and flexible". (Freedman, 2015, xi). Strategic thinking is the element that provides this fluidity and flexibility - further suggesting that it is <u>non-linear</u> and involves the ability to adapt, perhaps reflect on one's decisions, as well as problem solve swiftly.

2.3   Strategic Thinking and Cognition

If indeed strategic thinking involves the formulating aspect of strategy, it is a process which takes place in the mind - in the black box of the strategic thinker. (De Wit & Meyer, 2010a) This is what we need to examine if we are truly to define what strategic thinkers have in common and what sets them apart. However, up till now, there have been no means to measure strategic thinking using quantitative metrics or cognitive logic (Dagir & Zaydie, 2005, cited in Sarker, et. al. 2018), as such, the topic has yet to be fully explored (Bonn, 2005; Schwenk, 1988).

This section will present an outline of how the mind works, or rather, what features or processes are relevant when the strategic thinker processes information and tackles problems. For clarity, we have drawn upon an analogy by De Wit & Meyer (2010a) to help frame and better explain the cognitive aspects involved in strategic thinking. The analogy compares the mind of the strategic thinker to a computer: which has three levels (see figure 2).

Application Level

The first frame is referred to as the "application level" - it represents the cognitive activities or mental process we go through when attempting to understand a strategic problem or opportunity. The <u>process</u> is

divided into four stages: *identifying*, *diagnosing*, *conceiving*, and *realising*. Naturally, these elements do not occur in such an orderly fashion, in reality, they are integrated. (De Wit & Meyer, 2010a). However, for explanatory purposes, it is justifiable to propose the reasoning process like so.
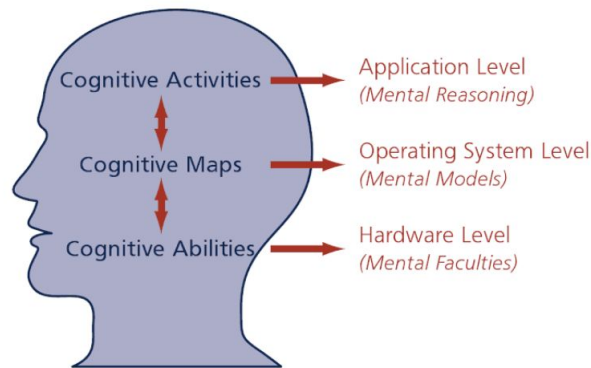
Figure 2. Three levels of the mind of a strategic thinker (De Wit and Meyer, 2010)

Operating System Level

The second level of the computer metaphor, the "operating system level", represents cognitive maps. Cognitive mapping, similar to cognitive schemata (Anderson, 1983), is the storing and applying of previous perceptions of the world to new situations and problems. All humans do this, however, strategic thinkers should have a particularly elevated ability to do so in order to frame and handle a strategic context. This "language" is acquired through experience, education, and social interaction. (De Wit % Meyer, 2010). This sits well with authors who argue that experience and practise can improve a person's ability to think strategically – solve complex problems (Fontaine, 2008; Watkins, 2007; Dragoni et al. 2011, Christensen, 1997).

Another noteworthy concept is the idea of cognitive simplification – that is, strategic thinkers must create simplified mental models to understand problems and solve them (Simon, 1957 & 1976, cited in Schwenk, 1988). However, while this ability, along with cognitive mapping, showcase the wonders of our minds, they are also the sources of our flaws (De Wit & Meyer, 2010a). Indeed, as Simon (1957 & 1976, cited in Schwank, 1988, pg. 44) argues, humans, as well as strategic thinkers, can only analyse a limited amount of information and as such, "they may be subject to selective perception" (i.e. perceive what they

want to and ignore opposing knowledge). Thus, there is a risk of biases contaminating the reasoning process. The consequence is wrong judgements and errors (Tversky and Kahneman, 1974). As for cognitive mapping, there might be a tendency to be anchored or fall in an availability heuristic (De Wit & Meyer 2010a. This is a hindrance to divergent thinking which provides novel ideas - a supposed ability of strategic thinkers. (Schoemaker, Krupp & Howland, 2013; Heracleous, 1998; Bonn, 2001; Chevallier, 1974). From this, we must deduct that although strategic thinkers have a positive ability to harness the past to tackle new problems, they are able to see flaws in their judgments, break away from cognitive maps to create a new.

Hardware Level

The so called "hardware level" represents our cognitive abilities and limitations on our mental faculties. Humans are flawed in a few aspects: they can not sense everything that is taking place in the world at one moment; they can only process a certain number of variables at the same time; they are unable to store vasts amount of information. The brain, therefore, makes shortcuts or deletes information - this means that knowledge can be acquired and lost. (De wit & Meyer, 2010). Having said this, literature would suggest that strategic thinkers, although still human, have an elevated ability to overcome these limitations and to cope with complex and unstructured problems (Dilchert & Ones, 2009; LePine, Colquitt & Erez, 2000, cited in Dragoni et al. 2011).

Summary

From this, we can deduct that strategic thinking involves some form of process in which information is processed. It may not be linear and fixed but some form of logical reasoning occurs to detect, understand and resolve a problem. If strategic thinking is the answer to uncertain and complex environments, it would suggest that they have an elevated ability to process information - which we will explore later in the study. We can also deduct that experience and remembering lessons learnt and applying to new contexts is relevant. However, the ability and trait to break away from old experiences and to create a new is also important. Strategic thinkers must therefore have the capacity to somehow overcome biases and flaws in their thinking process. These points will all be considered later in our study.

2.4   Schools of Thought

We will now consider the current schools of thought within the field of strategic thinking. We identified two notable approaches, referred to as the "rational reasoning perspective" and the "generative reasoning perspective" (De Wit & Meyer, 2010a; Hoogervorst, 2009).

The Rational Reasoning Perspective (School 1)

According to this approach, strategic thinking is strictly rational – based on logic rather than creativity. This is achieved by meticulously analysing vast amounts of information, finding threats and opportunities, as well as appraisal. Once this is done, multiple courses of action can be proposed and the one with the least risk is chosen. It is methodical and calculated – verging towards the sciences. (De Wit & Meyers, 2010a; Hoogervorst, 2009). This meticulous step by step process is championed by Porter (1996), Ridgley (2012), and Andrews (1987). The two former authors emphasize the use of analytical tools to find relationships between findings. Each step is thought out and provisions put in place before implementation - for "strategic thinking rarely occurs spontaneously" (Porter, 1987, pg. 17, cited in Mintzberg, 2000).

This approach could be compared to the analytical nature of chess. Players calculate each move and choose the one with the least risk. (Simon, 1987). Logic and analysis are needed to ensure decisions are based on facts and not emotions. That is not to say that emotions are totally irrelevant, however, in order to ensure judgment is not clouded, strategy must be principally a rational thinking process (Andrews, 1987). Creative and intuitive thinking are to be equally considered with suspicion. While creative thinking can lead to even the absurd, intuitive thinking is infamously unreliable. (De Wit & Meyer, 2010a).

The Generative Reasoning Perspective (School 2)

According to advocates of this approach, logic is necessary, however, too much of it can impede fresh and innovative ideas. That is, strategic thinkers should be creative, break old cognitive maps to reinvent something novel. As such, creativity should be weighed on more than logic. (De Wit & Meyer, 2010a). Ohmae (1982) is an advocate of this approach, stating that breaking down and analysis of problems is crucial. Then comes the piecing together of the parts to create a fresh configuration. The process is

spontaneous, intuitive, and mechanical, with synthesis as the activity that drives the new strategy. (Ohmae, 1982). Mintzberg (1994) is too a notable member of this approach, arguing for more synthesis over analysis. Strategic thinking is about creating new categories not just reconfiguring old ones - this requires creativity not logic (Mintzberg, 1994)

Returning to the previous analogy, strategic thinking is nothing like chess, according to this school of thought. While chess is a fixed environment, real strategic problems are not. The climate is unpredictable because not all variables can be known. As such, there are countless angles and potential solutions. Even strategic thinkers cannot account for and calculate all such possibilities. Logical thinking as described in the "rational reasoning perspective" is therefore unattainable and strategic thinkers rather rely on, for example intuition and creativity to make decisions. (De Wit & Meyer, 2010a). Strategic thinking should therefore be geared to creating and inventing rather than calculating or finding (Liedtka, 2000, cited in De Wit & Meyer, 2010a). The strategy is not calculated like science but dreamt up (drawn together) like a piece of art. While science is safe because the parameters are known, the arts are frame breaking and risky because the outcomes are uncertain. (De Wit & Meyer, 2010a). This idea resonated with much literature which states that strategic thinkers can cope with uncertainty, break cognitive maps, and challenge the status quo. They are revolutionary by nature (Hamel, 1996).

The Third Perspective

Although we identified two schools of thought, they are rather the two most extreme approaches. In fact, analysing literature on the topic, we discovered that a great deal of authors agree that strategic thinking involves a combination of generative and rational reasoning. (De Wit & Meyer, 2010a; Tovstiga, 2015; Graetz, 2002). This is necessary to ensure that strategy has a healthy dose of the imaginist and the analyst (Graetz, 2002). In the next section, 2.5, we will further present and explore this combination of both rational and generative reasoning.

2.5   Strategic Thinking Cognitive Elements and Traits in Literature

Before discussing the combination of generative and rational reasoning, we will present the most notable and commonly referenced strategic thinking traits and cognitive elements proposed by literature. 15 have been drawn from Sandelands & Singh's (2017) thesis - co-members of this research project. We have

scrutinized their sources and are in accordance. We proceeded to further support these traits and cognitive elements by providing additional sources. In by doing so, we will have an even more solid foundation for discussion on what strategic thinkers should have in common, according to the literature, and what sets them apart from others. For definitions of the below traits and cognitive elements please refer to Chapter 4, section 4.6, table 11).

Please note that the numbers represent how many sources Sandelands & Singh's (2017) found to support the traits and cognitive elements. The row below, presents the sources we encountered which support the same traits and cognitive elements.

Analytical	Conceptual	Context Oriented	Creative	Divergent
8	5	6	12	5
De Wit & Meyer (2010a) Raimond (1996) Wilson (1994) Porter (1996) Ridgley (2012) Andrews (1987) Tovstiga (2015)		Goldman & Scott (2016)	De Wit & Meyer (2010a) Raimond (1996) Ohmae (1982) De Bono (1996) Robinson & Stern (1997) Keelin & Arnold (2007)	Sloan (2016) Ridgley, 2012 Ohmae (1982) Raimond (1996) Kao (1996) Goldman & Scott (2016) Cropley (2006) De Bono (1996)

Flexible	Future Oriented	Holistic	Intuitive	Integrative
5	5	4	6	6
	Ridgley (2012) Raimond (1996) Graetz (2000; 2002) Sanders (1998)	Graetz (2002) Ehrlich (2011)	Sloan (2016) Gilkey, Caceda & kilts (2010) Ridgley (2012) Ohmae (1982) Raimond (1996) Wilson (1994) Tovstiga (2015)	Ohmae (1982)

Process Oriented	Reflective	Synthesizing	Systematic	Visionary
6	6	6	6	10
Ridgley (2012)	Sloan (2016) Pisapia et al. (2009) Kao (1996) Ridgley (2012) Goldman & Scott (2016) Tovstiga (2015) Argyris and Schon (1978)	Ohmae (1982) Fontaine (2008) Heracleous (1998)	Ridgley (2012)	Goldman & Scott (2016)

Table 1. Cognitive elements and traits (Sandeland and Singh, 2017)

The following additional elements and traits were found in literature and we believed them to be equally relevant, given the number of sources that supported them:

Convergent	Learning ability/quick insight	Visual thinking	Challenge Convention/Artsy
Sloan (2016) Raimond (1996) Chevallier (2016) Cropley (2006) Bonn (2005)	Ridgley (2012) Brown (2005) Nuntamanop et. al. (2013) Tovstiga (2015)	Sanders (1998)	Hamel (1996) Kao (1996) Heracleous (1998) De Wit & Meyer (2010a)

Table 2. Additional cognitive elements and traits found

For the purpose of clarity, we separated the traits and cognitive elements, however, in reality, they should be considered as integrated, distinct yet complementary. For instance, convergence should be paired with divergence (Heracleous, 1998; Sloan, 2016; Bonn, 2005; Chevallier, 2016). While the former harnesses experience, the later allows for the breaking away from old habits to think a new (Sloan, 2016). Further, while divergence provides new creative ideas, convergence is practical and ensures ideas are realistic (Chevallier, 2016). According to Heracleous (1998), good strategy balances these two competencies. This is by no means an easy endeavor, in fact, it requires excellent logic abilities. Through logic, strategic thinkers can evaluate whether their experience and judgments are reliable or not (De Wit & Meyer, 2010a). Liedtka (1998), on the other hand, links divergent thinking to being holistic - able to link principles in different ways. Not only does this ensure strategies are unique, but, enables the strategic thinker to see the bigger picture (Ehrlich, 2011) and envisage the overall direction of the activity or objective.

Logic/analysis and creativity/synthesis presents another tension for strategic thinkers (De Wit & Meyer, 2010). In principle they represent fundamentally different concepts - one is rational and the other is generative -, however, they too must be integrated. Perhaps with a lean more towards creativity/analysis, but with logic and analysis all the same. (Graetz, 2002; De Wit & Meyer, 2010a; Raimond, 1996; Bonn, 2005). While logic/analysis is systematic and provides grounded interpretation of problems or situations (Porter, 1996; Andrews, 1987; Ridgley 2012), creativity/synthesis allows for reconfiguring of elements to create a unique and competitive strategy (Mintzberg, 1994; De Wit & Meyer, 2010a). Integrative is very similar to synthesis, both represent the idea of piecing together elements to create unique strategy.

Although the process is not perfect - because not everything can be analysed in detail, this takes too much time, strategic thinkers can rely on a few leaps of faith, guided by intuition, to integrate and synthesise. (De Wit & Meyer, 2010b; Mintzberg, 1994, b; Nuntamanop et. al., 2013; Olson & Simerson, 2015; Tovstiga, 2015; Ohmae, 1982). Indeed, Gilkey, Cacedo & Kilts' (2010) study showed that strategy involved parts of the brain associated with emotional intelligence as well as parts to do with rational reasoning.

Being reflective was another trait/cognitive element referenced often. It can be viewed in two ways however. In one way, it is the ability to learn from past experiences and apply lessons learned to new situations (Pisapia et al., 2009). In the second way, it links to being critical and challenging convention (Argyris & Schon, 1978). The trait to question the status quo is iterated by a number of different authors (Hamel, 1996; Kao, 1996; Heracleous, 1998; De Bono, 1996). In order to do this, the strategic thinker needs to be self-aware - of him/herself and the broader context (Olson & simerson, 2015; Ridgley, 2012) - what Sandelands and Singh (2017) call, the "process oriented" competency.

The idea that strategic thinkers are future oriented is also very present in literature. That is, strategic thinkers should be geared towards future markets, not to the ones that already exist. Further, strategic thinkers do not simply predict the future, they create the future they desire (Ridgley, 2012; Raimond, 1996; Graetz, 2000; 2002; Sanders, 1998). As such, strategic thinkers are visionaries (Bonn 2005; Goldman & Scott, 2016) - they create long-term direction.

The purpose of this literature review was to introduce the topic of strategic thinking, gain a general understanding of key principles, and to identify the most important cognitive elements and traits in current theory. Using this information (particularly related to cognitive elements and traits), we created a 360 Degree Feedback Survey. The parameters of the survey, its purpose and design will be further explained in the next section (section 2.6).

2.6   The 360 Degree Feedback Survey

As mentioned earlier, the literature review provided a framework with which we created a 360 Degree Feedback Survey. The survey was needed to gather further data on the perceived best strategic thinkers

(what they have in common) and to provide a basis for further exploration on strategic thinking. The following section will describe the details of its design and its relevance to the CPP.

In order to create a list of terms for the survey, we first analysed the literature and took note of recurrent traits and cognitive elements. Next, we compared our findings to the ones by Sandeland and Singh (2017). The table below shows both differences and similarities:

Findings from our literature review	Findings from Sandeland and Singh (2017)
Analytical	Analytical
Artsy	
Conceptual	Conceptual
Convergent	
Context Oriented	Context Oriented
Creativity	Creative
Divergent Thinking	Divergent
Flexible	Flexible
Future Oriented	Future Oriented
Holistic	Holistic
Informal / Variable rules (= working confidently in unpredictable situations)	
Integrative	Integrative
Intuitive	Intuitive
Logical	
Planner	
Process Oriented	Process Oriented
Quick Learner / Learning Ability	
Reflective	Reflective
Synthesis	Synthetic
Systematic	Systematic
Unorthodox	
Visionary	Visionary

Table 3. Comparison between our findings and the ones from Sandeland and Singh (2017)

After comparing the two lists, we selected cognitive elements and traits present in both literature reviews to form the basis of our 360 Degree Feedback Survey. We also scrutinized the number of sources supporting each cognitive element and trait. Those supported by few sources (marked in grey) were not selected to for our survey. For instance, we found *conceptual, context oriented, process oriented,* and *systematic* to be supported by a limited number of sources, as well as having vague definitions and being heterogenous. As such, they were removed from the survey.

Selected cognitive elements and traits discovered in our literature review, but which were not discussed by Sandeland and Singh (2017), were: *artsy, convergent, informal / variable rules, formal/ fixed rules, planner, logical, methodical, organised, quick learner / learning ability,* and *unorthodox*. We decided to utilise these elements and traits because they were key concepts associated with the generative vs. rational reasoning perspective debate. That is, while artsy, unorthodox, informal / variable rules and divergent are connected to the generative reasoning perspective, planner, logical, methodical, formal / fixed rules, organised and convergent are connected to the rational reasoning perspective. By incorporating both perspectives in the survey, we wanted to put to the test the idea of the third perspective - the idea that strategic thinking is a combination of both generative and rational reasoning (De Wit & Meyer, 2010a; Tovstiga, 2015; Graetz, 2002). In other words, we were curious to see if the perceived best strategic thinkers would score on elements and traits from both categories - thus proving this idea. The idea of being a quick learner or having an elevated learning ability were also key concepts present in literature (as well as being an element measured by the CPP), as such, we decided to utilise these terms for the 360 Degree Feedback Survey.

The purpose of the literature review was to identify key or most recurring strategic thinking cognitive elements and traits present in existing theory. From this, we were able to design a 360 Degree Feedback Survey and, in turn, put these cognitive elements and traits to the test. Find below the list of cognitive elements and traits which were incorporated in the survey:

Trait / cognitive element	Definition	Generative or Rational
Analytical	Examining info in a thorough and careful way, paying attention to details.	Rational
Artsy	Breaking frames, challenging conventions, non conforming to the usual	Generative

	ways.	
Conventional	Tending to follow well-established patterns, preferring traditional ways.	Rational
Creative	Creating unusual and new ideas. Synthesising elements in unique ways.	Generative
Divergent	Able to use a variety of premises when thinking, limiting the number of assumptions.	Generative
Flexible	Ready and able to adapt to different situations.	Generative
Formal / Fixed Rules	Preference to work in familiar and predictable situations.	Rational
Future Oriented	Long-term forward thinking.	Both
Holistic	Viewing elements of a situation as a connected whole.	Generative
Informal / Variable Rules	Preference to work confidently in unpredictable and uncertain situations.	Generative
Integrative / Synthesis	Combining concepts, thoughts, or ideas.	Both
Intuitive	Reasoning and making decisions based on feelings rather than facts.	Generative
Logical	Reasons using formal arguments.	Rational
Methodical	Reasoning following a step by step process, or a systematic procedure.	Rational
Organised	Being structured.	Rational
Planner	Having a structured way to look at the future, categorising tasks to do in "boxes".	Rational
Quick Learner	Fast at grasping concepts and adapting.	other*
Reflective	Drawing upon and learn from past experiences. Being critical, evaluating one's own judgement and the external environment.	other*
Unorthodox	Challenging traditions and set norms.	Generative
Visionary	Able to foresee future trends and patterns before the others	other*

Table 4. Terms of the 360 Degree Feedback Survey and definitions.

*the elements marked as "other" are not discussed in theory as either generative or rational. However, they are still relevant to strategic thinking and are mentioned extensively in literary theory.

The terms above marked in green, share a resemblance to elements presented in the CPP (the CPP will be further explained in Chapter 3).

For better comparison, the table below presents the terms and definitions from the 360 Degree Feedback Survey, as well as the terms and definitions presented by the CPP theory (which the tool is based upon).

Term of 360 Degree Feedback Survey	Definition we used/gave	CPP Information Processing Competency	Definition given by CPP model	CPP Cognitive Style associated	CPP domain associated to it
Analytical	Examining info in a thorough and careful way, paying attention to details.	Analysis	Working systematically, independently. Detailed and precise in differentiating between, and linking, elements.	Analytical	Mixed
Creative	Creating unusual and new ideas. Synthesising elements in unique ways.	Verbal Conceptualisation	Unusual / flowery / creative and/or abstract verbalisation and conceptualisation		Strategic
Formal / Fixed Rules	Preference to work in familiar and predictable situations.	Rules	A focus on rules.	Analytical	Operational
Informal / Variable Rules	Preference to work in unpredictable and unfamiliar situations.				Strategic
Future Oriented	Long-term forward thinking.				Strategic
Holistic	Viewing elements of a situation as a connected whole.	Complexity	Emphasises wholeness and unity.	Holistic	Strategic
Integrative	Combining concepts, thoughts, or ideas.	Integration	Synthesis of ambiguous / discrepant / fragmented information	Integrative	Strategic
Intuitive	Reasoning and making decisions based on feelings rather than facts.	Judgement	Capitalising on intuitive insights to clarify unstructured and vague information	Intuitive	Strategic
Logical	Reasoning using formal arguments.	Logical reasoning	The disciplined, logical following through of reasoning processes	Logical	Strategic
Methodical	Reasoning following a step by step process, or a systematic procedure.	Exploration	Thoroughly explored different types of information. Checks information carefully and precisely.	Explorative	Operational
Organised	Being structured.	Categorisation	Groups information into	Structured	Operational

			coherent categories or structures. Orders information in terms of rules or characteristics.		
Quick Learner / Learning Ability	Fast at grasping concepts and adapting.	Quick insight learning	The tendency to grasp new concepts and acquire knowledge and understanding relatively quickly	Quick Insight	Unique
Reflective	Draw upon and learn from past experiences. Being critical, evaluating one's own judgement and the external environment.		Revisits previous conclusions. Shows a need for certainty. Explores and considers information very carefully.	Reflective	Operational

Table 5. Relations and comparison of elements of the 360 Degree Feedback Survey with elements of the CPP model (Cognadev, 2018).

As can be seen in the above table there is a reasonable amount of similarities between the cognitive elements and traits presented by the 360 Feedback Survey (based on literature) and the CPP theory.

2.7   Chapter Summary

Through our literature review we were able to establish key concepts and principles on the topic of strategic thinking. For instance, that strategic thinking is a thought process most appropriate for dynamic, complex and uncertain situations. It follows some form of logical process but it is by no means linear. Cognitive processes and an individual's capacity in these areas are highly relevant in defining whether a person is able to thinking strategically or not. This information was necessary to present in order to introduce strategic thinking and to provide a clear overview of the topic. The literature review was also used to create a 360 Degree Feedback Survey. The Survey utilized the cognitive elements and traits presented in the literature, as well as tested the notion of generative and rational reasoning processes.

3. The CPP Assessment Tool Explained

This chapter aims to introduce the CPP assessment tool, compare its criteria and dimensions with the previously analysed literature, and explain its relevance in answering our research questions and in the study of strategic thinking.

3.1   What is the CPP?

The CPP is a "computerized simulation exercise aimed at measuring thinking processes. It externalises and tracks thinking at a micro level according to thousands of measurement points. The results are integrated algorithmically and a report is automatically generated" (Cognadev, 2018, pg. 21).

More specifically, the simulation consists of eight exercises or "stories" - each story requires the testee to interpret symbols on cards and to produce a story in text relating to the symbols. The exercises/stories are supposed to simulate a complex, vague and unknown situation, essentially a real life strategic situation. Indeed, according to literature, these are the elements which constitute a strategic context (Mason and Mitroff, 1981; Graetz, 2002). All movements with the mouse are recorded and used to interpret the testee's cognitive styles, information processing competencies and level of work (Cognadev, 2018).

3.2   What does it measure?

The CPP is not used to simply measure general intelligence, as does the IQ test. Rather, it measures various interrelated dimensions associated with cognitive preferences and abilities. That is, it can determine: what level of complexity the testee is best suited for; what the testee's tendencies are when solving problems; strengths and weaknesses when it comes to processing competencies; pace; how much potential the testee has to improve if they undertake training; other observations deduced from the tested individual's profile combinations; and suggestions on how to improve. (Cognadev, 2018).

If we are to truly answer our research questions - discover what the best perceived strategic thinkers have in common, and what distinguishes them from the perceived non-best strategic thinkers-, we must explore the previously mentioned variables. That is, we must explore exactly what is happening in the black box.

Given that the CPP is able, or at least is the best existing tool, to externalise cognitive activity, as well as cognitive preferences (Kleppestø, 2017), it will be helpful in determining what the test group have in common (on a cognitive level). Also it will help evaluate how the test group differ from the control group (again, on a cognitive level).

3.3   Why use the CPP?

The CPP can be used to guide individuals to an optimal career path and for succession planning. Because of its ability to suggest potential for improvement, it can be considered as a tool for personal development. Companies can utilize the tool for the selection of appropriate individuals for particular positions, as well as for diagnostic and developmental purposes. Lastly, it can be an Intellectual Capital Solution within the organisation. (Cognadev, 2018).

There were several reasons as to why the CPP tool was used in this study. As mentioned before, the CPP is the only tool in existence which a) aims at measuring strategic thinking b) is most reliable c) is able to test on a large scale. Given that this study entailed measuring a fairly large number of individuals for strategic thinking, the CPP was the most appropriate and reliable tool available.

3.4 Reliability and validity of the CPP test

According the CPP, reliability and validity are strongly intertwined (Cognadev, 2016). Cognadev Technical Manual (2016) reminds the reader that if a test is not reliable, it cannot be valid, and that if it is reliable, then it may be valid. Thus, proving the validity of the CPP is key, in order to determine its reliability as well. A number of studies conducted over the years, mainly in South Africa, proved that the CPP is valid cross-culturally; the factors explored to prove its validity were ethnicity or race, gender, language, and educational level (Cognadev, 2016).

The techniques utilised by the CPP to reduce the impact of cultural factors are several. For example, the CPP allows the use of 15 cognitive styles, instead of only allowing the logical-analytical style, which is typically measured by IQ tests (Prinsloo, 2007). Another example is the fact that the CPP measures speed and power of thinking as separate constructs from the information processing competencies, which are obtained by measuring auditory, visual and kinesthetic factors during the test. Language requirements are

low since the testee's abilities are not evaluated according to correct use of grammar, spelling, vocabulary or syntax, as in the case of IQ tests (Cognadev, 2016). However, a minimum of 5 years of education in English is required in order to be able to carry out the CPP test in English (Prinsloo, 2007). Further, factors related to educational background are mitigated through the design of the methodology that capitalises on "leveling effects". Lastly, the test can be taken by individuals who are not computer literate . Because the CPP test is proven to be valid, it is also reliable. (Cognadev, 2016).

The sole reliability issue regarding the CPP tool is retest. Given that the tool aims at simulating a real life strategic problem (defined as a situation which is unknown or unfamiliar), tested individuals can only be tested once. Otherwise the element of novelty will be lost, making the test ineffective and unreliable, as well as taking away the raison d'etre of the assessment. (Cognadev, 2016). The only means to mitigate this issue is by allowing sufficient time to pass (even years), so that the individual no longer recalls the specifics of the test. The issue with waiting for years before being able to retake the test is that the tested individual's attributes might variate over an extensive period of time. (Cognadev, 2016).

3.5   Cognitive functioning in the work environment

The CPP has categorised task complexity into 5 categories. These categories represent different working environments (See figure 3). From left to right, the work environment becomes gradually more chaotic, uncertain, and complex. The left represents an operational thinking environment which is certain and focuses on "value creation, knowledge and detail". The right represents a strategic environment and entails "the overall direction of processes and decisions given its focus on "ideas, uncertainty and changing circumstances". (Cognadev, 2018, pg. 25).
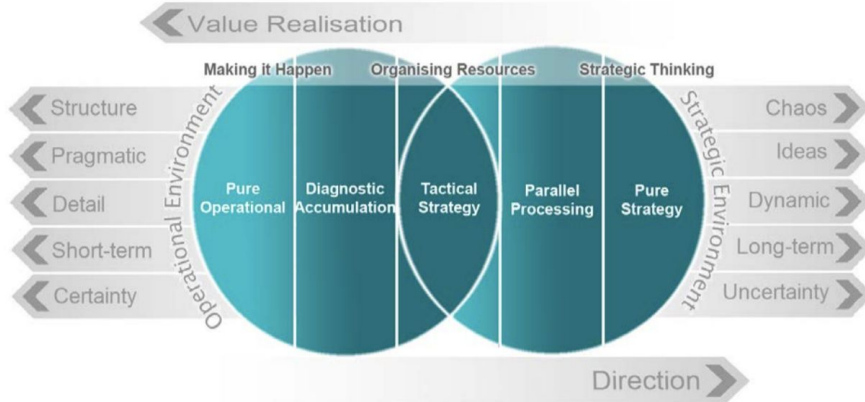
Figure 3: The Complexity of work (Cognadev, 2018)

If we consider the criteria of a supposed strategic planning situation, and the concepts associated with the rational reasoning perspective (stipulated in Chapter 2), they share a close resemblance with the characteristics of the CPP "operational" context. Hoogervorst (2009) makes a similar assumption, arguing that the strategic planning and the rational school of thought overlap on certain features - particularly on the elements of certainty, linear thinking and analyses. We have gone one step further in linking this theory to the operational category of the CPP - which too represents certainty and structure. See the table below for similar and potentially overlapping concepts.

Pure Operational

	Pure Operational	*Rational*	*Strategic Planning*
Structure	Rules, Policies	Formal and fixed	Formal and fixed
Focus	Routine	Routine	Routine
Time	1 Day - 3 Months		Short-term
Key Capability	Sensory orientation Touch, feel, sight	Complete and present information	
Process/Operation	Reactive, Step by Step	Step by step	Step by step
Excellence	Accuracy, Precision	Consistency, rigor, scientific and calculated	Consistent, calculated and accurate

	Pure Operational	Rational	Strategic Planning
Output	Can be completely specified	Plan is concrete and completely specified	Plan is concrete and completely specified

Table 6. Links between Pure Operational and Rational perspective and Strategic Planning (Cognadev, 2018)

If we consider the criteria of a strategic thinking climate and the features of the generative reasoning perspective (stipulated by the literature), we could make some associations with the "pure strategic" climate of the CPP assessment tool. The "pure strategy" working environment is uncertain and chaotic, it is dynamic and long-term (elements that are very much in line with the literature review). See the table below for more details:

Pure Strategic

	Pure Strategic	Generative	Strategic Thinking
Structure	5-10 year vision for long term viability	Visioning - informal and variable rules	Visioning - flexible and emergent
Focus	Dynamic Patterns and interactions - emerging patterns	Informal and variable rules	Seeing dynamic patterns and seeing strategy as emergent and flexible
Time	5 - 10 years +		Long-term
Key Capability	weaving - identifying opportunities and trends currently not in existence	Imagining, being creative	Synthesis, visioning and being future oriented
Process/Operation	Considering the interplay of dynamics within and across macro contexts		Context oriented and being aware of internal and external environments how they interplay
Excellence	Awareness of emerging patterns and long term strategy formation		Sees underlying patterns before others and is able to formulate long term strategy
Output	Adapting to different systems or environments	Break from old frames and adapt to new situations. Unorthodox	Flexible, frame breaking and unorthodox

Table 7. Links between Pure Strategic (Cognadev, 2018) and Generative perspective and Strategic Thinking

The above tables do show some overlaps between pure operational, rational thinking and strategic planning. As well as similarities between pure strategic, generative thinking, and strategic thinking. We are aware that the pieces do not fit perfectly, and as such, we cannot make a concrete claim that they equate. However, we believe that the general and fundamental principles of each are linked enough to group them in the same area or category. The purpose of carrying out such a comparison is to demonstrate that the CPP is relevant and able to asses the test group (the "best") and control group ("non-best") based on the parameters supported by the literature. Any cognitive elements or traits that come out of the CPP results, that cross over all three parameters (pure strategic from CPP, strategic thinking and generative from the literature) are a stronger indication as to what the "best" have in common and (comparing the results with the "non-best"), what sets them apart. Thus, we may more effectively and with justification, provide answers to our research questions.

It is important to discuss a slight contradiction between the literature and the CPP. As you can see from figure 3, people can be classified as pure operational or pure strategic. However, there are also three categories in between - *Diagnostic Accumulation*, *Tactical Strategy* and *Parallel Processing*. From the former to the latter, the environment becomes ever more strategic - complex and uncertain (Cognadev, 2018). This would suggest that individuals in the middle show cognitive elements that are both operational and strategic to varying degrees. Nonetheless, true strategic thinkers are pure strategic and have no crossover with operational according to the CPP. This absolute way of looking at strategic thinking problematizes the literature. From our literature review we deducted that strategic thinkers - although leaning more towards generative - show cognitive elements or traits perceived as rational. According to the CPP however, strategic thinking is absolute and showing operational or rational traits would therefore dilute strategic thinking and thus, not be considered as strategic.

Having said this, the CPP also evaluates people's preferences to certain cognitive styles. These styles, shown in the next section (3.5), could be divided under the generative reasoning perspective and the rational reasoning perspective. A pure strategic thinker could show cognitive styles which draw upon each of these two categories. For instance, a strategic thinker could have an intuitive style (tendency to combine and synthesise - associated as generative/strategic thinking) as well as an analytical style (apply rules, work systematically - associate as rational/strategic planning). Thus the CPP potentially does correlate with literature and will provide a stronger bases for conjectures and indications for our research questions.

3.6   Cognitive styles

The cognitive styles are response tendencies an individual takes when confronting unfamiliar contexts. These styles should be considered as the behaviours most frequent during the assessment. After taking the assessment, individuals are provided with their most frequent cognitive styles listed by rank. (Cognadev, 2018)

The aim of the cognitive styles is to give a more indepth and holistic presentation of the individuals' thinking abilities and how they solve problems. In this way, it deciphers what work environment a person is suited for (cognadev, 2018). The cognitive styles are presented below (note that these definitions reflect tendencies - they are not absolute:

Intuitive	Generative	- Interprets complex information at "gut" level - does to necessarily rely on an analytical approach - Often relies on previous knowledge and experience - Trusts own feelings and instincts
Integrative	Generative	- Tends to make sense of information as they go along - Likes the challenge of reconciling discrepant, ambiguous and fragmented elements to create a coherent whole
Holistic	Generative	- Tends to see the big picture without losing sight of detail - Emphasise on wholeness and unity - Usually deals with abstract and complex concepts - May be aware of detail but may not focus on it or analyse it to any great extent
Logical	Rational	- Is self-aware and rigorously monitors own reasoning processes - follows reasoning processes through in a rule-based manner - May focus on detail in an analytical manner - Tends to look for logical evidence - Apply convergent or divergent reasoning
Quick Insight	Generative	- tends to work quickly and accurately - grasps ideas, processes and integrates information relatively quickly - tends to focus and process information in a in a goal-oriented way - may be sensitive, intuitive and trust own insight
Memory		- Tends to concentrate well and remembers information - Relies on past experience and a knowledge base - Is aware of and mentally monitors own memory strategies
Learning		- Tends to be curious and explorative - Often capitalises on memory functions - Is self-aware and takes account of any feedback that is given - Is adaptable, flexible and able to acquire new ways of thinking - Seeks novelty and focuses on unfamiliar aspects
Metaphoric		- May combine elements of information in new and unusual ways - Tends to formulate unusual ideas to integrate discrepant information

Analytical	Rational	- Has a precise, detailed approach - Works systematically and pays attention to rules - Enjoys pulling information apart and subdividing issues - Analyses, compares and categorises various elements - Identifies relationships between different elements
Explorative	Rational	- Checks information carefully and precisely - Focuses on finding information relevant to the problem - Tries to understand the task requirements - Thoroughly explores different types and sources of information
Structured	Rational	- Likes to group information into coherent categories or structures - May prefer a relatively structured work environment - May come across as organised
Reflective		- Tends to explore and consider information very carefully - May be guided by existing knowledge and information structures - Shows a need for certainty - Indicates a preference for working with tangible information in structures contexts
Reactive		- likely to prefer structured and familiar information or environments - has a vague and unsystematic approach to problem-solving - May not systematically analyse, structure or reason about issues
Trial-and-error		- May respond emotionally rather than rationally - May find it difficult to deal with unfamiliar cognitive challenges - Likely to work quickly but inaccurately

Table 8. Cognitive styles of the CPP model (Cognadev, 2018)

According to the CPP manual, the styles highlighted in pink are considered strategic, the ones highlighted in orange are operational and/or strategic, and the blue ones are "operational". Given that tested strategic thinkers may have ranked cognitive styles that are both generative and rational, it would seem the CPP is line with what literature states as strategic thinking.

It is also interesting to make note that the descriptions of the cognitive styles have elements that can be associated with both schools of thought. For instance, logical (considered as rational in the literature) is described in the table above as producing both convergent or divergent reasoning. While convergent is linked to rational reasoning, divergent is generative. In other words, strategic thinkers can be logical and still be strategic. In fact, perhaps as the literature says, strategic thinking is a combination of both generative and rational elements.

In Chapter 6 we will discuss in more detail the cognitive styles and literature, as well as integrating the results of the "best" perceived strategic thinkers. By doing this, we hope to form an argument which answers our research questions.

3.7 Information Processing Competencies

Information processing competencies are sub-competencies, that evolve around the holonic model of Cognadev Information Processing Model, which measure the sub-processes recorded during the test (Cognadev, 2018). Some of these sub-competencies facilitate strategic growth and higher scores on these processes are associated to a stronger strategic ability.

The aim of the information processing competencies is to provide an accurate and more complete representation of the processes that go on in the mind of the testee during the assessment, but also for purposes of coaching and job placement (Cognadev, 2018).

The table below shows the information processing competencies grouped by process, with a brief description:

Memory	Use of Memory	Reliance on memory
	Memory Strategies	Effectiveness of memory strategies
Exploration	Pragmatic	Practical orientation (asking whether things will work in practice). 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 and / or abstract verbalisation and conceptualisation
Metacognition	Judgement	Capitalising on intuitive insights to clarify 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

Table 9. Information Processing Competencies (Cognadev, 2018)

Among the processing competencies listed above, some are linked to a higher level of strategic thinking. Therefore, high scores on those particular competencies are considered to be linked to a higher level of strategy and are associated to strategic cognitive styles, as stated by associate professor S. Kleppestø (2018). These processing competencies are marked in the table in blue.

3.8   Cognadev Information Processing Model

Figure 4 presents the holonic shaped Cognadev Information Processing Model. It represents the thinking processes involved when individuals problem solve and think. The model is a soft hierarchy "of increasingly complex and inclusive operations".
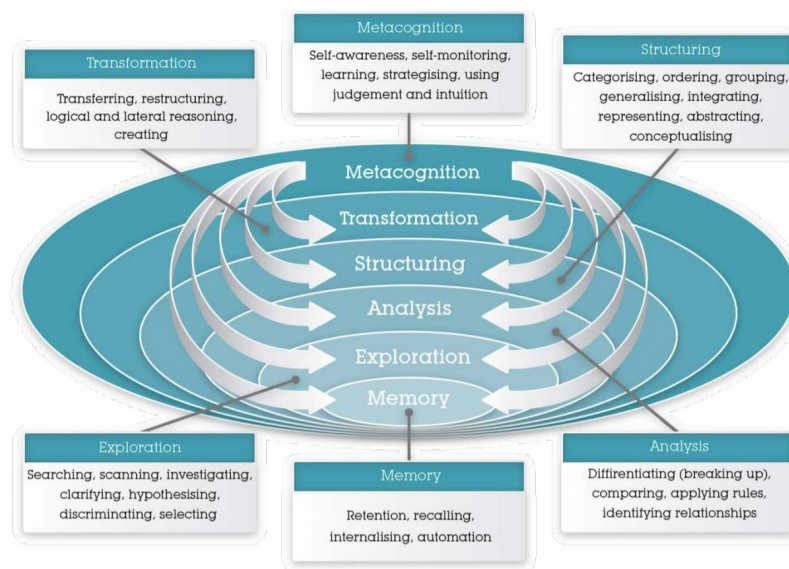
Figure 4: Cognadev Information Processing model: holonic structure of the model (Cognadev, 2018)

According to the the CPP manual (Cognadev, 2018), **memory** is the ability to store and retrieve experiences. It is at the core of problem solving and thinking. From this, **exploration** can take place - the investigating of new situations or problems utilizing past experiences. Once relevant elements have been selected from exploration, they need to be **analysed**. This involves breaking the matter apart to

understand and identify interconnected aspects - it is accurate and systematic. Next, comes **structuring** the information or knowledge in a meaningful way. Lastly, the structure may need to be remoulded (**transformed**) to the new context or to the needs of the activity/exercise. It is important to state that in reality, this is by no means a linear process, rather highly integrated. As for **metacognition**, this represents self-awareness and guides the whole thinking process. The CPP test measures and scores individuals along each of the information processing competencies.

3.9   Chapter Summary

This chapter provided an overview of the CPP assessment tool. First, we presented and described the tool - explaining what it measures and in what ways it can be employed. In this chapter the reader could also find more information on the cognitive elements and functions related to the work environment. A description of the cognitive styles and the information processing competencies was provided and linked to the literature. Finally, the information processing model by Cognadev, on which the CPP assessment tool is based, was presented and discussed.

4. Methodology

This chapter will present and defend our overall methodological approach and how this ties to our research design. It will describe and justify the tools and methods used to collect data, as well as explaining how this data will be analysed to answer our research questions. Practical limitations will also be discussed - how they may influence data and how we will attempt to mitigate and control variables.

4.1   Research Philosophy

We carefully considered how and in what form knowledge would be conceived in this study. More specifically, what assumptions we have and how this affects our research strategy and interpretations of the data. Indeed, as Johnson and Clark (2006, cited in Saunders, Lewis & Thornhill, 2009) suggest, the important issue is not so much "whether our research should be philosophically informed, but it is how well we are able to reflect upon our philosophical choices and defend them in relation to alternatives".

Given that there are no concrete or absolute means to determine what strategic thinking is, what it entails, and who represents this concept - it is fair to say that our understandings on this topic are based on assumptions about reality. Further, there are few studies in the past that have attempted to validate and verify our assumptions. We are therefore seeking an explorative study - in which we will connect ideas from causes and effects and attempt to explain them. As such, our research questions are fundamental to our philosophical approach and we believe that pragmatism is the ideal approach in achieving what we set out to do.

4.2   Research Approach

In order to carry out this study, we decided to opt for a deductive approach. That is, we drew upon existing theory and knowledge to design our research questions and objectives. We also used the theoretical section as a basis for our research strategy - we used it to guide our data analysis and discussion, as well as a foundation for providing answers to said research questions. We followed the steps stipulated by Robson (2002). This gave us a clear and methodical guide to going about the research

process. As stipulated, we first analysed current literature on strategic thinking (problems areas, major concepts and definitions) and from this, we based our research questions - points that we wanted to investigate further. Secondly, we presented how we would go about answering those questions - how we would measure variables and what tools we would use. Thirdly, we carried out the data collection and fourthly, we analysed the data and established whether or not it was in line with the literature. Lastly, we made some minimal alterations to the literature, given the outcome of the data.

4.3   Overview of Research Design

In order to efficiently collect data and to minimise any difficulties, we adopted a step by step method. We have provided a brief outline below, describing and explaining how this enabled us to answer our research questions:

Participants/Case Study

In order to answer our research questions and to fulfill our aims, it was necessary to form a test group and a control group. We therefore needed a fixed population, which amounted to the use of a case study. A management consulting firm based in Stockholm agreed to be the subject of our case study. All employees in the company were offered to participate in the study, but only 33 of 55/60 employees, volunteered. All these individuals were sent a questionnaire which asked them to nominate 5 to 10 people they believe are strategic thinkers. Out of the 10, 9 were asked to carry out the CPP - this group was defined as the test group (see section 4.6 as to why 9, instead of the planned 10 carried out the CPP). The other 24 volunteers also carried out the CPP test, and this group was defined as the control group. These two groups' (the best perceived strategic thinkers and the perceived non-best strategic thinkers) data results were compared and contrasted. The reason we used a case study was to provide a basis for the application of theory and methods, as well as to produce a real life situation to investigate.

Literature Review

We began by extensively researching as many sources as possible on the topic of strategic thinking. We also drew from a literature review by Sandelands & Singh (2017), co-members of this research project. In by doing so, we were able to further strengthen and support our understanding of strategic thinking. It also

provided us with a framework and basis to begin our enquiry. Then, we deduced the most recurring strategic thinking concepts, definitions, traits and cognitive elements. The purpose of this was to have basis for creating our research questions. That is, discover what needed to be further explored, what were the most important gaps in knowledge, and from there, create our points of intrigue. The literature also served as a parameter to understand the results, or rather, to further support our findings - if there are any overlaps between the theory and the data, this may indicate arguments that lead us closer to understanding what strategic thinkers have in common and what sets them apart from others. The literature was needed as a foundation for exploration and to support our findings, as well as to create the parameters for the 360 Degree Feedback Survey.

Voting Questionnaire

In order to answer our two research questions, we first needed to identify strategic thinkers to study. Given that there was no way for us to know who these individuals may be, we had to rely on other people's' judgments - a vote. We narrowed our pool by using a single case study (a company). We created a Voting Questionnaire which asked people to nominate five to ten strategic thinkers in their company. By doing so, we were able to come as close as we could to identifying true strategic thinkers. That is, voting systems have flaws (biases influence decisions), however, there was no better means to select people, thus we were obliged to carry out a vote. Once these individuals were identified, we could proceed to the next step in our methodology, which would lead us closer to answering our research questions. We created a Voting Questionnaire because there was no other means of identifying the "best" perceived strategic thinkers.

CPP Testing

Once we identified the perceived strategic thinkers, we could move to the next step which would more directly answer our first research question. We tested the individuals using the CPP assessment tool. This tool measures and indicates what cognitive styles and information processing abilities these individuals have. By comparing their results and looking for similarities, we would be able to suggest what these perceived best strategic thinkers have in common - answering our first research question. Further, by testing the rest of the company (people who were not voted or perceived as the best), and comparing results between the "best" and the "non-best", we could suggest what makes strategic thinkers distinct

from other types of thinkers. This would therefore enable us to fully answer our second research question. The CPP assessment tool was used because till now, there is no better tool to measure cognition in such a comprehensive and elaborate way (kleppestø, 2017). For this reason, this was the best choice, but also the only one, in finding out what the "best" have in common and what distinguishes them apart.

360 Degree Feedback Survey

Each of the perceived best strategic thinkers were asked to nominate three people in turn to carryout 360 Degree Feedback Surveys on themselves. The nominated people were asked to judge (on a scale of 1 to 5) how well terms (traits and cognitive elements drawn from the literature review) best described the specific strategic thinker. We compared all the surveys and looked for commonly voted competencies and from this, could deduct what similarities the strategic thinkers had - what they had in common. This information was needed to answer our first research question. Or rather, it provided an additional angle through which we could anyse what made the supposed best strategic thinkers strategic, and what they have in common. The reason we used specifically 360 Degree Feedback Surveys was because it enabled us to get multiple perspectives on the "best". Getting more than one angle would allow us to better evaluate each of the individuals. Further, the 360 Degree Feedback Survey is a known tool that is used within management research.

Normative Group

In order to gather as many angles for discussion, we decided to use a normative group (a group of individuals as close as possible to Company X) to compare and contrast with all those who were tested at Company X. The normative group consisted of 2,662 CPP results of similar individuals) By doing this, we could get a better understanding of how Company X measure with the rest of the "world" and see if any discrepancies in the data would be framed differently if contextualised.

4.4   Research Design

We chose a method based on different tools that utilise a quantitative approach. Utilising different quantitative tools was necessary because with one tool alone, we could not effectively answer our research questions. While the CPP provided an objective means to evaluate the individuals of our study,

the Voting Questionnaire and the 360 Degree Feedback Survey represent more a subjective approach. This not only gave us extra information which could indicate how perceptions of strategic thinking relate to a objective study, but there are no other tools available, aside from the CPP, that could provide objective data (Kleppestø, 2017).

4.5   Time Frame

From March 2018 we began work on this project. Initially familiarising ourselves with the CPP assessment tool and gathering information for our literature review. The Voting Questionnaire was sent out on the 12th of April and the voting collection was completed on the 7th of May. The CPP tests were carried out in turn, from the 24th of April to the 16th of of May. While the CPP tests were taking place, we already initiated the 360 Feedback Surveys on the top voted individuals - this stretched from the 11 of May to the 17th of May. Data collection, analysis and concluding the thesis took until the 6th of June. In this date we submitted our thesis.

4.6   Data Collection Method

The Voting Questionnaire

The Voting Questionnaire was created using Google Forms. We decided to use this application because of its ease and simplicity. The questionnaire consisted of a short text in which participants were introduced to the study, given instructions on how to complete the fields and given a prompt as to what strategic thinking entails (working in highly complex and uncertain situation). This was important in order to give a frame for the vote and ensured that there nominations were based on the criteria we desired. Below the text, 10 fields were left empty for voters to write their nominations. 5 were compulsory and the other 5 were optional.

Initially, we designed the questionnaire so that voters had to select 10 individuals they considered to be most strategic in their thinking. The logic behind 10 was that we would have a large enough pool of nominations to easily decipher which 10 individuals are strategic thinkers. More than 10 would be difficult as perhaps people either do not consider more than ten strategic thinking or because they do not know more than ten colle well enough to vote. However, upon further consideration and discussion with Company X, we realised that even nominating 10 individuals may be difficult for those who do not work

in a large team or who are not in regular contact with a large number of employees at the same company. As such, the first 5 fields were compulsory and the further 5 were optional.

The Voting Questionnaire was distributed via email with a link attachment. The voters clicked on the link and were directed to the questionnaire. Once submitted, the results were recorded and the participant was able to exit the form. The questionnaire was completely anonymous and the respondents were not able to see the results.

The people with the most votes were ranked from the most to the least voted. Originally we had decided to conduct the 360 Degree Feedback Survey on 10 individuals who received the most votes, but two of the 10 individuals could not take the CPP test. Therefore, we considered the 8 remaining individuals to be part of the test group, plus we added the next runner up - who had 6 votes (a number we considered sufficient to be considered a strategic thinker). We did not include any other runner ups because they did not receive a high enough number of votes - thus, not being perceived as strategic thinkers. The results of the selected individuals, represented by codes, are illustrated in the table below:

	Individual Code	N. of Votes received
1	**IND01**	23
	INDX	17
2	**IND02**	14
3	**IND03**	14
	INDY	12
4	**IND04**	10
5	**IND05**	7
6	**IND06**	7
7	**IND07**	7
8	**IND08**	7
9	**IND09**	6

Table 10. Individuals of the test group (the red highlighted scores represent the individuals that were removed from the study because they were unable to take the CPP test).

The CPP Assessment

33 individuals of Company X, those who agreed to take part in our study, took the CPP test. The tests were administered in separate time slots, to accommodate the tested individuals, as well as in different locations. Either at Company X, or over Skye when the tested individuals were at home. All the tests were administrator Stein Kleppestø, visually in person or via audio over Skype, to ensure that the test was carried out correctly and the individuals would get guidance if needed. The test duration is usually between 90 and 180 minutes, but more time can be used if needed. In the test, the individuals were required to interpret the symbols and to create a story, which they have to type at the end of each exercise. The test consists of 8 exercises, that become increasingly more complex (Cognadev, 2018).

The CPP software keeps track of the individual's movements, thanks to a mouse tracking process that can translate mouse shifts into micro-thinking processes by using thousands of measurement points (Cognadev, 2018). Furthermore, the text written at the end of each exercise is analysed to provide additional information on the thinking processes (Cognadev, 2016). Cognadev possesses the licence for the CPP assessment and thus also provides a report for each individual, which shows in detail the result of the test. Each individual's results are in numerical form; cognitive styles are listed and ranked from 1 to 14, from the most to the least used, and the current and potential work environments are indicated - ranked from 1 to 5, being 1 = pure operational and 5 = pure strategy -. Also, a score on a scale of 0-90 provides information on the processing abilities of the tested individuals.

The reports containing the results are distributed to the individuals who took the test by the moderator, who provides them a debriefing session in order for them to be guided through the report and interpret it correctly. Although, the results we had access to were strictly confidential and only Cognadev has access to the tested individuals' identity. This is the reason why the results of the 360-feedback survey which we collected were sent to the moderator, who matched them with the CPP results and returned them to us so that they remained confidential.

The CPP results of test group (who were perceived as the "best" strategic thinkers) were compared to the CPP results of the control group (the "non-best strategic" thinkers). In turn, the CPP results of the individuals within the test group were examined. The parameters were: the preferred cognitive styles; the information processing competencies; the current level of work. This was done in order to (1) investigate what the "best" strategic thinkers have in common, and what sets them apart from the control group (2)

find if there is a recurrent pattern in the test results of the 9 individuals perceived as strategic, and finally to (3) investigate if significant differences emerge from the results of the two groups of individuals.

Some cognitive elements and traits evaluated in the 360 Degree Feedback Survey of the test group, were matched and compared to the following elements of the CPP test results: preferred cognitive styles, and information processing competencies. This was done in order to find a relation between the competencies these individuals showed in the test and the competencies (traits and cognitive elements) that they are perceived to have. In by comparing and contrasting these two parameters, we can see how objective results (from the CPP) and subjective results (from the 360 Degree Feedback Survey) differ or are similar.

The 360 Degree Feedback Survey

The 9 most strategic thinkers in Company X were contacted via email and phone and asked to nominate 3 individuals - supervisors, subordinates, or colleagues - to carry out a 360 Degree Feedback Survey. In order to make the survey accurate and for judgments to be just, we emphasised the need for the participants to know the nominated individuals closely and in a professional setting. We conducted the 360 Degree Feedback Survey over the phone to ensure that all the participants carried out the survey within the designated time frame.

The survey was conducted over the phone as a 10-15 minute interview and consisted of two sections. In the first section the respondents were asked to (1) state the relationship to the selected individual, being the possible answers "I am their boss/supervisor", "I am a colleague", and "I am their subordinate", and (2) state how long they have been working together, being the possible answers "1 year or less", "1-5 years", and "more than 5 years". In the second section the respondents were asked to evaluate, on a scale from 1 to 5, how well the 20 terms shown in the table below describe the individual on whom they were conducting the survey. We decided to provide a short definition for each term, in order to avoid misunderstandings or different interpretations of the same term. The definitions, already presented in chapter 2, are repeated here:

Analytical	Examining info in a thorough and careful way, paying attention to details.
Artsy	Breaking frames, challenging conventions, non conforming to the usual ways.
Conventional	Tending to follow well-established patterns, preferring traditional ways.
Creative	Creating unusual and new ideas. Synthesising elements in unique ways.

Divergent	Able to use a variety of premises when thinking, limiting the number of assumptions.
Flexible	Ready and able to adapt to different situations.
Formal / Fixed Rules	Preference to work in familiar and predictable situations.
Future Oriented	Long-term forward thinking.
Holistic	Viewing elements of a situation as a connected whole.
Informal / Variable Rules	Preference to work confidently in unpredictable and uncertain situations.
Integrative / Synthesis	Combining concepts, thoughts, or ideas.
Intuitive	Reasoning and making decisions based on feelings rather than facts.
Logical	Reasons using formal arguments.
Methodical	Reasoning following a step by step process, or a systematic procedure.
Organised	Being structured.
Planner	Having a structured way to look at the future, categorising tasks to do in "boxes".
Quick Learner	Fast at grasping concepts and adapting.
Reflective	Drawing upon and learn from past experiences. Being critical, evaluating one's own judgement and the external environment.
Unorthodox	Challenging traditions and set norms.
Visionary	Able to foresee future trends and patterns before the others

Table 11. Terms of the 360 Degree Feedback Survey and definitions

Due to the subjective nature of this tool, we decided to keep in consideration possible biases. Since the evaluation of these competencies is subjective and based on perception, hierarchy and the relationships between the individuals carrying out the survey and the ones perceived as strategic, whom they evaluated, must be considered. Hence, our decision to ask the respondents of survey about their relationship to the individuals they evaluated and how long they have worked together. We believe that hierarchy and good relationships can play a role in the outcome of the survey. It is possible that the individuals in a higher position of the hierarchy get higher scores, due to perception related to their status in the company. It is also possible that the individuals who score higher are the ones who were evaluated by individuals who have a particularly good relationship with them. These elements will be further discussed in the section Findings and Discussion (section 6).

SPSS

The data collected through the CPP test and the Voting Questionnaire was analysed with the SPSS analytical tool. The SPSS tool was employed to find correlations and indications between the test and the control group. Thus, we compared:

- the results of the Voting Questionnaire with the Level of Work drawn from the CPP results, with a nonparametric Spearman's Rho test, a Chi-Square test and a cross-tabulation representation. Additionally, mean scores were compared.
- the preferred cognitive styles (rank order), drawn from the CPP test results, of the test group with the ones of the control group, with a nonparametric Mann-Whitney U test.
- the information processing competencies, drawn from the CPP test results, of the test group with the ones of the control group, through a nonparametric Mann-Whitney U test. Mean scores, and standard deviations were compared as well.
- the Level of Work, drawn from the CPP test results, of the tested individuals at Company X, with the ones of the normative group, through a nonparametric Mann-Whitney U test. Mean scores and the distribution of the Current Level of Work were compared as well.

4.7   Methodology Limitations

One significant obstacle we encountered regarded the literature review. Although we were able to draw from sources presented by Sandelands and Singh (2017), as well as a number of additional sources that we encountered, it was not possible to review all the literature on strategic thinking, especially given the time frame we had. As such, concepts, definitions, cognitive elements and traits were missed out. This is not because they were irrelevant, rather we did not find them or have the time to incorporate them. As such, our 360 Degree Feedback Survey might not be as complete as we wished it to be. It also suggests that the 360 Degree Feedback Survey was based on our own perceptions, assumptions and preferences. We attempted to mitigate this by using sources by reliable and noteworthy authors, by evaluating as many as sources as possible, given the time we had, and by only drawing from cognitive elements and traits that were mentioned several times by different authors. This removed as much as possible our own subjective decisions in selecting which elements and traits, definitions and concepts to draw from.

Another notable obstacle we encountered was in regards to the 360 Feedback surveys. We created the survey based on traits, concepts and elements that we had found in literature. However, the people carrying out these surveys were restricted and not able to express their different and unique thoughts/assumptions on what strategic thinking is. In other words, they expressed their assumptions, however, not in the extent that was free and could give us new insight. Further, it was not always easy for the strategic thinkers to nominate people - some had only been working in the company for a few months. Thus, the nominated people could not effectively evaluate the "best" perceived strategic thinkers and, as such, the quality of the surveys may not have been perfectly accurate. Having said this, it would have been very challenging to make every aspect of this study precise and accurate, some concessions had to be made. Further, we believe that the data collected, even if not under strict guidelines, provide us with enough information to at least make some indications.

Another limitation was the small sample size. Overall, if we were able to test more individuals, we would have been able to better determine the average values and not run into errors by using a small number of potentially abnormal samples. That is, we would have been able to judge a more accurate mean and isolate outliers. Outliers could potentially skew data and produce misleading conjectures. This was a challenge difficult to mitigate, given the time and resources (contacts with professionals, ability to select a more appropriate company) we had. We do believe however, that the samples were large enough to provide us with some useful data to work with, or at least, to indicate what elements of a future similar study would need modification or improvement. Further, our study relied on volunteers rather than the entire company. As such, one would question the motivations as to why those individuals volunteered. Motivations could affect the quality of the group and consequently, skew the true representation of the company.

One other limitation to our study was the fact that the CPP only measures elements and processes of thinking. This means that the CPP does not allow us to investigate how these processes, especially the strategic ones, are expressed and translated into actions. Thus, this limit is in reality also a limit of the CPP tool.

Only Western literature on Strategic Thinking available in English was utilised for this study. This means that the only perspective through which we analysed the data is Western. Since each culture values specific traits and abilities differently, the traits that are considered strategic in one culture can be

overlooked or completely ignored in another. Thus, the mono-cultural approach which we used to interpret the data represents a limitation to our study.

Ultimately, the limited time frame was a major factor which hindered us from fully meeting our desired methodology. That is, there was little time to find a company that fit the criterias appropriate for this methodology set up, or there was little time to tailor the study to the features of this case study.

Overarching Limitations

As stated in the Introduction, our study was part of a larger research project. Originally, the research questions and methodology were the same for all the pairs taking part in Project 2 in this large research. This way it would have been possible to compare the findings of all the pairs working in Project 2. In reality, this did not happen, since the initial research questions and methodologies were changed by all the pairs. The reason why the questions and methodology had to be changed was that each pair had a different company to conduct the study upon, and the companies were different in size, hierarchical structure, and what they specialise in. Therefore, maintaining the exact same research questions and identical methodology was impossible. We, as well as the other students working on the same project, had to adapt the research questions to the company and had to find a method that would allow us to answer the new research questions in a logical and coherent way, but that could, at the same time, still maintain a general structure and general elements used by all the pairs. This is why, as a mitigation, all the pairs utilised the same tools to conduct the study. The way these tools were employed, however, did differ from one pair to the other.

4.8   Validity, Replication, and Reliability

This explorative research study is part of a larger research project in cooperation with associate professor Stein Kleppestø, at Lund University School of Economics and Management. Four other pairs worked on the same research project, utilising a similar Voting Questionnaire, the CPP assessment, and a 360 Degree Feedback Survey carried out by 3 individuals per each of the individuals who were perceived as most strategic. Since the quantitative approach of the methodology adopted in this study is relatively simple to recreate again, one can assert that this study is replicable. However, one difficulty relative to the replicability of the study deals with the conditions a company needs to fulfill in order to be suitable for this kind of study. A company needs to be big enough to have a large enough pool of individuals, but also

needs to be small enough so that all the individuals in the company know each other relatively well. Further, the Voting Questionnaire and the 360 Degree Feedback Survey would equally be difficult to replicate. This is because these data collecting tools evaluate specific individuals - individuals naturally would change if the study was replicated and as such, so too would the results.

The CPP is considered a reliable and valid tool to measure strategic thinking, as explained in Chapter 3. As well as the CPP test, the 360 Degree Feedback Survey was designed to evaluate traits and cognitive elements of the perceived "best" strategic thinkers, but from a subjective perspective (that is, it is based on perception rather than a computerised test). The possible limitations of the 360 Degree Feedback Survey, that mainly depend on subjective factors, were kept in consideration in the study. Both the CPP and the Survey were able to provide information on the traits and cognitive elements of the perceived "best" strategic thinkers. This contributes to strengthening the validity of our study, since the tools utilised served to measure what we intended to explore and measure in our study. Ideally, we would have tested the control group through the 360 Degree Feedback Survey as well, but this was not possible due to the extremely limited timeframe to conduct the study. Because the population of our case study could be compared to a similar and much larger normative group, we can say that the sample of individuals we studied can represent even larger populations with similar characteristics. Thus, the population validity, which is an important element to consider in an explorative study like ours, is high. Given that we have proven the validity of this study, we are able to state that the study is also reliable.

4.9   Chapter Summary

This chapter provided a description of the method that was utilised throughout our study. We addressed the two research questions of our explorative study through a pragmatic philosophy, a deductive and quantitative approach, represented by the Voting Questionnaire, the 360 Degree Feedback Survey, and the CPP test. The findings from the Voting Questionnaire, we were able to identify the perceived best strategic thinkers, on whom the 360 Degree Feedback Survey was conducted. Then, the CPP tool was utilised to test individuals at Company X, to compare the results of the test and control group, as well as compare the results of the CPP test with the Survey results. Finally, the CPP results of Company X were compared to a normative group. The chapter also provided an overview of the method and the overarching limitations of the study.

5. Data Collection

5.1   Introduction

The following chapter will present the data collected and will discuss the results we can draw from it. In the following Chapter, (Chapter 6), the results will be discussed and conjectures drawn.

5.2   Voting Questionnaire

A total of 28 Voting Questionnaires were collected. The 9 individuals with the highest number of votes were selected to be part of the test group. The figure below presents the number of votes each of the 9 received, in descending order.

Number of votes received by each individual
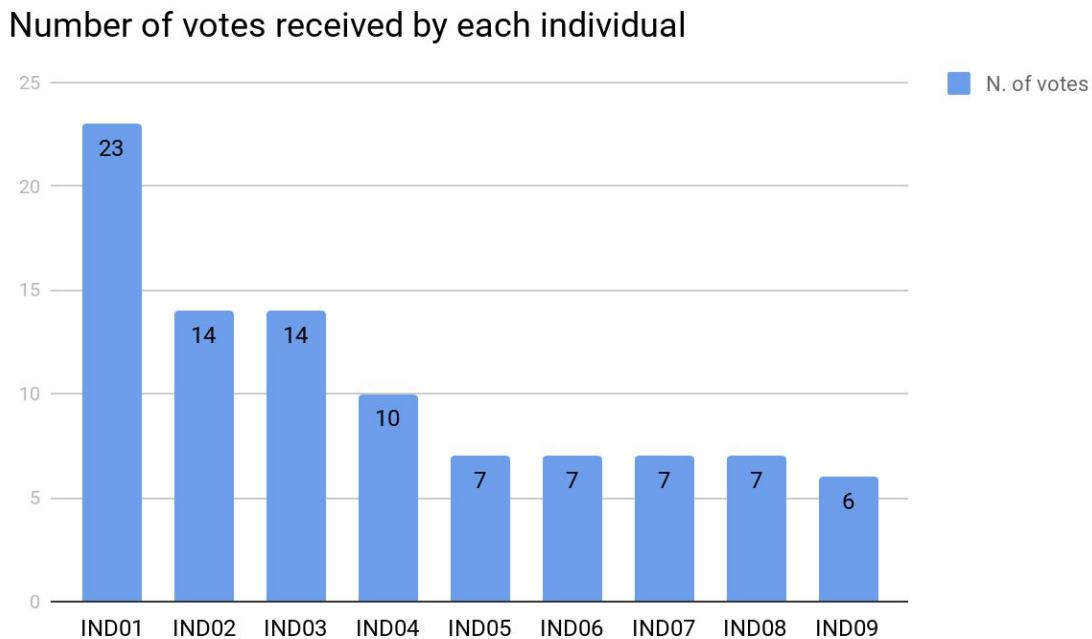
Figure 5. Number of votes received by each individual of the test group

5.3   Research Question 1: What are the key traits and cognitive elements found in the perceived best strategic thinkers?

The first research question was divided in 4 sub-questions, in order to better investigate all the aspects that may play a role in identifying what the perceived best strategic thinkers have in common. The 4 sub-questions are indicated with a Q, and the answers to those questions are indicated with an A.

Q1a: What are the key elements found in the perceived "best" strategic thinkers in terms of cognitive styles (CPP test)?

Below we have presented the distribution of the preferred cognitive styles of the best perceived strategic thinkers (the test group). Each box corresponds to one individual, and each colour is associated to a number from 14 to 1, where 14 (indicated in purple) represents the preferred cognitive style, and 1 the least preferred (indicated in orange).
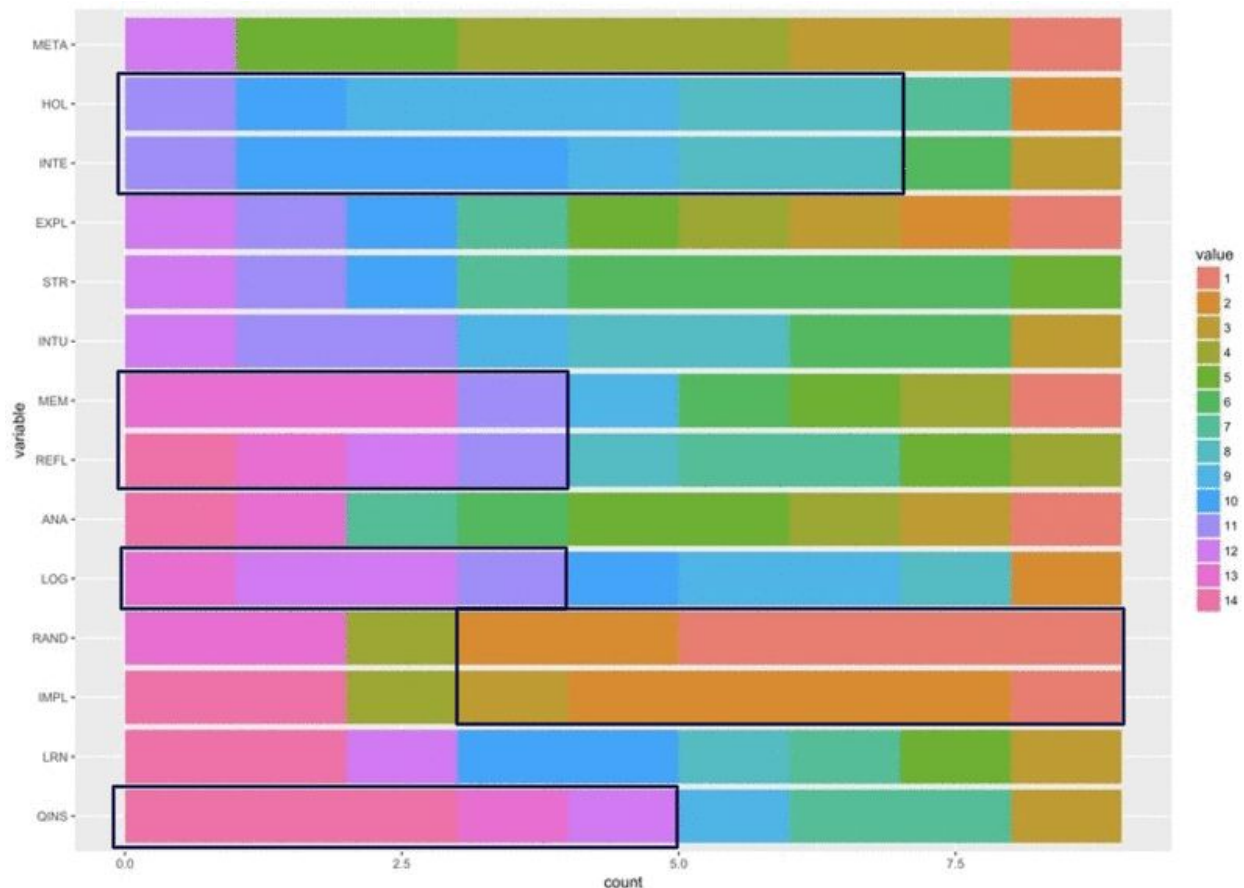
Figure 6. Bar plot representation of the tes group individuals' preferred cognitive styles, ranked from 14 to 1. Cognitive styles on the Y axis, number of individuals on the X axis. See Appendix 1 for full axis labels.

No significant pattern can be deducted by this graphic representation of the data. However, what can be observed is that 5 individuals show to have Quick Insight (a facilitator of strategic thinking) among the top 4 preferred cognitive styles. Similarly, Memory, Reflective, and Logical appear to be among the top 4 preferred cognitive styles for 4 individuals. Holistic and Integrative, associated to strategic thinking by the CPP, show a medium preferences (between the 4th and the 7th preferred) for 7 individuals. Random and Impulsive appear to be among the 3 least preferred cognitive styles for 6 individuals, which is a desirable result, as these two cognitive styles are highly operational.

Aa: There is no significance shown by this set of data. However, 5 individuals show a high preference for the cognitive style Quick Insight; 6 individuals show a medium preference for the styles Holistic and Integrative; these cognitive styles are associated with strategic thinking. 6 individuals show a low preference for the Random and Impulsive styles, which are strongly associated with operational thinking.

Qb: What are the key elements found in the perceived "best" strategic thinkers in terms of information processing competencies (CPP test)?

We analysed the 14 Information Processing Competencies - measured on a scale from 0 to 90 - of the test group. The data collected is represented in figure 7, where the plot bars represent the score distribution of the processing competencies of the test group. In the same figure, the standard deviation and the mean scores are also indicated.
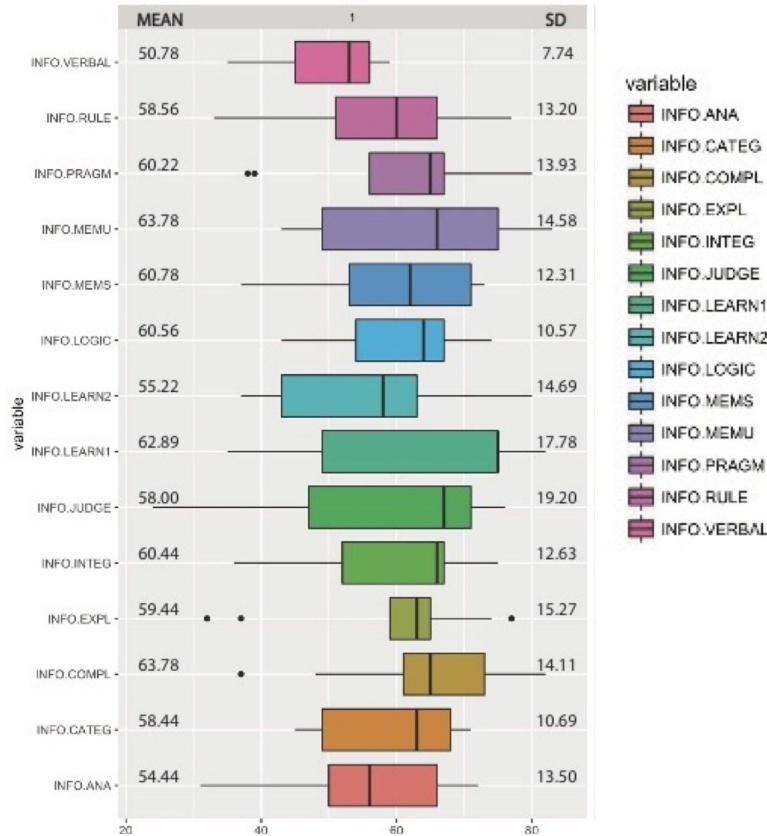
Figure 7. Plot bars of the processing competencies (CPP) for the test group with indication of the mean and standard deviation values. Information Processing Competencies on the Y axis, scores on the X axis.See Appendix 1 for full axis labels.

When analysing the data, the standard deviation can provide interesting information. The lowest standard deviation (7.74) is on Verbal Conceptualisation. This means that the scores on Verbal Conceptualisation of the 9 individuals of the test group are more condensed, being 50.78 the mean score for Verbal Conceptualisation (the lowest mean score). Since Verbal Conceptualisation is associated with strategic thinking, a high score on this variable was expected. However, the competencies where the test groups scored better, if we consider the mean scores, are Complexity (63.78), associated to strategic thinking, Use of Memory (63.78), considered operational, and Quick Insight Learning (62.89), a facilitator of strategic thinking.

Ab: The individuals of the test group show the highest scores (>62) on Complexity, Quick Insight Learning, and Use of Memory, being the first two competencies associated with strategic thinking. Their

scores are also more condensed (showing the lowest standard variation) on Verbal Conceptualisation, indicating that they all scored very similarly and not excellently on this variable.

Qc: What are the key elements found in the perceived "best" strategic thinkers in terms of cognitive elements and traits (360 Degree Feedback Survey)?

To answer this question we looked at the information collected through the 360 Degree Feedback Surveys. The table below represents the mean scores for each individual on each of the traits. The single scores for every single individual of the test group can be found in Appendix 2. Table 12 shows the total mean scores on each competency, which is used to investigate what the perceived best strategic thinkers have in common.

Competencies	IND01	IND02	IND03	IND04	IND05	IND06	IND07	IND08	IND09	Mean score
analytical	4.33	5	4.66	4	4	3.66	4	3.33	3.33	**4.03**
artsy	4.66	4	3.33	2.66	2.66	4.66	4	3.33	3.33	**3.63**
Conventional / convergent	3	3.66	2.66	3.66	3.33	2	3	3.66	3.66	**3.18**
creative	4.66	3.66	4.33	2.66	3	4	4.33	3	3.66	**3.7**
divergent	3.66	2.33	4	2	3.33	3.66	4.66	3.66	2	**3.26**
flexible	3.66	4.33	4	4.66	3	3	4.66	4	4	**3.92**
formal / fixed rules	2.33	3.66	3	2.66	3.66	2	2.66	2.33	4	**2.92**
future oriented	5	4.66	4.66	4	3.66	4.33	4.66	4	2.66	**4.18**
holistic	5	3.66	4.66	4.66	3.66	3.33	4.33	4.66	2.66	**4.07**
Informal / variable rules	4.66	3	3.66	4	3.66	3.66	4.33	4	2	**3.66**
Integrative	3.66	4.66	4.66	4.33	3	3.66	3.66	4.33	3.33	**3.92**
intuitive	4.33	2	4	4.66	2.66	3.66	4	3.33	3.33	**3.55**

logical	4	4.33	4.66	4	5	3.66	4	5	4.33	**4.33**
methodical	3.33	4.66	4	3	4	2.33	3	5	4.66	**3.78**
organised	2.66	4	4.33	3.66	4	2.33	3	4	4.33	**3.59**
planner	2.66	3.33	3.33	3.33	3.66	2.66	3	4	4.33	**3.36**
quick learner / learning ability	5	5	4.66	3.66	3.66	4	4	5	3.66	**4.29**
reflective	3.66	3.33	3.66	4.66	4	3.66	4.33	4.33	4	**3.96**
unorthodox	4.66	1.66	3.66	3	2	4.66	4	4.33	2.66	**3.40**
visionary	5	3	4	3.33	2.33	4	4.33	4.33	2.33	**3.62**

Table 12. Mean scores on the variables of the 360-feedback survey on individuals of the test group, and mean scores for each variable. Scale 1-5.

The individuals perceived as best strategic thinkers scored high (>4, marked in green) on analytical, future oriented, holistic, logical, and quick learner / learning ability. They scored medium-high (marked in pink) on flexible, integrative, and reflective. They score medium (3.5-3.8, marked in orange) on artsy, creative, informal /variable rules, intuitive, methodical, organised, visionary. Since the mean scores appear to be high, we set the minimum for "high" at 4 points. The interval for "medium-high" is 3.8-3.9 and for "medium" it is 3.5-3.8.

Another aspect we intended to explore was whether the perceived "best" strategic thinkers are divergent or convergent, and whether these elements exclude each other other or can coexist. The scores for both the elements are low and similar, as shown in Table 12. The individuals of the test group were evaluated as slightly more divergent. The similarity of the two scores shows that these individuals are not particularly divergent or convergent, and that the two element can coexist.

We also compared formal / fixed rules with informal /fixed rules. What emerges is that the individuals of the test group show the lowest score on formal /fixed rules, and show a medium score on informal / variable rules, indicating that these individuals prefer to work in uncertain and unfamiliar situations.

The scores of the 360 Degree Feedback Survey will be compared to the CPP results in the next paragraph, aiming at better answering the first research question.

Ac: The individuals of the test group were perceived as highly analytical, future oriented, holistic, logical, and quick learners. They were also perceived as flexible, integrative, and reflective. They score better on informal / variable rules than formal / fixed rules, and convergent and divergent do not show relevant differences in their scores.

> *Qd: How do the results of the 360 Degree Feedback Survey compare to the results of the CPP test?*

We compared the mean scores drawn from the 360 Degree Feedback Surveys, the corresponding means scores of the information processing competencies, and the preferred cognitive styles, shown by the individuals in the test group (see Appendix 3).

The comparison was not conclusive, and only 4 competencies were fully matching: Logical, Quick Learning, Intuition, and Reflective. All these elements, reflective excluded, can be paired with information processing competencies of the CPP that are considered to be strategic.

Logical can be compared to Logical Reasoning, an information processing competency linked to the Logical cognitive style, associated with strategic thinking. Logical (360 Degree Feedback Survey) shows the absolute highest mean score, Logical Reasoning has a mean score of 60.56, the third highest among the processing competencies shown in Figure 6, and the Logical Cognitive Style showed a medium to high preference. This means that for this element, *logic*, the results of the 360 Degree Feedback Survey *match* the results of the CPP test.

Quick learner / learning ability corresponds to the processing competency Quick Insight Learning, which is linked to the Quick Insight cognitive style, considered a style that facilitates strategic thinking. Quick Learner / learning ability (360 Degree Feedback Survey) shows the second highest absolute mean score, Quick Insight Learning has a mean score of 62.89, the absolute second highest among the processing competencies, and the Quick Insight Style showed a medium to high preference. This means that for this element, *quick learning / insight*, the results of the 360 Degree Feedback Survey *match* the results of the CPP test.

Intuitive can be compared to the information processing competency Judgement, which is linked to the Intuitive cognitive style, associated with the strategic domain. Intuitive (360 Degree Feedback Survey) shows a medium mean score (3.55), Judgement has a mean score of 58.00, a medium score among the information processing competencies, and the Intuitive Cognitive Style showed a medium preference. This means that for this element, *intuition*, the results of the 360 Degree Feedback Survey *match* the results of the CPP test.

Although, a surprising competence of the 360 Degree Feedback Survey did not match with the CPP results, which is analytical. Analytical scored high (4.03) in the 360 Degree Feedback Survey, but does not score high in the CPP test, showing a mean score of 54.44 for the information processing competency Analytical, and the analytical cognitive style shows a mixed preference. This means that for the element *analytical*, the results of the 360 Degree Feedback Survey *do not match* the results of the CPP test. The individuals were evaluated as more analytical than they appear to be in the CPP test.

Ad: Some of the scores of the 360 Degree Feedback Survey match the results of the CPP test. The perceptions on Intuitive, Logical, Quick Learner / Learning Ability, and Reflective match fully with the CPP results. The scores obtained for these elements are medium or medium to high. The perceptions on Analytical does not match the CPP results.

5.4 Second research question: How do the "best" compare to the control group?

Like in section 3.2, the second research question was divided in 4 sub-questions, in order to better investigate all the aspects that may play a role in identifying what distinguishes the perceived best strategic thinkers from the control group. The 4 sub-questions are indicated with a Q, and the answers to those questions are indicated with an A.

> *Qa: How do the individuals of the test group compare to the individuals of the control group in terms of cognitive styles (CPP test)?*

In order to answer this first question we ran a Mann-Whitney U Test on the two groups testing all the Cognitive Styles. No significance (sig. Level .05) and no indications were found in the test (see Appendix

4 to see the test results for each variable). This means that the preferred cognitive styles of the two groups do not differ.

The figure below represents the data of the two groups graphically. This may help the reader to better understand how the preference of the cognitive styles are distributed in the two groups. Again, each box represents one individual, and each colour represents a rank order preference, where 14 (marked in purple) is the most preferred cognitive style and 1 (marked in orange) is the least preferred cognitive style.
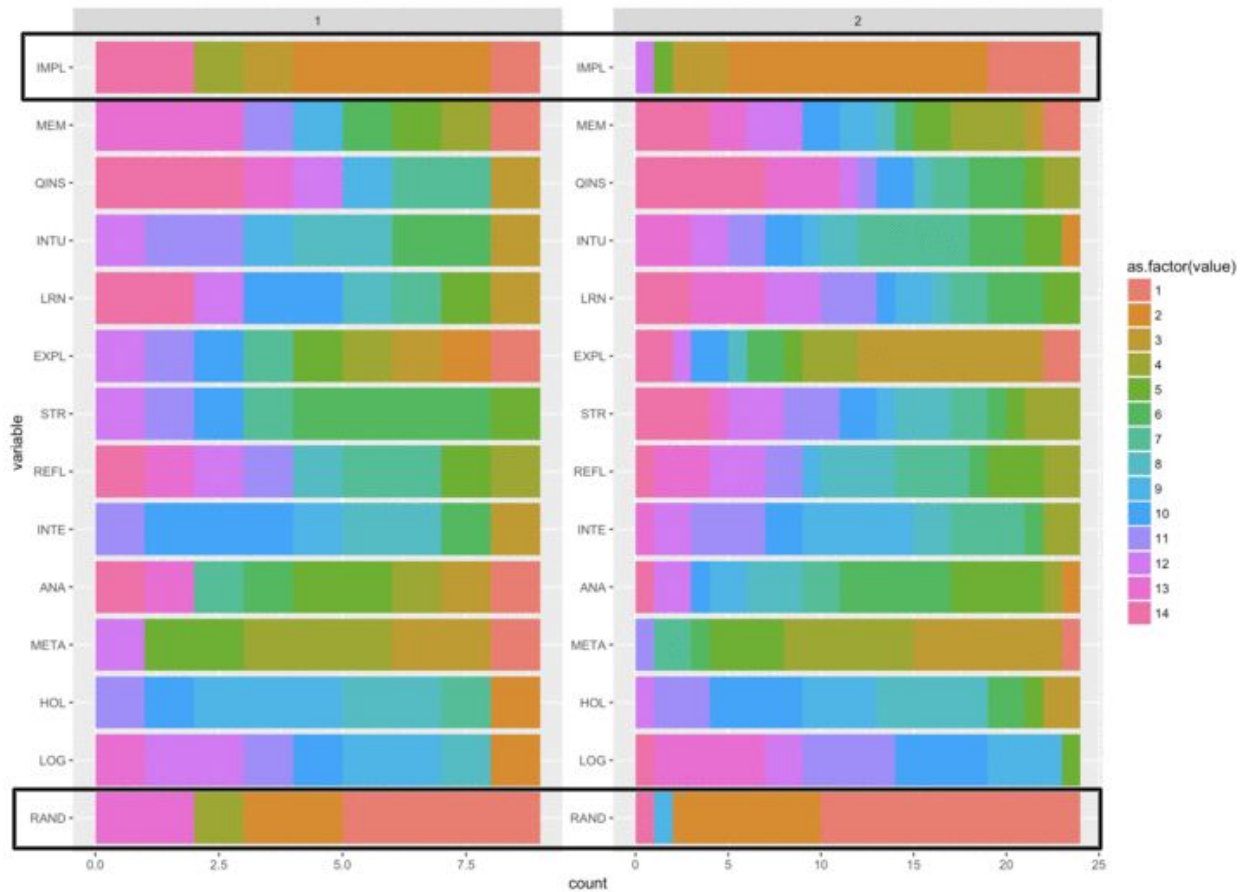
Figure 8. Bar plot representation of the individuals' preferred cognitive styles, ranked from 14 to 1, of the test group (left) and the control group (right). Cognitive styles on the Y axis, number of individuals on the X axis. See Appendix 1 for full axis labels.

As shown in Table 13, there is no significance. Also, as one can deduct from the graphic representation of the data (figure 8), there is no significant difference, since there is no clear pattern that emerges in any of

the variable. The only indication regards the preference for the styles Random and Impulsive, which are less preferred by the control group.

Aa: The preference of the cognitive styles measured by the CPP test show no significance in the two groups. Thus, the test group and the control group show the same preference for cognitive styles.

Q2: How do the individuals of the test group compare to the individuals of the control group in terms of information processing competencies (CPP test)?

We conducted a nonparametric Mann-Whitney U test on the test group and the contrast group, on the 14 information processing competencies of the CPP test, in order to investigate if there are significant differences between the two groups. Significance (sig. Level at .05) is shown for Verbal Conceptualisation (0.14) (see Appendix 4 to see the test results for each variable). Since the accepted standard significance for social sciences is set at 0.5, we consider Verbal Conceptualisation significant. As shown in Figure 8, the mean score for Verbal Conceptualisation in the test group is 50.78, whereas it is 59.54 for the control group. Although, this difference in the mean scores of Verbal Conceptualisation shows that the control group scored better than the test group.
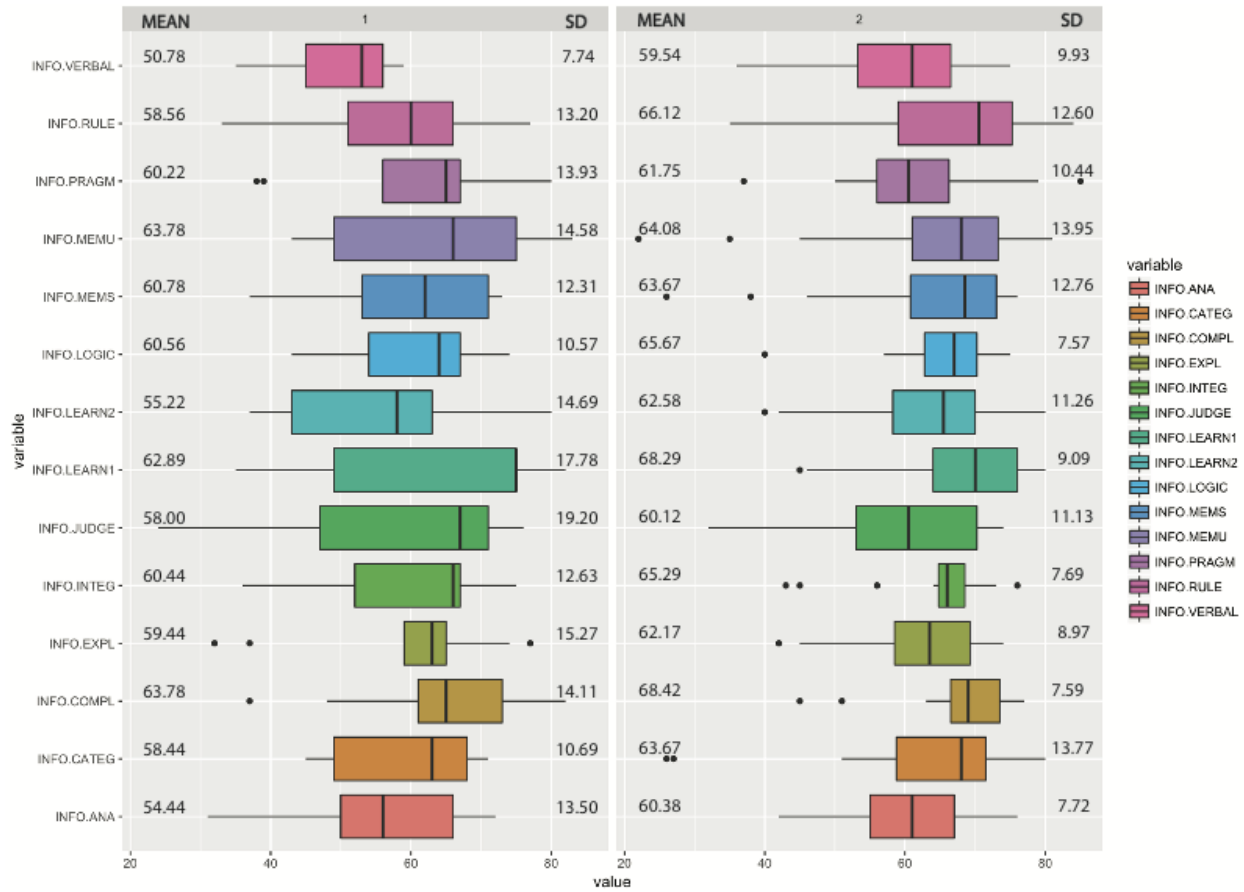
Figure 9. Plot bars of the processing competencies (CPP) for the test group (left) and control group (right), with indication of the mean and standard deviation values. Information Processing Competencies on the Y axis, scores on the X axis. See Appendix 1 for full axis labels.

When looking at the mean scores of both groups, it is possible to observe that the all the mean scores of the processing competencies for the control group are higher than the ones for the test group. Also, the standard deviations of the control group are lower than the standard deviations of the test group, except for Verbal Conceptualisation and Memory Strategies. The standard deviation for Verbal Conceptualisation in the test group is 7.74, whereas it is 9.93 in the control group. The standard deviation for Memory Strategies for the test group is 12.31, and it is slightly higher in the control group (12.76). Looking at the standard deviations of the control group, one can observe that the lowest standard deviations are on Logic (7.57) and Complexity (7.59). One reason why the standard deviation is higher in the test group may be due to the limited number of individuals who belong to that group.

Ab: There is a significant difference on the variable Verbal Conceptualisation, where the control group scores better than the test group. This variable is associated with creativity and how an individual externalises verbally information and concepts.

Qc: How do the individuals of the test group compare to the individuals of the control group in terms of Current Level of Work (CPP test)?

We conducted a nonparametric Mann-Whitney U test and a Chi-Square test on the test group and the contrast group, on the Current Level of Work of the CPP test, in order to investigate if there are significant differences between the two groups.

Hypothesis Test Summary	
Null hypothesis	significance
The distribution of CURRENT LEVEL OF WORK is the same across the test group and the control group.	.858

The significance level is .05

Table 14. Mann-Whitney U Test groups * Current Level of Work

*Pearson Chi-square test Curr * Groups*:

Value X-square = 3.254

Df = 2

P-value (asymptotic Significance) (2-sided) = 0.197

The significance level is .05

	Level 2	Level 3	Level 4	Total
Test group	3 (33,3%)	2 (22,2%)	4 (44,4%)	9 (100%)
Control group	3 (12,5%)	13 (54,2%)	8 (33,3%)	24 (100%)
total	6	15	12	33

Table 15. Crosstabulation of the Chi-Square test

The Mann-Whitney U test and Chi-Square test on Current Level of Work did not show any significance. However, 3 individuals from both groups are on Level of Work 2. Even though proportionally, the test

group had more individuals that scored 4 (implying that they are more strategic), proportionally, the control group scored higher on level 3 and lower on level 2 (which is considered not strategic). Thus, the data is conflicting and can not out right demonstrate that the test group is more strategic than the control group. To further support this, the mean score of level of work is 3.11 for the test group, and 3.21 for the control group, thus very similar, as shown in the table below.

Descriptives				
	GROUP		Statistic	Std. Error
CURRENT LEVEL OF WORK	test	Mean	3.11	.309
		Median	3.00	
	control	Mean	3.21	.134
		Median	3.00	

Table 16. Descriptives Groups * Current Level of Work for the individuals of the test group

Ac: there is no significant difference between the two groups shown in the test results. Thus, the individuals in the test group are not more or less strategic than the ones in the control group.

> *Qd: Do the number of votes correlate to the Current Level of Work (CPP) of the*
> *individuals of the test group?*

In order to answer the question, we investigated if there is a correlation between the number of votes received by the individuals of the test group in the Voting Questionnaire and the variable Current Level of Work, measured by the CPP test, for the individuals of the test group.

		Number of votes in the Voting Questionnaire					
		6	7	10	14	23	Total
Current level of work	2	1	0	1	0	1	3
	3	0	1	0	1	0	2
	4	0	3	0	1	0	4
Total		1	4	1	2	1	9

Table 17. Current Level of Work * Number of Votes in the Voting Questionnaire for the individuals in the test group.

The following graph represents the distribution of the Current Level of Work among the 9 individuals of the test group, ordered from the one with the most votes to the one with the fewest. As shown in table 17 and figure 10, there is no pattern that emerges, as the distribution is random.
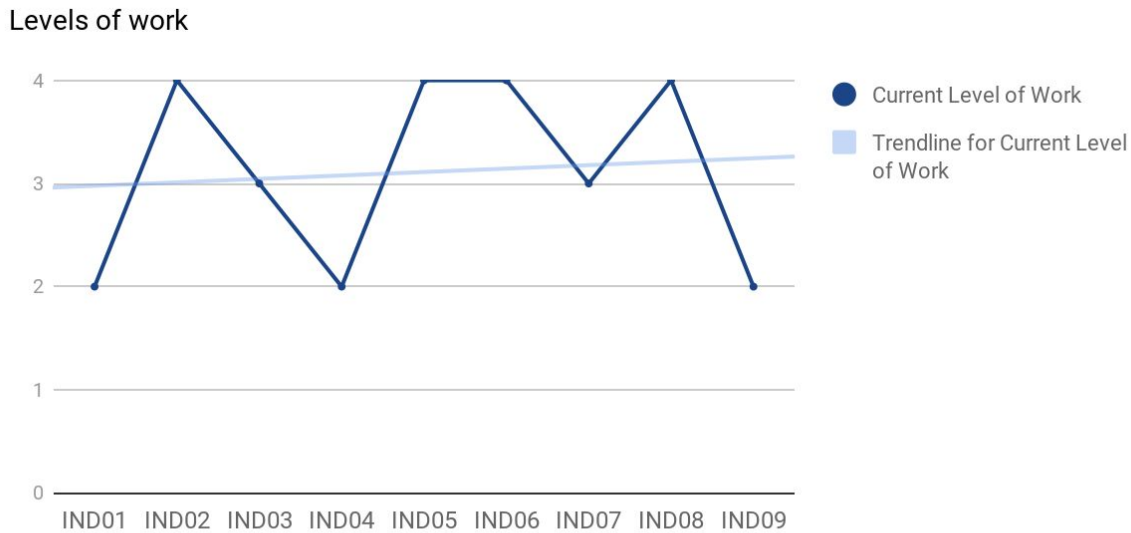
Figure 10. Graphic representation of the Current Level of Work for the 9 individuals of the test group, with a curve showing the trend for the same variable on these individuals

As confirmed by the graph, there is no relation between the number of votes and the Current Level of Work. The slope of the trendline for the Current Level of Work is positive, which means that the score of the Level of Work increases slightly by decreasing the number of votes which each individual obtained in the Voting Questionnaire. Indeed, the order by which the individuals were given a code was based on the number of votes: the most voted individual was marked as IND01.

Ad: As one can deduct from the data collected, there is no correlation between the Current Level of Work of the CPP test and the number of votes which the individuals in the test group received. The data was inconclusive.

5.5 Further data for discussion

360 Degree Feedback Survey - Hierarchy

One of the the questions we asked the individuals who carried out the Survey on the perceived best strategic thinkers was about their relationship with them, whom they evaluated. The following diagram represents the distribution of the data we collected.
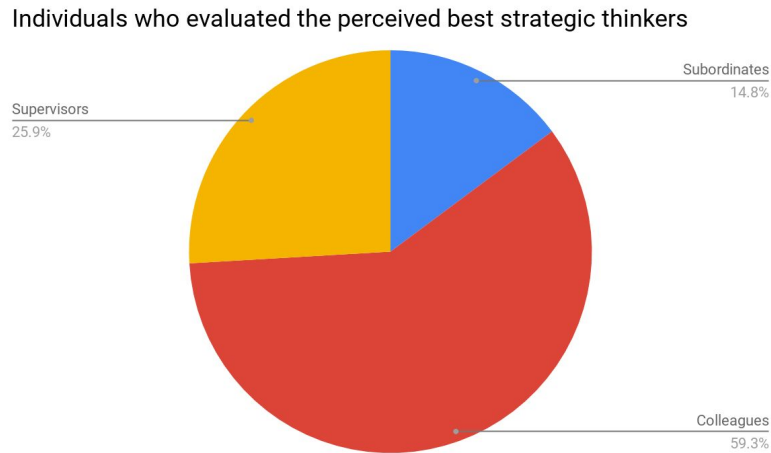
Figure 10. Pie chart describing the relation of the individuals who took the Survey with the perceived best strategic thinkers.

The individuals of test group were evaluated, in total, by 7 supervisors / bosses, 16 colleagues, and 4 subordinates. As one can observe the majority (59.3%) of the individuals evaluating the perceived best strategic thinkers were colleagues, and 25.9% were supervisors of the perceived best strategic thinkers. IND01, who received the most the votes and scored really high on the 360 Degree Feedback Survey, was evaluated by 3 subordinates. The positive results of the Voting Questionnaire and 360 Degree Feedback Survey of this individual may have been related to this individual's hierarchical position in the company. IND09, who received the fewest number of votes in the Voting Questionnaire, did not score particularly high in the 360 Degree Feedback Survey. This may have to do with the fact that this individual was evaluated by 2 supervisors / bosses and 1 colleague. The influence of hierarchy on the voting process and the carrying out of the 360 Degree Feedback Survey are further discussed in the Discussion section. The full results regarding hierarchy can be found in Appendix 2.

Company X compared to a normative group with similar characteristics

Since the data did not show conclusive results and there no significant difference between the test and the control group was shown, we decided to test the results concerning the Current Level of Work of all the tested individuals at Company X (test group + control group) against a normative group provided by Cognadev. The normative group consists of 2662 managers of different nationalities, between 35 and 55 years old, males and females, and white caucasian. This pool of individuals is similar to the individuals working at Company X, therefore it is possible to compare these two groups.

In order to discover if the tested individuals at Company X score differently on Current Level of Work compared to a much larger normative group with similar characteristics, we ran a nonparametric Mann-Whitney U test and compared the mean scores of the two groups.

Hypothesis Test Summary	
Null hypothesis	significance
The distribution of CURRENT LEVEL OF WORK is the same across the test group and the control group.	.030

The significance level is .05

Table 18. Mann-Whitney U Test groups * Current Level of Work.

As indicated in the Mann-Whitney U test, significance in the distribution of the current level of work is shown. In order to show how the distribution differs from one group to the other, the data was expressed in plot bars (Figure 11).
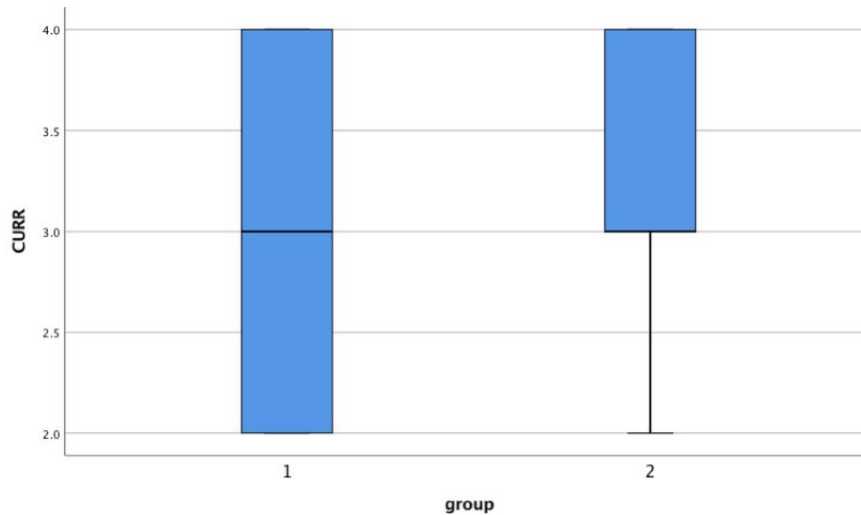
Figure 11. Plot bars representing the distribution of the scores on current level of work for the testred individuals at company X (1) and the individuals of the normative group (2).

As it is possible to observe, the distribution of the scores on current level of work for the normative group is more concentrated than for the individuals at Company X.

In order to better investigate how the two group scored in relation to each other, we also compared the mean scores on Current Level of Work in the two groups. The results are illustrated in the table below.

Descriptives				
	GROUP		Statistic	Std. Error
CURRENT LEVEL OF WORK	company X	Mean	3.18	.127
	normative	Mean	2.86	.017

Table 19. Descriptive of the mean scores and median.

The mean scores show that the tested individuals of Company X score on average higher than the normative group on Current Level of Work, as shown in Table 19. Thus the tested individuals at Company X are on average more strategic than the normative group. We also looked at the distribution of the scores on current level of work for the two groups.

Crosstabulation					
		Company X	%	Normative group	%

CURRENT LEVEL OF WORK	Level 1	0	0	101	3.8
	Level 2	6	18.2	894	33.6
	Level 3	15	45.4	959	36
	Level 4	12	36.4	697	26,2
	Level 5	0	0	11	0.4
	Total	33	100	2662	100

Table 20. Cross Tabulation group * Current Level of Work.

The table above shows interesting data regarding the distribution (%) of the scores on current level of work. If we look at the data of Company X, we see that only 18.2% is on level 2, whereas the remaining 81.8% is distributed on levels 3 and 4. No individual is on level 1 or 5, contrarily to the normative group. Despite only 1% of the general world population is on level 5 (Cognadev, 2018) only 0.4% of the normative group is on level 5. Lastly, only 62.2% of the individuals of the normative group are on level 3 and 4, versus 81.8% of Company X.

Conclusion

We have presented the data we collected and described the results. In the following chapter, we will interpret the data and build a discussion on the significance of the results.

6. Findings and Discussion

6.1 Introduction

The aim of this chapter is to provide an in depth analysis and discussion on findings of the study. The data collected and presented in chapter 5 represented the basis from which we built our discussion, considering as well the literature and the CPP theory, presented in the first half of the thesis. The chapter is divided into three sections - each representing an overarching finding. Within each section, we discuss what we expected and go into more detail of what exactly we found. We then discuss potential reasons behind the unexpected results.

6.2 Finding 1: We did not find a significant amount of common traits and cognitive elements within the individuals of the test group on the following criteria:

- Cognitive styles (CPP)
- Information processing competencies (CPP)
- Current level of work (CPP)
- 360 Degree Feedback Survey

What we expected

We expected the test group individuals to score highly in the CPP on current level of work (at least 3 or above). We expected their information processing competencies to be similar and elevated for the ones associated with strategic thinking. In terms of cognitive styles, we expected them to have similar styles, associated with strategic thinking - as well as ones associated with more operational. Thus, as the literature stipulated, a mix of considered generative and rational styles were expected (De Wit & Meyer, 2010a; Graetz, 2002).

However, individuals of the test group did not demonstrate a striking similarity in terms of these criterias, except for the 360 Degree Feedback survey. As for high scores on the CPP criterias, while some scored highly (4 on level of work for example), others scored very low (2 on level of work for example). Because

of this disparity, it was difficult to draw a solid basis for comparing what elements they have in common. Having said that, there were some modest patterns which may provide some indications. These patterns are discussed below:

Indicatications

1. *The individuals of the test group demonstrate the ability to function at a relatively high level of complexity*

Because these individuals scored higher on the information processing competencies Complexity, Quick Insight Learning, Use of Memory and Memory Strategies, which are interconnected, they show a tendency to prefer to function in complex situations, and to capitalise on memory when solving problems (Cognadev, 2018). However, it is important to note that although they scored higher, they did not necessarily score high compared to other information processing competencies. Thus, while there seems to be an indication that what they have in common is the ability to work well in complex and unfamiliar situations, which according to the literature is considered the optimal climate for strategic thinkers (Bonn, 2001; Zabriskie & Huellmantel, 1991), the result is minimal.

In terms of cognitive styles, the test group share medium preferences for Holistic and Integrative. These two cognitive styles are closely related according to the CPP and too indicate that they prefer to work in complex and abstract situations (Cognadev, 2018). However, given that the preferences were only medium and that overall the "best" perceived strategic thinkers were not consistently strong strategic thinkers (3 current level of work or above), it is hard to state that these elements are really what characterise the perceived "best" strategic thinkers.

According to the CPP, an element that they have in common is their reliance on using memory to deal with unfamiliar situations. They scored high on both Use of Memory and Memory Strategies. This indicates that they not only utilise memory to recall past situations, but they also use that memory and apply it to new problems or situations (Cognadev, 2018). The idea of memory links to the literature which suggests that experience and building cognitive maps are essential to thinking strategic thinking (De wit & Meyer, 2010a; Fontaine, 2008; Watkins, 2007; Dragoni et al., 2011, Christensen, 1997). However, given that that overall the "best" perceived strategic thinkers did not score constantly high on current level

of work, perhaps this suggests that memory's relevance to strategic thinking is questionable. Indeed, while the literature suggests experience and applying past lessons learned is helpful, experience can also be a hindrance. That is cognitive maps can be flawed and being anchored in one way of thinking hinders divergent and unique ideas (Tversky and Kahneman, 1974; De Wit & Meyer, 2010a). As such, while memory is what they have in common, it is difficult to suggest that this is an element they have in common because they are strategic thinkers.

Further, memory is linked to being careful and attentive (Cognadev, 2018). These traits are not considered to be strategic in the literature - rather, it represents more strategic planning/rational thinking. Strategic thinkers are not careful or attentive to detail - rather, they make leaps in faith that can be risky. (De Wit & Meyer, 2010a; Mintzberg, 1994a, b; Nuntamanop et. al., 2013; Olson & Simerson, 2015; Tovstiga, 2015; Ohmae, 1982). This common traits in the test group - of which few scored as highly strategic - could therefore suggest that memory is indeed not a key cognitive element associated with strategic thinking. Or at least, something to be further explored.

2. *The individuals of the test group score low on Verbal Conceptualisation*

Verbal conceptualisation, which expresses how ideas are formulated and verbally expressed, is related to the level of creativity of the language used, and unusual perspectives adopted. A low score indicates that the individuals tend to express themselves in a simple and straightforward manner, without using flowery expressions or many metaphors (Cognadev, 2018).

According to literature, strategic thinkers are creative and frame breakers (De Wit and Meyer, 2010a; Raimond, 1996; Ohmae, 1982; De Bono, 1996). That is, they challenge old forms, breakdown elements and creatively piece together (synthesis) the components in a new way. The outcome is innovative and unique. We therefore expected the test group to take a similar approach when creating the "stories" in the CPP exercises. We expected them to piece together terms associated with the symbols in interesting and elaborate ways. Further, we expected them to not be restricted by a fixed group of vocabulary stipulated by the test, but rather be divergent and use their own words that were more distant from the original term - creating unique and interesting stores. However, the shared low scores on verbal conceptualisation would indicate that these abilities were not in their breadth and, according to the literature, not particularly strategic in their thinking.

3. *The individuals of the test group score high on all the competencies of the 360 Degree Feedback Survey, but particularly high on logical, holistic, future oriented, quick learning, and analytical*

The test group was perceived to be holistic and logical, elements that in the CPP model are associated to strategic thinking (Cognadev, 2018). Logical is also a strategic element of the rational school of thought (De Wit & Meyer, 2010a, and is mentioned - although not considered a fundamental element - in the generative school of thought (De Wit & Meyer, 2010a). The fact that the test group shows this trait in the 360 Degree Feedback Survey confirms that logical is an element associated to strategic thinking. Holistic also appears in the literature regarding strategic thinking (Graetz, 2002; Ehrlich, 2011). Future oriented and the ability to think long-term, which represent key qualities of a strategic thinker according to the literature (Ridgley; 2012, Raimond, 1996; Graetz, 2000, 2002; Sanders, 1998) and the CPP (Cognadev, 2018), were confirmed in the Survey. The ability to learn and grasp concepts fast, proven by the CPP to be a competency of the test group, was also recognised in the Survey. Finally, analytical, represents the most inconsistent finding, as it strongly emerged in the 360 Degree Feedback survey but did not score high in the CPP test. However, analytical is one of the core competency of the Rational perspective.

In terms of the literature, the scores in these particular traits/cognitive elements present a positive outcome. The literature argues that strategic thinking involves a combination of traits or cognitive elements that can be considered rational and/or generative (De Wit and Meyer, 2010; Tovstiga, 2015; Graetz, 2002).

4. *According to the 360 Degree Feedback Survey, the individuals of the test group are equally convergent and divergent*

We expected these two terms to score highly, given its prominence in literature. Indeed, according to authors, strategic thinking involves both divergent and convergent thinking (Sloan, 2016; Ridgley, 2012; Ohmae, 1982; Raimond, 1996; Kao, 1996; Goldman & Scott, 2016; Cropley, 2006; De Bono, 1996; Chevallier, 2016). However, while the test group scored similarly, the 360 Degree Feedback Survey did not show a strong tendency in the test group to be either divergent and/or convergent. Thus, we can only make an indication that they are qualities that can coexist, but not that they are key strategic thinking traits - particularly given their low average score for current level of work.

5. *According to the 360 Degree Feedback Survey, the individuals of the test group prefer to work in unfamiliar and more unpredictable environment, indicated by a higher score on Informal/Variable Rules*

The 360 Degree Feedback Survey shows that the test group scores higher on informal / variable rules, which indicates they prefer to work in unfamiliar situations, rather than in formal / fixed rules, which are familiar. Despite showing these traits, according to their peers, low average scores for current level of work in the CPP show disparity between what is perceived and the reality of the tests group's true abilities. Low scores in the CPP would suggest that they are unable to work in complex and unfamiliar situations. Later in the discussion we will attempt to understand and explain these discrepancies.

Why were there no significant similarities?

1. *Not all the individuals of the test group were strategic thinkers (according to the CPP, they did not consistently obtain high current level of work scores - more than 3)*

In order to fulfill the purpose of this thesis, we set out to discover what traits and cognitive elements the best perceived strategic thinkers had in common. We therefore needed to identify who the perceived best were in Company X. Given that there were no means for us to know who the "best" were, we needed to rely on the perceptions and judgments of their colleagues. We therefore asked employees to vote for individuals they considered to be the "best". Although this method served its purpose, there are fundamental flaws which could have affected the outcome for the vote. We believe that the negative result (the lack of similarities between the "best") could be down to the flaws in the vote. That is, voting is based on perceptions, a potentially flawed principal. It can not be controlled nor accounted for. For instance, the individuals who voted may have been clouded by hierarchy. That is, they associated strategic thinking to status in the company (in fact, senior members received the most votes, yet scored least at the CPP). However, hierarchy is not necessarily associated to strategic thinking - thus, the vote could have been based on a flawed understanding of what strategic thinking is. As such, outliers (scored below 3 - may have distorted the data).

Another point to consider is the number of nominations the voters had to make. They were asked to vote for 10 colleagues at Company X - 5 votes were compulsory and 5 were optional. In order to make our

study more efficient and reliable, we needed the voters to nominate at least 5 people. Otherwise, the pool would be too small, and there would be less likelihood of outright and credible votes for 10 individuals. However, this may have been challenging for the voters - perhaps they do not know 5 strategic thinkers, let alone 10. Maybe they only know 3. Thus, they had to falsify or invent nominations. If this is the case, then the votes were diluted, the supposed "best" strategic thinkers were in fact not significantly strategic thinkers and, consequently, could not demonstrate similarities that could be interpreted as "strategic".

Further, perhaps the voters did not reflect enough when making their nominations. It is plausible that they were in a rush or did not take the vote seriously enough to make informed and genuine votes. This too could have diluted the votes and potential for determining the perceived "best" strategic thinkers. Lastly, the voters could have based their votes on emotions - voted for friends or people they admire. These motivations would do little to distinguish the "best" in Company X - rather provide individuals who are not actually strategic in their thinking. Naturally, a mixture of best and non-best would present inconsistent results.

It is also interesting to note that the low scores for information processing competencies indicate a difficulty in responding verbally (express themselves). This could indicate that the individuals prefer visual modes (express themselves using images or graphics - other non text expressions), however, this is not something the CPP is able to measure (Cognadev, 2018). As such, this could be a flaw in the CPP assessment tool and (given that Company X is a consulting firm, specializing in strategy), perhaps they are indeed strategic, but the CPP can not measure these parameters.

2. *The CPP results are flawed or inaccurate*

If indeed we consider the voting as a flawed tool, the consequence is that the CPP results are too inaccurate - or rather, inaccurate at representing strategic thinkers. Indeed, if the "best" perceived strategic thinkers were in fact not the "best", there results would naturally be conflicting and difficult to interpret in relation to the elements and traits perceived as strategic.

Another aspect to consider is the testing environment. Although plans and provisions were made in order to perform the tests in a controlled setting (Company X office, under direct supervision), this was not always possible. That is, because of their demanding work schedule, we needed to be flexible and accommodating. As such, some tests were taken at the homes of the tested individuals and under limited

supervision. Further, although they were monitored over skype - the administrator was present only via audio. The tested individuals were therefore not supervised visually. The implication of this is that they may have carried out the test incorrectly. That is, without the pressure of being watched, they may have taken long breaks, be disengaged with the assessment, or distracted. As such, their results may not be true representations of their level of work. Further, we were made aware by the administrator that a few of the tested individuals had technical issues when trying to complete the assessment. This too may have had an influence on their attention and focus on the assessment.

We could also consider a number of other factors related more to the tested individuals' state of being. That is, they may have been very busy and therefore rushed through the assessment without properly adhering to the guidelines. Perhaps they were stressed for a number of different reasons: a) stressed due to other obligations and tasks b) stressed due to the nature of the test and the implications it may have. That is, given that the company focuses on strategy, there may have been anxiety over underperforming. In fact, Stress and anxiety do have an affect on performance (Cognadev, 2018). Lastly, there may have been lacking motivation to complete the test - further implying lack of focus and attention. Indeed, a number of individuals were persuaded to the assessment, meaning that engagement could have been low.

Ultimately, the validity of the CPP tool could also be put into doubt. If the test group truly was strategic in their thinking, then the CPP has parameters that are inaccurate or unbalanced. Indeed, the CPP has yet to be approved as a concrete and definitive tool for measuring strategic thinking. There are still aspects that need to be scrutinised and further explored. Further, the tool is unable to measure all elements and concepts that have been stipulated by the literature. In fact, the CPP is based on the work of certain theories - who is to say that those theories are absolute.

3. *We didn't actually get the "best" perceived strategic thinkers, according to the CPP test results*

Although the 9 individuals in the test group received the most votes and were perceived as the most strategic in Company X, some scored lower in the CPP than the individuals in the control group. As such, the test group was not composed of the "best" according to the CPP results. If we had first tested the entire company and would have picked the best 10 results - and used this as the test group - perhaps then, we may have seen patterns on what strategic thinkers have in common.

4. *Hierarchy played a role in determining the characteristics of the perceived best strategic thinkers*

The individuals of the test group were asked to nominate 3 individuals in the same company each to conduct a 360 Degree Feedback Survey on themselves. Because the perceived best strategic thinkers had the possibility to choose who would have to conduct the Survey, there is a possibility that those who were nominated to conduct the Survey have a good relationships with the perceived best strategic thinkers. This might explain why 59% of the individuals who took the 360 Degree Feedback Survey were colleagues of the perceived best strategic thinkers. It is possible that a colleague (who may also know the individual of the test group better, as they might spend more time together) can give more positive feedback than a supervisor. This could also help explain why the results of the 360 Degree Feedback Survey were so positive on all the elements to evaluate. As a supporting argument to this, the individual who got the most votes, IND01, and thus who was perceived the best strategic thinker in the company, was only evaluated by subordinates and tended to score more positively than IND09, who was evaluated by 2 supervisors and 1 colleague. This implies that hierarchy can have an influence on how people perceive and evaluate individuals within the same company.

Summary

Overall, there were no significant similarities between the test group, as shown in the data analysis. We can therefore not provide any strong or conclusive arguments which suggest what the supposed strategic thinkers have in common, nor what strategic thinking may entail. The above indications or patterns, in general, did not provide positive outcomes, thus, considering the test group as similar and strongly strategic, is difficult. However, the tests did show that they work well in complex situations - which is strategic - and in terms of the 360 Degree Feedback surveys, they clearly scored well, particularly on elements strong in literature. Further, if we compare the overall results of Company X, with the normative group, they score higher in terms of current level of work - and are thus, on average, more strategic than most. This produces rather inconclusive results and we believe that further exploration and testing on the topic is therefore needed. Although our study may provide some aid to research, our study was not as in-depth and elaborate, because of the timeframe, as perhaps was needed for such an unexplored topic. Further, the sample group may have been far too small to produce enough data to analyse and to draw conclusions.

6.3 Finding 2: There were no significant differences between the test group and the control group - both groups were very similar, with the control group scoring slightly higher on the following criteria:

- Information processing competencies
- Current level of work

What we expected

We expected the test group to score higher than the control group on current level or work, as well as on the six strategic information processing competencies. We also expected the test group to prefer cognitive styles associated to strategic thinking, and the control group to prefer cognitive styles associated with operational. We expected the test group to score higher than 3 current level of work and the control group to score lower than 3, or at least 3 (low strategic). Lastly, given that the groups were supposed to represent the extremes ("best" and "not-best") we were expecting to see more significant differences or noticeable indications between the two groups.

Stronger differences between the control group and the test group

1. *The individuals of the control group score significantly better on Verbal Conceptualisation than the test group, even though this variable alone is not sufficient to draw a solid conclusion*

What Verbal Conceptualisation translates into in terms of behaviour and characteristics was explained in the previous section (1a, point 4). So, this result indicates that the individuals of the control group have a better ability to express themselves verbally, which may indicate they are more creative in conceptualising and using metaphors.

2. *The control group scores higher in all Information Processing Competencies and slightly higher on Current Level of Work*

The control group demonstrates better capabilities in all information processing competencies, including both the ones associated to strategic thinking and the ones associated to operational thinking. This explains why the mean score indicating the Current Level of Work of both groups differs, but not

significantly. Because of the higher scores obtained by the control group on the strategic information processing competencies, they were able to reach higher Current Levels of Work. But because they scored high also on competencies associated to operational thinking, the overall score on Current Level of Work was lowered. For this reason, even though the control group scores slightly better than the test group, the difference is not significant. Thus, it is possible to affirm that the two groups are equally strategic, despite the distribution of Levels of Work in the two groups varies.

Given that our literature review was based on strategic thinking traits and cognitive elements, and the control group (who is not perceived as the best strategic thinkers) scored higher than the test group - we can not use the literature to support our findings. That is, we can not draw results of the "non-best" to support what cognitive elements and traits can be considered as strategic.

Weaker indications

1. *The individuals of the control group show a slightly lower preference for the Random and Impulsive cognitive styles, but not enough to be considered significant*

The tests do not show significant differences, although the control group rejects the Random and Impulsive style more than the test group. This may indicate that the test group prefers the "world of ideas" associated to Random and Impulsive, "as opposed to the logical-analytical and facts-oriented worlds", associated to the strategic cognitive styles (Cognadev, 2018, p. 86). Or, that emotional factors, such as stress and anxiety, may have influenced the performance of some individuals. However, the distinction between the groups may be more noticeable due to the low number of individuals in the test group. So, if only one individual is deviant, the difference appears to be, proportionally, much larger than it would be in a group with many more individuals. Therefore, this difference cannot be considered significantly important.

2. *The individuals within the test group tend to score more similarly on Verbal Conceptualisation and Memory Strategies, whereas the ones within the control group tend to score more similarly on Logical Reasoning and Complexity*

The standard deviations in the control group are lower than in the test group on all the information processing competencies except Verbal Conceptualisation and Memory Strategies. So, the test group shows a standard deviation that is lower than the control group on these two competencies, indicating that the test group is more similar in these scores than the control group. The score on Verbal Conceptualisation, as stated earlier, is the lowest out of all the information processing competencies, for the test group. Memory Strategies, instead, represents one of the highest scores for the test group. These competencies are associated with operational thinking, and thus do not strengthen the argument that the test group is more strategic than the control group. On the other hand, the lowest standard deviations for the control group is on Complexity and Logical Reasoning, on which the individuals score respectively the highest and high, which means that the all the individuals of the control group tend to score higher and similar to each other on these competencies. These competencies are associated with strategic thinking, showing that the control group has better strategic abilities than the test group.

Similarly, these findings are irrelevant to the literature because the test group scored lower than the control group. We can indicate or provide any conjectures which indicate what strategic thinking is or what it entails - the purpose of this thesis.

Why were there no significant differences?

The flaws and limitations discussed in Finding 1.c, also apply to finding 2.

1. *The groups were tested in different environments*

According to the administrator of the CPP test, whereas the members of the control group were tested at Company X under strict supervision, the majority of the test group were tested under suboptimal conditions - as discussed in 1.c. As such, this could explain why the results of the test group are not as elevated as one would imagine and, why there are no significant differences between the groups.

2. *The test group may have been affected by anxiety*

Given that the test group was composed of more senior level employees, perhaps they felt more pressure to perform well in the assessment. Anxiety is a variable that has an influence on the results of tested individuals.

3. *The limitations of the method influenced strongly the results*

The original plan was to test the 10 "best" and the 10 "worst", this may have provided a better means for comparing and contrasting the test group and the control group. However, for ethical reasons, this was considered as inappropriate. Further, it is likely that we would not have found a company to agree to the study under these terms. As such, we were forced to test the "best" against the rest of the volunteers from Company X. Perhaps the volunteers just so happened to be strategic thinkers. For this reason, it would have been better to have the "worst" or a random sample group.

4. *The members of the control group and the test group are hired on the same basis*

The fact that we were unable to see differences between the test group and the control group could be due to the fact that the employees at Company X are hired on a similar criteria. If indeed this is true, then this could explain the lack of differences.

5. *The test group and the control group were not given the same instructions before completing the assessment*

The administrator may have used different wording when presenting instructions. As such, the different wording may have been perceived or interpreted differently by the tested individuals, affecting their understanding and performance. For instance, if the administrator expressed the idea that interpretations and the storey writing element of the assessment is open - those individuals may have been more free and creative with their stories. Given that the CPP monitors and measures such actions or qualities - this could explain why there is inconsistency among the test group and the control group.

Summary

Overall, the test group scored lower than the control group - in terms of information processing scores related to strategic thinking and current level of work. We can therefore not provide clear conjectures on what sets the "best" from the "non-best". We did see see some menial patterns, however, they are differences which set the control group as more strategic and different to the test group - the opposite outcome of what we expected. We believe that the flaws in the methodology (time issues, lack of participants, limited data etc) are a factor as to why our results are inconclusive. In the recommendations section 7.2 we will provide more suggestions as what could be done if this study is repeated, to mitigate our challenges and limitations. Maybe if this is done, conclusive results can be drawn.

6.4 Finding 3: the tested individuals at Company X are more strategic on average compared to a similar normative group of managers.

Because the differences between the test and the control group were not enough and/or not strong enough, we were not able to clearly discern one group from the other. Thus, we deduced that the two groups are not significantly different and, therefore, we decided to consider the two groups as one single group, to compare to a much larger normative group, with similar characteristics. This would allow us to compare Company X to a more global context, and explore if Company X scores differently to a similar, but larger, sample of individuals.

What we expected

We expected the tested individuals at Company X to score higher on current level of work than a normative group of managers of different nationalities. This is because Company X works with strategy on a daily basis, and thus the individuals working there might be more used to and trained to deal with unfamiliar and complex situations. Especially given that literature states that with more practice and explore to strategic climates - the more chances there are of improving.

Conclusive results

1. *The tested individuals at Company X are on average are more strategic, in terms of current level of work, than a large normative group of managers*

The tested individuals at Company X demonstrated to be more strategic than a normative group of 2662 managers, aged 35-55, white-caucasian. The mean score of Current Level of Work for the individuals at Company X falls into the end of the Tactical Strategy domain, whereas it falls into the beginning of the Diagnostic Accumulation domain for the normative group.

Because there were no substantial differences between the test and the control group, the two groups could be merged together as one, and be compared to another group, much larger, to explore whether the individuals at Company X are, on average, more strategic than the norm. The results indeed, showed that the individuals at Company X are more strategic, scoring higher on current level of work, than the normative group.

Why were there differences?

1. *Company X works with strategy, which means the individuals working there are more experienced in strategy*

Since Company X is a consulting firm specialising in strategy, its employees are required to work with and develop strategies on a daily basis. This could mean that the individuals at Company X are constantly exposed to unfamiliar and complex situations, where they have to think strategically in order to solve problems. So, these individuals must be more experienced than the majority of the individuals working for companies where strategy is not the focus of the job. The fact that Company X on average scores higher on current level of work than the normative group might also depend on the fact that the managers of the normative group are not required to work with strategy as much as the ones at Company X, and thus they might be required to execute more operational tasks.

2. *The individuals at Company X might have been hired according to specific criteria related to a higher level of strategic thinking*

People working at Company X may have been hired specifically to respond to situations and settings that are highly unfamiliar, and thus that require strategic competencies and traits. So, if all the individuals at Company X were hired according to the same criteria, despite they all have different personalities and

skills, the competencies related to strategic thinking may be better developed in them, even if they are varied - as shown by the CPP results -.

Summary

Given that the test group - who was supposed to be the "best" strategic thinkers in Company X - did not show a significant difference compared to the control group (i.e. - the "non-best") it may appear that Company X is not a very strategic company and that their results in total can not indicate what strategic thinking is and entails. However, if we reframe the study - compare the results of Company X to a normative group -, we do see a positive outcome. That is, Company X, on average score higher on level of current work, suggesting that they are very strategic in relation to their proportion and in the "world". If only 1 out of 100 people score a 5 (Cognadev, 2018), and Company X had employees well below 100 - we should not expect to see a 5, let alone in a test group of 9 individuals. Further, 4 out of 100 score a 4 (Cognadev, 2018) and Company X had 36% of its employees who were tested score 4. They are therefore above the normal percentile. Further, 81.8% of Company X scored a 3 or 4 (whereas it was only 62.2% for the normative group), meaning that the majority of Company X fall in the strategic sphere. Thus, in the grander scheme, Company X could be considered as strategic and their results interesting to analyse if we want to truly find out what strategic thinkers and what it entails. In order to do this we would have to study Company X and the normative group - given the limited time frame, however, this is not possible. It is something to consider for a future study.

7. Conclusion

Due to advancing technology and globalisation, the world is becoming ever more complex and unpredictable (Reeves & Deimler, 2011; Bonn, 2001; Christensen & Kowalczyk, 2017). To endure this peril, strategic thinking has been championed as a critical competency (Bonn, 2001; Zabriskie & Huellmantel, 1991). However, despite it's acclaim, there is still much to be explored on the topic (Liedtka, 1997; Bonn, 2001; Tovstiga, 2015; Sarker et al. 2018). To begin with, we must investigate what exactly strategic thinking is and what it entail. Next, how can we measure it, and lastly, how can we harness it to our advantage. In order to encourage progress in research, more exploration is needed. Particularly on a cognitive level, as well as on potential means to measure strategic thinking - aspects that have yet to be established (Steptoe-Warren et al. 2011, cited in Goldman & Scott, 2016; Bonn, 2005; Sarker et al. 2018). This was the very purpose of this thesis. We set out to explore what knowledge already existed on the topic, study individuals who are perceived to be the best strategic thinkers and to try using the CPP (a potential tool for widespread use in the measuring of strategic thinking). From this, we hoped to see patterns or common outcomes that would allow to to provide some indications of what strategic thinking entails, or suggestions for what needs to be further explored.

In order to conduct our exploration, we used Company X as our case study. A Voting Questionnaire determined who out of Company X were the best perceived best strategic thinkers. The "best" (9 individuals), as well as the rest of the volunteers at Company X, were tested using the CPP. The results of the 9 "best" (test group) were compared to the results of the rest - the "non-best" (control group). The individuals within the test group were also compared to one another - using the results of the CPP and the 360 Degree Feedback Surveys. The 360 Degree Feedback Survey was completed by three people per perceived best strategic thinker.

From the data collected, we expected the test group (the "best") to score at least 3 or higher on current level of work, to all score high on information processing competencies related to strategic thinking, and to present similar preferences to cognitive styles associated to strategic thinking. We believed these outcomes would enable us to answer our first research question. We also expected the test group to score higher on current level of work compared to the control group (the "non-best"), as well as see more differences which set the test group as strategic and the control group as operational - in terms of

cognitive styles and information processing competencies. Lastly, we expected the test group to score similarly in the 360 Degree Feedback surveys.

However, the data was not what we expected. We did not see any significant similarities between the individuals of the test group nor any significant differences between the test group and the control group. In fact, the control group scored higher in terms of current level of work and information processing competencies. As such, we were unable to fully achieve our purpose of our study - provide conjectures that would bring us closer to defining strategic thinking - or answering our research questions. Consequently, we began to explore the reasons behind this inconclusive data and attempted to position Company X at a different angle - by comparing the CPP results with a normative group.

We believe that the inconclusive data was a result of unattainable standards. That is, the conditions in which the study took place were not ideal - compromises that had to be made with Company X, as well as limited resources and time. Thus, the data may have been compromised, leading to skewed results.

Having said this, as mentioned earlier, this was an explorative study and there were lessons to be learned and new insights which can be applied to further studies on this very topic. One interesting finding, which was a result of exploring, was the comparison between Company X and the Normative group. The results were not very optimistic for Company X, however, compared to the normative group, their results were more positive. Perhaps future studies need to ensure that they carry out tests from various angles. Ensuring that the case study is being framed more true to life.

Further, based on the limitations that we previously mentioned, we propose the following recommendations for future studies:

Firstly, a larger sample of individuals to examine would be more ideal, as it would provide large enough data to analyse, as well as enable more comprehensive testing methods to be used. With a wider pool of individuals to study, the statistical tools would also produce much more reliable and precise results. Further, testing a company of at least 50-60 individuals (all of which participate in the study) would be more appropriate. This would ensure that we obtained a full representation of the company and that motivation biases are eliminated. Secondly, a longer time frame to conduct the study would be necessary to analyse more in depth and further explore the data, in order to find more concealed patterns, hints or interpretations. Thirdly, the CPP testing conditions need to be standardized. The way the instructions are

given by the administrator may change from a testing session to another. Also, the test environment was not always ideal in out study, since some individuals took the test late at night or at home. This may have affected the results. Thus we recommend that in the future the test conditions are in an as ideal as possible environment, since the CPP test requires focus.

As of yet, the strategic thinking enigma has yet to be broken, however, through exploration and perseverance, we will come close to the core.

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Appendixes

Appendix 1

Labels on the Y axis on Figure 6.

Meta	metaphorical
Hol	holistic
Inte	integrative
Expl	explorative
Str	structured
Intu	intuitive
Mem	memory
Refl	reflective
Ana	analytical
Log	logical
Rand	random
Impl	impulsive
Lrn	learning
Qins	quick insight

Labels on the Y axis on Figure 7 and 9.

info verbal	verbal conceptualisation
info rule	rules
info pragma	pragmatic
info memu	use of memory
info mems	memory strategies
info logic	logical reasoning
info learn 2	gradual improvement learning
info learn 1	quick insight learning
info judge	judgement
info integ	integration
info expl	exploration
info compl	complexity
info category	categorisation
info anaanalysis	

Labels on the Y axis on Figure 8

Impl	impulsive

Mem	memory
Qins	quick insight
Intu	intuition
Lrn	learning
Expl	explorative
Str	structured
Refl	reflective
Inte	integrative
Ana	analytical
Meta	metaphorical
Hol	holistic
Log	logical
Rand	random

Appendix 2

Below the reader can find the results of the 360 Degree Feedback Survey for each of the 9 individuals of the test group.

IND01

This individual was evaluated by 3 subordinates. 2 people have worked with this individual for for 1 to 5 years, and 1 for over 5 years.

The following table illustrates the mean score IND01 obtained for each of the 20 terms evaluated on a scale from 1 to 5.

Term	Feedback 1	Feedback 2	Feedback 3	Mean score
analytical	5	4	4	**4.33**
artsy	5	5	4	**4.66**
conventional	3	3	3	**3**
creative	4	5	5	**4.66**
divergent	3	4	4	**3.66**
flexible	4	4	3	**3.66**
formal / fixed rules	2	3	2	**2.33**
future oriented	5	5	5	**5**
holistic	5	5	5	**5**
Informal / variable rules	5	5	4	**4.66**
integrative / synthesis	4	4	3	**3.66**
intuitive	3	5	5	**4.33**
logical	4	4	4	**4**

methodical	4	2	4	**3.33**
organised	3	3	2	**2.66**
planner	2	3	3	**2.66**
quick learner	5	5	5	**5**
reflective	4	3	4	**3.66**
unorthodox	5	5	4	**4.66**
visionary	5	5	5	**5**

Table 21. 360 Degree Feedback Survey results for IND01

IND02

This individual was evaluated by 2 colleagues and 1 boss/supervisor. 2 people have worked with this individual for one year or less, and one for 1 to 5 years.

The following table illustrates the mean score IND02 obtained for each of the 20 terms evaluated on a scale from 1 to 5.

Term	Feedback 1	Feedback 2	Feedback 3	Mean score
analytical	5	5	5	**5**
artsy	4	4	4	**4**
conventional	4	4	3	**3.66**
creative	3	3	5	**3.66**
divergent	2	1	4	**2.33**
flexible	4	5	4	**4.33**
formal / fixed rules	3	5	3	**3.66**
future oriented	5	5	4	**4.66**
holistic	2	5	4	**3.66**
Informal / variable rules	4	1	4	**3**
integrative / synthesis	5	4	5	**4.66**
intuitive	1	2	3	**2**
logical	4	5	4	**4.33**
methodical	5	5	4	**4.66**
organised	5	4	3	**4**
planner	4	2	4	**3.33**
quick learner	5	5	5	**5**
reflective	4	2	4	**3.33**
unorthodox	1	1	3	**1.66**
visionary	4	2	3	**3**

Table 22. 360 Degree Feedback Survey results for IND02

IND03

This individual was evaluated by 3 colleagues. 1 person has worked with this individual for 1 year or less, and 2 for 1 to 5 years.

The following table illustrates the mean score IND03 obtained for each of the 20 terms evaluated on a scale from 1 to 5.

Term	Feedback 1	Feedback 2	Feedback 3	Mean score
analytical	4	5	5	**4.66**
artsy	2	4	4	**3.33**
conventional	3	2	3	**2.66**
creative	4	4	5	**4.33**
divergent	4	4	4	**4**
flexible	3	5	4	**4**
formal / fixed rules	2	4	3	**3**
future oriented	5	4	5	**4.66**
holistic	4	5	5	**4.66**
Informal / variable rules	4	3	4	**3.66**
integrative / synthesis	4	5	5	**4.66**
intuitive	3	4	5	**4**
logical	5	4	5	**4.66**
methodical	4	4	4	**4**
organised	3	3	4	**4.33**
planner	2	4	4	**3.33**
quick learner	4	5	5	**4.66**
reflective	3	4	4	**3.66**
unorthodox	3	4	4	**3.66**
visionary	4	4	4	**4**

Table 23. 360 Degree Feedback Survey results for IND03

IND04

This individual was evaluated by 2 colleagues and 1 boss/supervisor. 2 people have worked with this individual for less than a year and 1 for more than 5 years.

The following table illustrates the mean score IND04 obtained for each of the 20 terms evaluated on a scale from 1 to 5.

Term	Feedback 1	Feedback 2	Feedback 3	Mean score
analytical	3	4	5	**4**
artsy	2	4	2	**2.66**
conventional	4	3	4	**3.66**
creative	2	4	2	**2.66**
divergent	2	3	1	**2**
flexible	4	5	5	**4.66**

formal / fixed rules	3	2	3	**2.66**
future oriented	3	4	5	**4**
holistic	4	5	5	**4.66**
Informal / variable rules	3	4	5	**4**
integrative / synthesis	4	4	5	**4.33**
intuitive	5	4	5	**4.66**
logical	5	4	3	**4**
methodical	3	3	3	**3**
organised	4	3	4	**3.66**
planner	3	3	4	**3.33**
quick learner	3	4	4	**3.66**
reflective	4	5	5	**4.66**
unorthodox	3	3	3	**3**
visionary	3	4	4	**3.33**

Table 24. 360 Degree Feedback Survey results for IND04

IND05

This individual was evaluated by 2 colleagues and 1 boss/supervisor, who have worked with this individual for 1 to 5 years.

The following table illustrates the mean score IND05 obtained for each of the 20 terms evaluated on a scale from 1 to 5.

Term	Feedback 1	Feedback 2	Feedback 3	Mean score
analytical	4	5	3	**4**
artsy	3	2	3	**2.66**
conventional	3	4	3	**3.33**
creative	3	2	4	**3**
divergent	4	3	3	**3.33**
flexible	2	3	4	**3**
formal / fixed rules	5	2	4	**3.66**
future oriented	4	4	3	**3.66**
holistic	3	4	4	**3.66**
Informal / variable rules	2	5	4	**3.66**
integrative / synthesis	3	3	3	**3**
intuitive	2	2	4	**2.66**
logical	5	5	5	**5**
methodical	5	4	3	**4**
organised	5	3	4	**4**
planner	5	3	3	**3.66**
quick learner	3	4	4	**3.66**

Term	Feedback 1	Feedback 2	Feedback 3	Mean score
reflective	4	4	4	**4**
unorthodox	1	2	3	**2**
visionary	2	2	3	**2.33**

Table 25. 360 Degree Feedback Survey results for IND05

IND06

This individual was evaluated by 3 colleagues, who have worked with this individual for 1 to 5 years.

The following table illustrates the mean score IND06 obtained for each of the 20 terms evaluated on a scale from 1 to 5.

Term	Feedback 1	Feedback 2	Feedback 3	Mean score
analytical	4	4	3	**3.66**
artsy	5	4	5	**4.66**
conventional	1	3	2	**2**
creative	4	5	3	**4**
divergent	3	4	4	**3.66**
flexible	3	4	2	**3**
formal / fixed rules	2	3	1	**2**
future oriented	5	4	4	**4.33**
holistic	4	4	2	**3.33**
Informal / variable rules	4	3	4	**3.66**
integrative / synthesis	4	4	3	**3.66**
intuitive	4	5	2	**3.66**
logical	4	4	2	**3.66**
methodical	2	3	2	**2.33**
organised	3	3	1	**2.33**
planner	3	3	2	**2.66**
quick learner	5	4	3	**4**
reflective	5	3	3	**3.66**
unorthodox	5	5	4	**4.66**
visionary	5	4	3	**4**

Table 26. 360 Degree Feedback Survey results for IND06

IND07

This individual was evaluated by 1 boss/supervisor, 1 colleague, and 1 subordinate. 2 people have worked with this individual for 1 year or less, and 1 person for 1 to 5 years.

The following table illustrates the mean score IND07 obtained for each of the 20 terms evaluated on a scale from 1 to 5.

Term	Feedback 1	Feedback 2	Feedback 3	Mean score
analytical	5	3	4	**4**
artsy	5	3	4	**4**

Term			
conventional	3	4	2	**3**
creative	4	4	5	**4.33**
divergent	5	5	4	**4.66**
flexible	5	4	5	**4.66**
formal / fixed rules	2	3	3	**2.66**
future oriented	4	5	5	**4.66**
holistic	4	4	5	**4.33**
Informal / variable rules	5	4	4	**4.33**
integrative / synthesis	4	3	4	**3.66**
intuitive	5	4	3	**4**
logical	4	4	4	**4**
methodical	3	3	3	**3**
organised	3	3	3	**3**
planner	3	3	3	**3**
quick learner	4	4	4	**4**
reflective	5	3	5	**4.33**
unorthodox	5	3	4	**4**
visionary	5	4	4	**4.33**

Table 27. 360 Degree Feedback Survey results for IND07

IND08

This individual was evaluated by 2 colleagues and 1 boss/supervisor, who have worked with this individual for 1 to 5 years.

The following table illustrates the mean score IND08 obtained for each of the 20 terms evaluated on a scale from 1 to 5.

Term	Feedback 1	Feedback 2	Feedback 3	Mean score
analytical	4	1	5	**3.33**
artsy	4	4	2	**3.33**
conventional	4	4	3	**3.66**
creative	2	3	4	**3**
divergent	3	4	4	**3.66**
flexible	3	4	5	**4**
formal / fixed rules	2	3	2	**2.33**
future oriented	4	4	4	**4**
holistic	4	5	5	**4.66**
Informal / variable rules	3	4	5	**4**
integrative / synthesis	5	4	4	**4.33**
intuitive	3	3	4	**3.33**
logical	5	5	5	**5**
methodical	5	5	5	**5**

Term				
organised	3	4	5	**4**
planner	4	4	4	**4**
quick learner	5	5	5	**5**
reflective	3	5	5	**4.33**
unorthodox	5	4	4	**4.33**
visionary	4	4	5	**4.33**

Table 28. 360 Degree Feedback Survey results for IND08

IND09

This individual was evaluated by 1 colleague and 2 bosses/supervisors. 3 people have worked with this individual for 1 to 5 years.

The following table illustrates the mean score IND09 obtained for each of the 20 terms evaluated on a scale from 1 to 5.

Term	Feedback 1	Feedback 2	Feedback 3	Mean score
analytical	3	4	3	**3.33**
artsy	3	3	4	**3.33**
conventional	4	3	4	**3.66**
creative	3	4	4	**3.66**
divergent	2	3	1	**2**
flexible	4	5	3	**4**
formal / fixed rules	4	3	5	**4**
future oriented	2	4	2	**2.66**
holistic	2	4	2	**2.66**
Informal / variable rules	2	3	1	**2**
integrative / synthesis	3	4	3	**3.33**
intuitive	3	4	3	**3.33**
logical	4	5	4	**4.33**
methodical	4	5	5	**4.66**
organised	5	3	5	**4.33**
planner	4	4	5	**4.33**
quick learner	3	4	4	**3.66**
reflective	4	4	4	**4**
unorthodox	3	3	2	**2.66**
visionary	2	3	2	**2.33**

Table 29. 360 Degree Feedback Survey results for IND09

A question we asked the individuals who evaluated the perceived best strategic thinkers, in the 360 Degree Feedback Survey, was "How long have you worked together?". The graph below describes the data we collected.

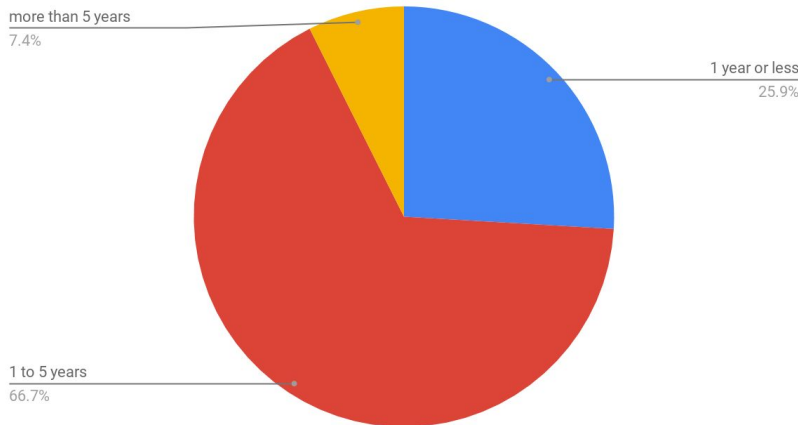answers to the question "how long have you worked together?"

more than 5 years
7.4%

1 year or less
25.9%

1 to 5 years
66.7%

Figure 12. Pie chart describing how long the individuals who took the 360 Degree Feedback Survey have known the individuals of the test group.

Appendix 3

In the table below the mean scores drawn from the 360 Degree Feedback Surveys are indicated, and compared to the corresponding elements measured by the CPP test, which are: information processing competencies, paired with the mean scores of the test group, and cognitive styles, paired with level of preference shown by the individuals in the test group.

The competencies drawn from the 360 Degree Feedback Survey where the individuals of test group scores show full correspondence in the results of the CPP are marked in green, the ones that show partial correspondence are marked in in yellow, and the ones that do not correspond are marked in red.

Traits (360)	Mean Score	Processing Competency (CPP)	Mean Score	Cognitive Style associated (CPP)	Preference level	CPP domain associated
Analytical	4.03	Analysis	54.44	Analytical	Mixed	Mixed
Creative	3.7	Verbal Conceptualisation	50.78			Strategic
Formal / Fixed Rules	2.92	Rules	58.56	Analytical	Mixed	Mixed
Informal / Variable Rules	3.66					Strategic
Future Oriented	4.18					Strategic
Holistic	4.07	Complexity	63.78	Holistic	Medium	Strategic

Integrative	3.92	Integration	60.64	Integrative	Medium	Strategic
Intuitive	3.55	Judgement	58.00	Intuitive	Medium	Strategic
Logical	4.33	Logical reasoning	60.56	Logical	Medium to high	Strategic
Methodical	3.78	Exploration	59.44	Explorative	Mixed	Operational
Organised	3.59	Categorisation	58.44	Structured	Medium to high	Operational
Quick Learner / Learning Ability	4.29	Quick insight learning	62.89	Quick Insight	Medium to high	Unique
Reflective	3.96			Reflective	Medium to high	Operational

Table 30. Comparison of the elements of the 360 Degree Feedback Survey, paired with elements evaluated by the CPP test.

Appendix 4

Mann-Whitney U Test on the test and control groups testing all the Cognitive Styles. The following table illustrates the results.

Hypothesis Test Summary		
	Null hypothesis	significance
1	The distribution of RANDOM is the same across the test group and the control group.	.349
2	The distribution of LOGICAL is the same across the test group and the control group.	.254
3	The distribution of HOLISTIC is the same across the test group and the control group.	.736
4	The distribution of METAPHORICAL is the same across the test group and the control group.	1.000
5	The distribution of ANALYTICAL is the same across the test group and the control group.	.309
6	The distribution of INTEGRATIVE is the same across the test group and the control group.	.677
7	The distribution of REFLECTIVE is the same across the test group and the control group.	.890
8	The distribution of STRUCTURED is the same across the test group and the control group.	.142
9	The distribution of EXPLORATIVE is the same across the test group and the control group.	.648
10	The distribution of LEARNING is the same across the test group and the control group.	.648

11	The distribution of INTUITIVE is the same across the test group and the control group.	.953
12	The distribution of QUICK INSIGHT is the same across the test group and the control group.	.890
13	The distribution of MEMORY is the same across the test group and the control group.	1.000
14	The distribution of IMPULSIVE is the same across the test group and the control group.	.193

The significance level is .05

Table 31. Mann-Whitney U Test groups * Cognitive preferences

Mann-Whitney U test on the test group and the contrast group, on the 14 information processing competencies of the CPP test.

	Hypothesis Test Summary	
	Null hypothesis	significance
1	The distribution of ANALYTICAL is the same across the test group and the control group.	.222
2	The distribution of CATEGORIZATION is the same across the test group and the control group.	.086
3	The distribution of COMPLEXITY is the same across the test group and the control group.	.414
4	The distribution of EXPLORATION is the same across the test group and the control group.	.890
5	The distribution of INTEGRATION is the same across the test group and the control group.	.414
6	The distribution of JUDGEMENT is the same across the test group and the control group.	.858
7	The distribution of LEARNING 1 is the same across the test group and the control group.	.736
8	The distribution of LEARNING 2 is the same across the test group and the control group.	.131
9	The distribution of LOGIC is the same across the test group and the control group.	.222
10	The distribution of MEMORY STRATEGIES is the same across the test group and the control group.	.328
11	The distribution of USE OF MEMORY is the same across the test group and the control group.	.984
12	The distribution of PRAGMATIC is the same across the test group and the control group.	.796
13	The distribution of RULES is the same across the test group and the control group.	.131

14	The distribution of VERBAL CONCEPTUALISATION is the same across the test group and the control group.	.014

The significance level is .05

Table 32. Mann-Whitney U Test groups * Processing Competencies.