

What Do The Best Strategic Thinkers Do?

A Case Study of Cognitive Elements in Strategic Thinking Among Managers at E.ON

Lund University School of Economics and Management

Master's Thesis

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Abstract

Strategic thinking is a popular topic in management journals, and many researchers have highlighted the importance of strategic thinking in managerial contexts. Still, there is a lack of consensus in the extant literature about what strategic thinking is, how it can be measured, and what are the cognitive elements that shape it. However, Prinsloo (2007) indicated that the Cognitive Process Profile (CPP) assessment can measure strategic thinking. In this direction, Sandelands & Singh (2017) present 15 core concepts relating strategic thinking. Although that the results of the CPP assessment offer a promising avenue for measurement of strategic thinking, little more research has so far been conducted to validate its results scientifically.

The purpose of this case study is to investigate the most prominent cognitive elements of strategic thinking of managers in a department at E.ON. Our findings can provide a building block that enables researchers to understand what strategic thinking entails from practitioners' perspective. This paper could also help to validate the CPP assessment as a practical tool practical measuring tool for measuring strategic thinking ability.

This master's thesis is based on a mixed method case study. The data is collected in three steps: 1) a self-completion voting questionnaire (voting questionnaire), 2) a 360-degree semi-structured telephone interview (360), and 3) a CPP assessment.

Our findings could indicate that the prominent cognitive elements of the E.ON sample are: complexity, trial and error, categorizing, pragmatic, logical reasoning, exploration, structured, and holistic. Furthermore, the number of votes in the voting questionnaire correlates with the level of work which classifies the individuals according to their strategic thinking abilities in the CPP assessment. Therefore, a higher number of votes indicate stronger strategic thinking abilities in the CPP assessment. Thus, it could suggest that the strongest strategic thinkers in the sample at E.ON were identified.

Keywords: Management, Strategic Thinking, Cognitive Process Profile (CPP) Assessment, 15 Core Concepts

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1. Introduction

There is a lack of consensus on the definition of strategic thinking in the current literature. In this research project, strategic thinking is defined as “the thinking that occurs before and about making strategic decisions [where strategic decisions are those in which] we commit a substantial amount of limited resources for a long time and under great uncertainty” (Kleppesø, 2017). Thus, strategic thinking is needed in strategic work environments to solve and overcome unfamiliar problems with limited resources, which cannot be solved with a known logic (Cognadev UK Ltd., 2016). In contrast, familiar problems can be solved with a known logic via applying operational thinking (Cognadev UK Ltd., 2016). There is an ongoing debate on this definition, but that engaging in it falls beyond the focus of this study.

The inspiration to study strategic thinking in a managerial context stems from the extent management literature, which highlights the importance of strategic thinking for successful managers. For example, managers have to make decisions within the dynamics, unfamiliarities, and uncertainties of a fast-changing environment (Zahra and O’Neill, 1998; Prinsloo, 2007; Sullivan, 2016; Dushkov, 2018). Therefore, “the usual way of thinking today will almost certainly be ineffective in the near future” (Dushkov, 2018, p. 26678). However, there is a lack of managerial strategic thinking ability as a core competence in most companies (Christensen, 1997; Bonn, 2001). Consequently, it is a common challenge in companies that managers lack the strategic thinking ability and are instead thinking more in an operational way (Bonn, 2001). Therefore, Bonn (2001) argues that, when recruiting senior managers into organizations, they should be selected based on their ability to learn and their ability to think strategically as opposed to mere consideration of their past performance. Bonn (2001) also argues that strategic thinking is a core competency for organizations to stay competitive. In this light, the cognitive elements of strategic thinking need to be further investigated especially within a managerial context. The focus of this case study is not on the question when to think strategically but on what strategic thinking entails.

1.1 Purpose and Research Questions

There is a gap between the theory and practice in regards to strategic thinking mainly because of lacking consensus on the definition of strategic thinking. In particular, there is no common agreement in the literature on the components that make up the strategic thinking ability. This makes strategic thinking a difficult topic to study and, as such, very hard to measure. Given the limited amount of existing empirical data, Bonn (2001) states that further research is needed when it comes to the ability to think strategically. Furthermore, Bonn (2001) calls for developing tools for measuring strategic thinking ability. A tool measuring strategic decision-making of individuals on a cognitive level would, for example, help managers to improve their strategic thinking ability. Additionally, it provides more effective ways to recruit managers based on their attributes of strategic thinking (Bonn, 2005). Bonn (2001) encourages to investigate strategic thinking with qualitative research methods combined with an in-depth case study design. Consequently, this explorative case study aims to indicate the most prominent cognitive elements relating strategic thinking among managers. Cognitive elements are defined in Chapter 2.

This master's thesis is part of a larger research project about strategic thinking at Lund University School of Economics and Management in Sweden. In the larger research project, three different subprojects work parallelly on the topic of strategic thinking from different perspectives. This particular subproject consists of five different case studies concerning the cognitive elements of strategic thinking. Thus, the purpose of this case study is to explore and define the most prominent cognitive elements of strategic thinking in managers at a department at E.ON, which is an international energy supplier company. The purpose is intended to be fulfilled by answering the following research questions:

1. Is there a significant correlation between the number of votes among individuals perceived to be the strongest strategic thinkers and the scores in the items in the Cognitive Process Profile assessment as well as the average ratings in the 360-degree semi-structured telephone interview?
2. How do the individuals perceived as the strongest strategic thinkers' level of work, scores of information processing competencies, and preferences in cognitive styles in the Cognitive Process Profile assessment differ from two reference samples?

1.2 Outline of the Thesis

Chapter 2 - Literature Review

Strategic thinking is a popular topic especially in the Harvard Business Review and in the Journal of Management, but the topic is discussed with a lack of common foundation and understanding of what strategic thinking is and entails. Therefore, a discussion about the notions strategic thinking and strategic planning is presented. In particular, the 15 core concepts discovered by Sandelands & Singh (2017) and the theory behind the Cognitive Process Profile assessment is provided.

Chapter 3 - Methodology

In this chapter, the methodology of this research is presented and evaluated. To present the methodology in a structured way the research onion by Saunders, Lewis, and Thornhill (2009) is used as a framework. In other words, the research design, research approach, research philosophy, limitation, and data analysis are described systematically and in detail.

There are three research methods used to collect data: a self-completion voting questionnaire (voting questionnaire), a 360-degree semi-structured telephone interview (360), and a Cognitive Process Profile (CPP) assessment.

Chapter 4 - Findings

In this chapter, the primary results of each research method and each research question are presented. The results offer potential insights concerning the most prominent cognitive elements among the managers in this case study context. However, due to the explorative nature of this case study design such as the small sample size, the results cannot be generalized. Thus, further investigation on strategic thinking is needed.

Chapter 5 - Discussion

This chapter connects the interpretations of the findings with the literature. Worth noting is that the interpretations rely solely on the researchers of this case study and other interpretations are also possible. Furthermore, suggestions for future research are presented.

2. Literature Review

Strategic thinking as a topic began to bloom at the beginning of the 1970s and 1980s and ever since became a significant topic especially in management research (Zahra & O’Neill, 1998). In a management research group survey conducted in 2013, the executives were asked to select the most critical leadership behavior in relation to the future success of the company (Sullivan, 2016). Not surprising, being strategic was chosen 97% of the time (Sullivan, 2016). “Strategic thinking is basic leader’s characteristics” (Dushkov, 2018, p. 26678). However, there is no one clear definition of strategic thinking, how it works, and how it can be measured (Sandelands & Singh, 2017). This is natural because abstract cognitive phenomena such as strategic thinking are truly complicated to be measured and therefore defined (Sandelands & Singh, 2017).

In this chapter, different approaches on strategic thinking are discussed briefly to introduce the multidirectional nature of strategic thinking and provide an understanding of strategic thinking based on available literature. We exclude the research that is labeled as strategic thinking but actually discuss other constructs. For example, Allio (2006) writes about strategic thinking but is mainly referring to strategic planning. The relationship between the strategic thinking and strategic planning is presented in the following. Furthermore, our emphasis is on the 15 core concepts related to strategic thinking by Sandelands and Singh (2017) and the theories behind the CPP assessment by Prinsloo (2007). Both are carefully investigated to serve as a basis to investigate the cognitive elements of strategic thinking further. Despite the fact that both have different approaches to the components of strategic thinking, both are used to investigate the cognitive elements in this case study further.

2.1 Strategic Thinking

The terms strategic thinking and strategic planning are often interrelated and discussed in the literature without an agreement on the specific definitions of these terms (Heracleous, 1998). Three different approaches to this issue are discussed. First, scholars such as Mintzberg (1994) and Liedtka (1998) claim that strategic planning and strategic thinking are two different notions. In contrast, several researchers such as Bourgeois and Eisenhardt (1988), Eden (1990), Porter (1991), Zabriskie and Huellmantel (1991), and Wilson (1994) claim that both notions describe

the same idea. Thirdly, authors such as Argyris (1991), Heracleous (1998), Bonn (2001, 2005), Graetz (2002), Haycock (2012), and Prinsloo (2016) claim that strategic planning and strategic thinking are on a spectrum and thus interconnected. For the purpose to investigate the cognitive elements of strategic thinking further, Mintzberg's approach will be presented to illustrate the difference between the two notions. However, this thesis is based on the idea that both approaches are part of a spectrum presented, for example, by Bonn (2001). Additionally, potential cognitive elements of strategic thinking are presented.

Mintzberg (1994, p. 107) makes a clear distinction between the terms strategic thinking and strategic planning and claims that "strategic planning is not strategic thinking". For example, the focus in strategic planning is on breaking a problem into smaller parts using analysis tools, which is also called analytical thinking. In contrast, the focus in strategic thinking is on the ability to form integrated perspectives, which is also called systems thinking (Mintzberg, 1994). Mintzberg (1994) illustrates that organizations should highlight strategic thinking in complex strategy making processes rather than strategic planning. Mintzberg (1994) describes the strategy making process as capturing learnings from all available resources and turning them into a long-term vision and direction for the company. As strategic issues are complex and often dealt by managers, organizations should support managers to think strategically (Mintzberg, 1994).

In contrast, Bonn (2005) disagrees with Mintzberg's (1994) view and supports the idea that the two notions are part of a spectrum. Bonn (2001) takes this a step further and claims that strategic thinking should be recognized as two levels in organizations, an individual and an organizational level. On an individual level Bonn (2001) describes the main elements of strategic thinking as a holistic understanding of the organization's position in its context, the turbulent working environment, creativity to recognize alternative ways of doing things and vision of the activities that would serve the purpose of the organization. Bonn (2005) changes the item holistic understanding to systems thinking. At the organizational level, organizations should structure their processes and activities so that they facilitate strategic dialogue throughout all levels of the organization (Bonn, 2001). On an organizational level, the main elements of strategic thinking are to create a safe environment for all employees to participate openly into strategic dialogue and to foster the creativity of each employee to take advantage of it (Bonn, 2005).

It is discussed if strategic thinking can be deconstructed into different cognitive elements. According to Cantor and Kihlstrom (1987), the issue of proposed cognitive elements is an attempt to generalize across different contexts and task requirements. However, Richter (1992) claims that there is no problem in generalizing cognitive abilities used in different situations. This case study is particularly interested in models which break strategic thinking down into specific components. These component describe the attributes of strategic thinking which might help to make it measurable. In the following, some components mentioned by current researchers are presented as examples. The list does not claim to be finite, rather shows the variety of elements emphasized by different scholars and also presents a contradiction. Following elements are mentioned by current researchers: future-oriented and reflective, creative, intuitive, and holistic as well as experienced, extrovert, and action-orientated.

Sullivan (2016) claims that strategic thinking is strongly related to reflection, continuous learning, and forward-looking. Consequently, unwillingness to learn and to change direction is often the obstacles for strategic thinking (Christensen, 1997). Davey (2014) claims that decisions based on reflection are particularly important in today's volatile work environments. In order to be able to think strategically about a complex issue in a clear and effective way, one should stop and start to reflect (Ehrlich, 2011). In double-loop learning, an individual reflects actively to find alternative ways to solve a problem (Argyris, 1991). Thus, through a continuous reflection, an individual is also able to improve the performance (Argyris, 1991). Therefore, double-loop learning is related to strategic thinking (Heracleous 1998).

Strategic thinking is a system combining creative and intuitive thinking into the creation of a holistic perspective of the enterprise (Mintzberg, 1994; Bonn, 2005). A strategic thinker understands the internal and external dynamics of a company and how the actions of an individual influence these dynamics (Bonn, 2005). Accordingly, Sullivan (2016) emphasizes similarly that different interconnecting points do not concern only internal but also the external connections of an organization, which enables gaining a holistic perspective. Moreover, Davey (2014) states that strategic thinking means to put any decision, big or small, in the context of the organization's goals. In order to develop such a holistic approach (Liedtka, 1998; Bonn, 2005). It

is stated that strategic thinkers create distance to their tasks (ed. Garratt, 1995; Bonn, 2005). Consequently, a strategic thinker understands the bigger picture (Sullivan, 2016) by “creating connections between ideas, plans, and people” Davey (2014, p. 2).

According to Dragoni, Oh, Vankatwyk, and Tesluk (2011) accumulated work experience and extroversion are associated with strategic thinking. The analysis of multisource data from 703 executives by Dragoni, Oh, Vankatwyk, and Tesluk (2011) shows that next to the cognitive ability to think strategically, accumulated work experience is the most important predictor for strategic thinking. Interestingly, the level of work experience is higher when the manager is extroverted (Dragoni, Oh, Vankatwyk & Tesluk, 2011). Furthermore, the ability to use intuition increases with accumulated work experience (Olson & Simerson, 2015; Sandelands & Singh, 2017). Thus, accumulated work experience and extroversion in managers could function as a potential foundation for strategic thinking ability. In addition, Sullivan (2016) states that the best thinkers always seek for information to implement ideas because they are action-oriented. Thus, strategic thinking could also be seen as action orientation (Bonn, 2005). However, more research is needed on if this holds true and moreover how to measure an individual’s strategic thinking.

2.2 The 15 Core Concepts

To accomplish tasks in a continuously changing environment, strategic thinking is required as a core concept in managers (Bonn, 2001). Sandelands and Singh (2017) claim that strategic thinking ability of an individual is influenced by personality, value systems, and environmental factors. Based on their literature review concerning what strategic thinking is, the 15 core concepts are identified relating the components of strategic thinking (Appendix A). The 15 core concepts are:

- Analytical,
- Creative,
- Conceptual,
- Context-oriented,
- Divergent,
- Flexible,
- Future-oriented,

- Holistic,
- Integrative,
- Intuitive,
- Process-oriented,
- Reflective,
- Synthetic,
- Systematic, and
- Visionary (Sandelands & Sing, 2017, p. 27).

As the 15 core concepts serve a rather clear framework to capture some potential components relating to strategic thinking, the 15 core concepts are investigated in this case study context. However, the literature review by Sandelands and Singh (2017) is not in-depth and does not contain an extensive analysis of the referenced literature. For example, the authors did not distinguish between strategic thinking and strategic planning. Therefore the 15 include the whole spectrum between both terms. It is worth to note that some elements such as accumulated work experience, extraversion, and action-orientation, which are also discussed in relation to strategic thinking in the existing literature, are discriminated from the list. Interestingly, Sandelands & Singh (2017) found in their case study that the CPP assessment, presented in Chapter 2.3, could measure more profoundly the 15 core concepts in individuals with managerial background compared to students. The 15 core concepts are comprehensive enough to function as a framework on cognitive elements of strategic thinking in this case study.

2.3 Cognitive Process Profile Assessment

The CPP assessment, developed by Dr. M. Prinsloo in South Africa, is an interactive online assessment, which claims to predict cognitive performance in complex and dynamic work contexts such as in the professional, strategic, and executive environment. Consequently, the CPP assessment is used to measure the potential strategic thinking ability. In this case study context, the particular focus of interest are the three components measured within the CPP assessment: the level of work, the preferences in cognitive styles and the information processing competencies. These components of the CPP assessment and from which theory they came from are explained in this chapter (Prinsloo, 2007). According to Cognadev UK Ltd. (2016), the CPP

is based on two theoretical models, which explain cognitive functioning in the work environment. These two are:

- Cognadev UK Ltd. Information Processing (CIP)
- Stratified System Theory (SST).

The CPP assessment is based on the CIP theoretical model illustrated in figure 2.1 called a ‘holonic model’ which means that it “consists of various subsystems, each of which incorporates and transcends underlying subsystems” (Cognadev UK Ltd., 2016, p. 24). Each process of the six categories builds on the previous process. Thus, the processes construct a sequence so that each layer contains its lower layer (Cognadev UK Ltd., 2016). To illustrate, the process of problem-solving relies on the participants’ memory capacity as a basis to process information, on exploration processes, analyzing ability, and structuring skills of information as well as the ability to transform and contextualize (Cognadev UK Ltd., 2016). Finally, the metacognitive awareness guides the thinking process and therefore also the performance (Cognadev UK Ltd., 2016). Furthermore, the model is dynamic which allows going forth and back in the processes, for example, after structuring information one remembers new information (Cognadev UK Ltd., 2016).

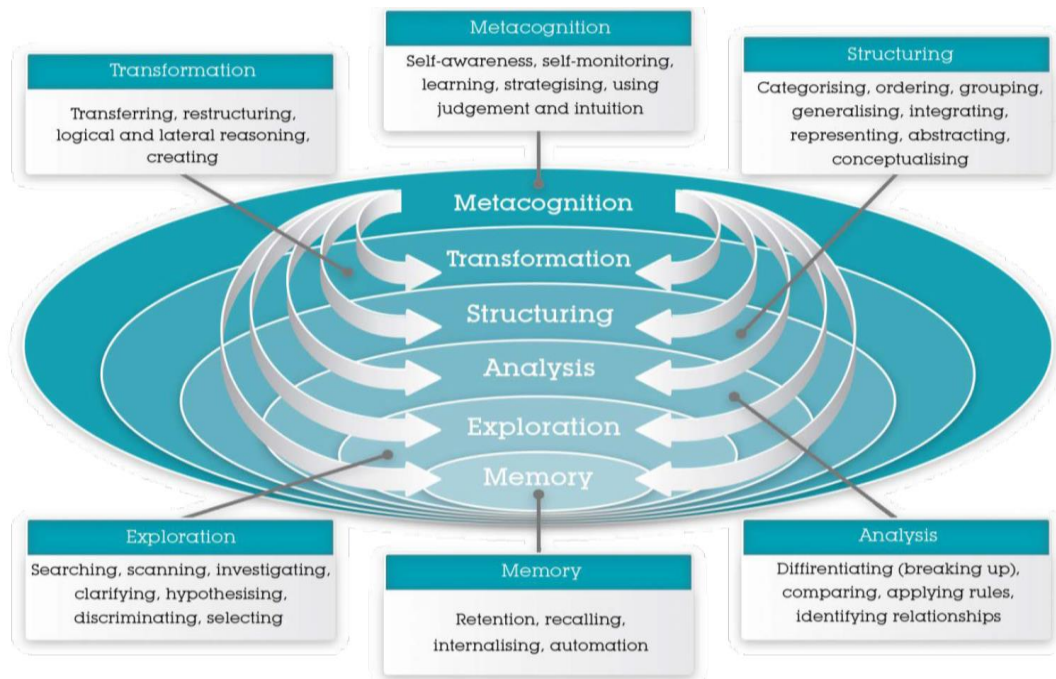


Figure 2.1 The holonic structure of the functional processing categories in the CPP assessment (Cognadev UK Ltd., 2016, p. 25)

The 14 information processing competencies used in the CPP assessment are measured in the following six categories:

- Memory
 - Use of memory,
 - Memory strategies,
- Exploration
 - Pragmatic,
 - Exploration,
- Analysis
 - Analysis,
 - Rules,
- Structuring
 - Categorization,
 - Integration,
 - Complexity,
- Transformation
 - Logical reasoning,
 - Verbal conceptualization,
- Metacognition
 - Judgment,
 - Quick insight learning, and
 - Gradual improvement learning. Cognadev (Pty) Ltd., 2018, p. 16)

Six of the presented information processing competencies facilitate strategic thinking. These are called integration, complexity, logical reasoning, verbal conceptualization, judgment, and quick insight. A more detailed description of the information processing competencies is presented in Appendix B.

The CPP assessment is also based on Elliot Jaques' (1986) Stratified System Theory (SST), alternatively referred to as the Requisite Organizations model as well as Viable Systems Model (Cognadev UK Ltd., 2016). SST divides work into seven categories based on the complexity of

decision-making (Jaques, 1989). It is claimed that individuals have different cognitive abilities to differentiate and integrate information with different levels of complexity. Moreover, the SST theory is based on the assumption that individuals' cognitive capacity is finite and can, therefore, be illustrated on a scale. However, the model is criticised for being too simple (Boal & Whitehead, 1992). SST might indicate the individual's abilities, but the skill of using it when it is required is not indicated (Boal & Whitehead, 1992).

Build on the SST, Cognadev reduces the original seven levels of decision making complexity into the following five categories of work complexity in the CPP assessment (Cognadev UK Ltd., 2016, p. 12):

- Pure operational,
- Diagnostic accumulation,
- Tactical strategy,
- Parallel processing, and
- Pure strategy.

Five categories of work complexity describe the work environments which can be suitable for CPP assessment participants (see figure 2.2). They are also referred to as level of work and classify how strategic individuals are able to think. The CPP assessment links each participant's identified cognitive profile to the cognitive requirements of operational and strategic environments (Cognadev (Pty) Ltd., 2018). Chaos, uncertainty, and complexity increase from pure operational to pure strategy (Cognadev UK Ltd., 2016). A pure strategy work environment describes when chaos dominates structure, ideas win over pragmatism, dynamic thinking is needed more than detail orientation and long-term concerns get more important than a short-term focus (Cognadev UK Ltd., 2016). It illustrates a spectrum from pure operational to pure strategy environment, which is similar to what is shown in the literature review chapter 2; a spectrum from strategic planning to strategic thinking. In other words, the CPP assessment is measuring one's tolerance to change the way of thinking when the situation moves from being familiar to unfamiliar and how capable one is of thinking strategically.

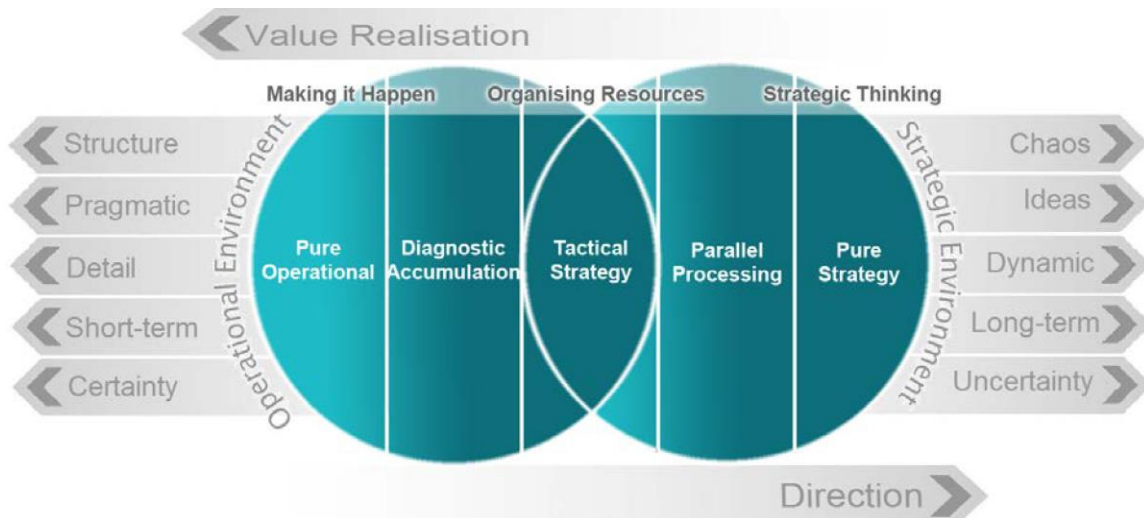


Figure 2.2 Five categories of complexity of work in the CPP assessment (Cognadev UK Ltd., 2016, p. 12)

The CPP assessment measures 14 identified cognitive style preferences (Cognadev UK Ltd., 2016). “Cognitive styles can be described as broad cognitive response tendencies and should be understood as the most frequent behavior during the assessment” (Cognadev UK Ltd., 2016, p. 20). Similarly, Richter (1992) defines cognitive styles as part of the personality, representing the way an individual processes information. Therefore, cognitive styles are stable preferences of individuals (Richter, 1992). The 14 cognitive style preferences are:

1. Logical Style
2. Analytical Style
3. Explorative Style
4. Trial-and-Error (Random) Style
5. Reflective Style
6. Memory Style
7. Learning Style
8. Metaphoric Style
9. Reactive Impulsive Style
10. Quick Insight Style
11. Structured Style
12. Holistic Style
13. Intuitive Style
14. Integrative Style. (Cognadev UK Ltd., 2016, pp. 21-23)

Some of the listed cognitive styles facilitate strategic thinking, some hinder it. Cognitive preferences which facilitate strategic thinking are: quick insight, intuitive, integrative, logical, and holistic (Cognadev UK Ltd., 2016). In contrast, hindering are reflective, explorative, structured, reactive, and trial and error (Cognadev UK Ltd., 2016). The rest of the elements are neutral and can either facilitate strategic thinking or hinder it. Namely, learning, memory, metaphoric, and analytical (Kleppetstø, 2017). A more detailed description of the cognitive style preferences is presented in Appendix C.

Several evaluations of SST distributions of employees have indicated that the majority of employees show operational thinking (see figure 2.3). Only a very small number of world population show the ability of strategic thinking (Cognadev UK Ltd., 2016). This can be interpreted as that most people tested prefer a pure operational or diagnostic accumulation work environment while only one percent prefers and is capable of working in a pure strategic environment. Also, the red curve illustrates the preference of tested generic corporate population compared to the blue curve that represents the generic management population. Interestingly, the generic corporate population has a higher preference for the pure operational environment compared to the generic management population.

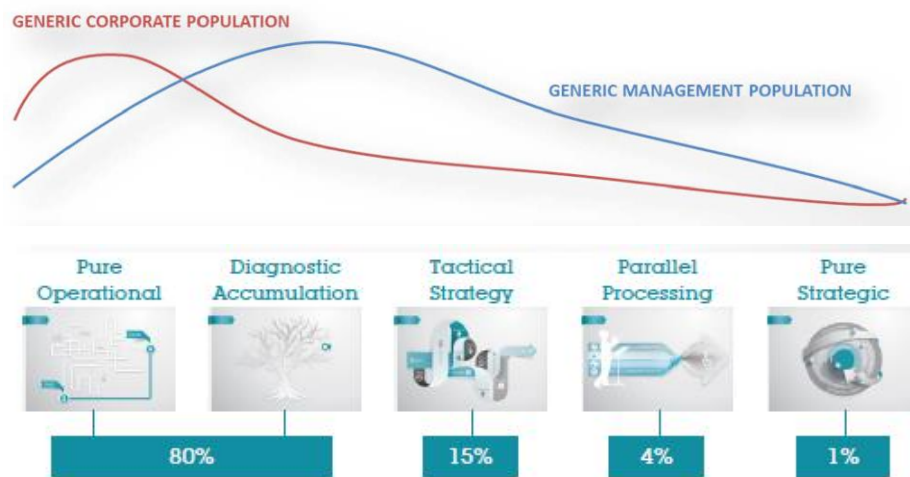


Figure 2.3 Stratified system theory distribution curve of the generic corporate population and the generic management population (Cognadev UK Ltd., 2016, p. 14)

3. Methodology

In this chapter, the methodology of the project is presented in great detail to increase the replicability of this research. We used the theoretical framework developed by Saunders, Thornhill, and Lewis (2009). It comprehensively illustrates layers of research designs by illustrating it with an onion. The layers are the research philosophy, research approach, research strategies, time horizons, the data collection method, and analysis.

All layers of the methodology design regarding this case study are descriptively visualized in figure 3.1. Firstly, the outer layer of the onion, the research philosophy, defines the way of justifying the research. Secondly, the research approach outlines what type of methodology, such as qualitative or quantitative, is used. Thirdly, the research strategy describes how the research will be carried out. Fourthly, the time horizon demonstrates the time needed for the completion of the research. Lastly, the data collection method and its analysis are presented. Those layers are investigated one after another in the following paragraphs. Additionally to the research onion, the limitation of the three methods and the project are highlighted together with the challenges faced during the data collection. Consequently, the validity and reliability of the methods are presented as well at the end of this chapter.

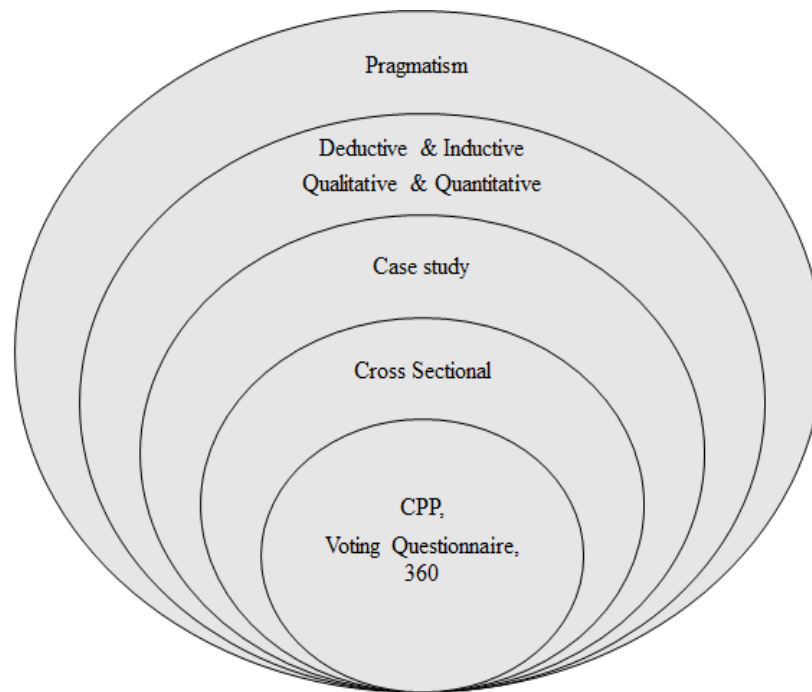


Figure 3.1 The research onion based on Saunders, Lewis, and Thornhill (2009) applied on this research designy [Own Representation]

3.1 Research Philosophy

The research philosophy in this case study follows the epistemology and the paradigm pragmatism. Epistemology is “the researcher’s view regarding what constitutes acceptable knowledge” (Saunders, Thornhill & Lewis, 2009, p. 117). Pragmatism is an epistemological position and is described as: “Either or both observable phenomena and subjective meaning can provide acceptable knowledge dependent upon the research question. Focus on practical applied research, integrating different perspective to help interpret the data” (Saunders, Thornhill & Lewis, 2009, p. 117). Pragmatism is chosen since various research questions need to be investigated by different kinds of data collections and method designs, and thus when both quantitative and qualitative is used. Since this is a pilot study answering the research questions attempting to provide a meaningful and practical description of the world. However, it will potentially indicate the need for further investigation after the study to than objectively describe the reality.

3.2 Research Approach

A deductive and inductive approach, as well as qualitative and quantitative approach, complement each other in this case study. A deductive approach uses existing theories (Saunders, Thornhill & Lewis, 2009) such as the CPP assessment in this case study. In contrast, an inductive approach is used to explore and collected data to find, for example, patterns (Saunders, Thornhill & Lewis, 2009). The methodology for the second research question provides analyzable data. Furthermore, expectation about the results of the differences between the E.ON sample and the two reference samples are stated. Moreover, the results may help to validate the CPP assessment. Therefore, a theory is tested in this explorative case study and the research approach is mainly deductive. However, to investigate the elements of strategic thinking further by exploring the core concepts of the literature review and comparing those to the elements of the CPP assessment is a rather inductive approach. This mixed-method case study combines both qualitative and quantitative research methods to gain a more holistic perspective on understanding the complexity of evidence-based strategic thinking (Bryman & Bell, 2011).

3.3 Research Strategy

A pilot or explorative single organization case study and a comparative design are used as the research strategy. A case study design is a popular research design in business research (Bryman & Bell, 2011). Typically for case studies, multiple methods of data collection are used (Benbasat, Goldstein, & Mead, 1987). Therefore, the three data collection steps with qualitative and quantitative nature are used. This case study is an exploratory study because it attempts to test existing, well-formed theories, the CPP assessment, and the 15 core concepts based on a literature review (Bryman & Bell, 2011). Moreover, due to the intangible nature of strategic thinking and the rather low number of studies on this topic, an explorative case study design regarding a further investigation of the cognitive elements of strategic thinking is appropriate. Explorative case studies help to increase the understanding of the nature and complexity of phenomenon (Bryman & Bell, 2011). Especially when the underlying theory is not developed enough and only a few studies in this area have been conducted (Benbasat, Goldstein, & Mead, 1987). The case study is executed in cooperation with a single department at E.ON with a focus on employees in managerial positions. Therefore, it is a single organization case study. Furthermore, not only a case study is executed, but in addition, a case contrast study is analyzed since the CPP assessment results are compared to two other reference samples. Therefore, this pilot single case study entails also a comparative design.

3.4 Time Horizon

The time horizon of this pilot case study is cross-sectional and lasts for 11 weeks. A cross-sectional time horizon describes an established time frame for the data collection. However, the reason for the time horizon is not due to the phenomena investigated rather due to the researchers' time schedule.

3.5. Data Collection

The layer data collection demonstrates and fosters decisions on the sample groups, data collection tools, and questionnaire content. In the following subchapters, the reason, the execution, and procedure of the samples are shown. Furthermore, the purpose of the method and an in-depth description of the execution of the data collection is presented. The case study entails

three data collection steps: a voting questionnaire, the CPP assessment, and a 360. All three methods are connected with each other and form a unit to investigate the cognitive elements of strategic thinking further.

3.5.1 Self-completion Voting Questionnaire

A self-completion questionnaire is a survey, which is filled out by the participants of the research themselves (Bryman & Bell, 2011). The voting questionnaire is used to conduct the voting of the perceived strongest strategic thinkers at E.ON. Therefore, a situation where participants know each other within a working environment very well is needed so that it could be assumed that the strongest strategic thinkers will be identified. A self-completion voting questionnaire is an appropriate tool to use in the voting because it serves a rather quick and simple way to accomplish the selection. Accordingly, Bryman & Bell (2011) state that a self-completion questionnaire is a quick research method because it is easy to understand for the participant.

The first step in starting the cooperation with E.ON is to explain the purpose of the research and the benefits to the participants. Therefore, a contact person is identified and an appointment where all details can be further explained is made. A first email where the project is explained in greater detail is sent by the contact person to all participants. Furthermore, the head of the department explained the importance of this project in their monthly meeting.

As a second step, the link with the voting questionnaire is sent through our contact person at E.ON to the participants. Despite the access to all contact information of the participants it is decided to ask the contact person at E.ON to take responsibility for contacting by using the email address of the head of the department. Two reasons lead to this decision. First, an email from someone internal, especially high in the hierarchy, receives more attention and might be valued as more important and serious than from someone external. Secondly, the risk that emails sent from externals might end up in the junk file is mitigated.

The self-completion voting questionnaire is applied by using the free online survey format Doodle. Doodle serves not only an easy way for the research to share the questionnaire to participants but also an easy way for the participants to answer the questionnaire (Doodle, 2017).

Accordingly, Doodle enables reaching a larger number of participants fast and direct. It includes the function that participants cannot see the answers of other participants. However, the researchers are able to identify each participant. Therefore, the information remains confidential. Moreover, the option to export the results from Doodle to spreadsheet is possible and facilitates the following result evaluation. Therefore, Doodle is chosen as an online survey method in this case study.

The instructions and the most essential information regarding strategic thinking are provided at the beginning of the voting questionnaire. For example, strategic thinking is simply defined as thinking used in complex and uncertain situations (Mintzberg, 1994). Moreover, the participants are informed that the questionnaire takes approximately five minutes to complete and that all personal information remains confidential in the published master's thesis. For the participants' interest, the information about the next steps of the case study is also provided. In particular, the information says that the participant will be continue to participate in the next stage of the study based on the results from the voting. Consequently, there is only one question in the questionnaire asking the participant to select ten individuals out of 46 provided names, based on who the participant perceives as the strongest strategic thinker (Appendix D). Out of 46 employees in managerial positions, 11 are selected by their peers perceived as the strongest strategic thinkers, as also called as E.ON sample.

Sample

The non-random and convenience size at the investigated department at E.ON for the voting questionnaire is n=46 participants. Convenience sampling is applied in this research when determining the sample size. Convenience sampling describes samples which are available and accessible (Bryman & Bell, 2011). In this single organization explorative case study, access to a department at E.ON is organized and thus available. Furthermore, it is a non-random sample out of the parent population in the investigated department where all subjects satisfy defined criteria (Bryman & Bell, 2011). This criterion is that they fulfill managerial tasks and services in a supervisory position for subordinates. The sample group of 46 people is rather homogenous as the sample size contains employees with managerial tasks within one department in an

organization. All are mainly within the age of 30-55 years and with European ethnicity. Nine of the participants are females and 37 are males.

3.5.2 360-degree Semi-structured Telephone Interview

The telephone interview applied copies the approach of the well known 360-degree feedback method. It is executed with the supervisor, colleague, and subordinate of each of the perceived as strongest strategic thinkers in this case study. Additionally, since one could also vote for themselves in the self-completion voting questionnaire, a self-evaluation is included. However, it is not about giving feedback to the person “in the middle” rather taking advantage of the nature method of being an in-depth data collecting tool. The 360 is used to validate the result of the voting questionnaire by using an open question asking why the person was voted for being a strategic thinker. Answers which describe elements and characteristics of strategic thinking would validate the results of the voting questionnaire because it would show that the peers voted based on their perception of strategic thinking abilities. In contrast, answers that are not associated with strategic thinking such as hierarchy would discredit the result of the voting questionnaire. In this case peers would have voted not for the strongest strategic thinker but for high positions in the hierarchy.

A telephone interview was conducted because answers could be received faster. Bryman and Bell (2011) state that a telephone interview is useful for hard-to-reach target groups. Since only participants with a high workload were selected, a phone call is convenient for interviewer and interviewee. Also, an interview done via telephone offers the possibility to highlight the purpose of the interview, to explain the research project and to answer possible questions at the beginning of the interview. Accordingly, the verbal communication supports the building of a more personal relationship between the interviewer and the interviewee, which presumably could lead to higher quality answers compared to self-completion surveys. Furthermore, it is more flexible and cost-efficient compared to a face-to-face interview (Bryman & Bell, 2011). The alternative face-to-face interview would not provide any further data via observation in this case. Moreover, a telephone interview has the advantage that the respondents are less likely to become influenced by the interviewers’ personal characteristics than a face-to-face interview (Bryman & Bell,

2011). However, the two interviewers might have influenced the answers more and differently than if the participants would have done it via an online link as in the voting questionnaire.

As a first step, the contact information is collected by asking the identified strongest strategic thinkers by email for their own contact information as well as to voluntarily name one supervisor, one colleague, and one subordinate and their contact details via the contact person at E.ON. The information about the start of the interviews was sent to the contact person who forwarded the information to the participants. The interview calls were made between 9 am and 6 pm. Also, challenges were mitigated by contacting the target person directly via email or text message, for example, to make appointments for the phone calls.

Bryman & Bell (2011) emphasize the importance of clear instructions when conducting a research interview. Thus, a clear instruction about the 360-degree semi-structured telephone interview is provided for the participant when conducting the interview calls. There are three questions in the 360. The questions are structured in a way that the topic related questions come first in order to reduce the risk of confusion concerning the aim of the interview and to create trust for the interview (Bryman & Bell, 2011). Hence, the open questions come first and then more specific questions concerning the 15 core concepts by Sandelands and Singh (2017) with answer alternatives in a Likert-type scale (Appendix E). A Likert-type scale describes a scale from one to five. This quantitative scale is used to receive clear answers straight away and thus avoid the need for recording and transcription because of the limited time frame (Bryman & Bell, 2011). If one of the core concepts appears to be unclear to interviewee the definitions provided by Sandelands and Singh (2017) are explained. In addition, the telephone interview is planned to take maximum 20 minutes to accomplish, in order to maintain focus (Bryman & Bell, 2011). In this case study, one telephone interview took approximately seven minutes to complete.

Sample

The non-random, snowball sample at the investigated department at E.ON for the 360 is aimed for n=46x4 interviews; four interviews per identified strategic thinker. Snowball sampling is a form of convenience sample (Bryman & Bell, 2011). However, it describes the contact with relevant participants to receive the contact information for further subjects (Bryman & Bell,

2011). In this research, the perceived as strongest strategic thinkers are the relevant participants from who we receive contact data for three additional employees at the investigated department at E.ON. For each of those, the three contacts are one supervisor, one subordinate, and one colleague.

3.5.3 Cognitive Process Profile Assessment

The CPP assessment is introduced in chapter 2.3. After arranging appointments with the member of the E.ON sample and the instructor the CPP assessment was executed on two days, ten days apart from each other, either at E.ON or remotely. To arrange appointments the list with the names of the E.ON sample was sent to the contact person at E.ON. No information regarding the CPP assessment content was shared with the participants to keep the research objective. The reason is that the CPP assessment aims to measure how individuals solve unfamiliar problems. Information about the assignment beforehand could influence the results. However, a list of requirements for the CPP assessment such as headphones and an updated Flash Player on the computer was sent to and forwarded by our contact person. Due to the high workload and busy schedules of the participants, two dates were set. The time slots were in the afternoon even though Cognadev UK Ltd. (2016) suggests to execute the CPP assessment in the morning so that participants are most alert. In addition, two different instructors guided the participants both at E.ON and remotely despite it is important to have the same conditions for all participants.

Sample

The 11 identified as the strongest strategic thinkers are a non-random, key information sample. A key information sample includes subjects with specific expertise (Lucas, 2012). In this case study, it is assumed that the 11 perceived as strongest strategic thinkers have expertise in strategic thinking. The chosen sample is rather homogenous since they all have high positions in the hierarchy at E.ON, work in Sweden, and are Europeans. Furthermore, this sample contains three female and eight male individuals which are 38 - 60 years old.

Due to the second research question the non-random, key information sample is compared to two available reference samples. These two samples are called a normative sample and a contrast sample. Both of the reference samples entail participants of the CPP assessment with following

characteristics: managerial position, 30-55 years old, accomplished a bachelor degree, and are white Europeans. Furthermore, 60 percent are male, and 40 percent are female. The difference between the two groups is that the normative has a sample size of $n=2600$ participants with the characteristics above picked out of the approximately $N=40.000$ participants worldwide. Contrary, the contrast group is a sample $n=55$ out of the normative sample with individuals in not strategic positions.

3.6 Data Analysis

IBM SPSS 24 is used to conduct the data analysis in this case study because it is an accepted statistical tool and because its availability at Lund University. More specifically, due to the nonparametric characteristics of the data, the nonparametric calculations are selected. Pallant (2013) emphasizes, that nonparametric statistics is an option when the data is in nominal or ordinal scale, and when the sample size is small and thus not normally distributed. The data analysis for the first research question and for the second research question is presented in the following subchapters.

3.6.1 First Research Question

Pallant (2013) suggests that, when performing a correlation analysis, it is beneficial to begin with doing a scatterplot. By interpreting the output of the scatterplot, the nature of relationships between two variables can be determined (Pallant, 2013). To give an example, a curved line drawn from the main cluster points would indicate a curvilinear relationship (Pallant, 2013). Pallant (2013) states, that Pearson r calculation cannot be used if the scatterplot is not linear. For that reason, the correlation in this case study is calculated with using Spearman's Rank Correlation, which is a useful procedure for non-parametric data and for data especially in ordinal scale (Pallant, 2013). The value of the correlation coefficient is an important output from the correlation (Pallant, 2013). Thus, the correlation coefficient value $\rho = .10$ to $.29$ indicates small correlation, $\rho = .30$ to $.49$ indicates medium correlation and $\rho = .50$ to 1.0 indicates large correlation (Cohen, 1988). The sign indicates whether it is a negative (-) or positive (+) correlation (Pallant, 2013). Furthermore, a significance value (p) indicates significance when $\alpha \leq 0.05$ (Cohen, 1988).

A content analysis is done to analyse the the data of the open questions in the 360. A content analysis is an analysis method that is used when seeking objectively and systematically a deeper meaning beyond a certain phenomena (Bryman & Bell, 2011). Thus, it is a beneficial analysis method to use in order to determine, especially, the reasons why the participants think a certain individual is perceived as a strategic thinker. However, Bryman & Bell (2011) emphasise that content analysis to questions starting with a why, often cannot not independently provide answers. Hence, it is used in this case study context as a complementary method to explore reasons for the voting result and further understanding of strategic thinking. In the content analysis in this case study, words and phrases that are related to skills, characteristics, and work are decided to be the units of analysis. Thus, the themes in the content analysis are organized according to the keywords relating these words and phrases. In this context, there is no need for computer-aided content analysis due to the small sample size. Therefore, the content analysis is done manually by categorizing the skills, characteristics, and work-related words and phrases in the data in groups according to themes, subthemes, and number of times they occurred (Appendix F).

3.6.2 Second Research Question

To begin the data analysis for the second research question, nonparametric techniques are used in the data analysis due to the ordinal scale in the level of measurement in the CPP assessment. More specifically, the level of working, scores of information processing competencies, and preferences in cognitive styles are in ordinal scales. A reason for choosing nonparametric statistics is the small sample size of 11 individuals, who are perceived as the strongest strategic thinkers. Therefore, the Mann-Whitney U-test is used to measure whether or not the level of working, scores of information processing competencies, and preferences in cognitive styles in the CPP assessment results differ between the E.ON sample and the two reference samples. The Mann-Whitney U test calculates differences of a continuous measure between two independent groups (Pallant, 2013). As a result, the Mann Whitney U test gives a level of significance (p), which determines whether there is a statistically significant difference between two groups (Pallant, 2013). Also, the Mann-Whitney U test gives a level of correlation (r), which is similarly interpreted as the correlation coefficient value (ρ). Furthermore, the z-value (z) indicates the direction of the difference (Pallant, 2013).

3.7 Validity, Reliability, and Limitations

The validity and reliability of this particular case study are discussed in relation to the quality of the data in this chapter. Pallant (2013) states that validity and reliability are two factors that are important to consider in research because validity and reliability affect the quality of the data collected. According to Bryman & Bell (2011), the replication in business research is rare, but in order a study to be replicable, the procedures should be described in detail. For this reason, the procedures regarding the data collection are described by providing detailed examples, which enable the evaluation of validity and reliability.

Validity indicates to what extent the scale “[...] measures what it is supposed to measure” (Pallant, 2013, p. 7). Furthermore, there are several different ways to measure validity: external, internal, and measurement validity (Bryman & Bell, 2011). External validity, which tries to answer a question whether the result of the study can be generalized or is it only applicable in the particular research context (Bryman & Bell, 2011). Internal validity is concerned about the causality of the variables such as if there are other aspects affecting the result (Bryman & Bell, 2011). Measurement validity is concerned about the accuracy of the measurement, more specifically if the measurement is measuring what it is supposed to measure (Bryman & Bell, 2011). Three kinds of validities are the external, internal validity, and measurement validity. The measurement validity and the internal validity of all three research methods used in this case study are discussed in this chapter.

The external validity of the whole research design remains rather low. This thesis has a case study design with a focus on one single department in one organization with a small sample size. The result of this thesis is applicable to this particular department but cannot be generalized. However, when combining the results of this case study with the results of four other case studies, which are part of this same research subproject, a more comprehensive understanding can be obtained.

Furthermore, as both the CPP assessment and the core concepts include the spectrum from strategic planning to strategic thinking or as called in the CPP assessment from operational to strategic they are used to identify the prominent cognitive elements of strategic thinking based on

perception indicated by the voting questionnaire. However, it has to be noted that there are different notions behind the CPP and the core concepts and here it is used for the same purpose to investigate the cognitive elements of strategic thinking further. In this manner, the validity of the methodology could be questioned. However, mixed methods are used to strengthen the validity.

Additionally, typical for a case study is a control group which increases the validity of the research. However, due to limitations in time and resources as well as access to resources at E.ON, a control group within E.ON was not conducted. Thus, reference samples provided by Cognadev are used.

According to Pallant (2013, p. 6) “The reliability of a scale indicates how free it is from random error”. Test-retest reliability illustrates the assessment of a method to the same sample group twice (Pallant, 2013). Due to the limited time of 11 weeks, the execution of re-tests is not possible in this particular case study context. However, based on the significant results it is assumed that if assuming the same circumstances such as that the participants know each other very well, the results of the voting, 360, and CPP assessment would be the same.

3.7.1 Self-completion Voting Questionnaire

The measurement validity of the voting questionnaire is important to evaluate in order to explore the trustworthiness of the data. However, it can be speculated that some matters influenced the measurement validity of the voting questionnaire. For example, the term strategic thinking is not described in detail in the voting questionnaire and therefore the individuals might have voted based on different understandings of strategic thinking. Despite the lack of common understanding of strategic thinking, the emphasis in the voting questionnaire is in the perception. Furthermore, it is assumed that the individuals vote genuinely according to their best knowledge of strategic thinking.

There are also other challenges in the voting questionnaire, which have to be taken into consideration when evaluating the measurement validity of the data. To give an example, the participants could log in to the self-completion voting questionnaire more than once. Thus, the

participants could vote more than once for the same individuals. However, those participants can be identified and deleted from the dataset. Furthermore, despite the fact that the information in the voting questionnaire instructed the participant to vote for ten strongest strategic thinkers, the participant could complete the questionnaire also by voting for less than ten individuals. The names were presented in alphabetical order to support the participant to orientate and to mitigate the risk that the names at the beginning of the list are voted more than the names at the end of the list. Therefore, as a suggestion to overcome these limitations and to strengthen the measurement validity in the future studies, more specific restriction within the tool used for the voting questionnaire would be recommended.

3.7.2 The 360-degree Semi-structured Telephone Interview

The 360 is used as a research method in this case study to validate the voting questionnaire. There are both qualitative and quantitative questions in the 360 in order to make the measurement validity stronger. Thus, the design of the 360 aims to gather first the perceptions of strategic thinking with an open question and then to gather the evaluations of the 15 core concepts that are associated with strategic thinking based on the findings of Sandelands and Signs (2017) (Appendix E). The 360 is implemented to the supervisor, colleague, subordinate of an individual including a self-evaluation, in order to gather a holistic understanding of the person and to strengthen the measurement reliability and quality of the data.

One limitation was that no intimate knowledge about how well the individuals within E.ON know each other and that not all voters participated. Intimate knowledge would have provided the possibility to select the raters with the most knowledge about the person rated. The selected raters might be chosen based factors such as on friendship or practical reasons. Therefore, this selection could have influenced the results.

However, it is also important to be aware of the possible limitations that might affect the internal validity and the quality of the data. To give an example, two different interviewers conducted the 360-degree semi-structured telephone interviews independently. In accordance, there is a possibility that the interviewers take biased notes or influence the participants differently (Bryman & Bell, 2011). For this reason, it is carefully discussed, for example, how the

interviewers take notes in the open question ‘Why do you think this person is perceived as a strategic thinker’ (Appendix E) or how they explain the core concepts.

Another example of a possible limitation affecting the internal validity and reliability is the unregulated environment of the interviewer and the interviewee. Although the interviewers conduct the telephone interviews in silent rooms, the environment of the interviewee is not regulated. Possible noises in the background might influence the concentration of the interviewee when answering the interview questions. Furthermore, the quality of the telephone connection is an aspect that could have affected the interviewer and the interviewee. Furthermore, a challenge faced was that the interviewers were calling from foreign phone numbers. That could have had an effect on the rate of non-response.

The limitations of the structure in the 360 with two open questions followed by fifteen questions with answer alternatives in a Likert-type scale influences the measurement validity of the 360 data. One possible limitation in the structure of the 360 is the lack of reference when the interviewee is answering especially questions regarding the 15 core concepts in a Likert-type scale. Thus, it is challenging for the interviewee to evaluate a person on a five-point scale.

Contradicting results could emerge due to different factors. To give an example of a possible limitation affecting the measurement validity, the interviewee could highlight the person’s analytical skills in the open question but when answering the evaluation of the 15 core concepts the interviewee might answer, for example, three instead of five on a five-point-scale. Furthermore, some 360 may be rushed so that it did not allow to present definitions properly. Moreover, English skills were assumed. However, there may have been some difficulties when defining terms. This might result in contradicting results in the data.

Another challenge faced is the individuals who took part in the interview more than once and evaluated more than one person or those who did not participate. Multiple evaluations might have been affected by a learning bias, as they learned the structure of the interview after answering one interview. Thus, previous evaluations could be used as a reference. Not

responding participants challenged the results in that way that the results of the ratee are not as reliable.

Consequently, the lack of reference and the differences in understanding the core concepts in strategic thinking, as well as the learning bias might influence the measurement validity. Hence, a bigger sample size so that a participant would answer to the interview only once might help to avoid these challenges, mitigate the limitations and increase the validity and reliability.

3.7.3 Cognitive Process Profile Assessment

Prinsloo (2007) states that the CPP assessment is characterized by measuring how an individual solves unstructured problems and how one copes with uncertainty. Thus, the measurement validity of the CPP assessment is assumed to as be high as the understanding of strategic thinking is explored according to Sandelands and Singh's (2017) findings relating the 15 core concepts in this case study.

The computerized administration of the CPP assessment serves a rather standardized collection of the data. Furthermore, the automated scoring is useful in terms of standardization and the removal of observer biases (Prinsloo, 2007). Computer skills are not required to participate in the CPP assessment (Prinsloo, 2007). However, exposure to computers is desirable (Prinsloo, 2007). In this case study, it can be assumed that the sample group consisting of employees in managerial positions have been exposed to computers before taking the assessment. Prinsloo (2007) claims that the CPP assessment is culture-neutral, but basic knowledge of English is required. As this case study is done in collaboration with individuals working in managerial positions in an international company, it is assumed that all participants have basic knowledge of English. Thus, the English and computer skills of the participants influencing the quality of the data can be assumed to be minimal.

Due to the structure of the particular company, some challenges were faced such as remote assessments. Seven participants did the CPP assessment with a present instructor and three participants took the CPP assessment remotely. Due to lack of careful supervision, one participant took notes despite the forbidding rules. However, Cognadev UK Ltd. reported that the

results did not contain irregularities. Due to unstandardized environments of the two participants, it can be speculated whether other matters might have influenced the reliability. For future research, it would be recommendable to have a standardized environment in the CPP assessment testing occasion as possible for all participants.

Due to the limited time of 11 weeks and a limited amount of financial resources in this case study, the CPP assessment is not assessed twice to the sample group of the perceived as the strongest strategic thinkers. The recommended re-test duration for retaking the CPP assessment is more than five years (Cognadev UK Ltd., 2016).

4. Findings

This chapter entails five subchapters, where the results are presented. First, the results of the voting questionnaire, the 360, and the CPP assessment are presented. Secondly, the results to answer the research questions are provided using IBM SPSS 24. Important to note, potential interpretation and discussions about the implications of the results are presented in chapter 5.

4.1 Self-Completion Voting Questionnaire

Despite the fact that a self-completion questionnaire is a rather quick and easy way to collect data, it is typical to get a low response rate (Bryman & Bell, 2011). In this particular case study, 29 individuals out of the targeted sample size of 46 individuals participated in the self-completion voting questionnaire overall. Hence, the non-response rate in the self-completion voting questionnaire is medium with 37%.

The purpose of the voting questionnaire is to identify the strongest strategic thinkers and invite them to the next part of the research, which is the CPP assessment. 11 people were identified as the strongest strategic thinkers (see figure 4.1). The x-axis represents the number of people who received votes from others and the y-axis represents the number of votes per individual. Overall, 35 individuals received votes. The red line demonstrates the drop in the number of votes between seven and eight votes. Thus, 11 participants who have more than seven votes participate in the CPP assessment. An alternative could have been to draw the line between eight and nine votes. Then there would be eight strongest strategic thinkers who would be invited to participate in the CPP assessment. Because 11 participants give more space to the possible non-response rate compared to eight participants, the number of 11 strongest strategic thinkers is decided to be the borderline. For this reason, 11 participants are selected and invited to participate in the next part of this research, more specifically to the CPP assessment.

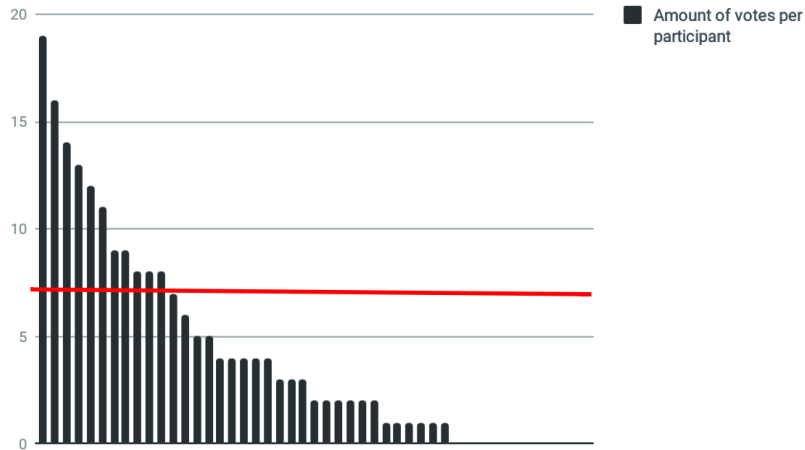


Figure 4.1 Results of the self-completion voting questionnaire

The ten participants identified as the strongest strategic thinkers are all quite high in their position within the department at E.ON. They are highlighted in red color in figure 4.2. The light gray box in figure 4.2 illustrates the individual, who could not participate in the CPP assessment. Among the ten, seven males and three females received the highest number of votes.

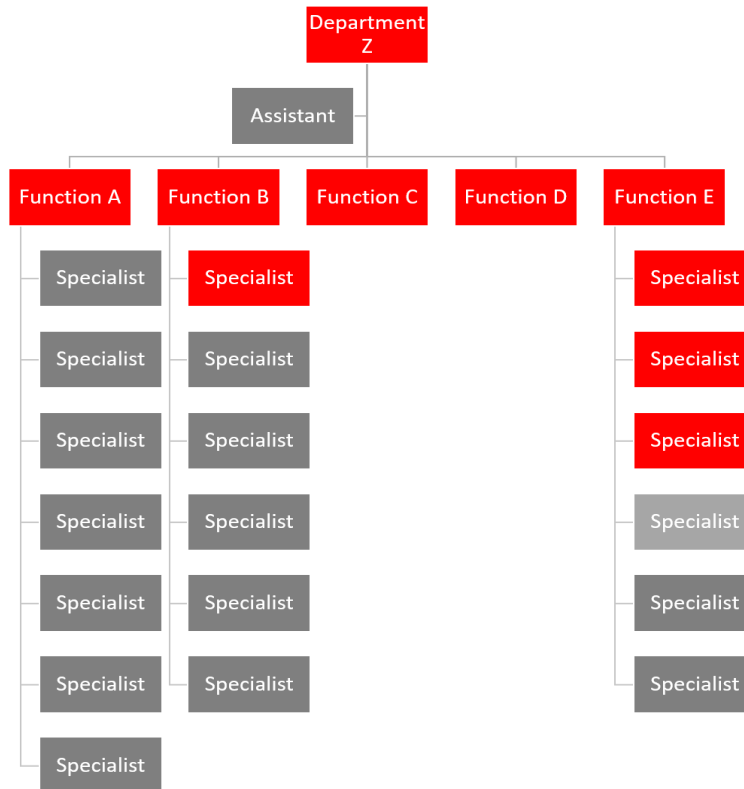


Figure 4.2 Organigram of the department at E.ON presenting the position of the eleven perceived as the strongest strategic thinkers [Own Representation]

4.2 The 360-Degree Semi-Structured Telephone Interview

The contact information of a subordinate, supervisor, and colleague was received from all final ten perceived as the strongest strategic thinkers, who were able to take part in the CPP assessment. 34 out of 40 interviews were accomplished. Thus, the non-response rate is low with 15%. One purpose of the 360 is to validate the voting questionnaire. The results are presented in the following paragraph.

The result for the first question in the 360 ‘how long have you been working together?’ shows that the maximum is 30 years, the minimum is 0.5 years, and the average is 6 years. Therefore, it can be assumed that the peers know the evaluated participants well enough to judge them why they were voted for as well as their abilities within in core concepts.

According to the results of the second question in the 360 ‘why do you think this person is voted for as a strategic thinker?’ terms of the following categories are mentioned most often. The number in the brackets represents how often a specific keyword is mentioned.

Work-related expressions:

- Experience (9),
- Knowledge (8), and
- Position (9).

Characteristic and skills related expressions:

- Holistic (8),
- Creative (10),
- Decision-making (2),
- Analytical (10),
- Visionary (11),
- Action-oriented (2),
- Communication (8), and
- Process-oriented (1) (Appendix F).

All the first descriptive words in the previous list describe the possible skills and characteristics of strategic thinking, at least how strategic thinking is perceived. Interestingly, all expression but

decision-making, action-oriented, and process-oriented are rated rather similarly. The characteristic and skills related expressions of creative, analytical, and visionary are rated only slightly higher compared to work-related expressions of experience, knowledge, and position. However, concerns about the fact that the voting result shows the importance of one's high position in the hierarchy instead of emphasizing skills and characteristic relating strategic thinking can be mitigated based on the result.

The result concerning the third question asking to evaluate and give rates on a five-point-scale on the 15 core concepts (Appendix G), shows a specific pattern in minimum, maximum, median, and mean (see table 4.1). On the five-point-scale, the minimum score is either two or three. In contrast, the maximum score in each of the core concept is five. The median is most of the times four except in the core concepts it is three: divergent, intuitive, and visionary. Since the comparison of the medians does not show differences between the core concepts, the average is also calculated. The average score is above four in the following core concepts: analytical, context orientated, future-oriented, holistic, and systematic.

Table 4.1 Minimum, maximum, median, and mean of the ratings of the core concepts in the 360

Elements	Minimum	Maximum	Median	Mean
Analytical	3	5	4	4.15
Creative	3	5	4	3.56
Conceptual	3	5	4	3.68
Context-oriented	3	5	4	4.18
Divergent	2	5	3	3.44
Flexible	2	5	4	3.68
Future-oriented	3	5	4	4.18
Holistic	2	5	4	4.06
Integrative	2	5	4	3.94

Intuitive	2	5	3	3.56
Process-oriented	2	5	4	3.71
Reflective	2	5	4	3.85
Synthetic	2	5	4	3.71
Systematic	2	5	4	4.06
Visionary	2	5	3	3.50

4.3 Cognitive Process Profile Assessment

According to the CPP assessment of the E.ON sample the following results in current level of work (CLOW) and potential level of work (PLOW) are presented (see Appendix H). The CLOW and PLOW demonstrate the current and potential preference of the individual regarding the complexity in working environment divided into five categories (Cognadev UK Ltd., 2016). In figure 4.3, the black pillar represents the scores in the item CLOW and the grey pillar the scores in the item PLOW of the E.ON sample. The number of participants in each of the five categories is presented in percentages. The particular interest is in the CLOW and not in the PLOW as the future cannot be predicted.

The results show that none of the identified perceived strongest strategic thinkers have currently or potentially the CLOW of a pure strategic thinker. Thus, none of them would suit the pure strategic work environment. However, four out of ten currently prefer and are capable of working in an environment as parallel processors and six out of ten have the potential for it according to the CPP assessment. Thus, these individuals possess or have the potential of the ability to think strategically. Most participants' cognitive profile currently seems to best suit in the work environment parallel processing. Moreover, the CPP assessment identified three individuals preferring a tactical, strategic working environment and three having the potential of being capable of working within such an environment. Furthermore, two are identified to prefer to process in the style of diagnostic accumulation. Interestingly, one participant has the potential for diagnostic accumulation but currently prefers the pure operational work environment.

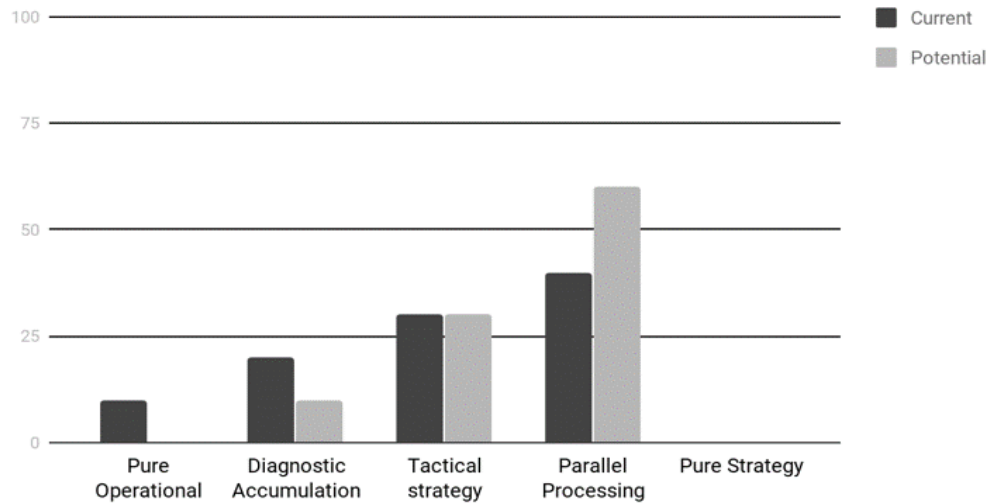


Figure 4.3 Results of the score of the E.ON Sample in current and potential level of work

4.4 First Research Question

The results to answer the first research question are presented below. The purpose of this question is to further validate the voting by calculating the correlation between the number of votes and the CLOW. Furthermore, to investigate the prominent cognitive elements of strategic thinking of the E.ON sample, correlation between the number of votes with the average scores of the 15 core concepts by Sandelands and Singh (2017), and the scores in the certain items in the CPP assessment are investigated (see appendix). In the following, the most interesting correlations for this research are presented.

There is a significant large positive correlation between the number of votes and the level of work based on CPP assessment (see figure 4.4). The x-axis shows the CLOW and the y-axis demonstrates the number of votes. Only nine points are visible because two individuals with working-level two got the same number of eight votes. Thus, two individuals are in the same spot in the scatterplot. The cluster of points is in curvilinear shape which could indicate a curvilinear relationship between the two variables. Therefore, both variables increase to a certain point after which the level of work stops to increase.

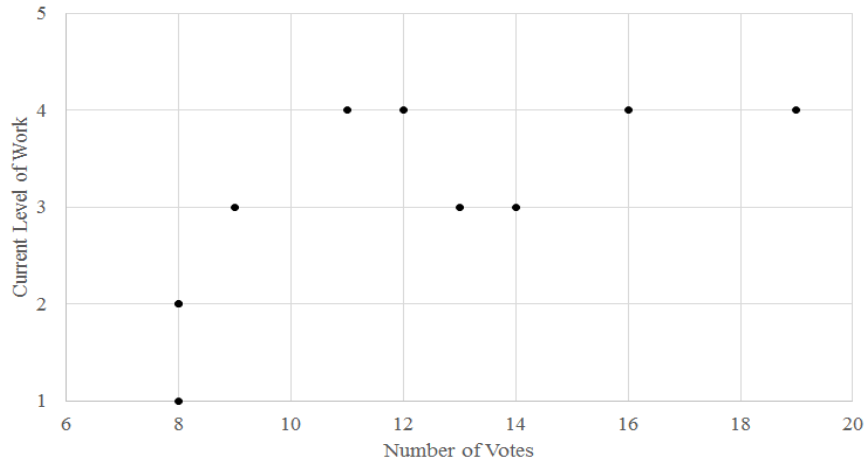


Figure 4.4 Scatterplot of the scores in the item current level of work and the number of votes

The correlation coefficient $\rho=.766$ between the number of votes and the CPP assessment result in the item of CLOW is large and positive with a high significance level of $p=.010$ (see table 4.2). The correlations are calculated by using the Spearman's Rank Correlation with IBM SPSS Statistics 24. To investigate the significance of this result further the outliers are excluded. An outlier is a point in the scatterplot that stands on its own away from the main cluster of points (Pallant, 2013). When removing the lowest point and the highest point from the main cluster of points, the correlation coefficient $\rho=.646$ with a level of significance $p=.083$. This result can be interpreted as there is no significant correlation. However, the outliers in this case do not stand alone and therefore will not be considered further.

Table 4.2 Correlation and significance between the scores in the current level of work and number of votes with and without outliers

	CLOW & Number of Votes	
	All Participants	Without Outliers
Correlation coefficient (ρ)	.766	.646
Significance (p)	.010	.083
Participants (N)	10	8

Another finding is that the votes significantly, $p=.016$, correlate, $\rho=.733$, with the position within the investigated department at E.ON. This is also illustrated in figure 4.2 and demonstrates that a higher position within E.ON indicates a higher number of votes. However, there is no significant correlation between the position and CLOW.

Furthermore, the results show two significant large negative correlations between the averages of the rates in the core concept analytical and process-oriented by Sandelands and Singh (2017) and the number of votes (see table 4.3). The averages used are presented in appendix G. More specifically, the significant $p=.022$ large and negative correlation coefficient between the average rates in the core concept analytical and the number of votes is $\rho=-.709$. The large negative correlation coefficient between process orientation and the number of votes is $\rho=-.637$ this is significant with a significance level of $p=.048$. This means that a higher number of votes follows a significantly lower score in the core concepts of analytical and process-oriented.

Table 4.3 Two significant Spearman Rank correlations between the averages of rates in the core concepts in the 360 and the number of votes in the voting questionnaire

	Average Rates in the Core Concepts in the 360 & Number of Votes	
	Analytical	Process-oriented
Correlation coefficient (ρ)	-.709	-.637
Significance (p)	.022	.048
Participants (N)	10	10

Only one significant correlation between the scores in the cognitive styles in the CPP assessment and the number of votes in the voting questionnaire is discovered (see table 4.4). The scores in the cognitive style of trial and error show a large correlation coefficient $\rho=.716$ significance being $p=.020$, with the number of votes. This indicates that a higher number of votes leads to a higher score in the cognitive style trial and error. Other cognitive style preferences scores do not show significant correlation with the number of votes.

Table 4.4 One significant Spearman Rank correlation between the scores in the cognitive Style Preferences in the CPP assessment and the number of votes in the voting questionnaire.

Scores in the Cognitive Style Preferences (CPP) & Number of Votes (Voting Questionnaire)	
Trial and Error (Random) style	
Correlation coefficient (ρ)	.716
Significance (p)	.020
Participants (N)	10

Five significant correlations are identified when calculating the correlation between the scores in the information processing styles in the CPP assessment and the number of votes in the voting questionnaire (see table 4.5). The scores information processing style of complexity shows a large correlation coefficient $\rho=.784$ with a high significance $p=.007$. Furthermore, the information processing styles scores of categorizing ($\rho=.726$, $p=.017$), pragmatic ($\rho=.669$, $p=.034$), logical reasoning ($\rho=.691$, $p=.027$), and exploration ($\rho=.638$, $p=.047$) show a significant large correlation. This can be interpreted as a higher number in votes indicate a higher score in the information processing competencies pragmatic, categorization, logical reasoning, complexity, and exploration.

Table 4.5 Five significant Spearman Rank correlations between the scores in information processing competencies in the CPP assessment and the number of votes in the voting questionnaire

Scores in the Information Processing Competencies (CPP) & Number of Votes (Voting Questionnaire)					
	Pragmatic	Cate- gorization	Logical reasoning	Complexity	Exploration
Correlation (ρ)	.669	.726	.691	.784	.638
Significance (p)	.034	.017	.027	.007	.047
Participants (N)	10	10	10	10	10

To conclude, the answer to the first research question is that there are several significant correlations between the number of votes among individuals perceived to be the strongest strategic thinkers, the scores in the items of Cognitive Process Profile assessment, and the average ratings in the 360-degree semi-structured telephone interview.

The significant correlations between the votes and the scores in the CPP as well as with the average rates of the 360 are identified with the following items:

- Complexity,
- Trial and error,
- Categorizing,
- Pragmatic,
- Logical reasoning,
- Exploration,
- Analytical, and
- Process-oriented.

4.5 Second Research Questions

The results to answer the second research question are presented in this subchapter. The purpose of this question is to investigate the difference in the results of the CPP assessment between the E.ON sample and two reference samples. The CPP assessment indicates a current and a potential work environment for each individual. However, no time frame is given to predict when the person will reach their potential level since this depends on various factors including opportunity and motivation (Cognadev UK Ltd., 2016). Therefore, in the following the focus is on the differences of the CLOW. Furthermore, the differences in the cognitive styles and information processing competencies are presented as well.

When applying the Mann-Whitney U test and calculating the significance in the differences in the level of work between the E.ON sample and two reference samples, the results show no significant difference between the samples (see table 4.6). When comparing the E.ON sample with a contrast sample, the level of significance is $p=.750$. Similarly, the result shows the level of significance being $p=.529$ when comparing the E.ON sample and the normative sample. Based

on these results, it can be interpreted that there is no statistically significant difference in the level of work between the E.ON sample and two reference samples.

Table 4.6 Mann-Whitney-U test results illustrating no difference between the E.ON sample and the two reference samples in the scores in the item current level of work in the CPP assessment

	CLOW	
	E.ON/Normative	E.ON/Contrast
Significance (p)	.750	.529

However, the E.ON sample scores significantly higher compared to the normative sample in the styles of categorizing and structured and higher than the contrast sample in the cognitive style of holistic. The significant differences are illustrated in table 4.7 and 4.8.

Significant differences between the group of the E.ON sample and the contrast sample are found in the preferences in the cognitive style of holistic ($p=.027$, with $z=-2.210$) (see table 4.7). This is indicating that the E.ON sample scores significantly higher in holistic compared to the contrast. However, the effect is rather small $r=-.274$.

Table 4.7 One significant result of the Mann-Whitney-U test when comparing the E.ON sample and the contrast sample scores in both information processing competencies and cognitive style preferences of the CPP assessment

	E.ON & Contrast Sample
	Holistic
Significance (p)	.027
Z-value (z)	-2.2210
Correlation (r)	.274

When comparing the normative sample and the E.ON sample a statistically significant difference is found in two elements (see table 4.8). A significant difference in the style of structured of $p=.026$ is found. The direction of this difference being $z=-2.226$. This means that E.ON sample scores significantly higher than the normative sample. The approximate value of $r=-.044$ indicates a very small effect. Furthermore, when comparing the information processing competency of categorizing, there is a significance level of $p=.025$, with a direction of difference being $z=-2.239$ which indicates that E.ON sample scores higher than the normative sample. However, the approximate value of $r=-.044$ can be interpreted as being a very small effect.

Table 4.8 Two significant results of the Mann-Whitney-U test when comparing the E.ON sample and the normative sample scores in both information processing competencies and cognitive style preferences of the CPP assessment

	E.ON & Normative Sample	
	Structured	Categorizing
p	.026	.025
z	-2.226	-2.239
r	-.044	-.044

To conclude, the answer to the second research question is that the E.ON sample is not significantly different to the normative sample nor to the contrast sample when it comes to the scores in the level of work in the CPP assessment. However, the E.ON sample is significantly different compared to the two reference samples in the items:

- Holistic,
- Categorizing, and
- Structured.

5. Discussion

In this chapter, the results are discussed comprehensively in relation to the purpose and research questions of this case study. First, the results regarding first research question will be interpreted and discussed. Therefore, the correlations between the number of votes and the scores in the items in the CPP are discussed. Furthermore, the correlations between the number of votes between the average rates in the 360 are presented. Secondly, results, interpretations, and discussions regarding second research questions are provided. Thus, the differences between the E.ON sample and the two reference samples are presented. Furthermore, a table illustrating the findings in this discussion can be found in the appendix J.

5.1 First Research Question

According to the voting questionnaire, 11 individuals are identified as the strongest strategic thinkers. Due to one drop out, however, ten participants took part in the CPP assessment (E.ON sample). The one who could not participate had the lowest number of votes and therefore did not influence the results to a large extent. As slightly expected, none of the individuals in the E.ON sample have the working-level five (pure strategic) nor have a potential for it. This is very likely since only 1% of the world population has this working-level (see figure 2.3). However, four participants out of the ten have parallel processing as their CLOW. According to Cognadev UK Ltd. (2016), only 4% of the generic population has the parallel processing level of work. Interestingly, 40% of the E.ON sample suit the work environment of parallel processing. Also, one individual is purely operational. This is interesting since the strongest strategic thinkers should be identified with the voting. However, since the number of votes and CLOW correlate, this individual receives a low number of votes. A possible interpretation could be that there are no stronger strategic thinkers than this individual at E.ON. This is likely since 80% of the world population is either pure operational or diagnostic accumulation (Cognadev UK Ltd., 2016).

The significant correlation between the number of votes and the CPP assessment results lead to the potential interpretation that the CPP assessment possibly has the ability to identify the same

abilities as the voters. Consequently, this could indicate that the voting identified the strongest strategic thinkers, and the CPP assessment also measures it accordingly.

However, the votes also significantly correlate with the position within the company. This could indicate as mentioned in the literature review that a higher position is related to more work experiences, which leads to becoming perceived as more strategic. However, this could also be one example of a potential structural problem. Meaning that people confuse strategic thinking with position or that people in top positions are more well known. Another possible interpretation is that the voting and the CPP assessment measures something but not strategic thinking specifically.

When calculating the correlation between the number of votes and the scores in the cognitive styles in the CPP assessment, individuals who scored higher in the item trial and error also received a higher number of votes in the voting questionnaire. The highly significant, positive, and large correlation between the cognitive style trial and error and the votes can be interpreted as contradicting to results just presented since trial and error is not supporting strategic thinking (Cognadev UK Ltd., 2016). Also, no significant correlation between the items which either support or hinder strategic thinking is found in this case study.

The very significant, positive, and large correlations between the information processing competencies and the number of votes could indicate that these items are common within individuals perceived as strong strategic thinkers in the E.ON sample. Interestingly, the identified high scored information processing competencies are pragmatic, categorization, and exploration. These are those who either hinder or are neutral towards strategic thinking in the CPP assessment. This could be interpreted as contradictive to the CPP assessment because individuals who are perceived as strategic thinkers score high in these categories. However, there is a correlation with the information processing style of logical reasoning and a very significant correlation with information processing style of complexity. These items are facilitating strategic thinking in the CPP assessment. Thus, this supports the approach of the CPP assessment. Therefore, a possible interpretation is that logical reasoning and complexity could possibly be cognitive elements of strategic thinking.

The high results in the median and mean in the third question in the 360 regarding the 15 core concepts could show that actual strategic thinkers are identified based on the perception of strategic thinking. A possible interpretation can be that a slightly higher means in the 15 core concepts indicate that these are stronger connected to strategic thinking. Furthermore, it could be that the core concepts with higher means or medians are easier to observe by the peers. However, it could also be that these core concepts are more associated with the concept strategic thinking and are not related to the ten participants since the scores are very similar. In that manner, the fact that the individuals who participated have ongoing working relationships, the validity of the voting questionnaire, and the 360 can be questioned. Thus, the participants could give votes and ratings based on other criteria such as personal preference instead of the guidelines stated in the voting questionnaire and in the 360. Furthermore, elements that are not only associated with strategic thinking, such as elements relating to strategic planning, are included in the 15 core concept and thus are also in the 360. Therefore, the results should show bigger differences in the average rates of the core concepts.

Furthermore, the results of the second question in the 360 support the validity of the voting questionnaire result as the participants associated strategic thinking slightly more on skills and personal characteristics than the position in the hierarchy. However, the responses represent only a small sample of all voters and thus the results can only be analyzed as indicating.

Based on the correlation between the number of votes and the average rates of the 15 core concepts by Sandelands & Singh (2017), two negative correlations are identified. Thus, the correlation between the number of votes and the average rates of the core concepts of analytical and process orientation is negative. The fact that CPP assessment does include analytical as a supporting element for both strategic thinking and operational thinking would support this finding. To conclude, a possible interpretation is that strategic thinking does not entail the core concepts of analytical and process orientation.

5.2 Second Research Question

The E.ON sample does not differ in the level of work from the two reference samples. However, it scores significantly higher in the information processing styles of categorization, structured compared to the normative group as well as in the cognitive style of holistic compared to the contrast sample.

There is no significant difference between the E.ON sample and the two reference samples in the level of work. This could be interpreted that the E.ON sample is not significantly different from the two reference samples when it comes to the level of work measured by the CPP assessment. Consequently, this finding may indicate that the voting did not identify strong strategic thinkers. However, the voting is executed only within E.ON. Therefore, it could be that the strongest strategic thinkers at E.ON are identified with the voting. Furthermore, the pool the participants voted from could have represented the world population and thus most likely did not include pure strategic thinkers. This possible interpretation is supported by the results of the significant correlation between the voting and the CLOW.

The information processing competence categorization and the cognitive style of structured and holistic correlate significantly with the numbers of votes. Cognadev states that holistic facilitates strategic thinking (Cognadev UK Ltd., 2016) Interestingly, the cognitive style of structured and the information processing competence categorization does not facilitate strategic thinking (Cognadev UK Ltd., 2016). Three possible interpretation for the identified significant differences are offered. First, the characteristics of E.ON as a company is dominated by employees with an engineering background. Thus, the styles of structured, categorizing, and holistic can be forestanding due to the company culture. Second, it could be that these three elements are those which are easy to perceive within the E.ON sample and that these three elements are required for the positions in E.ON. Holistic is also identified in the list of the 15 core concepts relating to strategic thinking by Sandelands & Singh (2017). Interestingly, categorizing also significantly correlated with the number of votes. A possible interpretation could be that this element is easy to perceive or very popular in the sample group.

6. Conclusion

The purpose of this case study is to explore and define the most prominent cognitive elements of strategic thinking in managers at one department at E.ON and, as such, to investigate the cognitive elements of strategic thinking further. Therefore, three research methods are used; namely, a voting questionnaire, 360, and CPP assessment. First, the perception of strategic thinking is explored with the voting questionnaire. Since a significant correlation between the number of votes and the scores in CLOW in the CPP assessment exist, the strongest strategic thinkers at E.ON are identified via the voting questionnaire. This provides the basis for further analysis of the data.

While the core concepts by Sandelands and Singh (2017) are rated in the 360, the level of work, cognitive styles, and information processing styles, which directly pertain to strategic thinking, are explored with using the CPP assessment. Based on the results of the voting questionnaire, 360, and the CPP assessment, a comprehensive understanding of the most prominent cognitive elements in strategic thinking within the E.ON sample is thus presented. Furthermore, comparing the E.ON sample with two reference sample identified additional prominent cognitive elements.

The prominent cognitive elements identified within the E.ON sample are:

- Complexity,
- Trial and error,
- Categorizing,
- Pragmatic,
- Logical reasoning,
- Exploration,
- Structured, and
- Holistic.

These are the most prominent elements. On the one hand, they either showed significant correlations between the number of votes and the scores of the items in the CPP assessment. On the other hand, they indicated the correlation between the number of votes and the average rates in the 360. Additionally, prominent cognitive elements are identified because, they are significantly different compared to two reference samples.

The significant correlation between the number of votes and the score in the information processing competency and cognitive style preference identified the following prominent cognitive elements in the E.ON sample: complexity, trial and error, categorizing, pragmatic, and exploration in the CPP are. Furthermore, the significant differences between the E.ON sample and the two reference samples indicate that the cognitive elements of categorizing, structured, and holistic are prominent in this case study context. It must be noted that the E.ON sample scores high in these styles compared to the two reference samples. Due to the significant negative correlation between the number of votes and the ratings in the 360, it could be stated that the core concepts of analytical and process orientation would not be part of the prominent cognitive element of strategic thinking in the E.ON sample.

Based on the results, and considering the literature and the theory of the CPP in particular, the cognitive elements of strategic thinking could most likely be:

- Complexity,
- Logical Reasoning, and
- Holistic

According to Cognadev UK Ltd., (2016), these three items facilitate strategic thinking. Since significant correlation is found, these items are also identified as prominent in the E.ON sample which demonstrates individuals perceived as the strongest strategic thinkers. In addition analytical is not prominent in the E.ON sample and does not facilitate strategic thinking in CPP. Therefore, it could be stated that this is not a cognitive element of strategic thinking.

This is an exploratory pilot study with several limitations discussed in the chapters 3.7 and 7. The purpose to investigate the most prominent cognitive elements on strategic thinking at a small sample size at E.ON offered valuable results. These results can motivate further research to investigate the cognitive elements of strategic thinking further.

7. Suggestions for Future Studies

As this is a case study exploring the most prominent cognitive elements at one department at E.ON, the results of this particular case study are only applicable to this case study context and may not necessarily be generalized. However, this research might provide insights to investigate strategic thinking further. As a suggestion for further research, a bigger and more consistent sample, improvements in the voting questionnaire, and 360, as well as more controlled conditions in the CPP assessment, should be considered.

Two aspects lead to the requirement of a bigger sample size. First, the results cannot be generalized and every individual has a very high impact on the results (see Correlation between the voting questionnaire and CPP assessment results without outliers). However, since this is an explorative case study, a small sample size enables to identify potential topics of interest for further investigation. Secondly, the comparison between the E.ON sample and the reference samples lead to some problems. Although the individuals in the reference sample show similar characteristics to the E.ON sample, the E.ON sample is compared with a sample outside of E.ON. Thus, for further studies, it would be beneficial to compare votes and results in the CPP assessment for strategic thinkers and operational thinkers with one sample and a contrast group from the same context such as the same company.

As a suggestion to strengthen the measurement validity in the future studies, more specific restriction within the tool used for the voting questionnaire would be recommended as some problems were faced using the online survey tool Doodle (see chapter 3.7). The 360 could have included more items such as experience, extroversion, and cognitive elements related to non-strategic thinking. Experiences seem to be related to strategic thinking since most votes were received by employees high in the hierarchy. This could support the finding by Dragoni, Oh, Vankatwyk, and Tesluk (2011) that the accumulated work experience is the most important predictor of strategic thinking. Furthermore, personal traits such as extraversion might have a relation with strategic thinking since Dragoni, Oh, Vankatwyk, and Tesluk (2011) supports this. However, these elements are also not included in the CPP assessment but might add or be a valid indicator for strategic thinking. Furthermore, since the rating in the 360 was overall positive,

non-strategic elements would have helped to identify differences between strategic and non-strategic elements to mitigate the possible attitude to rate peers positively. Other additional information could be collected about the organization since Bonn (2001) states that it is important to consider the individual, the group dynamic as well as the organizational context to gain a holistic understanding of strategic thinking.

More controlled conditions to mitigate biases such as the way the methods were executed. During the CPP assessment, remote test and telephone interviews were executed under not highly controlled conditions. Someone who, for example, has questions or cheats during the CPP assessment without supervision could have different results than those with supervision. Lastly, the telephone interview questionnaire can not only be improved content wise but also how it is conducted. Furthermore, during the telephone interview a quiet environment and stable connection cannot always be provided. For example, the order of the elements of the 360 could change in every interview and people should not be able to rate more than one person since this might influence the rater.

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Appendix A

The 15 core concepts and their descriptions according to Sandelands & Singh (2017, pp. 27-28).
[Own Representation]

Core Concepts (Sandelands & Singh, 2017, p. 27)	Description (Sandelands & Singh, 2017, p. 27)
Analytical	Demonstrating a logical, reason-based approach
Creative	Searching for new approaches and envisioning better way of doing things (Bonn, 2005, p. 338)
Conceptual	Forming ideas or concepts to provide answers to experiences, observations etc.
Context-oriented	The ability to recognize the environment of operation (e.g. individual, organisational) (Bonn, 2005)
Divergent	The ability to think in a different manner or ways
Flexible	Displaying adaptability, able to handle change
Future-oriented	Being forward thinking
Holistic	Realisation that a scenario must be viewed as a whole, rather than within separate parts (Kaufman, 1991)
Integrative	The ability to combine concepts, thoughts, or ideas
Intuitive	The ability to react instinctively (Olson & Simerson, 2015)
Process-oriented	Cognitive activities demonstrative of self-awareness, and awareness of the wider environment (Olson & Simerson, 2015)
Reflective	An ability to draw upon and learn from past experiences
Synthetic	Refers to the ability to synthesize (blend) ideas, information, or processes
Systematic	An ability to examine how different concerns are connected, affect, and influence one another (Liedtka, 1998)
Visionary	Individuals who convey a sense of direction, and provide a focus for all activities in an organisational context (Bonn, 2005, p. 339)

Appendix B

The 14 Information Processing Competencies in the CPP (Cognadev (Pty), 2018, p. 16) [Own Representation]

Information Processing competencies		Description
Memory	Use of memory	A tendency to rely on memory and to concentrate on the task
	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	Categorization	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 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

Appendix C

The 14 Cognitive Styles in the CPP (Cognadev UK Ltd., 2016, pp. 21-23) [Own Representation]

	Description
Logical Style	<ul style="list-style-type: none"> ● Tends to look for logical evidence ● Is self-aware and rigorously monitors own reasoning processes ● Follows reasoning processes through in a rule-based manner ● May apply convergent or divergent reasoning ● Tends to verify or falsify arguments logically ● May prefer to focus on complex issues and long-term implications ● Tends to be a disciplined and critical thinker ● May pursue complex cognitive challenges ● May focus on detail in an analytical manner
Analytical Style	<ul style="list-style-type: none"> ● 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 Style	<ul style="list-style-type: none"> ● Tends to investigate issues ● Thoroughly explores different types of information ● Checks information carefully and precisely ● Tries to understand the task requirements ● Focuses on finding information relevant to the problem ● May get confused by over-exploring and checking too much ● May repeatedly explore the same information without moving forward
Trial-and-Error (Random) Style	<ul style="list-style-type: none"> ● Has a vague and unsystematic approach to problem-solving ● Tends not to plan or monitor information processing approach ● May show an undirected action approach ● Not likely to be focused on the task or goal ● May lack self-awareness, motivation or flexibility ● Likely to prefer structured and familiar information or environments ● May not systematically analyse, structure or reason about issues
Reflective Style	<ul style="list-style-type: none"> ● Tends to explore and consider information very carefully ● May be guided by existing knowledge and information structures ● Shows a careful approach and revisits previous conclusions ● May work relatively slowly ● Tries to avoid making mistakes ● Indicates a preference for working with tangible information in structured contexts ● Shows a need for certainty

Memory Style	<ul style="list-style-type: none"> ● Tends to concentrate well and remembers information ● Usually tries hard, concentrates carefully and has high standards ● May internalise and integrate information while processing it ● Relies on past experience and a knowledge base ● May show a technical specialist orientation, but not necessarily ● Tends to use memory strategies such as confirmation of hypotheses, external reminders, visualisations and associations ● Is aware of and mentally monitors own memory strategies ● Often has a need to achieve ● Can overload memory and become confused
Learning Style	<ul style="list-style-type: none"> ● Tends to be curious and explorative ● Often capitalises on memory functions ● Is self-aware and tends to respond to feedback on the effectiveness ● Tends to improve problem-solving skills continuously ● Is adaptable, flexible and able to acquire new ways of thinking ● Seeks novelty and focuses on unfamiliar aspects ● Usually is motivated, concentrates well and invests in problem-solving ● Can easily get bored, so needs challenge and stimulation ● Is likely to enjoy fast-changing work environments
Metaphoric Style	<ul style="list-style-type: none"> ● Tends to view problems abstractly or symbolically ● May combine elements of information in new and unusual ways ● Tends to formulate unusual ideas to integrate discrepant information ● Often creates mental pictures to represent an idea ● Capitalises on both verbal and visual modes ● May use storytelling techniques, vivid verbal pictures, analogies and metaphors ● Can convey information and align the perceptions of others by using powerful metaphors
Reactive (Impulsive) Style	<ul style="list-style-type: none"> ● Likely to work quickly but inaccurately ● May be impulsive or show quick closure ● May respond emotionally rather than rationally ● May not identify or focus on the most relevant aspects of a problem ● May not spend sufficient time on complex cognitive challenges ● Could lack motivation ● Likely to be sensitive and / or experience performance anxiety ● May find it difficult to deal with unfamiliar cognitive challenges
Quick Insight style	<ul style="list-style-type: none"> ● Tends to works quickly and accurately ● Grasps ideas and reaches conclusions relatively quickly ● Tends to focus and process information in a goal-oriented manner ● Processes and integrates information relatively quickly ● Uses effective reasoning and memory strategies

	<ul style="list-style-type: none"> ● Is likely to be self-confident and takes pride in working quickly ● May be sensitive, intuitive and trusts own insights ● Regards the speed information is processed as important
Structured Style	<ul style="list-style-type: none"> ● Likes to group information into coherent categories or structures ● Carefully orders information in terms of rules or characteristics ● Identifies core elements and formulates generalisations ● May prefer a relatively structured work environment ● May order information by summarising, mapping, filing or listing ● May represent information as pictures, maps, and diagrams ● Tends to order information to manage complexity and assist memory ● Likely to have an operational or tangible focus ● May come across as organised ● Likely to strive for certainty and a sense of control
Holistic Style	<ul style="list-style-type: none"> ● Tends to see the big picture without losing sight of detail ● Emphasises wholeness and unity ● Identifies critical factors in calibrating the big picture ● Views elements in relation to the whole ● Wants to contextualise information and tends to ask ‘why?’ ● Synthesises and integrates separate information structures ● 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
Intuitive Style	<ul style="list-style-type: none"> ● Usually explores and checks information in a seemingly aimless manner ● Often relies on previous knowledge and experience ● Largely relies on connections made at a subconscious level ● Interprets complex information at ‘gut level’ ● Trusts own feelings and instincts ● Likely to be self-aware, sensitive, open-minded, and perceptive ● May integrate information to formulate creative and unusual ideas ● Does not necessarily rely on an analytical approach
Integrative Style	<ul style="list-style-type: none"> ● 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 ● Tends to formulate, verify, and falsify hypotheses to eliminate unnecessary information ● Has a need to understand and usually learns in the process ● Often uses abstract concepts to express ideas ● Tends to focus on complex information and intellectual challenges

Appendix D

Voting questionnaire

Voting Questionnaire

This questionnaire has been designed to collect information for a study on strategic thinking, carried out by students at Lund University. This particular study will be done in collaboration with your company. The questionnaire will take you approximately five minutes to complete. All personal information in this questionnaire will remain confidential and anonymous. You can therefore use a pseudonym for the survey if you want to. Furthermore, we ask you to keep your answers confidential so as not to influence other participants.

We kindly ask you to select ten people you perceive to be the strongest strategic thinkers in your company. Strategic thinking is used in complex and uncertain situations. Please vote by clicking on the names in the list below. The list is in alphabetical order.

For your interest, out of all the names proposed, ten will be selected to participate in the next stage of the study.

Thank you for your participation!

Jaqueline Hinz & Anna Suokas

(Due to anonymity the presentation of names is excluded)

Appendix E

360-degree Semi-Structured Telephone Interview

Question 1:

How long have you been working together in years?

Question 2:

Why do you think person X is perceived as a strategic thinker?

Question 3:

We will ask you to evaluate person X based on fifteen characteristics, one characteristic at a time, on a five-point-scale. Number one is very low, number two is low, number three is medium, number four is high and number five is very high. Feel free to use the whole scale when giving answers. Behind each characteristic stands a concept, if you are unsure about the characteristic I will gladly explain it to you. (Sandelands & Sing, 2017, p. 27).

- Analytical, (Demonstrating a logical, reason-based approach)
- Creative, (Searching for new approaches and envisioning better way of doing things)
- Conceptual, (Forming ideas or concepts to provide answers to experiences, observations)
- Context-oriented, (The ability to recognize the environment of operation (e.g. individual, organisational))
- Divergent, (The ability to think in a different manner or ways)
- Flexible, (Displaying adaptability, able to handle change)
- Future-oriented, (Being forward thinking)
- Holistic, (Realisation that a scenario must be viewed as a whole, rather than within separate parts)
- Integrative, (The ability to combine concepts, thoughts, or ideas)
- Intuitive, (The ability to react instinctively)
- Process-oriented, (Cognitive activities demonstrative of self-awareness, and awareness of the wider environment)
- Reflective, (An ability to draw upon and learn from past experiences)
- Synthetic, (Refers to the ability to synthesize (blend) ideas, information, or processes)
- Systematic, (An ability to examine how different concerns are connected, affect, and influence one another)
- Visionary, (Individuals who convey a sense of direction, and provide a focus for all activities in an organisational context)

Appendix F:

Table illustrating the results of the content analysis.

Theme	Category	Condensed meaning units (keywords and phrases)	Number of times mentioned
Work-related expressions	Experience	several positions during the years, wide experiences, experiences, working experience, experienced, experiences, experience, has a lot of experiences, very experienced	9
	Knowledge	know the industry, great knowledge, knowledgeable, knowledge, a lot of knowledge, great knowledge, knowledge, knowledge	8
	Position	the head, very high up, position, the position, position, managerial role, high up in the hierarchy, managerial role, position	9
Skills and characteristics related expressions	Decision-making	decision making, decision making	2
	Communication	expresses opinions, can communicate the information, engage in discussions, communicating well, an extrovert, discussions, able to explain things, talks a lot about things to others.	8
	Action-orientation	action, doing person	2
	Holistic	broad, higher view on things, see the large picture, capable to look a bigger picture and the whole picture, tries to understand whole problem, broad, broad perspectives, holistic	8
	Reflective	take time to reflect	1
	Creative	try different ways, ability to look at different aspects at the same time, explores different kinds of solutions,	7

		considers options, different perspectives, whole perspective from every angle, looks at different angles, able to combine complex issues	
	Analytical	a lot of questions in order to understand and analyse, can simplify the faced problem, tools to work analytically, analytical, can take very difficult things/tasks and cut them down into smaller parts, analytical, break down things, analytic, analytical, analytical	10
	Process-oriented	turns the informations into processes	1
	Visionary	long term, good forecasting, thinking about the future, visionary, forward thinking, visionary, future-oriented, long-term, a long-term view, clear visions, able to think long term/direction	11

Appendix G

Results of the 360-Degree Semi-structured Telephone Interview [Own Representation]

Individual ID	1	2	3	4	5	6	7	8	9	10
Gender (1=male;0=female)	1	1	0	1	1	0	1	1	1	0
Position (Department=1; Function=2; Specialist=3)	2	3	3	3	3	2	2	2	1	2
Colleague										
How long have you been working together?	2.5	2	2	9	10		30	0.5	7	3
Analytical	5	4	5	5	4		4	4	3	4
Creative	3	5	3	4	4		3	4	5	4
Conceptual	5	4	4	4	5		4	4	4	4
Context-oriented	4	3	3	5	4		5	5	5	3
Divergent	2	4	3	3	5		3	3	4	4
Flexible	2	4	4	3	4		3	4	3	4
Future-oriented	4	4	4	5	4		4	4	5	4
Holistic	4	5	5	4	4		4	5	4	4
Integrative	4	3	3	4	4		4	5	5	4
Intuitive	5	3	3	5	4		5	3	5	3
Process-oriented	5	5	5	5	5		5	4	4	3
Reflective	5	3	5	5	5		4	4	2	4
Synthetic	3	4	4	4	4		4	4	5	4
Systematic	5	3	5	5	5		4	4	4	3
Visionary	3	4	3	5	4		3	4	5	4

Subordinate										
How long have you been working together?	2.5	8	2	6				5	15	
Analytical	3	4	4	5				4	4	
Creative	4	3	4	4				3	5	
Conceptual	4	3	4	4				3	3	
Context-oriented	5	4	5	5				5	4	
Divergent	3	4	4	4				4	4	
Flexible	4	2	5	3				3	5	
Future-oriented	4	4	4	5				4	5	
Holistic	5	4	5	4				5	4	
Integrative	4	3	5	4				5	5	
Intuitive	4	2	4	4				3	4	
Process-oriented	3	2	4	5				3	3	
Reflective	5	3	4	5				4	5	
Synthetic	4	3	5	4				4	4	
Systematic	4	5	5	4				5	4	
Visionary	3	3	4	5				3	5	
Supervision										
How long have you been working together?	8	13	2,5	4	3	0.5	4	5		2.5
Analytical	3	4	5	4	4	4	4	4		4
Creative	2	4	3	4	3	4	3	2		4
Conceptual	3	3	4	4	4	4	3	3		3
Context-oriented	4	4	4	4	4	3	4	3		4

Divergent	3	3	3	3	3	3	3	2		3
Flexible	4	4	2	5	4	3	4	3		3
Future-oriented	3	5	5	5	4	3	4	4		5
Holistic	2	4	3	4	3	4	4	3		4
Integrative	3	4	5	5	4	3	4	4		2
Intuitive	4	3	2	3	3	4	4	4		5
Process-oriented	4	3	5	3	3	4	3	3		2
Reflective	3	4	5	5	4	3	4	3		3
Synthetic	3	4	4	3	3	3	3	3		3
Systematic	4	3	5	5	4	4	4	4		3
Visionary	2	4	3	4	3	3	3	2		4
Self-evaluation										
Analytical	4	4	5	5	4	4	5	4	4	4
Creative	3	3	4	3	4	4	3	3	3	4
Conceptual	4	3	3	3	3	3	4	4	4	4
Context-oriented	4	4	4	5	3	5	4	4	5	5
Divergent	4	3	4	4	4	3	5	3	2	5
Flexible	4	3	5	4	3	5	4	4	3	5
Future-oriented	4	3	4	4	3	4	5	4	4	5
Holistic	5	3	4	4	4	4	5	4	4	4
Integrative	5	3	3	3	4	4	4	3	4	5
Intuitive	5	3	3	2	2	3	3	3	3	5
Process-oriented	4	4	3	3	4	3	4	4	2	4
Reflective	4	3	2	3	5	4	4	3	4	2
Synthetic	4	2	3	4	4	4	4	4	3	5
Systematic	4	3	2	5	3	5	4	4	4	3

Visionary	4	3	3	3	3	4	2	3	4	4
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	Averages of the evaluated core concepts [Own Representation]									
Individual ID	1	2	3	4	5	6	7	8	9	10
Analytical	3.75	4.00	4.75	4.75	4.00	4.00	4.34	4.00	3.67	4.00
Creative	3.00	3.75	3.50	3.75	3.67	4.00	3.00	3.00	4.33	4.00
Conceptual	4.00	3.25	3.75	3.75	4.00	3.50	3.67	3.50	3.67	3.67
Context-oriented	4.25	3.75	4.00	4.75	3.67	4.00	4.33	4.25	4.67	4.00
Divergent	3.00	3.50	3.50	3.50	4.00	3.00	3.67	3.00	3.33	4.00
Flexible	3.50	3.25	4.00	3.75	3.67	4.00	3.67	3.50	3.67	4.00
Future-oriented	3.75	4.00	4.25	4.75	3.67	3.5	4.33	4.00	4.67	4.67
Holistic	4.00	4.00	4.25	4.00	3.67	4.00	4.33	4.25	4.00	4.00
Integrative	4.00	3.25	4.00	4.00	4.00	3.50	4.00	4.25	4.67	3.67
Intuitive	4.50	2.75	3.00	3.50	3.00	3.50	4.00	3.25	4.00	4.33
Process-oriented	4.00	3.25	4.25	4.00	4.00	3.50	4.00	3.50	3.00	3.00
Reflective	4.25	3.25	4.00	4.5	4.67	3.50	4.00	3.50	3.67	3.00
Synthetic	3.50	3.25	4.00	3.75	3.67	3.50	3.67	3.75	4.00	4.00
Systematic	4.25	3.50	4.25	4.75	4.00	4.50	4.00	4.25	4.00	3.00
Visionary	3.00	3.50	3.25	4.25	3.33	3.50	2.67	3.00	4.67	4.00

Appendix H

Cognitive Processing Profile Assessment Results of the Ten Perceived as the Strongest Strategic Thinkers at E.ON [Own Representation]

Individual ID	1	2	3	4	5	6	7	8	9	10
Position (Department=1; Function=2; Specialist=3)	2	3	3	3	3	2	2	2	1	2
Gender (1=male;0=female)	1	1	0	1	1	0	1	1	1	0
Level of Work										
Current	3	3	2	4	1	4	2	4	4	3
Potential	3	4	3	4	2	4	3	4	4	4
Information Processing Competencies										
Analysis	49	59	57	71	24	71	35	56	70	62
Rule Orientation	64	72	50	82	31	79	65	58	85	76
Categorizing	70	68	63	70	39	69	60	66	74	75
Quick Inside Learning	57	66	50	73	29	73	58	71	65	73
Integration	57	70	60	71	41	72	57	73	75	67
Complexity	62	64	59	73	30	74	49	71	68	65
Logical	63	65	58	70	38	75	43	70	72	63
Verbal Conceptualization	45	58	64	55	62	69	36	55	56	60
Memory	63	75	51	71	41	58	73	55	78	65
Memory strategies	52	69	62	74	41	75	63	50	71	68
Exploring	58	66	61	76	37	69	58	73	76	69
Gradual Improvement	74	65	66	60	29	75	63	61	60	61

Learning										
Judgement	58	61	55	62	21	64	59	70	61	64
Cognitive Style Preferences										
Random	3	2	3	1	14	1	4	1	1	1
Logical	13	11	8	14	5	13	8	12	12	9
Holistic	8	6	13	6	7	8	6	11	8	6
Metaphoric	1	4	11	3	12	4	2	3	4	3
Analytical	7	7	7	12	1	9	3	6	9	8
Integrative	9	13	12	8	9	10	11	14	11	10
Reflective	11	12	6	11	8	12	9	13	10	5
Structured	12	14	14	13	4	7	10	8	14	13
Explorative	4	3	2	4	11	3	1	4	3	4
Learning	14	10	10	9	2	14	13	9	7	12
Intuitive	5	9	9	5	10	6	12	7	6	11
Quick Insight	6	5	4	10	3	11	7	10	5	14
Memory	10	8	5	7	6	5	14	5	13	7
Impulsive	2	1	1	2	13	2	5	2	2	2

Appendix I

Spearman's Rank Correlation Between the Number of Votes and the Core Concepts by Sandelands and Singh (2017) in the 360-Degree Semi-structured Telephone Interview [Own Representation]

	Correlation Coefficient	Significance (2-sided)	N
Analytical	-.709	0.22	10
Creative	.281	.431	10
Conceptual	-.232	.519	10
Context-oriented	.424	.222	10
Divergent	-.618	.057	10
Flexible	.069	.849	10
Future-oriented	.130	.721	10
Holistic	-.097	.789	10
Integrative	.386	.270	10
Intuitive	.508	.134	10
Process-oriented	-.637	.048	10
Reflective	-.370	.292	10
Synthetic	.456	.185	10
Systematic	.069	.849	10
Visionary	.321	.366	10

Appendix J

Table illustrating the summary of the discussion.

Data-analysis	Identified item	Theory in relation to strategic thinking
Significant correlation between the number of votes and the cognitive styles	Trial and error	Hindering (Cognadev UK Ltd., 2016)
Significant correlation between the number of votes and the rates in the 360	Analytical	Either/Both (Cognadev UK Ltd., 2016) Core concept (Sandelands & Singh, 2017)
	Process orientation	Core concept (Sandelands & Singh, 2017)
Significant correlation between the number of votes and the information processing styles	Complexity	Facilitating (Cognadev UK Ltd., 2016)
	Categorizing	Not facilitating (Cognadev UK Ltd., 2016)
	Pragmatic	Either/Both (Cognadev UK Ltd., 2016)
	Logical reasoning	Facilitating (Cognadev UK Ltd., 2016)
	Exploration	Either/Both (Cognadev UK Ltd., 2016)
Significant differences between the E.ON sample and the normative sample	Categorizing	Not facilitating (Cognadev UK Ltd., 2016)
	Structuring	Hindering (Cognadev UK Ltd., 2016)
Differences between the E.ON sample and the contrast sample	Holistic	Facilitating (Cognadev UK Ltd., 2016) (Sandelands & Singh, 2017)