



LUND UNIVERSITY  
School of Economics and Management

# Developing Strategic Thinking

A study on the impact of the Master's programme International Strategic  
Management & a Metacognitive Awareness Module

By

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“Intuition does not come to an unprepared mind” – Albert Einstein

## **Abstract**

The purpose of this study is to improve the understanding of an educational intervention's impact on the development of strategic thinking. To get a better understanding, this study examined the impact of the one-year Master's programme International Strategic Management (ISM) and a metacognitive awareness module, on business students' ability to think strategically. To comprehend this impact, this study 1) used the Cognitive Process Profile (CPP) as the assessment tool for measuring the strategic thinking capability, and 2) examined the intention of ISM and the metacognitive awareness module to develop strategic thinking. In total 29 participants were non-randomly assigned to three sample groups and underwent an assessment of their strategic thinking capability at three different moments throughout the academic year. Within this research, quantitative data obtained from the CPP was analysed using nonparametric statistics, and coalesced with qualitative data, obtained from the ISM syllabi and in-depth interviews. The findings of this study did not show any significant improvement of students' overall ability to think strategically, neither after ISM nor after the participation in the metacognitive awareness module.

**Keywords:** Analytical Thinking, Cognitive Process Profile, Developing Strategic Thinking, Educational Intervention, Metacognitive Awareness, Strategic Thinking, Systems Thinking

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# Table of Contents

<b>1</b>	<b><i>Introduction</i></b> .....	<b>1</b>
1.1	Background & Problem Formulation.....	1
1.2	CPP: A Brief Introduction.....	2
1.3	Motivation for Choosing International Strategic Management.....	2
1.4	Purpose & Research Question.....	3
1.5	About This Study.....	4
1.6	Thesis Outline.....	5
<b>2</b>	<b><i>Literature Review</i></b> .....	<b>6</b>
2.1	Strategy.....	6
2.2	Strategic Planning vs. Strategic Thinking.....	7
2.3	Brain Functioning.....	8
2.4	Schools of Thought.....	9
2.5	Coherent Lack of Consensus.....	11
2.6	Defining Strategic Thinking.....	12
2.7	Application of Distinct Thinking Modes.....	13
2.8	Developing the Ability of Strategic Thinking.....	13
<b>3</b>	<b><i>CPP: A Theoretical Juxtaposition</i></b> .....	<b>21</b>
3.1	General Presentation of the CPP.....	21
3.2	Cognadev Information Processing Model.....	22
3.3	Suitable Work Environment Model.....	24
3.4	Cognitive Styles.....	25
3.5	Established Conceptual Framework.....	26
<b>4</b>	<b><i>Methodology</i></b> .....	<b>29</b>
4.1	Research Philosophy.....	29
4.2	Research Approach and Time Horizon.....	30
4.3	Research Design.....	30
4.4	Sampling Process.....	31

4.5	Research Questions .....	33
4.6	Data Collection.....	34
4.7	Data Analysis .....	36
4.8	Quality of the Research.....	39
5	<i>Findings</i> .....	41
5.1	Sample Group Demographics.....	42
5.2	CPP Findings .....	44
5.3	Correlations CPP – Demographics .....	48
5.4	Intention of the Educational Interventions .....	49
5.5	Development of Strategic Thinking .....	53
6	<i>Discussion</i> .....	54
6.1	ISM and its Misguided Emphasis on Analytical Thinking .....	55
6.2	Systems Thinking within ISM .....	55
6.3	ISM’s Strategic Thinking Blueprint .....	55
6.4	The (In-)efficiency of Educational Interventions.....	57
6.5	The Impact of the Metacognitive Awareness Module .....	58
6.6	Other Learnings from This Study.....	59
7	<i>Conclusion</i> .....	59
7.1	Research Aims and Objectives .....	60
7.2	Practical Implications.....	61
7.3	Limitations .....	61
7.4	Future Research.....	62
	<i>References</i> .....	63
	<i>Appendices</i> .....	68

## List of Tables

Table 3. 1 Overview Information Processing Competencies.....	24
Table 5. 1 Overview population ISM .....	42
Table 5. 2 Overview participants sample group 1 .....	42
Table 5. 3 Overview participants sample group 2 .....	43
Table 5. 4 Overview participants sample group 3 .....	43
Table 5. 5 Overview all participants of sample group 1, 2 & 3.....	43

## List of Figures

Figure 2. 1 Strategic thinking and its two distinct thinking modes .....	12
Figure 2. 2 Relationship analytical- and systems thinking .....	12
Figure 3. 1 The CPP Information Processing model .....	23
Figure 3. 2 SST Work Environment Model.....	25
Figure 3. 3 CPP Cognitive Styles. ....	26
Figure 3. 4 Conceptual Framework .....	27
Figure 3. 5 Conceptual Framework including (sub) research question(s).....	28
Figure 5. 1 Histogram distribution and median SST current – groups .....	44
Figure 5. 2 Histogram distribution and median SST potential – groups .....	45
Figure 5. 3 Scatter plot combined SST work environment scores.....	45
Figure 5. 4 Line graph information processing competencies of three sample groups .....	46
Figure 5. 5 Line graph cognitive style preferences – three sample groups.....	48
Figure 5. 6 Outline of the ISM courses.....	52
Figure 5. 7 Conceptual framework reminder.....	53

## **List of Abbreviations**

<b>BA</b>	Business Administration
<b>CPP</b>	Cognitive Process Profile
<b>F</b>	Female
<b>FI</b>	Finance & Economics
<b>IPC</b>	Information Processing Competencies
<b>ISM</b>	International Strategic Management
<b>LUSEM</b>	Lund University School of Economics and Management
<b>M</b>	Male
<b>MAM</b>	Metacognitive Awareness Module
<b>O</b>	Other
<b>SST</b>	Stratified Systems Theory



# 1 Introduction

## 1.1 Background & Problem Formulation

In a fast-changing, uncertain and dynamic environment, *strategic thinking* is crucial for creating a sustainable competitive advantage (Heracleous, 1998; Graetz, 2002), as it serves as a lever to create knowledge in every activity of an organisation (Timuroglu, Naktiyok & Kula, 2016). Within these highly competitive markets, strategic decision making is seen as the base for superior business performance and continued business growth, originating after strategic thinking has occurred (Mason, 1986; Zabriskie & Huellmantel, 1991; Eisenhardt, 1999; Bonn, 2001; Essery, 2002; Nuntamanop, Kauranen & Igel, 2013).

Central in both superior business performance and maintaining sustainable competitive advantages, are the human resources of an organisation (Barney & Wright, 1998). As previous research has pointed out that strategic thinking is a developable skill (Easterby-Smith & Davies, 1983; Bonn, 2001; Graetz, 2002; Goldman, 2007; Sloan, 2017), any organisation is well advised to equip their employees with strong strategic thinking competencies and foster the *development of strategic thinking*.

More strategic thinkers on multiple levels of an organisation will allow a better response to changes within the business environment and govern upcoming challenges (Tavakoli & Lawton, 2005; Casey & Goldman, 2010). Contemporary literature (Easterby-Smith & Davies, 1983; Kunc, 2012; Weaver, 2014; Bratianu, 2015) considers education as a way of developing the ability to think strategically. Thus, it is of high interest to examine the efficiency of *educational interventions* on the ability to think strategically, to provide organisations with guidance in their search for superior business performance.

Despite the acknowledged importance of strategic thinking and the possible role of education in the development of this ability, the impact of business education on the development of strategic thinking has only received mediocre academic attention. The development of strategic thinking has so far only been conducted through self-evaluation. Besides self-assessments there have been no conclusive means of measuring the strategic thinking ability. Nonetheless, this study makes use of the test called *Cognitive Process Profile*, henceforth CPP. The reason for choosing the CPP as the preferred tool is because of its unique amalgamation of practical usability and non-reliance on self-assessment (Cognadev Technical Manual, 2016). Since the

CPP is used as the primary tool of measurement and thus circumvents self-assessment, this study takes a pioneering role in the academic pursuit of externally measuring strategic thinking. Hence, making a valuable contribution to the understanding of the effect of educational interventions on business students' ability to think strategically.

## **1.2 CPP: A Brief Introduction**

The Cognitive Process Profile (CPP), developed by Dr. Maretha Prinsloo from Cognadev LTD, is a validated & licensed-for-use computer simulation exercise, tested over 200.000 individuals worldwide (Cognadev Technical Manual, 2016). The problem-solving assessment measures a person's intellectual functioning using constructs related to cognitive preferences such as "creativity or complexity" (Cognadev Technical Manual, 2016, p.8). The participant's behaviour on their ability to explore, link, structure, transform, remember, learn and clarify information in an unfamiliar environment is monitored by means of advanced mouse tracking algorithms. The participants are expected to solve eight different increasingly complex stories by interpreting the message that is conveyed by symbols on multiple type of cards (Cognadev Technical Manual, 2016). While solving the stories, the CPP externalises and tracks thinking at a micro level and subsequently results in an automatically generated report in which the results are integrated algorithmically (Cognadev Technical Manual, 2016). This report contains the score on the overall ability to think strategically as well as an assessment of the underlying components of strategic thinking.

## **1.3 Motivation for Choosing International Strategic Management**

As part of an ongoing research project at Lund University School of Economics and Management that intends to break new ground on the impact of education on strategic thinking, this research project conducted a study among the one-year "International Strategic Management" Master of Science in Business and Economics (60 ECTS), hereafter called ISM. ISM is taught at Lund University School of Economics and Management and builds on previous undergraduate studies within Business Administration (Lund University, 2018a).

The choice for ISM was made based upon several aspects:

1. The Master programme intends to provide its graduates with "the latest thinking in comparative international strategic management [...] with a thorough understanding of strategic thinking" (Lund University, 2018b, p.1).

2. The programme aims at providing breadth as well as depth in the main fields of strategic management
3. The programme intends to provide the tools needed for a career bearing a managerial or even as a senior organisational leader.
4. The programme is meant to prepare its students for the increasing challenges within a more and more competitive business environment.
5. The structure of the programme intends to be on the latest stage of the art combining the academical perspective with business practice.

(Lund University, 2018a; Lund University, 2018b).

With its given structure and its intentions, ISM is seen as a suitable representation of an educational intervention which particularly aims on the development of strategic thinking. The programme acknowledges the previously mentioned, increasingly growing competition and the resulting need for organisations to foster strategic thinking in order to gain or uphold their competitive advantage. Furthermore, the programme is addressing students which have already made experience within business education during their undergraduate studies. Also, does the programme aim at students who pursue a career within strategic management, both on a more general managerial level but also within the range of senior executives. Hence, those students can be assumed of being willing to learn the ability to think strategically. The outline of the programme intends to be on the intersection of academical perspectives and business practice which aligns also with the mutual interest of both the business - as well as the academical side in exploring the development of strategic thinking.

Furthermore, this research will include the analysis of a metacognitive awareness module as another type of educational intervention and its impact on strategic thinking. The module is designed to improve the ability to think strategically by increasing the metacognitive ability (Kleppestø, 2018) and will be presented in more detail in chapter 5.4.

## **1.4 Purpose & Research Question**

The purpose of this study is to improve the understanding of an educational intervention's impact on the development of strategic thinking. Because the CPP is used as the primary measurement tool, strategic thinking is referred to as the ability to make decisions in an unfamiliar context, utilising elements of systems thinking.

To gain a deeper understanding, a study on the ISM master programme and a metacognitive awareness module are conducted through which the *main research* question is answered:

*“Does the educational intervention ISM or the Metacognitive Awareness Module improve the ability to think strategically, as measured by the CPP?”*

The main research question is supported by two *sub-research questions*:

1. *“Does ISM or the Metacognitive Awareness Module, alter the underlying components of strategic thinking, as measured by the CPP?”*
2. *“Is either ISM or the Metacognitive Awareness Module intended to develop the ability to think strategically, as measured by the CPP?”*

## **1.5 About This Study**

This research started with an extensive review of the literature in the field of strategy and the exploration of the term strategic thinking. As a next step, literature, focusing on the concept of developing strategic thinking, was assessed. Next, the CPP’s theoretical foundation was compared to the findings of the literature review which concluded in the researchers’ conceptual framework.

For the data collection 29 enrolled ISM students (total population = 44 enrolled students) were non-randomly participated in a CPP assessment. The participants underwent the CPP assessment at three different moments in time. One group at the start and one group at the end of the academic year, plus an additional group who participated in the metacognitive awareness module at the end of the year. Besides the CPP assessment, the ISM master programme was examined. Hereby the research focused on trying to identify how the programme helps to develop strategic thinking and which elements of the programme may be accountable for this development. Likewise, the metacognitive awareness module was examined. The master programme was analysed making use of the programme syllabus and the syllabi of the nine courses being taught during the programme. Subsequently, an in-depth interview with the programme director was conducted, relating to the findings of the literature review and for crafting additional information on the ISM programme. The metacognitive awareness module was examined based on an interview with the responsible module instructor, conducted by Adler & Midson, (2018) who are participating in the same research project from Lund University as this research degree project, and a presentation (Kleppestø, 2018).

Once the programme and the metacognitive awareness module were analysed and cross-checked on the previously defined elements of strategic thinking, a nonparametric statistical analysis was executed in order to find patterns or correlations in the development of strategic thinking between the three sample groups. The findings of this study make a valuable contribution to the academic pursuit of trying to understand the effect of educational interventions on the ability to think strategically.

## **1.6 Thesis Outline**

### Chapter 1: Introduction

The first chapter of this thesis gives insight into this study and serves the purpose of describing the context of strategic thinking. After the background and problem formulation, the primary tool of measurement, CPP, is briefly introduced. Next, the motivation and purpose of this study are presented, followed by the presentation of research questions.

### Chapter 2: Literature Review

The second chapter reviews previous literature. The chapter commences with elaborating upon the term strategy and presents the two underlying thinking modes of strategic thinking: analytical thinking and systems thinking. By reviewing the literature, a definition of the term strategic thinking could be defined. As a third, the chapter addresses the development of strategic thinking and presents activities which are ought to foster the development.

### Chapter 3: Methodology

The third chapter presents the methods utilised for this study and the related methodological choices that were made. The chapter elaborates upon which research philosophy the researchers follow, how the research was being approached and how data was collected and analysed. The chapter closes with the discussion of the quality of the research, highlighting the aspects of reliability and validity.

### Chapter 4: CPP: A Theoretical Juxtaposition

The fourth chapter focuses on comparing the findings of the literature review with the CPP and serves the purpose of providing the reader with a thorough understanding of the measurement tool. A general presentation of the CPP is given before the CPP's three underlying models are elaborated on. The chapter closes with the presentation of a conceptual framework, on which the analysis of the data collected will draw upon.

### Chapter 5: Findings

The fifth chapter incorporates the findings of this study. First, the demographics of the three sample groups are presented. After the demographics, the findings follow the structure of the conceptual framework by presenting the findings on the CPP. Next, correlations between the CPP findings and the demographics are presented, followed by the analysis of the educational interventions ISM and the metacognitive awareness module. Lastly, the research questions are answered on the hand of the above described findings.

### Chapter 6: Discussion

The sixth chapter discusses the findings of this study and elaborates on several aspects, which may serve as explanations for the obtained results. The current design of ISM and its implications for the development of strategic thinking, the impact of the metacognitive awareness module as well as other learnings from this study are being discussed.

### Chapter 7: Conclusion

The seventh and last chapter summarises and concludes the study with its most important findings on the hand of the research aims, and objectives. Furthermore, the limitations of this study are presented, and practical implications are elaborated on. The chapter closes by presenting suggestions for future research.

## **2 Literature Review**

This chapter starts by reviewing the literature on the roots of strategy and the corresponding scattered field of stances towards this topic, grouped in two sides: strategic planning and strategic thinking. Subsequently, the two underlying thinking modes: analytical thinking and systems thinking are presented. Once the thinking modes are elaborated on, the brain functioning of strategic thinking and Henry Mintzberg's "Ten Schools of Thought" (1990) are being reviewed. By reviewing the literature, a definition of the term strategic thinking could be made. Finally, the literature review inquires previous research on the development of strategic thinking.

### **2.1 Strategy**

The term strategy, formerly known as *strategía* or *strategiké*, roots back to the ancient Greeks. The antiquity originally used the word strategy to describe the skills of the general (Heuser, 2010) and defined strategy as oscillating between different positions and perspectives relative to a particular purpose (Sloan, 2017). In 1832, Carl von Clausewitz book *On War* (Howard &

Paret, 1976) set another definition of strategy, that distinguished between strategic vision and strategic execution (Haycock, Cheadle & Bluestone, 2012).

Since 1832, the modern literature on strategy and in particular strategic thinking has developed significantly with Henry Mintzberg spearheading the field of strategy for the last decades. In 1990 Henry Mintzberg, who is acknowledged as prodigious researcher in the field of strategic management research (Kippenberger, 1998), presented the ten schools of thoughts (Mintzberg, 1990). Although the year of publication may indicate an inevitable outdatedness, the ten schools are still perceived as a very good illustration of the disparate strands of thinking on the field of strategy (Kippenberger, 1998). Within this illustration, the ten schools of Mintzberg as well as many other publications follow a same disparity in the highly discussed field of strategy with two major overarching sides: *strategic planning and strategic thinking*.

Each side has its own approach towards strategy, perceives the world explicitly different and links these thoughts to a specific physical mindset. The side of strategic planning considers strategy as a systematic and logical application of strategies, whereas the side of strategic thinking sees it as an innovative creative visionary process (Haycock, Cheadle & Bluestone, 2012). Each side represents one side of the spectrum on strategy and clearly distinguishes between two thinking modes: *analytical thinking and systems thinking* (Harrison & Bramson, 1982; Senge, 1991; Ackoff, 1994; Bartlett, 2001). These distinct thinking modes as well as the interlinkage towards the overarching sides (strategic planning and strategic thinking) are presented in more detail in paragraph 2.5. The upcoming paragraphs will first further elaborate on these two perspectives, the specific associated brain functioning and the link to Henry Mintzberg's ten schools of thought.

## **2.2 Strategic Planning vs. Strategic Thinking**

To fully understand the thinking process of strategy formation, the two sides strategic planning and strategic thinking are elaborated on. Within the two sides, the two clearly distinct underlying thinking modes: analytical and systems thinking emerge.

### **2.2.1 Strategic Planning**

The left side of the spectrum on strategy that is highlighted is strategic planning, which erupted in the second half of the 20th century, pioneered by Frederick Taylor, Igor Ansoff, Peter

Selznick, Ken Andrews (Mintzberg 1994), and was later on helmed by gurus like Michael Porter. The theorists of strategic planning perceive strategy as science (O`Shannassy, 1999) and assume the challenge of setting strategic direction primarily as being analytic and linear. According to Porter (1987) strategic planning is a systematic discipline with the predominant focus to break down a certain goal into steps. Heracleous (1998) continues on this notion and distincts strategic planning as a convergent and analytical thinking process. Graetz (2002) embroidered on Heracleous`s (1998) as in the way strategic planning helps to realize, support and integrate strategies into businesses. This argument is supported by Hussey (2001) which argues that strategic planning guides creative strategic thinking when making strategic decisions.

### **2.2.2 Strategic Thinking**

The other side of the spectrum on strategy is strategic thinking and commenced out of the strategic planning field in the 1970s, when a shift towards strategy formation occurred within organisations (Wilson, 1994; Heracleous, 1998). In light of this development, strategy is no longer perceived as science, but as art (O`Shannassy, 1999). Mintzberg (1994) describes strategic thinking as a way of thinking that utilizes intuition and creativity. Heracleous (1998) continues on the notion of Mintzberg and describes strategic thinking as synthetic and divergent through which creative, ground-breaking, unplanned strategies emerge.

Hamel & Prahalad (1989) link strategic thinking to their concept of strategic intent which occurs when there is a “direct intuitive understanding of the future direction” (O`Shannassy, 1999, p. 17). This perception is in line with Ohmae`s (1982) thoughts on strategic thinking being “the ultimate nonlinear thinking tool” (Ohmae, 1982, p.13). Bonn (2001; 2005) sees strategic thinking as systems thinking with creativity and a vision for the future. Liedtka (1998) continues on the timeliness and argues that strategic thinking encompasses seeing the big picture while simultaneously considering the interrelation between its pieces and linking future with the present and past. Goldman (2007) defines the purpose of strategic thinking as “to discover novel, imaginative strategies [...] to envision potential futures significantly different from the present” (Goldman, 2007, pp.75-76).

## **2.3 Brain Functioning**

As can be seen from the paragraphs above, each side considers strategy and its formation from a different angle with two distinct underlying thinking modes: analytical thinking & systems



thinking. These thinking modes require and are triggered by separate parts of the brain. This brain-split theory was proved first by Roger Sperry, 1981 Nobel Prize winner in Medicine, and later on acknowledged by leading academics in the field of psychology (Harrison & Bramson, 1982; Senge, 1991; Ackoff, 1994; Bartlett, 2001). Sperry won the Nobel Prize by proving a split between activities in the left- and the right-side of the brain (1961; 1967; 1968). The paragraphs below elaborate on how the split-brain theory spilled over to the field of strategy with authors describing the interlinkage of brain activity to strategy.

### **2.3.1 Left-side Brain**

Graetz (2002) refers to the split in brain activity and its underlying thinking processes by disparting the left-side of the brain from the right-side in being the most important for strategic planning, as it triggers logic, analysis and attention to detail. The left side of the brain comprehends strategy formulation as deliberate and intended (Mintzberg & Hunsicker 1988) and perceives the future as predictable and measurable (Liedtka, 1998). Heracleous (1998) describes this brain functioning as single-loop learning (Argyris & Schön, 1978) which involves thinking within existing assumptions and taking actions based on a fixed set of potential action alternatives.

### **2.3.2 Right-side Brain**

Graetz (2002) continues her view on strategic thinking by describing the right brain style, that is perceived to be the thinking component of strategy making: creative, inquisitive, intuitive, entrepreneurial. Besides this thinking style, Graetz (2002) and Goleman (1998) mention emotional intelligence as stimulating to the capacity of strategic thinking. Heracleous (1998) further elaborates on strategic thinking as a double-loop learning process that challenges existing assumptions and develops new and innovative solutions, leading to potentially more appropriate actions (Argyris & Schön, 1978).

## **2.4 Schools of Thought**

With the distinct underlying thinking processes, linked to the separate parts of the brain, the aforementioned Ten Schools of Thought (Mintzberg, Ahlstrand & Lampel, 1998) are tested towards this separation in the upcoming paragraphs.

### 2.4.1 Prescriptive Schools

Mintzberg, Ahlstrand and Lampel (1998) describe the first three schools: design-, planning- and positioning school as prescriptive because the schools focusing on “how strategies should be formulated” (Mintzberg, Ahlstrand & Lampel, 1998, p. 5) through “formal planning” and “analytical positioning” (Mintzberg, 1990, p.171). This assumes that the future is predictable and can be measured. Hence, a link can be drawn to the thinking mode analytical thinking. The design school sees strategy formulation as a result of a conscious and *deliberate* thought process (Kippenberger, 1998). The planning school perceives strategy formation in the same integral and formal light and breaks down the planning process into *discrete steps* each supported by *analytical* tools and techniques (Kippenberger, 1998). The last school which is perceived to be linked to analytical thinking is the positioning school that comprehends strategy formulation still as a *conscious controlled process* and builds upon the design school with generic strategies - named positions, such as cost leadership or differentiation (Kippenberger, 1998).

According to Mintzberg, Ahlstrand and Lampel (1998) the three above mentioned schools all suffer from certain fallacies that assume: that the entirety of an organization can be understood by a single strategist, that the future is predictable, and strategies arise from a narrow-limited portfolio of positions. These delusions make the prescriptive approach towards strategy in business rather inapplicable, hence Mintzberg, Ahlstrand & Lampel (1998) suggested the six descriptive schools of thought (discussed in the next paragraph), that do seek to describe what actually happens in business, rather than prescribe an ideal scenario.

### 2.4.2 Descriptive Schools

Mintzberg, Ahlstrand & Lampel (1998) describe the next six schools: entrepreneurial-, cognitive-, learning-, power-, cultural- and environmental school, as descriptive schools because of the focus on “how strategies do get made” (Mintzberg, Ahlstrand & Lampel, 1998, p.6). The descriptive schools see the future as *unpredictable*, hence are considered to be linked to the thinking mode systems thinking (Rialp-Criado, Galván-Sánchez & Suárez-Ortega, 2010; Luo, Sun & Wang, 2011). This particular study aligns the most with the entrepreneurial, cognitive and learning schools and thus those will be elaborated on in more detail. The latter three schools are discerned as irrelevant because these schools touch upon aspects of strategy that are not examined in the analysis of this research.

First, the entrepreneurial school regards strategy as *vision* which is based on experience and intuition and has a sense of *long term direction* (Kippenberger, 1998). Second, the cognitive school sees strategy as thinking and describes the strategy process as a cycle of *reflection* and action in the sphere of the human mind and cognition (Mintzberg, Ahlstrand & Lampel, 1998). Mintzberg, Ahlstrand & Lampel (1998) describe this cycle in which strategists *learn by experience* that result in specific actions which in turn shape their experience. Third, is the learning school that sees strategy as learning and describes strategy formation as an “*emergent process*” from individual or group sources that take decisions that lead to repeated actions.

### **2.4.3 Configuration School**

The last and final school Mintzberg, Ahlstrand and Lampel (1998) mention is the configuration school which is a combination of the nine previous mentioned schools (Mintzberg, Ahlstrand & Lampel, 1998). However, the configuration school distinct itself from the other nine school of thoughts in the way it is contingent on the *time* and *circumstances* of the *environment* on what approach towards strategy is most appropriate (Kippenberger, 1998). Hence, this school is not perceived linkable neither to analytical thinking nor to systems thinking.

Taking all Mintzberg’s (1990) Schools of Thought in consideration a similar parity can be noticed in terms of the two underlying thinking modes towards strategy: analytical and systems thinking. The following paragraphs will inquire into this parity and will try to clarify the scattered field of strategy and its underlying thinking processes.

## **2.5 Coherent Lack of Consensus**

Contemplating the extensive elaboration on the scattered field of opinions and stances concerning analytical thinking and systems thinking above, it can be concluded that there is a lack of consensus on the underlying thinking modes of strategy. This dichotomy in literature did not lead to choosing one side of the spectrum in order to explain the concept of strategic thinking, but rather helped in understanding the wide array of concepts by analysing the contradicting views. Even though literature distinct between strategic planning and strategic thinking, this distinction should not be misunderstood. When referring to the concept of strategic thinking one should not let oneself being misled by the labels strategic planning and strategic thinking. Not considering analytical thinking (linked to the strategic planning side) as part of strategic thinking, would mean to only acknowledge one side of the coin.

The wide array, visualized in figure 2.1, summarizes the previously-discussed contradicting stances on for example strategy originating from extensive linear analyses (Porter, 1987) versus creative intuitive thinkers (Mintzberg, 1994; Mintzberg, Ahlstrand & Lampel, 1998), or strategy formations being convergent & deliberate (Heracleous, 1998) - versus divergent & emergent processes (Mintzberg, Ahlstrand & Lampel, 1998). The brain functioning follows a similar split (Sperry, 1961; 1967; 1968), consisting of the right-side and left-side brain each utilized for different thinking styles, learned through distinct learning processes: single-loop vs. double-loop learning (Argyris & Schön, 1978). Taking all the contradicting views together, the lack of consensus suddenly appears to comprehend into two “camps”, labelled as the abovementioned distinct thinking modes: analytical thinking and systems thinking.

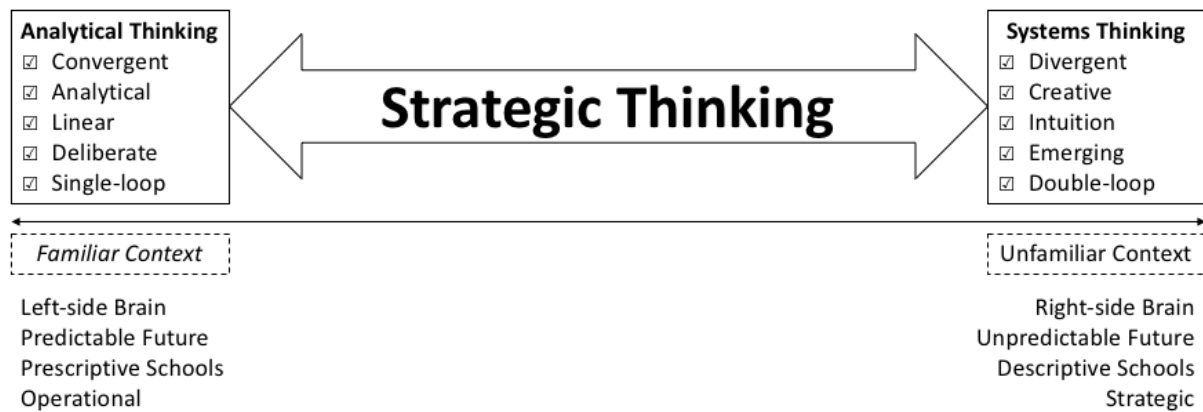


Figure 2. 1 Strategic thinking and its two distinct thinking modes (Own compilation)

## 2.6 Defining Strategic Thinking

The figure above helps to elucidate the vague concept of strategic thinking. Both thinking modes are interrelated, wherein analytical thinking serves as the core (see figure 2.2) from which systems thinking emerges (Heracleous, 1998; Graetz, 2002; Sloan, 2017). The two thinking modes are of limited value without the other for strategies to be successful (Heracleous, 1998). This means that using only analytical thinking is limiting the capability of dealing with complex, unfamiliar situations, whereas pure systems thinking is limiting the capability of operationalising the strategies (Porter, 1987; Mintzberg, 1994; Heracleous, 1998; Graetz, 2002). Additionally, analytical thinking is more useful in a familiar context in which the future is

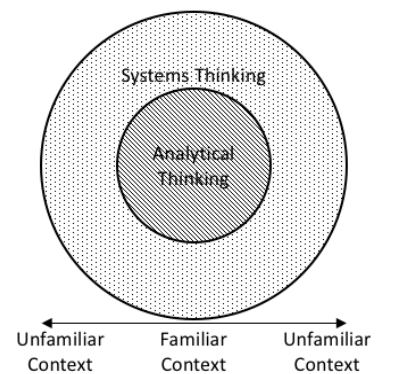


Figure 2. 2 Relationship analytical- and systems thinking (Own compilation)

predictable, whereas systems thinking is favourable in unfamiliar contexts with an unpredictable future (Hamel & Prahalad, 1989; Liedtka, 1998; O'Shannassy, 1999; Bonn, 2001). This means that with an increasing degree of complexity and unfamiliarity, the value of systems thinking increases and the utility of analytical thinking decreases.

It is important to note that this study examines, via the CPP, a participant's strategic thinking capabilities in an unfamiliar environment. Hence, in such a context the capabilities of systems thinking are of greater importance for strategic thinking to be successful. Thus, this research project from now on refers to strategic thinking as the ability to make decisions in an unfamiliar context relying on the elements of systems thinking.

## **2.7 Application of Distinct Thinking Modes**

With strategic thinking defined as the ability to make decisions in an unfamiliar context relying on elements of systems thinking, it is required to elaborate on the ability to apply distinct thinking modes in more detail. Fisher (1998) points out that metacognition forms a crucial part in understanding your own thinking and the application of it. Fisher (1998) constructed his definition of metacognition upon Flavell (1979), one of the leading figures in metacognition research, who termed the phrase 'thinking about your own thinking' as referring to metacognition. Ambrose et al. (2010) defined metacognition in a more recent book as a process of planning, monitoring and evaluating your thinking. As explained in the paragraphs above, different contexts require the application of different thinking modes in which metacognition can play an important role for an individual to learn and apply these distinct thinking modes. The next section will expatiate on the development of strategic thinking wherein the role of metacognition on the development of strategic thinking will be elaborated on as well.

## **2.8 Developing the Ability of Strategic Thinking**

After the prior section of the literature review focuses on identifying different elements of strategic thinking, this section is exploring how the ability to think strategically can be developed. Research has pointed out various different ways to foster the development process of strategic thinking.

1. One perspective being described within previous research, takes the stance of seeing strategic thinking as something that can only develop over time. Meaning that progressing maturity and experiencing life increases the ability to think strategically.

2. The second perspective considers strategic thinking as a learnable skill which can be fostered when conducting certain activities such as business education, games, mindfulness meditation or engagement in arts. As this research focuses on the impact of educational interventions, this second perspective will be divided into two fields: educational interventions and non-educational activities.

### **2.8.1 The Role of Experience in Developing Strategic Thinking**

As mentioned above, one perspective on developing strategic thinking is through experience. Goldman (2007) found that expertise in strategic thinking stems from 10 specific types of experiences. These experiences range from:

1. *personal* experience such as the received education or general work experience, to experience based on
2. *interpersonal* interaction, such as being challenged by a key colleague e.g. one's direct superior, to experience made from an
3. *organisational* level of interaction, such as participating in the strategic planning process, to experience made based upon a manager's interaction with the
4. *external environment* of an organisation, such as constantly dealing with the threat of being taken over, which pushes executives to continuously undertake a rethinking process, hence strengthening the ability to think strategically (Goldman, 2007).

Mintzberg (1994) considers the ability to think strategically as evolving over time as patterns of making reoccurring decisions ultimately become strategies (Mintzberg, 1994). In alignment with this view, Weaver (2014) sees the application of knowledge which is based upon *previous experience* as the lever of developing strategic thinking. As a way of doing so, projects or action learning, which are emphasising an individual's ability to learn from prior experience, could serve as a vehicle in facilitating the development of strategic thinking (Easterby-Smith & Davies, 1983).

Dragoni, Vankatwyk and Tesluk (2011) present a positive relation between the strategic thinking competency and an individual's experience built from having *different roles and responsibilities* throughout a career. Also, do they point out a strong relation between cognitive ability and strategic competency. Individuals are likely to lean towards jobs which are more complex when they are possessing a higher cognitive ability and this behavioural pattern in turn impacts the development of strategic thinking.

Later Dragoni et al. (2014) undertook a study being more specific towards global work experience. Their research was able to find a positive relationship between the ability to think strategically and *global work experience* (mainly of working overseas as an expatriate). In addition, did their research show that this positive relationship can be amplified when individuals are not only working in a foreign country but also being exposed to a certain *cultural distance* (Dragoni et al, 2014).

The literature field which focuses on the development of strategic thinking through experience is unified in the opinion that strategic thinking can be developed over time when experience is gained. Whereas Goldman (2007) and Mintzberg (1994) on the one side point out that the development of strategic thinking is facilitated when a continuous repetition of those experiences takes place, Dragoni, Vankatwyk and Tesluk (2011) do take a different stance as they see strategic thinking as being enhanced when experiencing different roles. In summary, research has pointed out different ways of facilitating the development of strategic thinking through experience: Projects or action learning (Easterby-Smith & Davies, 1983), different types of experiences (Goldman, 2007; Cahill & Filho, 2009), taking different roles (Dragoni, Vankatwyk & Tesluk, 2011) or by working in a foreign country with a distant culture (Dragoni et al., 2014).

### **2.8.2 Developing Strategic Thinking Through Educational Interventions**

This section will address the development of strategic thinking through educational interventions. In the following, business education and the focus on metacognitive awareness are presented as proxies for educational interventions.

#### Business Education

A second way of developing the ability to think strategically is through business education. Various research projects examined the efficacy of different elements of business education on the development of strategic thinking and their findings are presented below.

#### *Call for Changes in the Business Curricula*

A study by Bratianu (2015) conducted research on 5000 undergraduate and graduate students within Business & Economics in Romania, identifying how strategic thinking can be developed within business education. A questionnaire consisting of 47 items was used to assess values for four previously outlined dimensions of strategic thinking: time, complexity, uncertainty and innovation. The major findings of this study showed that the fundamental models of business

management being taught within business education programs need to be supplemented. Courses within “change management, entrepreneurship, decision making in conditions of uncertainty, knowledge management, critical thinking and strategic thinking” (Bratianu, 2015, p.426) are needed if strategic thinking is to be further developed within business education. Hence, this research questions the efficacy of contemporary business education. Nevertheless, the research does agree on the possibility to develop strategic thinking, under the precondition that *business curricula* are being adjusted if they are to be of help when developing strategic thinking.

### *Lectures & Case Studies*

Another study, done by Easterby-Smith and Davies (1983), discusses different methods in which strategic thinking can be taught. As a first way of doing so Easterby-Smith and Davies (1983) point out that *lectures* should only aim on informing about strategic thinking and the main components of strategic planning, as a lecture itself is only effective for teaching information but not for changing attitudes (Easterby-Smith & Davies, 1983). This point later got confirmed by Bratianu (2015).

A second way is through *case studies*, that can help to deal with the complexity of strategic plans, which ultimately becomes helpful when those plans are later to be implemented. Hereby, it is to be mentioned that when using case studies within business education it may also occur that a person’s tendency to question the underlying assumptions of a strategic plan decreases. This happens as participants in case studies aim at conforming to assumptions and constraints made by the person providing the case in order to find the expected “best solution” instead of critically assessing a case with different assumptions (Easterby-Smith & Davies, 1983). Thus, this behaviour has a negative impact on the strategic thinking ability, as the divergent process (Mintzberg, Ahlstrand & Lampel, 1998) through which novel strategies can emerge is limited.

In contrast to Bratianu’s (2015) need for change in business education curricula, Weaver (2014) acknowledges that business education programs have developed over time as they are not only placing focus on lectures, reading tasks or written assignments anymore. Moreover, they also emphasise *group works, case studies, computer simulations and discourse* which facilitates the development of strategic thinking. Yet, Weaver (2014) criticises business education for lacking in the application of learnings in real-life. The author underlines the importance of assignments within business education that enable students to apply their previously acquired knowledge in real-world situations. To have an impact on the strategic thinking ability, such assignments



need to be designed in a way that they make students “observe and analyse global events for their cascading impact upon the business environment” (Weaver, 2014, p.115). Since students will have to come up with sequential outcomes under different conditions, they will strengthen their intuition in finding the cause and effect of those outcomes (Weaver, 2014). As strategic thinking is seen as a way of thinking that utilises intuition (Mintzberg, 1994) a focus on sequential outcomes, serving as a proxy for the *real-life practice* which Weaver (2014) is calling for, supports the development of the ability to think strategically.

### *Modelling Reality to Develop Strategic Thinking*

In alignment with Weaver (2014), Kunc (2012) addresses the importance of understanding causal relationships (cause and effect) for the ability to think strategically. To facilitate this, he suggests making use of *system dynamics*, a modelling and simulation tool. Systems dynamics fosters systems thinking and hence strategic thinking as it facilitates the understanding of how strategies may perform over time, which interferences may occur, and which activities may improve the performance and implementation of the strategy (Kunc & Morecroft, 2007).

Furthermore, *scenario planning* can serve as a favourable tool for stimulating strategic thinking as it incorporates the systematic examination of underlying drivers of a system influenced by trends and uncertainty (Schoemaker, 1991). In doing so, scenario planning can help developing strategic thinking because it can provide different suitable responses to possible future outcomes, assisting the formation of creative thinking (Heracleous, 1998.) Strategic thinking is vital in a complex environment (Graetz, 2002). Hence, the ability of not only imagining a sufficient number of possibilities of how the future might look but also including the next step in thinking about corresponding actions represents a great strength.

In a similar way, *crisis simulation* can support the teaching of strategic thinking. Such a simulation model is of advantage as it allows an effective teaching of students about the dynamic of strategic interactions as participants needed to develop strategy in a fast-changing unpredictable simulated environment, while only being given limited information (Hunzeker & Harkness, 2014).

Yet, simulations are also seen counterproductive towards the development strategic thinking, as the usage of simulations can result in a behaviour where participants tend to start competing with other participants while neglecting to learn the underlying principles. Furthermore, can simulations be criticised because their setup is likely to be derived from circumstances which are familiar to the designer of the simulation. This hinders the development of strategic thinking, as strategic thinking encompasses facing events which occur in an unknown

environment (Easterby-Smith & Davies, 1983). Hence, if simulations are designed on the base of previous experience they cannot meet the criteria of representing an unfamiliar context and being of novel nature.

### Metacognitive Awareness

In previous research, *metacognition* was pointed out as an important element of strategic thinking (Cunningham, 2008). Also, does it have implications for the process of developing strategic thinking. Metacognitive awareness can help students in becoming “more conscious of what they are learning and more strategic in their learning process” (Zhao & Mo, 2016, p.78). Furthermore, metacognitive awareness aids students in solving problems successfully and increases their performance in education (Zhao & Mo, 2016). *Reflection* plays a vital role for metacognition as it involves “to step back from action based on mechanical thinking and to reflect on what would really be appropriate in the circumstances” (Cunningham, 2008, p.6). This is of importance for strategic thinking as the choice of the suitable thinking mode (analytical vs. systems thinking) highly depends upon the given context (familiar vs. unfamiliar).

To foster metacognition and hence the development of strategic thinking, education needs to establish an *auxiliary social environment*. This can be established through letting students take on different roles (such as scientist, teacher or historian), which are associated with a specific kind of thinking and through providing an environment where metacognition is being valued. (Lin, 2001). Such an approach allows individuals to explore what they normally think and what other alternatives there could be (Cunningham, 2008).

### **2.8.3 Developing Strategic Thinking Through Non-Educational Activities**

After the role of experience and educational interventions is elaborated on above, the next section will focus on activities which occur in a non-business-related context but are ought to foster strategic thinking. As such, the engagement in arts, mindfulness meditation or playing games are considered possible ways to develop strategic thinking.

#### Games

Games can help developing a better ability of strategic thinking, solving problems in a more creative way and can furthermore present a supportive role within education (Marone, Staples

& Greenberg, 2016). In line with this view games also represent an opportunity to receive inexpensive instant feedback on actions, a more engaging way of learning, an aid for individuals to reflect on own actions, a way of testing different scenarios, and an easily undertaken way of teaching to a large audience group - all factors facilitating the development of strategic thinking (Reeves & Wittenburg 2015). Besides their proposed suitability for the development of strategic thinking, the usefulness of games has also been criticised as there is the possibility that strategic skills, being acquired in a game, face the difficulty of being transferred into a different context. As strategic thinking requires the recognition of patterns in a specific context, games might not be suitable as they cannot provide that particular context needed (Easterby-Smith & Davies, 1983). Individuals might learn while playing games but if one is not able to make use of those learnings in a different context, games cannot contribute to the development of strategic thinking.

### Mindfulness Meditation

Talbot-Zorn & Edgette (2016) consider mindfulness meditation as a lever to increase strategic thinking. Mindfulness incorporates creating awareness for how the thinking process is responding unawaringly to internal and external stimuli. This awareness ultimately helps breaking such potentially misleading habitual patterns and for strategic thinking this is of importance because it allows a full exploration of assumptions and external factors. It becomes less likely that “input” of importance is unconsciously not been considered, which ultimately increases the quality of a strategic decision (Talbot-Zorn & Edgette, 2016).

### Engagement in Arts

Another way of enhancing the ability to think strategically can be the engagement in arts (Sloan, 2017). ‘First-hand learning’ through doing arts oneself (i.e. playing an instrument or painting) as well as learning through ‘second-hand experience’ meaning having knowledge about the fields of art (i.e. reading a novel, listening to an orchestra) are ways of being exposed to “nonlinear, a-rational thinking, divergent and convergent thinking, critical inquiry, critical dialogue and critical reflection” (Sloan, 2017, p.245), which all can enhance strategic thinking.

## **2.8.4 Learning to Think Strategically as an Iterative Process**

Various researchers presented different concepts to foster the development of strategic thinking which all follow an iterative process (Bennis & Goldsmith, 1997; Goldman, 2007; Casey & Goldman, 2010; Sloan, 2017).

Sloan (2017) sees learning to think strategically as a process which consists out of the three stages: (1) preparation, followed by (2) experience and (3) reevaluation. (1) The *Preparation Stage* deals with an affective element, being a reason and willingness to learn based on “passion, conviction, and emotion derived from past experience (Sloan, 2017, p.69), and a cognitive component, meaning that one has “specific information and clear analyses, and data needs to be gathered and tested on a continuous basis” (Sloan, 2017, p.69). In order to be facilitating in its role for the learning of strategic thinking the preparation stage requires both components, even though the affective element is less tangible and seemingly harder to teach. (2) The *Experience Stage* relates to experiential learning and incorporates a cycle of challenging, testing, reflecting and ultimately refining on current or past experience. (3) The *Reevaluation Stage* includes reflection to validate learning, but it is also the phase in which “new perspectives about priorities and relevance are generated” (Sloan, 2017, p.85). If one is aware of such a sequential three-step approach and understands the process, it aids to the disciplined development of the habits needed for strategic thinking (Sloan, 2017).

A similar approach is proposed by Bennis & Goldsmith (1997) who vote for a six-step process which assists to develop strategic thinking. Beginning with knowing where to start and setting a goal of where to finish - exploring various possible routes - deciding upon the best route - planning the resources and means to take that route - examining the route map objectively - and finally finding passion and commitment and starting the route.

Likewise, Goldman (2007) proposed a three-step planning process in which “(1) understanding where you are (2) determining where you want to be and (3) detailing how to get there” (Goldman, 2007, p.79) is helpful in developing strategic thinking. To be of success all those three steps require information and experience (Goldman, 2007) which links to Sloan’s (2017) call for a preparation stage (information) and experience stage (experience).

Casey & Goldman (2010) established another learning model of strategic thinking. In their model a “dynamic, interactive and iterative experiential learning process” (Casey & Goldman, 2010, p. 170) is responsible for the development of strategic thinking. Their four major activities of strategic thinking: *Scanning, Questioning, Conceptualising, and Testing* can be further developed by experiences made. These experiences can either build upon already present knowledge or reflect an add-on of novel knowledge, but they have to be considered valuable for the individual as otherwise the experiences will not contribute to the development of strategic thinking (Casey & Goldman, 2010).

### **3 CPP: A Theoretical Juxtaposition**

With an extensive analysis of the literature on strategic thinking in place, this chapter focuses on comparing the obtained findings from the literature with the CPP and its three underlying theoretical models. Every model is first elaborated in more detail before a link is tried to be drawn to the findings of the literature review. Once the comparison with the underlying models is made, the conceptual framework, developed for the analysis of this study, is presented.

As described in the previous chapter, strategic thinking requires both thinking modes: analytical- and systems thinking to be successful in both a familiar and an unfamiliar environment. Herein, each thinking mode has a preferable context in which utilised best. Preferably, there would be a tool testing both thinking styles simultaneously in a familiar and unfamiliar context to fully explore a participant's thinking capabilities and potential. However, to the researchers' best knowledge such a tool is non-existent.

As for this research project, strategic thinking is referred to as the ability to make decisions in an unfamiliar context utilising elements of systems thinking. The CPP is considered as the best suitable tool to assess the strategic thinking competency because it is "assessing an individual's cognitive processes and characteristic features when faced with an entirely novel cognitive task" (Cognadev Technical Manual, 2016, p.28) and describes "the cognitive response tendencies a person shows in dealing with unfamiliar environment" (Cognadev Technical Manual, 2016, p.20).

#### **3.1 General Presentation of the CPP**

The CPP is a "computerised simulation exercise which [...] provides clear feedback [...] regarding the cognitive capabilities and preferences of the individual, including his/her stylistic orientation, specific, information processing competencies, learning potential and an ideal work environment for the individual" (Cognadev Technical Manual, 2016, p.8). The CPP provides information on 14 information processing competencies, five suitable work environments, and a ranking of 14 cognitive styles. All findings of the CPP are being automatically calculated based on an underlying algorithm and a detailed feedback report is automatically generated (Cognadev Technical Manual, 2016). In the upcoming paragraphs, the theoretical foundations to which the CPP data refers to, are scrutinized in detail.

### 3.2 Cognadev Information Processing Model

The Cognadev Information Processing model, see figure 3.1, consists of six information processing elements:

1. Memory
2. Exploration
3. Analysis
4. Structuring/Integration
5. Transformation
6. Metacognition

which are organised as a “holon” (Cognadev Technical Manual, 2016, p. 24) (See figure 3.1 below). The Information Processing model describes the complete thinking process: (1) At the core, thinking depends upon an individual’s ability to store and recall knowledge and experiences made. Hence, this refers to an individual’s *memory* capacity. (2) Besides the ability to recall knowledge or information, the thinking process is dependent on the ability to draw on a frame of reference, which can provide guidance in the process of exploring (*exploration*) a certain field/problem and identify its relevant aspects. (3) Subsequently, there is a need for *analysis*. This includes the systematic, accurate and precise identification of the main parts out of which a certain field consists and their interrelationships. (4) *Structuring* the information through conceptualising and formulating contributes to making sense of the accumulated information in a coherent way. (5) As a new field/problem may differ from a former one, its context may require a certain *transformation* to generate a novel approach into this new field or problem (Cognadev Technical Manual, 2016).

The CPP considers the first five thinking elements as highly integrated and not following a strict linear nature. In contrast they are guided by (6) *metacognition*. This means that an individual’s self-awareness which is based upon internalised criteria such as the relevance, comprehensiveness, purposefulness or contextualisation of the information involved, is guiding the thinking process (Cognadev Technical Manual, 2016).

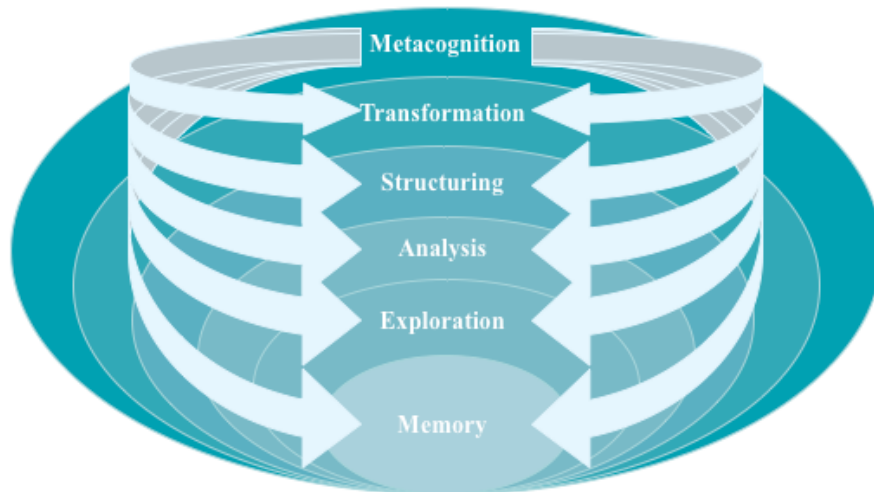


Figure 3. 1 The CPP Information Processing model  
(Cognadev Technical Manual, 2016, p.25)

The CPP tests a participant’s cognitive processes in an unfamiliar context and considers the three information processing elements *Structuring*, *Transformation* and *Metacognition* as facilitating strategic thinking (Cognadev Technical Manual, 2016), see table 3.1. As Cognadev describes these three cognitive processes as utilizing intuition, creativity and synthesizing information in unfamiliar and unpredictable contexts (Cognadev Technical Manual, 2016), a link to the earlier defined systems thinking can be drawn. Thus, the importance of these three elements grows with an increasing degree of complexity and unfamiliarity. Due to the unfamiliar testing environment of the CPP, the impact of analytical thinking (as previously defined in the literature review) on strategic thinking could not be measured.

Each of the six thinking processing elements is driven by multiple sub-processes. Those are cumulated in 14 underlying processing competencies (table 3.1). The CPP considers particularly the processing competencies: *Integration*, *Complexity*, *Logical Reasoning*, *Verbal Conceptualisation*, *Judgement* and *Quick Insight Learning* as facilitating strategic thinking (Cognadev, 2018).

Table 3.1 Overview Information Processing Competencies Boxed competencies are facilitating strategic thinking (Cognadev, 2018)

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

### 3.3 Suitable Work Environment Model

Next, the Suitable Work Environment model is elaborated in more detail. This model draws upon the Stratified Systems Theory, henceforth SST, of Elliot Jaques (1986). The SST of Jaques (1986) originally distinguished between seven strata's (levels of task complexity and cognitive mechanism used in the work environment), Prinsloo however, refined the strata to five broader elements in the Suitable Work Environment model (Cognadev Technical Manual, 2016, p.14). The elements, see figure 3.2, range from pure operational, diagnostic accumulation, tactical strategy, parallel processing to pure strategy (Cognadev Technical Manual, 2016, p.11).

1. **Pure Operational:** Being less interested in intellectual complexity, vagueness & cognitive challenge
2. **Diagnostic Accumulation:** Being quite analytical, but still showing a need for structure in the form of technical guidelines and/or previous experience
3. **Tactical Strategy:** No longer relying on linear processing, preferring to view issues in terms of tangible systems and the interaction between observable system elements
4. **Parallel Processing:** Having the capacity to accommodate novelty, vagueness, dissonance and fragmentation, which all require integration and innovation
5. **Pure Strategy:** Having the tendency for strong intuitive and holistic "big picture" thinking

(Source: Prinsloo, 2017)



In the five elements of the work environments, the degree of complexity and uncertainty is increasing the further one moves from pure operational towards pure strategy. Whereas the operational environment emphasises structure, certainty and detail, the strategic environment does require the ability to deal with chaos, uncertainty and dynamic thinking. Hence, an individual's ability to think strategically increases the further one moves towards pure strategy (Cognadev Technical Manual, 2016).

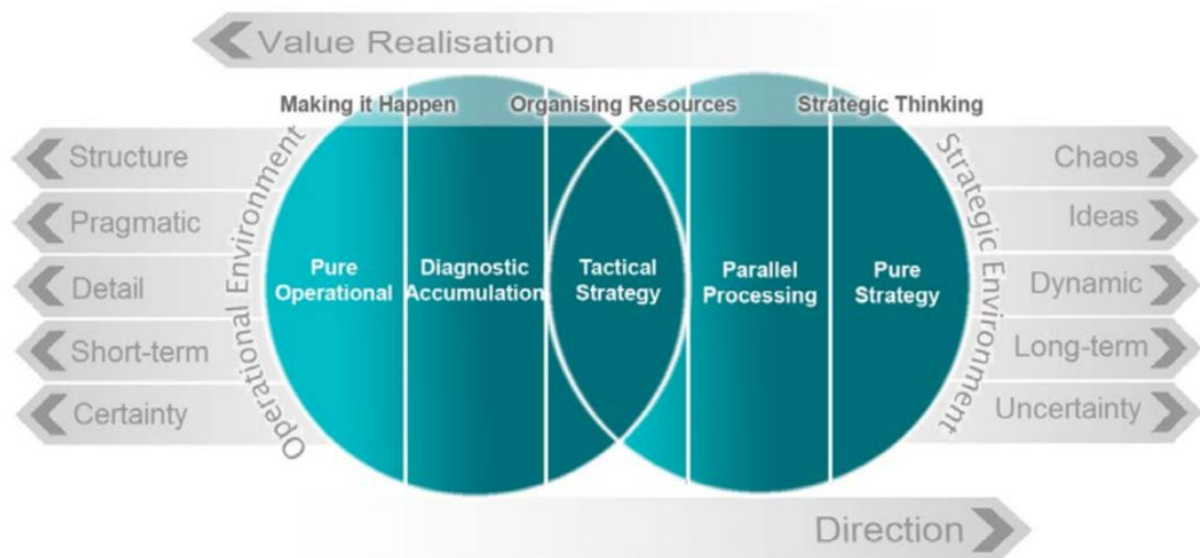


Figure 3. 2 SST Work Environment Model (Cognadev technical manual, 2016, p.12)

The *current work environment* indicated by the CPP mirrors the environment in which a participant is most comfortable in applying his/her thinking capabilities and in which the participant may be the most productive. Besides the current work environment, the CPP indicates the *potential work environment* where the participant has the potential to apply his/her thinking capabilities. This indication is based upon a participant's stylistic preference and thinking capabilities which the participant has, but which he/she does not use systematically (Cognadev Technical Manual, 2016, p.12). The two scores are considered as the CPP's approximate for an individual's ability to think strategically.

### 3.4 Cognitive Styles

As a third measurement, the CPP assesses the cognitive response tendencies of an individual, referred to as 14 different cognitive styles. The cognitive styles are examined because a development process, such as an educational intervention, aims at changing an individual's preferences (Stein Kleppestø, personal communication, 9 May 2018). As the CPP assessment occurs in an unfamiliar environment the cognitive styles are considered to be the broad cognitive response tendencies when having to deal with unfamiliar information (Cognadev

Technical Manual, 2016). In the CPP report each of the individual's styles are ranked in which the individual applies the cognitive styles. Both, the styles being the most dominant and the ones applied the least, are presented with a description and the according implications (Cognadev Technical Manual, 2016). The 14 cognitive styles identified by the CPP are outlined below.

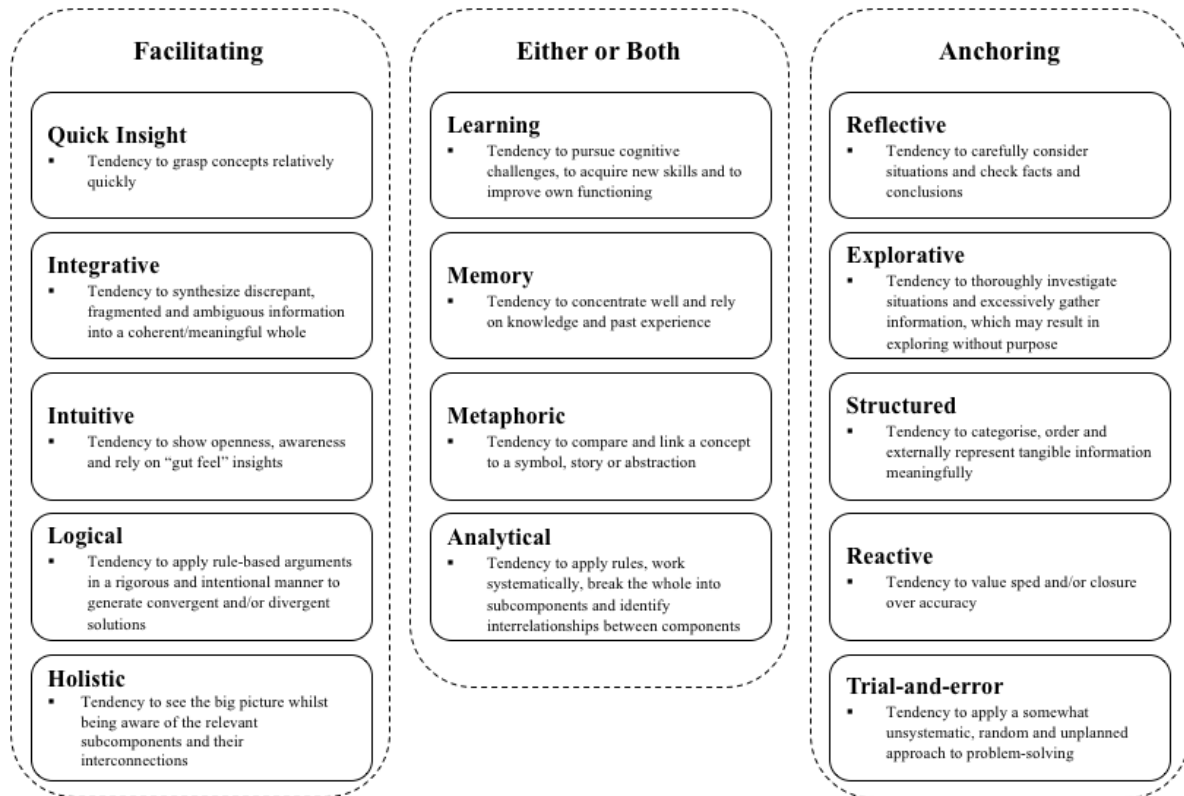


Figure 3.3 CPP Cognitive Styles. Cognitive styles on the left have a focus on a strategic context, the cognitive styles on the right have a focus on operational context, and the cognitive style middle have a focus on both strategic- and operational context. (Cognadev, 2018)

As can be seen from the table above, the five cognitive styles *Quick Insight*, *Integrative*, *Logical*, *Intuitive*, and *Holistic* are considered to facilitate strategic thinking, as they are focused on a strategic context. The next four cognitive styles *Learning*, *Memory*, *Metaphoric* and *Analytical* are seen as both strategic - and operational focused (Cognadev, 2018). The last five cognitive styles *Reflective*, *Explorative*, *Structured*, *Reactive* and *Trial-and-Error* are focused on an operational context, hence are explained as anchoring the ability to think strategically.

### 3.5 Established Conceptual Framework

Heretofore, the literature review in the previous chapter allowed the researchers to define the concept of strategic thinking, which served as the base for the theoretical comparison between strategic thinking and the theoretical models underlying the CPP. The focal point of this

paragraph will be the presentation of the conceptual framework which will be used for structuring the analysis in the findings.

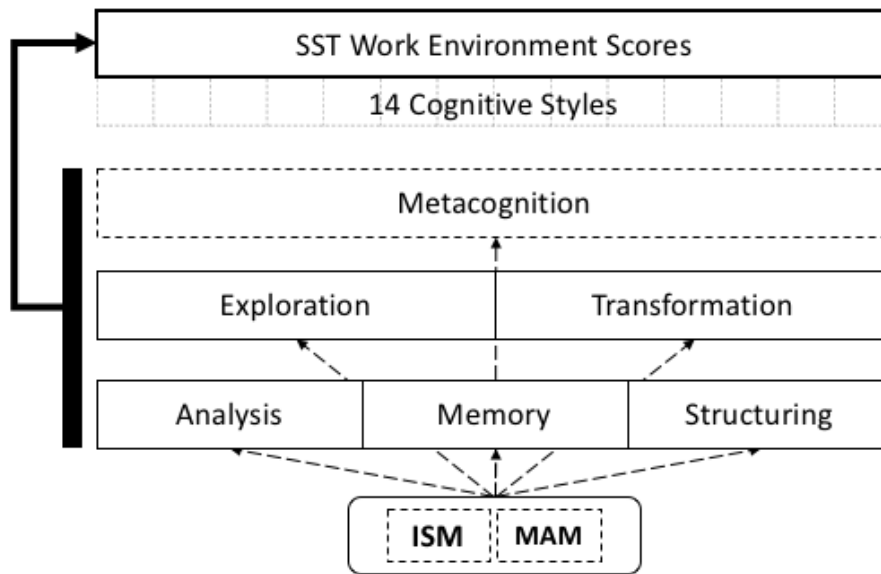


Figure 3.4 Conceptual Framework (own compilation)

Figure 3.4 visualises the conceptual framework, established by the researchers. The conceptual framework is a combination of the findings derived from the literature review, together with the CPP underlying theoretical framework. The mid-section of the conceptual framework consists of the six different elements derived from the Cognadev Information Processing model. The six elements are chosen because of their central role for the Suitable Work Environment model and the 14 cognitive styles (Cognadev Technical Manual, 2016). Please note that only the six elements are visualised, although are driven by the 14 underlying information processing competencies (see table 3.1).

As explained earlier in chapter 3.2, metacognition serves a different role in the thinking process in comparison to the other five elements, hence visualised with a dotted-line box overarching the other five elements. The three variables *structuring*, *transformation* and *metacognition* are considered to facilitate strategic thinking (Cognadev Technical Manual, 2016) as they increase in importance for the ability to deal with complex, unfamiliar contexts. The reason for still focussing on all six elements and not only consider structuring, transformation and metacognition, is to study the impact of the educational intervention on all elements. All six elements together lead to the current & potential SST work environment scores and the related 14 cognitive style preferences, visualised with the arrow on the left side.

The bottom consists of the educational intervention ISM and the metacognitive awareness module (referred to as MAM) that are examined in this research project. Both educational interventions are incorporated within the framework as this study tries to understand the impact of educational interventions on the ability to think strategically. The non-educational activities, explained in chapter 2.8.3, are not within the direct scope of this research project, hence not included in the conceptual framework. Although not included in the conceptual framework, the non-educational activities were analysed in the in-depth interview with the programme director.

The entire framework aims on helping the researchers to answer the main research question (“Does the educational intervention ISM or the Metacognitive Awareness Module improve the ability to think strategically, as measured by the CPP?”). The two sub-research questions which support the main research are represented in the conceptual framework (see figure below).

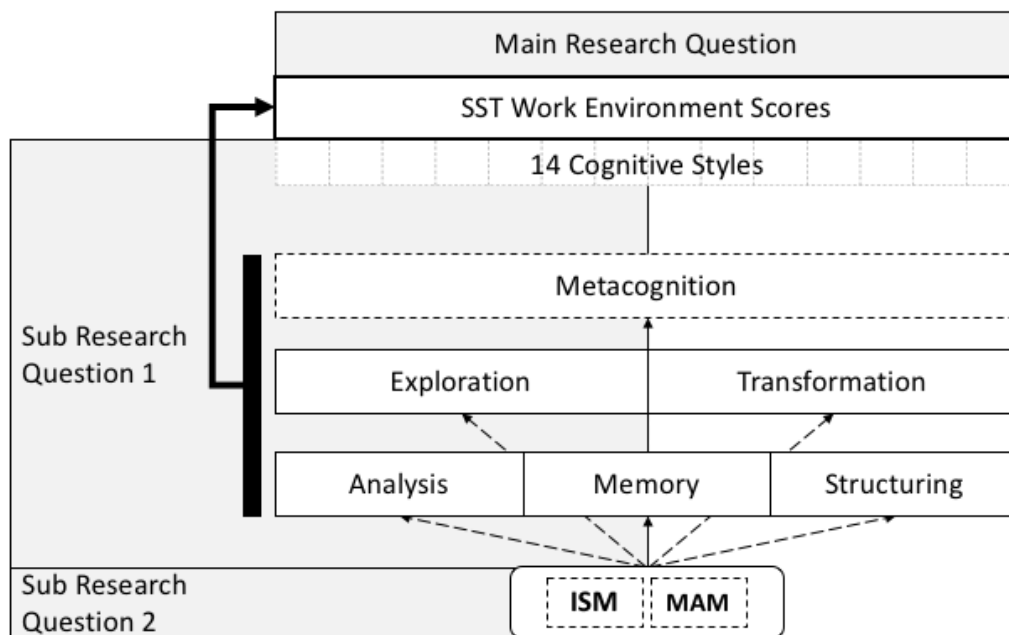


Figure 3. 5 Conceptual Framework including (sub) research question(s)(own compilation)

As can be seen, the conceptual framework is split up in two sections each linked to a specific sub-research question. The mid part of the conceptual framework aims on answering the first sub-research question 1 (“*Does ISM or the Metacognitive Awareness Module, alter the underlying components of strategic thinking, as measured by the CPP?*”) through examining the six information processing elements and its 14 underlying information processing competencies.

The lower section of the model aims on answering the second sub-research question (“*Is either ISM or the Metacognitive Awareness Module intended to develop the ability to think strategically, as measured by the CPP?*”) that expatiate on the intentions of the educational interventions ISM and the metacognitive module.

The main research question is visualised on top of the conceptual framework as it is based on the findings for the CPP scores of the SST current - & potential work environment scores. As can be seen in the figure above, the SST work environment scores, as well as the 14 cognitive style preferences are derived from the six elements, visualised with the arrow on the left. The main research question, together with the two sub-research questions will be answered and presented lastly in the findings chapter after all the results are presented.

## **4 Methodology**

The methodology chapter provides an overview of the methods used throughout this study. This chapter consecutively touches upon the research philosophy, - approach & time horizon and - design. Next, the sampling process and the sample groups are described. Subsequently, a description of the methods used for answering the research questions is given. Additionally, a brief elaboration on the collection methods used for the literature review is provided. Subsequently, the data collection and - analysis methods used for the CPP assessment, in-depth interview and syllabi analysis are elaborated upon. Lastly, the quality of the research will be assessed by the means of its validity and reliability.

### **4.1 Research Philosophy**

As there is no single reality that can be discovered when exploring the field of strategic thinking and its development, this study adheres to the philosophy of relativism (Easterby-Smith, Thorpe & Jackson, 2015). The multitude of perspectives and dependence on the viewpoint of the observer on strategic thinking, highlighted in the literature review, confirmed the

philosophical stance. The epistemological stance within this study can best be described as detached constructionist. As the CPP is used as the primary measurement tool, the researchers were enabled to measure the strategic thinking capability objectively without influencing the participant's test results. Although a detached constructionist stance is aimed for during this study, the researchers may have influenced the participants because of their close relationship to the population of this research project, explained in paragraph 4.4. The detached constructionist stance is in line with the relativist point of view about the multitude of different realities, hence required the researchers to gather multiple perspectives through a mixture of qualitative and quantitative methods (Easterby-Smith, Thorpe & Jackson, 2015).

## **4.2 Research Approach and Time Horizon**

The research was carried out in a deductive manner as its meanings and relationships are derived from a pre-existing theory where after being tested by the hypotheses supporting the research questions (Saunders, Thornhill & Lewis, 2009). The reason for choosing a deductive approach was the aim of this study that tried to explain the relationship between an educational intervention and the elements of strategic thinking, as measured by the CPP. By following five sequential stages of a deductive research progress (Robson, 2002), a structured approach was assured.

Due to a limited ten-week timeframe, the study was carried out as a cross-sectional study (Saunders, Thornhill & Lewis, 2009). Although most of the tasks for study were carried out during this timeframe, the control group was tested outside of this period in order to guarantee a correct control group. The assessment of the other two test groups, an in-depth interview and analyses of the syllabi and the metacognitive awareness module were carried out within the ten-week window.

## **4.3 Research Design**

Within this study multiple types of data coalesced which required a set of distinctive methods. Easterby-Smith, Thorpe and Jackson (2015) refer to such a design as a mixed-method research design. The combination of (1) quantitative data retrieved from the CPP assessment & (2) the qualitative data from the in-depth interview with the ISM programme director & syllabi as well as information about the metacognitive awareness module, required mixed-methods to corroborate the research findings.

Within mixed-method research design, a pre- / post testing design (Easterby-Smith, Thorpe & Jackson, 2015) was used, as the intention of this study is to collate three groups of students: One group at the start and one group at the end of the academic year, plus an additional group who participated in the metacognitive awareness module at the end of the year. Since the underlying concept of the CPP is to measure a person's ability of dealing with unfamiliar situations, a participant could not take part in the CPP test twice, as the unfamiliar context would become familiar when doing a CPP test a second time. This testing effect (Easterby-Smith, Thorpe, & Jackson, 2015) is minimized by ensuring the participants one-off participation in the CPP test, as well as participants were asked to not disclose their experience to fellow students, and testing results were only being distributed in May 2018 after the final testing phase was completed.

Because this testing method conducts tests before and after the participants were going through the educational intervention ISM or the metacognitive awareness module, the researchers were able to draw conclusions about causality. However, it must be noted that the difference in pre- and post-test groups could be affected by more events than solely the ISM programme like experience, maturation or other non-educational activities. In other words, it is not possible for the researchers to completely eliminate any alternative explanations between the three groups from the data other than the educational intervention ISM or the metacognitive awareness module, thus compel the researchers to be prudent about conclusions to be drawn. In order to understand any alternative explanations, the quantitative data was supplemented with qualitative data.

#### **4.4 Sampling Process**

Because of the study only aiming for a very specific population: 44 students enrolled in ISM 2017/ 2018 at Lund University, the probability of the population being sampled was known. Hence, a simple random sampling strategy was the desired sampling strategy (Easterby-Smith, Thorpe & Jackson, 2015). Despite all efforts made, the research project was not able to follow the desired simple random strategy mainly due to enthusiastic students on the one side, who were willing to find out more about their strategic thinking capabilities, and unwillingness to participate of some members of the population on the other side. Additionally, time-constraints for carrying out the research as well as limited time frames for participating in the CPP tests affected the sampling process. The limited time frame for conducting the CPP assessment was caused due to the necessity for the presence of a licensed facilitator, which did not allow any

remote CPP assessments. This might also have prevented parts of the population to participate in the research (i.e. not being available at the certain times when the CPP assessments were offered). Additionally, some of the students initially agreed on participating, but did not appear when the testing was conducted (one student) or dropped out during the metacognitive awareness module (two students). Because of the described factors affecting the sampling process, the sampling process can best be described as *convenience sampling process* in which the researcher's close relationship in the population affected the sampling process.

#### **4.4.1 Sample Groups**

When starting the research project, the initial intention was to cover the whole population of 44 ISM students, who would be randomly assigned to the three different samples of (roughly) the same size (2x 15 participants and one sample group with 14 participants). Due to the above described difficulties this was not achieved. Ultimately, 29 students, divided over three sample groups participated in the CPP assessment at different moments throughout the academic year. The pre-test group referred to as the control group was tested in the beginning of the ISM programme, the post-test group consists of two groups, both tested at the end of the ISM programme and are referred to as experimental group 1 & 2. The control group was tested on November 24th and consisted of 10 students. The six students of the first experimental group underwent the CPP assessment at April 5th after they participated in a metacognitive awareness module (total duration 12 hours). Experimental group 2 was tested during six different testing time slots between April 17th - 19th and consisted of 13 students. A detailed description of the sampling process is given in the appendix (appendix A) and an overview of the three sample groups is given below:



Table 4. 1 Overview Sample groups (own compilation)

Group	Student	Age	Gender	Previous Areas of Study	
1	1	23	2	Law and Marketing	GROUP 1 (Testing date: November 24th, 2017) Control Group
1	2	23	1	Business Administration	
1	3	22	1	Business Administration	
1	4	26	2	Finance & Economics	
1	5	24	1	Business Administration	
1	6	24	2	Business Administration	
1	7	25	2	Business Administration	
1	8	24	1	Business & Economics	
1	9	26	1	Business Administration	
1	10	25	2	Business Administration	
2	11	25	2	Business Administration	GROUP 2 (Testing date: April 5th, 2018) Experimental Group 1
2	12	25	2	Business Administration	
2	13	23	1	Finance	
2	14	26	1	Business Administration	
2	15	23	1	Business Administration	
2	16	24	1	Business Administration	
3	17	26	2	Business Administration	GROUP 3 (Testing date: April 17-19, 2018) Experimental Group 1
3	18	27	1	Business Administration	
3	19	26	1	Business Administration	
3	20	24	1	Business Administration	
3	21	25	1	Business Administration	
3	22	25	1	Marketing	
3	23	26	2	International Economics	
3	24	26	2	Business Administration	
3	25	22	1	Business Administration	
3	26	26	2	Finance & International Relations	
3	27	23	1	Business Administration	
3	28	25	2	Business Administration	
3	29	27	2	Marketing Communication	

## 4.5 Research Questions

**Main research question:** “Does an educational intervention, such as the Master programme ISM or the Metacognitive Awareness Module, improve the ability to think strategically, as measured by the CPP?”

The main research question was answered based on the findings for the CPP scores of the SST current - & potential work environment scores. The findings were compared on the hand of the distribution (Kruskal-Wallis test) and medians (Independent-Samples Median test) of the work-environment scores for the three sample groups.

**Sub-research question 1:** “Does ISM or the Metacognitive Awareness Module, alter the underlying components of strategic thinking, as measured by the CPP?”

The first sub-research question was answered by comparing the scores for the 14 underlying information processing competencies of the CPP among the three sample groups and the 14 cognitive styles. A comparison of their means was done before the distribution (Kruskal-Wallis test) and medians (Independent-Samples Median test) of the underlying components for the different sample groups were compared.

**Sub-research question 2:** *“Is either ISM or the Metacognitive Awareness Module intended to develop the ability to think strategically, as measured by the CPP?”*

In order to answer the second sub-research question a qualitative analysis of the ISM programme & course syllabi was conducted, combined with an in-depth interview with the programme director. The metacognitive awareness module was scrutinized based on an interview with the responsible module instructor Stein Kleppestø, conducted by Adler & Midson (2018) and a presentation (Kleppestø, 2018).

#### **4.5.1 Methods for the Literature Review**

Once the main research question was established, an extensive and objective review of the literature within the field of strategy, strategic thinking and its development was indispensable. A traditional literature review was conducted assessing literature, ranging from 1976 – 2016 (Easterby-Smith, Thorpe & Jackson, 2015). Different types of databases like LUBSearch and Google Scholar as well as the Lund University library were consulted through which academic literature was retrieved. The use of keywords and Boolean operators helped to retrieve the most relevant literature from these journals (appendix B)

#### **4.6 Data Collection**

As mentioned before, a mixed-method of data collection was chosen, combining both quantitative and qualitative methods to increase the validity and generalizability of results (Easterby-Smith, Thorpe & Jackson, 2015). Within the mixed methods, the researchers strived for triangulation (Easterby-Smith, Thorpe & Jackson, 2015) between three data sources:

1. CPP assessment
2. In-depth interview with the programme director & metacognitive awareness module instructor
3. Syllabi analysis

By utilizing the three sources, correlations could be identified on an objective manner. Quantitative data was collected during this research in the form of the results of the CPP assessment. Qualitative data was collected through the in- depth interviews with the responsible programme director and module instructor, as well as through the syllabi of ISM. Throughout the process of collecting data, emphasis was placed upon confidentiality and anonymity of the research participants (Bell & Bryman, 2007), and was communicated through

a consent form for every participant (appendix C). The data source was protected from other parties and names or other identifying information were concealed as all the data retrieved from the CPP were anonymised by the licensed facilitator before the information was analysed.

#### **4.6.1 CPP Assessment**

In total 29 participants participated in the CPP assessment sessions, which were held at Lund University. The first group underwent the CPP assessment on November 24th 2017, a second group on April 5th 2018 and a last group during one of the days from April 17th-19th 2018. In May 2018, Cognadev processed the data of the three sample groups and distributed it with the facilitator. The facilitator anonymised the data before handing it over to the researchers.

#### **4.6.2 In-depth Interview ISM Programme Director:**

The in-depth interview intended to gather as many insights as possible from the programme director's view on strategic thinking and the way ISM enhances this capability. For the in-depth interview with the programme director a semi-structured interview was selected (Easterby-Smith, Thorpe & Jackson, 2015). This structure was chosen as it allowed the researchers to get information on the way answers were given, and follow-up questions which permitted to go deeper into a specific answer (Easterby-Smith, Thorpe & Jackson, 2015).

In preparation for the interview, a topic guide (appendix D) was made. Therefore, the research question, research design as well as the sampling strategy were revisited first to clarify the purpose of the interview (Easterby-Smith, Thorpe & Jackson, 2015). The researchers attempted to avoid theoretical concepts or jargon to provide clarity and enhance comprehensiveness for the interviewee. When abstract concepts could not be avoided, the researchers were on the one hand asked to clarify their understanding and on the other hand were given examples to facilitate understanding. Emphasis was also placed upon questions being neutral and objective to not bias the interviewee in any possible way. The topic guide was built around three sections. The interview was started with opening questions, followed by questions about the main topics and ended with closing questions (Easterby-Smith Thorpe, & Jackson, 2015).

The semi-structured interview with the programme director of the ISM Master at Lund University was conducted on the 25th of April in Alfa 2, room 4043 at Lund University. The interview took place before any analysis of the CPP assessment was done. Therefore, the

interview questions were based upon findings of the literature review. The total length of the interview was 1 hour and 12 minutes and was recorded. During the interview both researchers alternated between the role of the interviewer and the note taker. All questions of the topic guide were answered.

### **4.6.3 Syllabi**

The programme curriculum of the ISM Master as well as the syllabi from its nine courses being offered were retrieved from the Lund University School of Economics homepage (Lund University, 2018c).

### **4.6.4 Metacognitive Awareness Module**

The metacognitive awareness module was scrutinized based on an interview with the responsible module instructor, conducted by Adler & Midson (2018) and a presentation (Kleppestø, 2018).

### **4.6.5 Demographics**

Because the participants of the research as well as the overall population of ISM students were known to the researchers, information about age, gender and the educational background could be retrieved to complement the CPP data.

## **4.7 Data Analysis**

Ensuing the data collection, the different types of data were analysed separately with the help of different methods. By analysing the data sets separately, the validity of the disparate data sets could be assessed prior to the crossover analyses.

For the qualitative data (in-depth interview and syllabi) a framework (See figure 2.1) was derived from existing theory on strategic thinking to organise and direct the analysis (Yin, 2014). The central themes around strategic thinking, its variables and components were identified and assumptions about the relationship among them were made. The analysis of qualitative data was supported by 1) summarising and 2) categorisation (Saunders, Thornhill & Lewis, 2009).

1. Condensed summaries were created from the syllabi and in-depth interview to comprehend and compress the large amount of data.

2. Categories were derived from a framework (figure 2.1) to group data and emerge a structure that aids to organise and analyse the data (Saunders, Thornhill & Lewis, 2009). The distinction between analytical - and systems thinking and the associated terms (i.e. analytical vs. intuition) were utilised as categories.

Because of this study utilising quantitative data (CPP) as the main data source, the qualitative data was not further structured using codes.

For the quantitative data (results of the CPP assessment, demographics) SPSS was selected as the statistical analysis tool. This choice was made because of the complexity of the nonparametric statistical analysis. The reason for selecting a nonparametric test were the small sample sizes, the lack of normal distribution in the data, and the ordinal level of measurement (Lehmann, 1975; Hollander & Wolfe 1973). Because of the sample groups being independent and consisting of more than two groups, combined with the ordinal level of measurement, the Kruskal-Wallis test as well as the Independent-Samples Median test were used to execute the nonparametric statistical analysis among the three sample groups (Easterby-Smith, Thorpe & Jackson, 2015). The Kruskal-Wallis test enabled the researchers to find any significant ( $\alpha \leq 0.05$ ) or indicative ( $\alpha \leq 0.20$ ) difference in terms of the distribution among the three sample groups. The Independent-Samples Median test allowed the researchers to analyse the data from the three sample groups for significant or indicative differences in terms of the median. Additionally, the quantitative data was analysed by comparing the means in SPSS.

#### **4.7.1 CPP Assessment**

The CPP data that was provided to the researchers was priority formulated and validated by Cognadev and subsequently shared through the facilitator. The data included anonymised information on each participant's: rank of current and potential working environment (1-5 from pure operational to pure strategy), the information processing competencies each containing scores ranging from 0 to 100, and lastly the cognitive style preferences (14 representing most applied style to one as the least). For the first two data sets, a Kruskal-Wallis test and Independent-Samples Median test was executed to find any significant or indicative differences among the three sample groups.

For the cognitive style preferences such an analysis was unfortunately not possible because of the importance of the order in the ranked data. For a precise analysis of the 14 cognitive preferences' interrelationship to the ability to think strategically, as measured by the CPP, the

cognitive preferences would preferably be analysed as a string, rather than as individual preferences. However, the amount of permutations would exceed to such an extent (more than 8 billion), in which significant differences among a sample of only (N=29) participants are impossible to find. Thus, the data on the cognitive style preferences was analysed using a mean comparison.

#### **4.7.2 In Depth-Interview**

As described above, the questions for the in-depth interview were derived from the concepts defined in the literature review. Subsequently, the answers on the questions were analysed from the recording (available on request) taken during the interview. The answers were transcribed and consequently scanned for the categories derived from the literature review. This analysis helped the researchers in clarifying the intention of ISM and if the programme is actually designed for enhancing strategic thinking from the perspective of the programme director.

#### **4.7.3 Syllabi**

To make sense out of the large amount of data that could be retrieved from the syllabi from the master program and subsequently the nine courses taught during the program. The documents were read and scanned for the categories analytical thinking and systems thinking to find correlations and patterns within the courses and finally to congregate an understanding of how the master programme intends to develop strategic thinking.

#### **4.7.4 Metacognitive Awareness Module**

For the analysis of the metacognitive awareness module, the data generated by the interview conducted by Adler & Midson (2018) as well as a presentation (Kleppestø, 2018) were examined. By analysing this data, the intentions of the metacognitive awareness module in relation to the ability to think strategically could be identified. For this analysis, the previously described qualitative methods were used.

#### **4.7.5 Demographics**

The demographics were analysed in the following way:

- Gender in terms of male and female (M/F)
- Age in three age intervals: 22-23 / 24-25 / 26-27

- and educational background in groups of: Business Administration / Finance & Economics / Other

The data was used for assessing the representativeness of the three sample groups and analysed for significant differences using the Kruskal-Wallis test and the Independent-Samples Median test.

Additionally, the data was used for a correlation analysis to study the demographical factors on the ability to think strategically. For this correlation analysis the Spearman correlation in SPSS was used because of the non-normal distribution of the data. The data was first bootstrapped to 10,000 simulated observations, to overcome the limitations of the small sample size (N=29) as it makes the calculation not dependent on the unknown distribution of the data. Furthermore, bootstrapping allowed the researchers to stress test the data in order to find any mistakes or odd correlations in the dataset, which would not be found with the original sample size of 29 participants.

## **4.8 Quality of the Research**

For an empirical research to be of high quality, validity and reliability are required (Yin, 2014). The following section therefore addresses the issue whether the aspects of reliability and validity were sufficiently met when conducting the research.

### **4.8.1 Reliability**

The reliability of a research study is given when other researchers can reach similar observations when replicating the study (Easterby-Smith, Thorpe & Jackson, 2015; Bryman & Bell, 2015). The outset of the conducted study is replicable as the elements being examined will most likely also be available for future research. The CPP as a tool to assess the capability to think strategically, ISM will continue to exist in the future. Hence, other researchers could replicate this study. As there is a great number of variables which characteristics are unique in a specific moment of time (such as the characteristics and abilities of the participants of this study) it remains questionable if such research would result in the same findings.

To ensure a high reliability, the methodology as well as the process data collecting were thoroughly explained. Collecting primary data through the conducted in-depth interview might hinder high reliability, as the interviewee's answers may tend to be rather subjective. To avoid

any misinterpretation when taking notes during the interview, the interview was recorded. This allowed the researchers to re-listen the interview and complement the notes taken. The topic guide is given in the appendix (appendix D) to allow transparency on the interview from which the results were obtained.

It must be noted that the results might have differed if different participants would have undergone the CPP assessment. This could have influenced the reliability of this research project, as future research might not observe similar observations due to the particular characteristics of the participants.

#### **4.8.2 Validity**

The validity of the research is determined by two facets, 1) if the correct measurements were used to accurately measure what is intended to be measured and 2) if the findings of the research are presented in a truthful way (Easterby-Smith, Thorpe & Jackson, 2015; Yin, 2014; Golafshani, 2003). The validity in the sense of accurate measurement depends on the way the data is interpreted and analysed in regard to the defined characteristics of strategic thinking. Meaning that the validity of this study relies on the interlinkage of the defined characteristics of strategic thinking with the CPP's definition to ensure that the study measures what is intended to be measured. As the underlying algorithms of the CPP are not disclosed by Cognadev, the interlinkage of the defined characteristics of strategic thinking with the CPP's definition must be perceived as an approximation to the researcher's best possible extent, hence possibly affecting the validity.

Additionally, as the CPP is used as the primary measurement tool its validity needs to be scrutinized. Cognadev extensively clarifies the validity of the tool for measuring a person's intellectual functioning through a multitude of quantitative and qualitative studies (Cognadev Technical Manual, 2016, p. 30-96) that have continuously been substantiated since the 1990's (Cognadev, 2018, p.23). Because of this extensive and longitudinal examination of the validity of the CPP, the tool is perceived as valid, thus the data retrieved is also seen as valid. However, if the validity of the CPP is proven erroneous, the results derived from this study have to be considered as invalid as well.

What is not measured by the CPP, but affects the validity of this research project, is the assurance that everyone understood the instructions of the test, hence a possible explanatory



factor for any low results in the CPP. A measurement tool, for example an eye-tracking device, that indicates a person's understanding of the instructions of the CPP would have solved this validity issue, however this was not available to the researchers.

Furthermore, Cognadev does not directly refer the results of the CPP assessment to strategic thinking, hence possibly endangering the validity and usability of this tool within this research project. The link towards strategic thinking was made by Cognadev through comparing their entire database of CPP results with external studies on strategic thinking (Cognadev Technical Manual, 2016, p. 30-96). This comparison showed significant correlations towards these external studies (Cognadev Technical Manual, 2016, p.29) on strategic thinking among students and business people, which make the CPP test a validated and usable tool for this study.

Lastly, Easterby-Smith, Thorpe and Jackson (2015) make a distinction internal and external validity. As the research is conducted among 29 students from the ISM Master programme, the external validity is dubious. However, due to the theoretical foundation plus the research approach being replicable among other educational programmes, a certain degree of generalizability can be assigned to this study. The internal validity is ensured by making use of multiple sample groups and additional qualitative data like the in-depth interview.

## **5 Findings**

In this chapter the findings of this research project are presented on the hand of the aforementioned conceptual framework (see chapter 3.5). First the demographics of the sample groups are given to get an overall understanding on the background of the participants from which the data is generated. Second, the findings of the CPP are presented, where after the findings are analysed for correlations to the demographics, meaning age, gender and educational background. Third, the intention of the educational interventions ISM and the metacognitive awareness module are explained. Lastly, the main research question as well as the sub-research questions are answered with all data gathered from the findings. The raw data for all the analyses made in this chapter, can be found in the appendix (appendix E).

## 5.1 Sample Group Demographics

Before analysing and presenting the data generated from the three different sample groups, it is important to comprehend the sample group's demographics. This first paragraph of the findings will present the characteristics of the total population of ISM students as well as the three sample groups in terms of gender, age, and educational background. For the age comparison, the mean is used as well as the age split up in three groups (22-23/24-25/26-27). The educational background of the individual participants is grouped in Business Administration (BA), Finance & Economics (FI), Other (O). The comparison of the three samples to the total population of ISM allows an assessment of the three sample groups' representativeness.

### International Strategic Management

The total population of ISM consists of 44 students of which 45% are female and 55% are male. The student population of ISM is on average 25.5 years old and are nearly all having their undergraduate degree in Business Administration, with a handful of exemptions coming from the field of Finance & Economics, or other.

Table 5. 1 Overview population ISM (own compilation)

<b>Name</b>	International Strategic Management	
<b>Dates</b>	Start: 1 September 2017	End: 8 June, 2018
<b>Population</b>	44 students	
<b>Gender ratio</b>	Female: 45%	Male: 55%
<b>Average Age</b>	25,5 years	
<b>Nationalities</b>	18 different nationalities	
<b>Background</b>	Business Administration	

### Group 1

Group 1, the control group, was tested after 30% of all courses were completed and consisted of 10 participants evenly split with female and male participants. The average age of the participants is slightly lower than the ISM average with 24.2 years, whereas the educational background is in line with the ISM population, containing of 70% having an undergraduate degree in Business Administration.

Table 5. 2 Overview participants sample group 1 (own compilation)

<b>Name</b>	Control Group		
<b>Testing Date</b>	November 24, 2018	30% ISM Completed	
<b>Sample Size</b>	10 participants		
<b>Gender ratio</b>	Female: 50%	Male: 50%	
<b>Average Age</b>	24,2 years		
<b>Background</b>	BA: 7	FI: 2	Other: 1

## Group 2

The six participants of group 2, the first experimental group, were tested after 77% of ISM completed and after engaging in the metacognitive awareness module (see chapter 5.4.2). The gender ratio 33% female, 67% male is in line with the ISM program, whereas the average age is slightly lower. There are no differences in educational background, with again Business Administration as the dominant undergraduate degree.

Table 5.3 Overview participants sample group 2 (own compilation)

<b>Name</b>	Experimental Group 1		
<b>Testing Date</b>	April 5, 2018	77% ISM Completed + Metacognition	
<b>Sample Size</b>	6 participants		
<b>Gender ratio</b>	Female: 33%	Male: 67%	
<b>Average Age</b>	24,3 years		
<b>Background</b>	BA: 5	FI: 1	Other: 0

## Group 3

The 13 participants of the third and final testing group, experimental group 2, were tested after 82% of ISM was finished. The sample group consisted of 43% females, 57% males, which is together with the educational background again in line with the overall population of ISM.

Table 5.4 Overview participants sample group 3 (own compilation)

<b>Name</b>	Experimental Group 2		
<b>Testing Date</b>	April 17-19, 2018	82% ISM Completed	
<b>Sample Size</b>	13 participants		
<b>Gender ratio</b>	Female: 43%	Male: 57%	
<b>Average Age</b>	25,2 years		
<b>Background</b>	BA: 9	FI: 2	Other: 2

By means of the analysis on the demographics of the three sample groups, it can be said that the samples represent the overall population of ISM.

## Sample Group Comparisons

Table 5.5 Overview all participants of sample group 1, 2 & 3 (own compilation)

Besides comparing the sample groups to the overall population of ISM, the demographics are also compared between the sample groups to cross-

<b>Name</b>	<b>Group 1</b>			<b>Group 2</b>			<b>Group 3</b>		
<b>Intervention</b>	ISM			ISM + Metacognition			ISM		
<b>ISM completion</b>	30%			77%			82%		
<b>Sample Size</b>	10 participants			6 participants			13 participants		
<b>Gender ratio</b>	Female: 50%	Male: 50%		Female: 40%	Male: 60%		Female: 43%	Male: 57%	
<b>Average Age</b>	24,2 years			24,3 years			25,2 years		
<b>Background</b>	BA: 7	FI: 2	O: 1	BA: 5	FI: 1	O: 0	BA: 9	FI: 2	O: 2

check the variables and notice possible differences. To a great extent the three sample groups are similar to each other. Group 3 has on average a slightly higher average age, however is not significantly different. Males dominated sample group 2 and three with roughly 60%, whereas male & female participants in group 1 were spread out evenly. Although there is a slight difference in gender between the sample groups, there is no significant difference found that might explain variances between the sample groups. There was no significant difference in

terms of educational background, as Business Administration was the dominant undergraduate degree in all three sample groups.

As no significant difference was discovered between the three sample groups in terms of age and gender, the variances that do occur between the sample groups cannot be derived from differences in the demographics of the sample groups.

## 5.2 CPP Findings

In the upcoming section, the findings of the three sample groups regarding the CPP scores on SST work environment, the Information Processing Competencies and the Cognitive Styles are presented.

### 5.2.1 SST Work Environment

As explained in chapter 3.3, the SST work environment scores are CPP's approximate to an individual's overall strategic thinking ability. The SST work environment scores are divided into 1) current work environment and 2) potential work environment, ranging from 1 (pure operational) to 5 (pure strategic). A significant difference between the three sample groups would therefore indicate a development in strategic thinking. To find any significant difference in either distribution (Kruskal-Wallis) or medians (Independent-Samples Median test), nonparametric tests were performed among the data of the (N=29) participants, split up in the three sample groups.

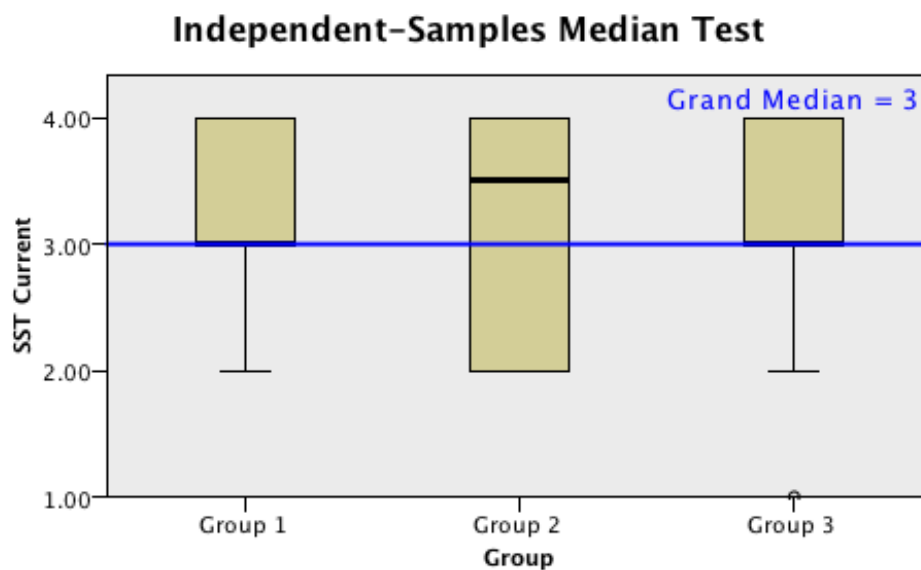


Figure 5. 1 Histogram distribution and median SST current – groups (own compilation)

As can be seen in the graph above (appendix F), neither a significant difference in distribution ( $\alpha = 0.836$ ) nor in the median ( $\alpha = 0.657$ ) is found between the three sample groups in terms of current SST work environment. Although Group 2 does have a higher median of 3.5 compared to the grand median of 3, no significance or indicative difference is measured.

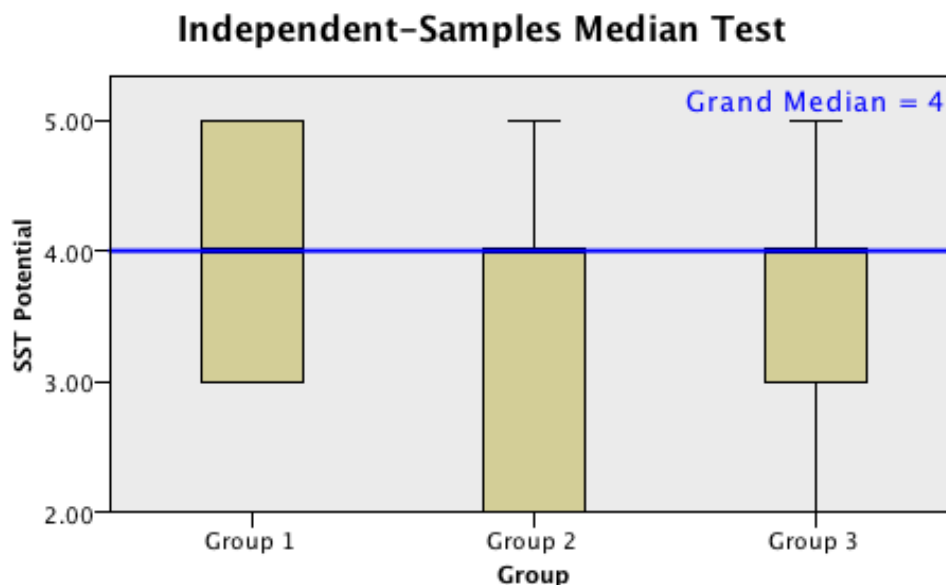


Figure 5. 2 Histogram distribution and median SST potential – groups (own compilation)

Similar to the current work environment, the potential work environment shows no significant difference (Kruskal-Wallis:  $\alpha = 0.849$ ; Independent-Samples Median test:  $\alpha = 0.828$ ) in distribution or median between the three sample groups (appendix F).

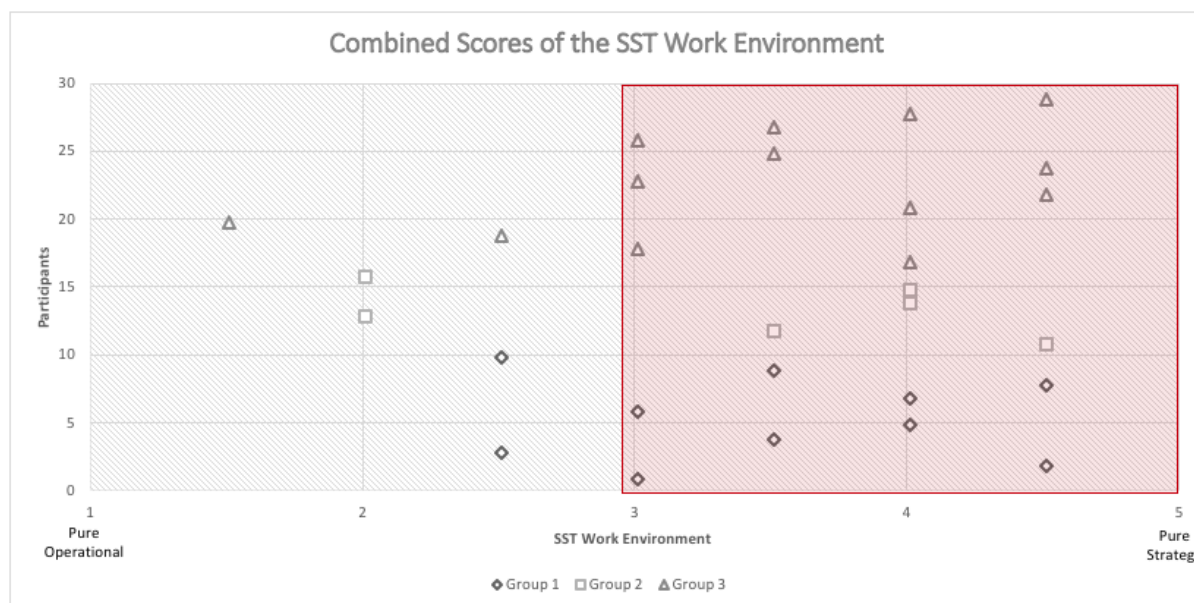


Figure 5. 3 Scatter plot combined SST work environment scores (own compilation)

When examining the combined SST work environment score  $\left(\frac{\text{Current} + \text{Potential Work Environment}}{2}\right)$  of the participants' individual distribution over the SST work environment continuum, a concentrated group with 23 out of 29 participants scoring  $\geq 3$  is revealed (appendix G). The high concentration displayed in the scatter plot provides a more detailed insight in the previous explained insignificant difference between the three sample groups and displays the consistent high SST work environment scores throughout all three sample groups.

### 5.2.2 Information Processing Competencies

This section scrutinizes the 14 underlying information processing competencies. The means of the 14 information processing competencies are displayed in the graph below for each of the three sample groups. The six competencies which are facilitating strategic thinking in an unfamiliar environment are framed in red.

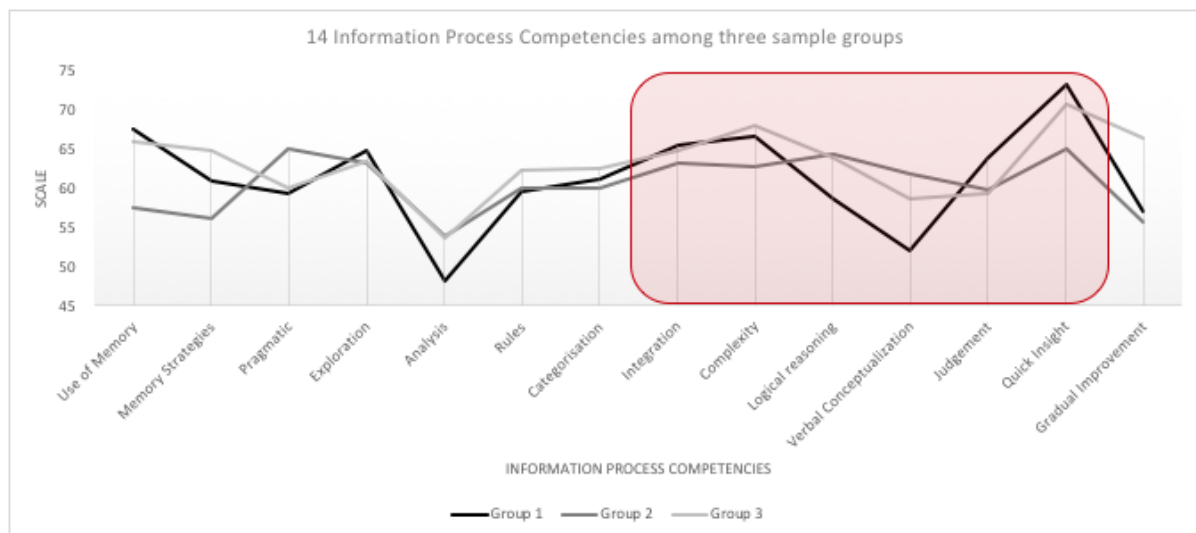


Figure 5.4 Line graph information processing competencies of three sample groups (own compilation)

The scrutinization of the 14 information processing competencies did, in contrast to the SST work environment scores, indicate differences among the scores of the (N=29) participants of the three sample groups (appendix H). It must be noted that in the figure above the scale of measurement 1-100 is zoomed in to the scale of 45-75, to obtain a more detailed view on the trends within the graph and make them easier to grasp. The competencies “Analysis”, “Logical Reasoning” and “Verbal Conceptualisation” show an improvement greater than 5 points, when comparing the scores from group 1 to group 2 & 3. The competence “Gradual Improvement” shows an improvement of more than 5 points from group 1 to group 3. Hence,

these four information processing competencies are examined in more detail, with help of the Kruskal-Wallis test and the Independent-Samples Median test, to find out if these indicated differences are significant or indicative (appendix I).

For the first three information processing competencies the scores of group 1 are compared to group 2 & 3. Starting with “*Analysis*”, neither the Kruskal-Wallis (distribution) nor the Independent-Samples Median test showed any significant or indicative results, thus the earlier indicated difference is to be seen speculative. Next, “*Logical Reasoning*” showed a strong indicative difference on the median ( $\alpha = 0.085$ ), however in terms of the distribution no significant differences were found. Following, “*Verbal Conceptualisation*” showed an indicative difference ( $\alpha = 0.129$ ) on distribution between the three sample groups, the medians showed no significant difference. For the fourth information processing competency “*Gradual Improvement*”, the Independent-Samples Median test showed a significant difference ( $\alpha = 0.018$ ) as well as the Kruskal-Wallis test showed a strong indicative difference ( $\alpha = 0.060$ ) among the first- and the third group.

The examination of the 14 information processing competencies provided the researchers with a more detailed view on the development of the underlying variables of strategic thinking. Although significant or indicative differences amongst only four out of the fourteen information processing competencies are noticed, it can be said that the educational interventions did have an impact on the development of some underlying components of the ability to think strategically, as measured by the CPP. Among these results, the educational intervention ISM had an impact on all information processing competencies, with the biggest alteration on “*Gradual Improvement*”. The metacognitive awareness module did not have an impact on the latter one but did indicate a higher indicative difference on the information processing competencies “*Logical Reasoning*” and “*Verbal Conceptualisation*”.

### **5.2.3 Cognitive Styles**

For a precise analysis of the 14 cognitive styles’ interrelationship to the ability to think strategically, as measured by the CPP, the cognitive styles would preferably be analysed as a string, rather than as individual preferences. However, the amount of permutations would exceed to such an extent (more than 8 billion), in which significant differences among a sample of only (N=29) participants are impossible to find.

Therefore, a mean comparison is made among the individual cognitive styles in regard to the three sample groups, which tells the researchers if either ISM or the metacognitive awareness module is having an impact on the cognitive styles of the (N=29) participants.

As can be seen in the graph down below, the three sample groups follow a very similar trend in terms of cognitive styles. Interesting to note is the high mean for “Learning” and the five cognitive preferences “Logical”, “Holistic”, “Integrative”, “Quick Insight” and “Intuitive” (see circle in graph) which are facilitating strategic thinking (appendix J). This reveals that the (N=29) participants already had a preference for using those cognitive styles that facilitate strategic thinking, as measured by the CPP, and that both educational interventions did not significantly influence these preferences.

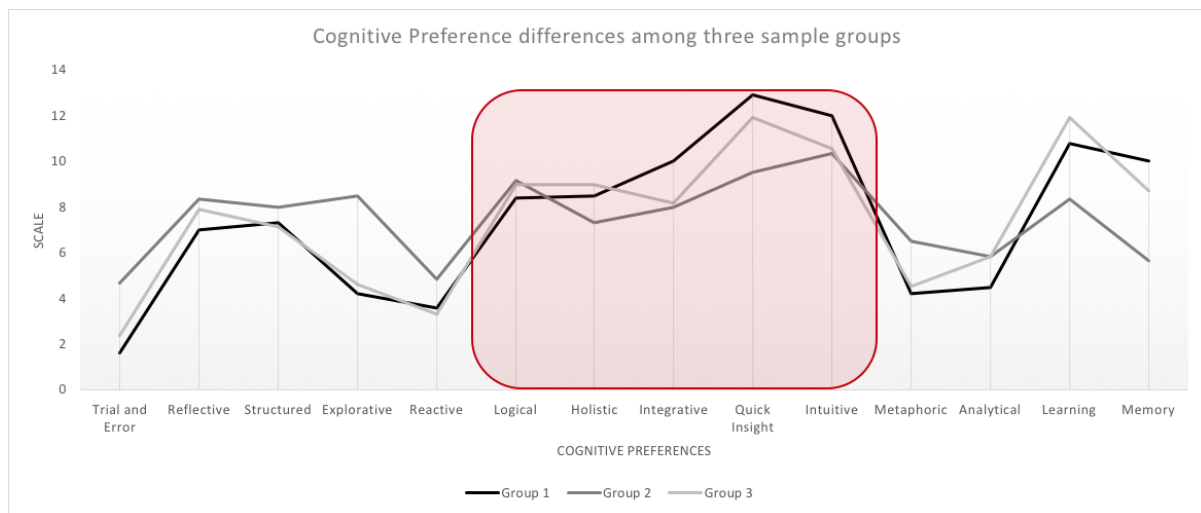


Figure 5. 5 Line graph cognitive style preferences – three sample groups (own compilation)

### 5.3 Correlations CPP – Demographics

This section is not focused on differences between the three sample groups but analyses the possible influence of the demographics on the (N=29) participants’ ability to think strategically, as measured by the CPP. A cross-comparison was made in terms of the demographics: gender (M/F), age (22-23/24-25/26-27) and educational background (Business Administration/ Finance & Economics/ Other) on the CPP data. First, a comparison was made using Spearman Correlation. The Spearman Correlation was chosen because of its function providing more accurate results with the non-normal distribution of the data generated by the CPP. Within the Spearman Correlation test, the small sample (N=29) size was bootstrapped to 10,000 simulated samples (appendix K).



The Spearman Correlation showed no significant correlation between the bootstrapped data of the (N=29) participants' demographical factors and the CPP data (SST current- and potential work environment, Information Processing Competencies or Cognitive styles).

Next, the demographical factors were analysed for significant differences in terms of distribution or medians on the CPP overall score (SST work environment current & potential). Similar to the Spearman Correlation, the Kruskal-Wallis and Independent-Samples Median tests did not show any significant differences among different age groups (appendix L), educational background (appendix M) or genders (appendix N). Hence it can be concluded that demographical factors:

1. Age as the time interval of 6 years (range youngest - oldest participants),
2. educational background
3. gender (M/F)

are not influencing the ability to think strategically, as measured by the CPP.

## **5.4 Intention of the Educational Interventions**

The following section of the findings will help to explore whether the two educational interventions ISM and the metacognitive awareness module intend to develop the ability to think strategically. First, the findings for ISM are presented, which are based on the in-depth interview conducted with the programme director Matts Kärreman, the analysis of the programme syllabus and the examination of the course syllabi.

Second, the metacognitive awareness module and its intention will be presented. Those findings are based on an interview with the module instructor Stein Kleppestø, conducted by Adler & Midson (2018) and a presentation given by the module instructor (Kleppestø, 2018).

The findings for ISM focus on how the two thinking modes: analytical and systems thinking are addressed during the academic year. For the metacognitive awareness module this distinction is not made, as the module does not intend to address a particular thinking mode but focuses more on thinking at a meta-level.

### **5.4.1 The Intention of ISM**

First the analysis of the ISM Master programme as a whole is presented, followed by a chronological analysis of the 9 courses being taught during the programme. An extensive summary of the findings can be found in the appendix (appendix O).

### Analysis of the ISM Programme

The Master of Science (M.Sc.) in International Strategic Management (60 ECTS, one year) aims at providing breadth and depth in central areas of strategic management. The programme consists of six compulsory core courses and three elective courses (students are supposed to choose two of those three electives). Two semesters are divided into two study periods each (Lund University, 2018a).

The programme intends to ensure “a thorough understanding of strategic thinking” (Lund University, 2018b) and covers both, analytical - and systems thinking. It intends on analysing complex phenomena and integrating knowledge when limited information is available. In-depth insight into practical and theoretical areas of international strategic management and understanding the role of a firm in a bigger system are major parts of the programme (Lund University, 2018a).

This aligns with the programme director’s view (Interview with the programme director, April 25, 2018) who indicated that ISM touches upon both systems thinking as well as analytical thinking and is affecting the development of strategic thinking, as it provides the tools and different concepts which are needed for strategic thinking. The director explained that the programme incorporates holistic thinking by having the firm as the analytical object rather than the individual, yet, the main focus of ISM is placed on enhancing the analytical capabilities of the students. ISM encourages the students to take distinct roles in different courses and the incorporation of self-reflection was pointed out as an important part of ISM (Interview with the programme director, April 25, 2018).

Regarding the structure of ISM, the programme director (Interview with the programme director, April 25, 2018) pointed out that the set of courses within ISM is carefully selected. The courses have to be seen as bricks which are building upon each other as the academic year progresses. The 10-month span of ISM is considered to be sufficient for reaching the intended learning outcomes, as ISM should not be perceived as an isolated educational intervention but builds on the undergraduate studies of the students (Interview with the programme director, April 25, 2018). The teaching methods during the programme include lectures, practical examples, seminars, guest lectures, discussions, group works case assignments as well as written assignments (Lund University, 2018a). The programme director (Interview with the programme director, April 25, 2018) explained that incorporating assignments which are more ambiguous into ISM would be valuable for the students, as it would allow a broader set of

different perspectives. However, previous experience indicated that for students, this would create frustration and cause difficulties in terms of examination. Hence, intentionally not incorporated in the programme (Interview with the programme director, April 25, 2018). Furthermore, the programme director (Interview with the programme director, April 25, 2018) considered the element of experiencing theory in practice as important. He did not think that the current structure of ISM would lack this aspect but acknowledged that ISM could be enhanced by including organisations from outside (Interview with the programme director, April 25, 2018).

As regards to non-educational activities, the programme director (Interview with the programme director, April 25, 2018) pointed out that ISM presupposes that students are stimulated by other activities. He underlined the importance of undertaking non-curricular activities for the development of students. ISM does not take responsibility for its students to do so, but the students are encouraged to participate in non-curricular activities (Interview with the programme director, April 25, 2018).

#### Intention of the 9 Courses of ISM

With the intentions of the programme as a whole examined in the section above, the figure below displays the nine courses taught during the programme and indicates their orientation towards either analytical thinking, a balanced approach, or systems thinking. A detailed course description can be found in the appendix (appendix P)

As can be seen, the two courses “Corporate Governance” and “Business & Sustainability” are leaning more towards systems thinking. The three courses “Strategic Management”, “Strategic Cost Management” and “Corporate Finance” are leaning more towards analytical thinking, whereas the other four courses “Performance Management”, “Research Methods”, “Innovation Management” and “Research Degree Project” are keeping a balance between analytical - and systems thinking.

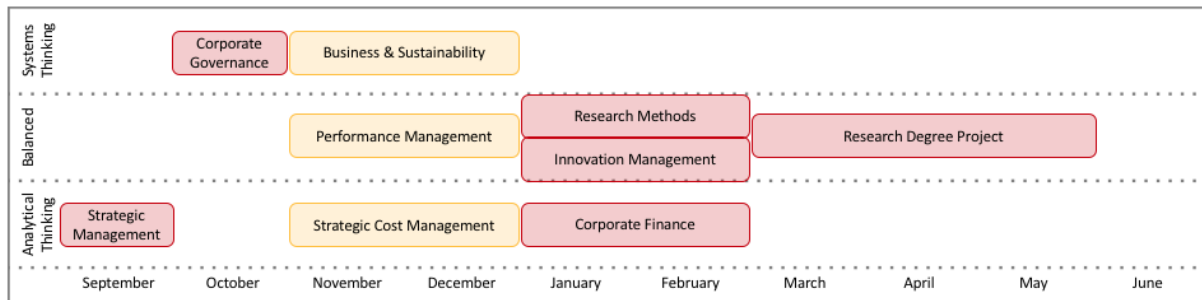


Figure 5. 6 Outline of the ISM courses.

The courses are sorted in regard to their orientation (systems -, analytical thinking or a balanced approach), red courses are mandatory whereas the yellow courses represent the elective courses (Lund University, 2018c)

The analysis of the nine courses confirms the findings of the ISM programme syllabus and the in-depth interview with the programme director. It can be said that ISM is intended to develop the ability to think strategically, although focuses more on analytical capabilities, rather than systems thinking. As explained earlier, this focus on analytical thinking is not beneficial when being faced with an unfamiliar context (the CPP testing environment) whereas relying on systems thinking would be more suitable for strategic thinking.

#### 5.4.2 The Intention of the Metacognitive Awareness Module

As explained in the literature review, metacognition plays an important role in the ability to apply different thinking modes which fosters the development of strategic thinking. In order to examine the impact of metacognition on the ability to think strategically, a three-day metacognitive awareness module took place over approximately 12 hours at Lund University in which the six participants of group 2 participated. Kleppestø (2018) explained that the module incorporates a presentation on different cognitive styles and incorporates a group exercise, that focuses on allowing the participants to experience those different cognitive styles. Furthermore, the module is designed to foster the ability to think strategically, based on the assumption that an increasing awareness of cognitive functions leads to a better implementation of those functions. The module intends to teach its participants an enhanced ability to make use of the cognitive processes particularly in regard to the context given (certainty vs. uncertainty). In regard to the CPP, the metacognitive awareness module is specifically designed to foster the ability to think strategically and especially to improve the metacognitive ability, as measured by the CPP (Adler & Midson, 2018; Kleppestø, 2018). Thus, the metacognitive awareness module intends to develop the ability to think strategically, as measured by the CPP.

## 5.5 Development of Strategic Thinking

The last section of this chapter provides the reader with an overview of the answers on the research questions by means of the previously presented findings. Every specific research question is answered on the hand of specific findings, explained in chapter 3.5. As a reminder, the conceptual framework is displayed below, visualising the linkage of the findings to the research questions. First the main research question will be answered, followed by the two sub-research questions.

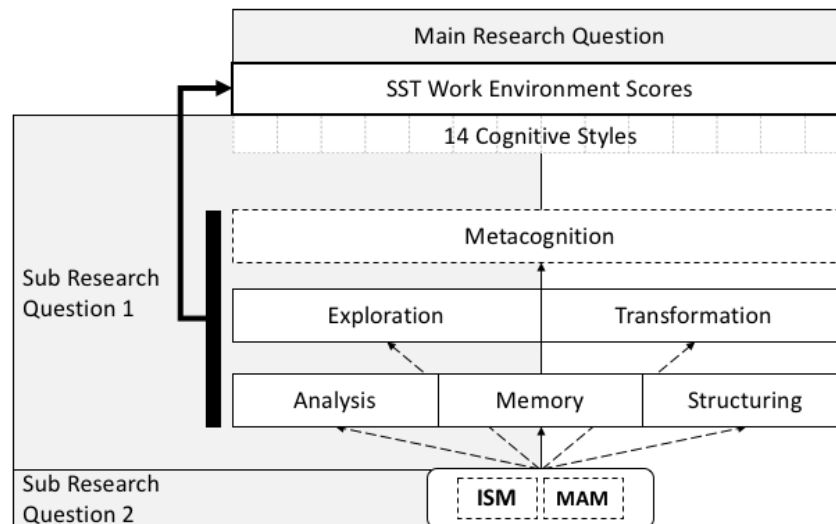


Figure 5. 7 Conceptual framework reminder (own compilation)

**Main research question:** “Does an educational intervention, such as the Master programme ISM or the Metacognitive Awareness Module, improve the ability to think strategically, as measured by the CPP?”

The findings of this study showed that the educational intervention ISM or the metacognitive awareness module did not improve the ability to think strategically, as measured by the CPP (SST current- and potential work environment). The findings on this research question provided a conclusive result as the analysis did not show any significant differences among the three sample groups.

**1. Sub-research question:** “Does ISM or the Metacognitive Awareness Module, alter the underlying components of strategic thinking, as measured by the CPP?”

Although the main research question is not supported, the findings did indicate either significant or indicative differences between the three sample groups in terms of four underlying information processing competencies. Both ISM and the metacognitive awareness

module lead to an increase in the components “Analysis”, “Logical Reasoning” and “Verbal Conceptualisation”, with the metacognitive awareness module improving the latter two slightly more. ISM specifically altered the component “Gradual Improvement”. Hence, it can be said that both educational interventions had an impact on the underlying components of strategic thinking, as measured by the CPP.

The cognitive styles showed no significant differences between the three sample groups, most likely caused by the high scores of all three groups on the cognitive styles facilitating strategic thinking.

**2. Sub-research question:** *“Is either ISM or the Metacognitive Awareness Module intended to develop the ability to think strategically, as measured by the CPP?”*

Although the master programme ISM intends to develop the ability to think strategically, its design is not specifically tailored to enhance the ability to think strategically, as measured by the CPP. Hence, ISM is not intended to develop the ability to think strategically, as measured by the CPP.

The findings for the metacognitive awareness module showed that the module is specifically designed to foster the ability to think strategically, as measured by the CPP. Hence, the metacognitive awareness module is intended to develop the ability to think strategically, as measured by the CPP.

The following chapter will discuss the findings of this research project. The discussion encompasses possible explanations for the indicated differences among the three sample groups on the hand of the findings and literature review. More importantly, it will be discussed why no significant differences on the ability to think strategically, as measured by the CPP, were found.

## **6 Discussion**

The discussion will elaborate on several aspects, indicated in the literature review, which may serve as explanations for the findings of this research. First, the discussion will focus on ISM as an educational intervention. Second, the discussion will address the metacognitive awareness module. Lastly, the discussion will elaborate on other learnings from this study.

## **6.1 ISM and its Misguided Emphasis on Analytical Thinking**

The analysis of ISM and its courses revealed that the programme incorporates elements of systems thinking but has a focus towards analytical thinking. Similarly, the findings of the CPP results indicated that ISM increased the information processing competency “*Analysis*”. Even though this difference was only to be found as speculative, it seems possible that these results are due to ISM’s emphasis of analytical thinking. As described in the literature review this research project considers analytical thinking as the core of systems thinking. This means that if ISM is to develop strategic thinking, it might be more fruitful if the programme would shift its focus towards systems thinking. This could help to improve students’ systems thinking and help them in dealing with complex, unfamiliar situations. Ultimately this may lead to an improved ability to think strategically, as measured by the CPP.

## **6.2 Systems Thinking within ISM**

The findings of the CPP analysis revealed that ISM increased the information processing competencies “*Logical Reasoning*” and “*Verbal Conceptualisation*”. As these two competencies were previously linked to systems thinking, ISM could be considered to partly foster strategic thinking, as measured by the CPP. Yet, those findings are only indicative which might hamper the strength of this argument.

In contrast, the differences within the information processing competency “*Gradual Improvement*” were significant. Gradual Improvement is a sub-process of metacognition (Cognadev technical manual, 2016), and thus indicates a utility for strategic thinking, as metacognition as a whole is considered to facilitate strategic thinking (Cunningham, 2008). Overall, those findings indicate that ISM at least partly had an impact on the development of systems thinking and therefore strategic thinking.

## **6.3 ISM’s Strategic Thinking Blueprint**

### **6.3.1 More Ambiguous Assignments and Simulations**

In terms of incorporating more systems thinking within ISM, the programme director (Interview with the programme director, April 25, 2018) elaborated on including more ambiguous assignments into the programme. Such assignments could be designed broadly and would be given to the students without clear instructions. Students would have to question underlying assumptions of given assignments, as simply trying to find the expected ‘best solutions’ is not possible with ambiguous assignments (Easterby-Smith & Davis, 1983). This

would create an unfamiliar learning environment, thus foster students' system thinking and hence their ability to think strategically.

Yet, university education might not be designed for incorporating ambiguous assignments. First, the examination and grading process would be hampered. For an ambiguous assignment, there should not be any "right or wrong", which contradicts grading on a scale between A-F. Second, students are likely to have a clear aversion against unfamiliar and ambiguous assignments (Interview with the programme director, April 25, 2018). This might relate to the above-mentioned problems regarding examination and grading, as students may perceive it as unfair to be graded on assignments which were given without clear instructions. It can thus be suggested that even though the aversion of the students might increase, ISM is well advised to incorporate ambiguous assignments in some elements of its programme.

Besides more ambiguous assignments, the use of simulations might be a way to support systems thinking within ISM. The analysis did not indicate that any types of simulations are currently used within ISM. Hence, integrating *systems dynamics* (Kunc, 2012), *scenario planning* (Schoemaker, 1991; Heracleous, 1998) or *crisis simulation* (Hunzeker & Harkness, 2014) into the programme may foster students' systems thinking and hence their ability to think strategically.

### **6.3.2 Incorporating more Real-life Practice**

As mentioned above, the findings revealed that ISM lead to a significant improvement of "Gradual Improvement Learning". This means that students' preference for practical or experiential learning increased (Cognadev Technical Manual, 2016). Hence, ISM's intention to provide in-depth insight into practical areas of international strategic management through practical examples or case assignments (Lund University, 2018a) was reached.

Although ISM already reaches its above-mentioned intention, the programme director (Interview with the programme director, April 25, 2018) acknowledged that the quality of ISM could be enhanced by including organisations from outside. This is in line with business education being criticized for lacking the application of learnings in real-life (Weaver, 2014). Real-life practice would allow students an experience of applying previously acquired knowledge in a context where actions lead to real consequences. Such a form of experiential learning was pointed out as a crucial element of the iterative process of learning to think



strategically (Casey & Goldman, 2010; Sloan, 2017) and would therefore foster the development of strategic thinking within ISM.

### **6.3.3 The Role of Self-reflection within ISM**

The programme director (Interview with the programme director, April 25, 2018) explained that ISM intends to provide different perspectives within the field of strategic management. Furthermore, the importance of self-reflection on the learnings received through those different perspectives was pointed out (Interview with the programme director, April 25, 2018). In the iterative process of learning to think strategically, reflection is important as it incorporates the validation of learnings (Sloan, 2017). Furthermore, reflection is considered as vital for metacognition which in turn fosters the development of strategic thinking (Cunningham, 2008). The analysis of the programme did confirm that ISM provides different perspectives in terms of the nine courses providing insights from different angles into the broader field of strategic management (Lund University, 2018a). Yet, reflection on learning was not found within ISM and its nine courses (Lund University, 2018a; Lund University, 2018b). In general, therefore, it seems that the iterative process of learning to think strategically, as well as metacognition are not sufficiently addressed within the current structure of ISM, which in turn hampers the development of strategic thinking.

### **6.3.4 The Duration of ISM**

Next to the role of self-reflection, the insignificant difference in the findings can also be explained on the hand of the duration of the programme. The 10-month timespan of ISM might be too short to allow a continuous repetition of experiences (Goldman, 2007; Mintzberg 1994). ISM does intend to provide different perspectives on the field of strategic management (Lund University, 2018a), but the short duration of the different courses (between 1-2 months, except the degree project) could not only be harmful for continuous repetition, but also be too short for students to dive into the different roles & perspectives and learn from this experience (Dragoni, Vankatwyk & Tesluk, 2011).

## **6.4 The (In-)efficiency of Educational Interventions**

This research showed that neither the educational intervention ISM nor the metacognitive awareness module had an impact on the overall ability to think strategically. As identified in the literature review, next to educational interventions, experience (Easterby-Smith & Davies,

1983; Mintzberg, 1994; Goldman, 2007) and non-educational activities (Reeves & Wittenburg, 2015; Marone, Staples & Greenberg, 2016; Sloan, 2017) are indicated as alternative ways to foster the ability to think strategically.

Although this research project did not assess the impact of non-educational activities or experience on the ability to think strategically. It did examine the current balance between educational interventions, non-educational activities and experience within ISM. The analysis of this balance for students studying the ISM programme, showed a strong focus towards educational interventions. Although the programme director (Interview with the programme director, April 25, 2018) indicated that experience and non-educational activities are of high importance to develop strategic thinking, this is not actively encouraged within ISM. The passive stance of ISM towards those two factors may serve as an explanation for the current findings.

## **6.5 The Impact of the Metacognitive Awareness Module**

It is difficult to measure the influence of the metacognitive awareness module on the ability to think strategically as the participants of the module also were students of the ISM programme. Therefore, there is reason to believe that besides the metacognitive awareness module ISM has also influenced the results.

The findings on the overall ability to think strategically, did not reveal any significant results. Nevertheless, the module did improve the underlying information processing competencies “*Logical Reasoning*” and “*Verbal Conceptualisation*”. As explained earlier, these two information processing competencies are linked to systems thinking. Hence, the metacognitive awareness module increased the ability for strategic thinking in terms of some underlying components of strategic thinking.

As the metacognitive awareness module explicitly intends to increase the metacognitive ability and thus improve the ability to think strategically, as measured by the CPP (Adler & Midson, 2018; Kleppestø, 2018), it is likely that the module is responsible for the increase in the two components of strategic thinking, regardless the abovementioned possible influence of ISM. Although the metacognitive awareness module only had a duration of 12 hours an improvement was measured in the underlying components of strategic thinking. This supports the speculation

that metacognitive awareness as an educational intervention can improve the ability to think strategically.

## **6.6 Other Learnings from This Study**

Besides the structure of ISM having a possible influence on the indifference on the ability to think strategically, other explanatory factors, learned from this study, need to be pointed out.

### **6.6.1 Characteristics of the Sample Groups**

The non-random assignment of participants may have influenced the findings of this research. The characteristics of the participants could have impacted their willingness to participate in this research. For example, participants who are more interested in strategic thinking or perceive themselves as good strategic thinkers may signed up for the CPP assessment in the first testing phase. Vice versa, participants who are less interested or less confident could have agreed to participate in an assessment only at the end of the academic year. Therefore, it is possible that the types of personality and their ability to think strategically differs among the sample groups and distort the findings.

### **6.6.2 ISM's Recruitment Policy**

Besides the sample groups having specific characteristics due to the non-random allocation of the participants, it also needs to be pointed out that the overall score of all 29 participants in this research was high (23/29 observations scoring  $\geq 3$  on the SST work environment score). Within these high scores the (N=10) participants of group 1 scored on average (3.5) as high as group 3. This highly clustered group of scores indicates that ISM recruits students that already possess the capabilities fostering strategic thinking. With already this high concentration of scores in place, it is questionable how much the ability to think strategically would improve in only a timeframe of 10 months, despite the structure of the programme.

## **7 Conclusion**

Strategic thinking has close ties to organisations' performance and is perceived as a crucial component for their pursuit of a sustainable competitive advantage (Heracleous, 1998; Graetz, 2002). Although it is seen as a crucial element for superior business performance, there is still a lack of consensus within previous research on strategic thinking. Its meaning is scattered and encompasses a wide array of different concepts ranging from analytical thinking to systems thinking. Whereas analytical thinking is utilised best for making strategic decisions in a

familiar context, systems thinking is essential for making strategic decisions in an unfamiliar context. This means that for strategic thinking the value of systems thinking increases with an increasing degree of complexity and unfamiliarity, and the utility of analytical thinking decreases.

Business education is considered as a way of developing strategic thinking (Easterby-Smith & Davies, 1983; Kunc, 2012; Weaver, 2014; Bratianu, 2015), preparing graduates for their future career in today's dynamic and complex business environment. Yet, the impact of business education has received mediocre attention through empirical studies. Therefore, this research makes a valuable contribution to the understanding of the effect of educational interventions on Business students' ability to think strategically.

## **7.1 Research Aims and Objectives**

The aim of the present research was to assess the efficiency of educational interventions in developing the ability to think strategically. The effects of a one-year Master programme within International Strategic Management (ISM) and a 12-hour metacognitive awareness module were examined, making use of a measurement tool called CPP. Throughout this research, in total (N=29) participants were non-randomly assigned to three sample groups and underwent a CPP assessment. One group was tested at an early stage of the ISM programme and two groups at the end of the ISM programme, whereas one group additionally participated in a metacognitive awareness module. The CPP was used to examine their ability to think strategically as well as their cognitive preferences.

Even though, there were significant and indicative increases in underlying components of strategic thinking. The findings of this study did not show any significant improvement of students' overall ability to think strategically, as measured by the CPP. Neither after taking a one-year M.Sc. within International Strategic Management nor after the participation in the metacognitive awareness module. To answer the main research question: "*Does an educational intervention, such as the Master programme ISM or the Metacognitive Awareness Module, improve the ability to think strategically, as measured by the CPP?*", it is concluded that an educational intervention such as the Master programme ISM or the metacognitive awareness module does not improve the ability to think strategically, as measured by the CPP.

## **7.2 Practical Implications**

Although the findings show a conclusive result, the causes for the insignificant difference among the three sample groups are inconclusive. Besides possible research design flaws, the current structure of ISM is perceived as insufficient to meet its own intention of providing a “thorough understanding of strategic thinking” (Lund University, 2018b).

The findings indicated that ISM places greater emphasis on analytical thinking whereas systems thinking is only partly addressed. To foster the ability to think strategically, the current design of ISM needs to shift its focus towards systems thinking. To address systems thinking, ISM is suggested to have a different structure with for example more emphasis on ambiguous assignments, the integration of business simulations or incorporating more real-life practice.

The evidence from this study suggest that if ISM would incorporate these suggestions in the programme, it would deliver even better future managers as its graduates would be supplied with the strategic thinking tools needed for their career in the dynamic and complex business environment.

## **7.3 Limitations**

This section serves the purpose of summarising the limitations of this study which may have confined the quality of the research.

The main weakness of this study was the paucity of large and randomly assigned sample groups, which hampered the trustworthiness of the obtained data and thus affected the quality of the research.

Another limitation of this study is its definition of strategic thinking as the ability to make decisions in an unfamiliar context utilising elements of systems thinking. Although this definition is based on a thorough review of the literature, it should still be seen as indefinite. As this study is part of an ongoing research project from Lund University, which started in 2017, thus, still is in its preliminary stage, the term strategic thinking is not yet conclusively defined.

Third, this study was limited by the vague concept of strategic thinking which lacks consensus in terms of its underlying thinking modes. This lack of consensus and the above explained inconclusive definition of strategic thinking, makes the utilisation of the CPP as the primary measurement tool to think strategically, questionable.

An additional limitation of this study is Cognadev's non-disclosure of the CPP's underlying algorithms, that did not allow a full understanding of the CPP as a tool to measure the ability to think strategically. This unintentionally could have impeded the interpretation of the obtained data.

Furthermore, the CPP can be criticized for not being distinct enough in its scale for measuring the ability to think strategically. The CPP's overall assessment of strategic thinking only considers 5 levels within the continuum of the SST work environment model, which make it hard to capture observations on the development of strategic thinking. The findings indicated a high score for the overall ability to think strategically already in the group being tested at the beginning of ISM. Therefore, the small scale made it hard to obtain significant differences among the three sample groups and limited the researchers in drawing conclusions about causality.

Last, it is unfortunate that the researchers were not able to test the impact of the full 10-month programme of ISM on the participants. Meaning, that the participants were tested on the earliest possible date, wherein already 30% of the programme was completed, and the latest possible date wherein only 82% was completed. Hence, this research could not measure the full impact of the educational intervention ISM on the ability to think strategically.

#### **7.4 Future Research**

As previously explained, the findings of this study were conclusive, whereas the limitations of this study may have caused the inconclusive explanations of the findings. To reach a conclusive result for the findings and the underlying causes, it is suggested to utilise larger sample groups to provide more definitive evidence. The participants within those sample groups should be assigned randomly to avoid distortions through potential differences in the characteristics of participants. Furthermore, it is suggested to test the control group one day before the start of an educational intervention whereas the experimental group one day after graduation, to realize the biggest possible impact in the pre- post-test design. Last, as literature suggested the development of strategic thinking through non-educational activities and experience, further research is advised to assess the impact of those factors.

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# Appendices

<b>Appendix A: Sampling Process Log</b> .....	69
<b>Appendix B: Literature Review Log</b> .....	70
<b>Appendix C: Consent Form</b> .....	71
<b>Appendix D: Interview Topic Guide</b> .....	72
<b>Appendix E: Raw Data CPP</b> .....	74
<b>Appendix F: Nonparametric Tests SST Work Environment Scores – Sample Groups</b> ..	76
<b>Appendix G: Mean Comparison SST Work Environment Scores – Sample Groups</b> .....	77
<b>Appendix H: Mean Comparisons IPC – Sample Groups</b> .....	78
<b>Appendix I: Nonparametric Tests IPC – Sample Groups</b> .....	79
<b>Appendix J: Mean Comparison Cognitive Styles – Three Sample Groups</b> .....	81
<b>Appendix K: Spearman Correlation Analysis CPP – Demographics</b> .....	81
<b>Appendix L: Nonparametric Tests - SST Work Environment Scores – Age Ranked</b> .....	83
<b>Appendix M: Nonparametric Tests SST Work Environment Scores – Education</b> .....	83
<b>Appendix N: Nonparametric Tests SST Work Environment Scores - Gender</b> .....	84
<b>Appendix O: Overview International Strategic Management</b> .....	85
<b>Appendix P: Detailed Description Courses</b> .....	92

## Appendix A: Sampling Process Log

### Sampling Process Group 1

In November 2017 a presentation was given to the whole population of the ISM Programme during a lecture at Lund University offered to all students attending the ISM Master. During the presentation

the project itself was presented, the relevance for students to participate (i.e. exploring one's cognitive preferences and suitable work environment), instructions on how to sign-up and the contact details of the researchers were provided. The presentation was made available subsequently in a private Facebook Group of the International Strategic Management Master 2017/2018. This resulted in ten participants for the control group.

### Sampling Process Group 2 & 3

In March 2018 the project was again pitched by the researchers, which resulted in six students of the programme expressed their interest to participate in the metacognition workshop (followed by a CPP assessment) and six students in directly being assessed by the CPP. As those numbers were considered to be insufficient for the aims of this research, all remaining students of the ISM Master were contacted personally via email by the researchers, asking for their willingness to participate in the research. After this, two more participants signed up for the metacognition workshop and eight more for doing the CPP assessment directly. As three of the signed-up participants either dropped out or did not show to the assessment the experimental samples consisted out of six (metacognition workshop) and thirteen students (direct CPP assessment).

## Appendix B: Literature Review Log

The literature was executed according to a predefined funnel, see figure down below. By starting broadly, scrutinising the term strategy, a thorough understanding of the field of research was gathered. Throughout the literature review, the researchers gradually went through the funnel layer by layer, until the last stage “can strategic thinking be taught or developed through educational interventions” was reached. This stage was perceived as the sufficient level of literature.



The literature review consisted of an extensive and objective review of the literature within the field of strategy, ranging from 1976 – 2016. Different types of databases like LUBSearch and Google Scholar as well as the Lund University library were consulted through which academic articles and books were collected. Especially the book Strategy Safari from Henry Mintzberg (1998) was examined to understand to roots of the ten schools of thought on strategic management. As strategy and strategic thinking are such highly discussed academic fields, the use of keywords and Boolean operators helped to retrieve the most relevant literature from these journals, as can be seen in table down below.

### Search engine overview (LUBSearch)

Terms	Hits
Strategic Thinking	1-32,000
Developing strategic thinking	1-2000
Foster Strategic thinking	1-600
Learning to think Strategically	1-200
Cultivate Strategic Thinking	1-100



# The LUSEM Strategic Thinking Project

Thank you! For considering being a participant in the LUSEM Strategic Thinking Project. The aim of this project is to uncover insights into what strategic thinking is, how it can be measured and ultimately how it can be developed. Your participation will be an important contribution to this exciting research.

By agreeing to participate you are agreeing to make yourself available for one (1) 2-4-hour psychometric evaluation. You are also consenting to the de-identified data from those tests, interviews and surveys being used in research analysis, thesis papers and publications. You will not be identified in any paper or publication.

If you agree to take part in this research you will be not only provided with the opportunity for a free psychometric evaluation, but you will also be eligible to be considered for participation in additional free courses, such as an intensive course in advanced case solving skills, or a course in advance metacognitive awareness and be invited to participate in a feedback session on your test results toward the end of spring semester.

*We hope you will join us and your classmates in taking advantage of this opportunity, by signing below.*

**I consent to participate in the LUSEM Strategic Thinking Project, including participation in a 2-4 hour psychometric evaluation during the period of my course, and give consent for my de-identified data from that test and any surveys or interviews to be used in analysis, thesis papers and research publications.**

Name

Signature

Date

## Appendix D: Interview Topic Guide

### 1. Introduction:

- a. Short presentation of the project and the formalities of the interview
- b. Ask for permission to record the interview
- c. Announce the themes to be discussed:
  - i. **General:**
    1. Strategy
    2. Strategic Thinking
    3. Development of strategic thinking
    4. Impact of educational interventions on strategic thinking
  - ii. **Master Programme:**
    1. Candidates & the programme composition
    2. Structure of the education programme
    3. Non-curricular
    4. Curricular

### 2. General

- a. Strategy
  - i. How would you define strategy?
  - ii. What role does strategy play for an organisation's performance?
- b. Strategic thinking
  - i. What is your definition of strategic thinking?
  - ii. What elements would you identify facilitating strategic thinking?
  - iii. What elements can you imagine being hindering for strategic thinking?
- c. The development of strategic thinking
  - i. To what extent is strategic thinking a developable skill?
  - ii. Which activities do you think are facilitating the development of strategic thinking?
- d. The impact of educational interventions on the development of strategic thinking
  - i. Are educational interventions having an impact on strategic thinking?
  - ii. How are educational interventions in your opinion having an impact on strategic thinking?

### 3. Master Programme

- a. Structure of the education programme
  - i. What are your thoughts on a best suitable form of education?
  - ii. Which process/structure should education follow to be most efficient?
  - iii. Is there a certain aim for a balance between curricular vs. non-curricular workload?
  - iv. What about the timeframe, what is the ideal timeframe to reach the targeted learning outcomes?
- b. Non-curricular
  - i. Are complementing non-curricular activities needed for the programme?
  - ii. How much do you encourage students to do non-curricular activities?
- c. Curricular
  - i. Why is the programme consisting out of this specific selection of courses?
  - ii. Are the courses impactful on themselves or only in combination as a whole / in combination with other courses?
  - iii. If you would have the possibility to add more elements/courses to the programme, what would it be?
  - iv. What does ISM as a programme aim for, in terms of students future career?
  - v. In what way are students asked to:
    1. Follow their intuition
    2. Have a holistic mindset
    3. Use analytical skills
    4. Use creativity



5. Deal with unfamiliar environments
6. Solve complex problems
7. Take different roles
8. Be reflective (in terms of self-awareness)
9. Question underlying assumptions

**4. Closing Section**

- a. Thank the participant for the interview
- b. Ask for further data / additional files about the programme
- c. Can we come back if we have missed out s.th. or in case we have additional / follow up questions?
- d. Does participant want to be anonymised in the written report?
- e. Does the participant have any questions?
- f. Does the participant want to make any additional comments?

## Appendix E: Raw Data CPP

Group	Participant	STT Work Environment			14 Cognitive Styles														
		SST CURR	SST POT	T38	Anchoring Trial and Error	Anchoring Reflective	Anchoring Structured	Anchoring Explorative	Anchoring Reactive	Facilitating Logical	Facilitating Holistic	Facilitating Integrative	Facilitating Quick Insight	Facilitating Innuitive	Either/both Metaphoric	Either/both Analytical	Either/both Learning	Either/both Memory	
1	1	3	3	64	2	5	6	1	4	7	11	12	13	13	14	8	3	10	9
1	2	4	5	77	1	7	9	2	8	8	10	10	11	14	4	5	6	12	
1	3	2	3	61	3	8	6	4	9	10	5	7	12	13	1	2	14	11	
1	4	3	4	62	1	12	5	14	2	11	9	8	13	6	4	7	10	3	
1	5	4	4	71	1	7	8	4	2	6	9	11	13	14	3	5	12	10	
1	6	3	3	66	2	5	13	1	4	8	10	12	12	11	3	6	9	14	
1	7	3	5	67	1	4	5	2	3	8	10	14	14	12	6	7	13	11	
1	8	4	5	80	1	8	6	4	2	11	7	14	9	14	3	5	12	13	
1	9	3	4	67	1	9	5	7	2	8	10	12	13	14	4	4	11	3	
1	10	2	3	59	3	5	10	2	6	7	8	9	12	13	4	1	11	14	
2	11	4	5	80	1	7	8	3	2	11	9	14	14	13	4	5	6	12	
2	12	3	4	72	2	9	10	14	1	13	6	12	8	7	4	3	11	5	
2	13	2	2	34	13	6	2	14	12	4	5	3	10	8	11	7	9	1	
2	14	4	4	76	1	9	10	4	2	11	8	5	13	6	3	12	14	7	
2	15	4	4	73	2	9	13	3	1	12	10	11	4	14	5	6	7	8	
2	16	2	2	54	9	10	5	13	11	4	6	7	8	14	2	2	3	1	
3	17	4	4	66	2	5	11	3	1	12	8	6	9	10	4	7	13	14	
3	18	3	3	64	1	5	8	2	4	6	11	9	13	14	7	3	12	10	
3	19	2	3	57	3	4	6	1	7	10	11	9	13	8	5	2	12	14	
3	20	1	2	41	13	8	6	12	14	10	5	4	11	9	1	3	7	2	
3	21	4	4	72	1	4	7	3	2	8	10	9	12	14	6	5	13	11	
3	22	4	5	77	1	11	5	6	2	9	10	8	14	12	4	7	13	3	
3	23	3	3	62	2	5	8	1	3	7	10	9	11	13	6	4	12	14	
3	24	4	5	77	1	7	5	4	2	8	9	11	13	12	6	3	14	10	
3	25	3	4	67	1	14	9	4	2	11	10	7	13	13	3	5	8	6	
3	26	3	3	59	2	9	4	14	1	8	7	5	12	10	6	13	11	3	
3	27	3	4	69	2	14	10	3	1	8	11	9	9	6	4	13	12	5	
3	28	4	4	75	1	11	7	4	2	12	10	8	13	5	3	6	14	9	
3	29	4	5	76	1	6	7	3	2	8	9	10	13	11	4	5	14	12	

		14 Information Processing Competencies																							
Group	Participant	MEMORY				EXPLORATION				ANALYSIS				STRUCTURING				TRANSFORMATION				METACOGNITION			
		Use of memory	Memory Strategies	Pragmatic	Exploration	Analysis	Rules	Categorisation	Integration	Complexity	Logical reasoning	verbal	conceptualization	Judgement	Quick Insight	Gradual Improvement									
1	1	65	54	52	61	35	45	61	64	66	59	62	61	73	44										
1	2	81	77	68	69	60	72	60	76	73	70	68	68	80	43										
1	3	63	54	52	53	30	49	61	52	58	54	38	48	65	77										
1	4	51	39	64	61	51	39	42	56	71	62	46	68	68	56										
1	5	67	74	68	76	54	70	68	73	68	54	45	70	79	67										
1	6	77	65	57	63	54	76	74	61	59	54	40	67	69	43										
1	7	78	54	53	62	55	59	61	72	68	56	60	65	79	68										
1	8	74	71	72	84	57	77	61	75	81	67	47	84	90	52										
1	9	46	58	61	63	48	45	45	70	66	59	64	67	69	60										
1	10	74	64	47	57	37	64	80	57	58	53	51	41	62	61										
2	11	82	72	68	74	58	77	79	76	76	76	68	73	84	44										
2	12	61	63	67	73	38	69	65	65	61	65	52	64	65	60										
2	13	21	25	50	37	52	35	36	43	47	50	65	56	43	61										
2	14	69	70	75	76	73	79	75	70	76	72	52	65	80	72										
2	15	75	72	67	70	63	77	74	75	72	75	74	62	72	59										
2	16	37	35	64	49	40	24	32	50	45	49	60	39	46	39										
3	17	79	71	59	70	67	84	65	67	73	67	55	68	75	74										
3	18	67	67	67	59	40	57	90	64	63	59	72	55	71	62										
3	19	73	47	54	54	30	55	60	54	59	57	49	41	61	58										
3	20	38	51	52	30	27	34	37	34	43	44	32	33	40	44										
3	21	78	80	56	62	58	69	65	71	73	67	66	67	75	68										
3	22	49	58	66	72	67	52	54	75	80	75	68	77	84	71										
3	23	82	72	42	55	43	60	64	65	62	55	62	48	71	70										
3	24	77	73	77	81	49	67	66	75	74	70	73	74	84	80										
3	25	69	75	60	66	61	75	59	68	70	67	55	55	71	59										
3	26	53	53	46	63	73	60	55	62	68	72	69	58	65	71										
3	27	49	62	57	62	70	61	51	66	69	59	51	61	64	63										
3	28	65	64	82	80	54	65	73	66	72	65	46	73	76	69										
3	29	78	71	64	72	59	73	74	77	78	73	64	61	83	75										

## Appendix F: Nonparametric Tests SST Work Environment Scores – Sample Groups

### Hypothesis Test Summary

	Null Hypothesis	Test	Sig.	Decision
1	The medians of SST Current are the same across categories of Group.	Independent-Samples Median Test	.657	Retain the null hypothesis.
2	The distribution of SST Current is the same across categories of Group.	Independent-Samples Kruskal-Wallis Test	.836	Retain the null hypothesis.
3	The medians of SST Potential are the same across categories of Group.	Independent-Samples Median Test	.828	Retain the null hypothesis.
4	The distribution of SST Potential is the same across categories of Group.	Independent-Samples Kruskal-Wallis Test	.849	Retain the null hypothesis.

Asymptotic significances are displayed. The significance level is .05.

## Appendix G: Mean Comparison SST Work Environment Scores – Sample Groups

SST CURR	SST POT	Participants	Groups	Combined SST scores
3	3	1	Group 1	3,0
4	5	2	Group 1	4,5
2	3	3	Group 1	2,5
3	4	4	Group 1	3,5
4	4	5	Group 1	4,0
3	3	6	Group 1	3,0
3	5	7	Group 1	4,0
4	5	8	Group 1	4,5
3	4	9	Group 1	3,5
2	3	10	Group 1	2,5
4	5	11	Group 2	4,5
3	4	12	Group 2	3,5
2	2	13	Group 2	2,0
4	4	14	Group 2	4,0
4	4	15	Group 2	4,0
2	2	16	Group 2	2,0
4	4	17	Group 3	4,0
3	3	18	Group 3	3,0
2	3	19	Group 3	2,5
1	2	20	Group 3	1,5
4	4	21	Group 3	4,0
4	5	22	Group 3	4,5
3	3	23	Group 3	3,0
4	5	24	Group 3	4,5
3	4	25	Group 3	3,5
3	3	26	Group 3	3,0
3	4	27	Group 3	3,5
4	4	28	Group 3	4,0
4	5	29	Group 3	4,5

## Appendix H: Mean Comparisons IPC – Sample Groups

	Group 1	Group 2	Group 3
Use of Memory	67,60	57,50	65,92
Memory Strategies	61,00	56,17	64,92
Pragmatic	59,40	65,17	60,15
Exploration	64,90	63,17	63,54
Analysis	48,10	54,00	53,69
Rules	59,60	60,17	62,46
Categorisation	61,30	60,17	62,54
Integration	65,60	63,17	64,92
Complexity	66,80	62,83	68,00
Logical reasoning	58,80	64,50	63,85
Verbal			
Conceptualization	52,10	61,83	58,62
Judgement	63,90	59,83	59,31
Quick Insight	73,40	65,00	70,77
Gradual Improvement	57,10	55,83	66,46

## Appendix I: Nonparametric Tests IPC – Sample Groups

**Hypothesis Test Summary**

	<b>Null Hypothesis</b>	<b>Test</b>	<b>Sig.</b>	<b>Decision</b>
1	The medians of Use of Memory are the same across categories of Group.	Independent-Samples Median Test	.803	Retain the null hypothesis.
2	The distribution of Use of Memory is the same across categories of Group.	Independent-Samples Kruskal-Wallis Test	.752	Retain the null hypothesis.
3	The medians of Memory Strategies are the same across categories of Group.	Independent-Samples Median Test	.801	Retain the null hypothesis.
4	The distribution of Memory Strategies is the same across categories of Group.	Independent-Samples Kruskal-Wallis Test	.717	Retain the null hypothesis.
5	The medians of Pragmatic are the same across categories of Group.	Independent-Samples Median Test	.155	Retain the null hypothesis.
6	The distribution of Pragmatic is the same across categories of Group.	Independent-Samples Kruskal-Wallis Test	.432	Retain the null hypothesis.
7	The medians of Exploration are the same across categories of Group.	Independent-Samples Median Test	.358	Retain the null hypothesis.
8	The distribution of Exploration is the same across categories of Group.	Independent-Samples Kruskal-Wallis Test	.924	Retain the null hypothesis.
9	The medians of Analysis are the same across categories of Group.	Independent-Samples Median Test	.501	Retain the null hypothesis.
10	The distribution of Analysis is the same across categories of Group.	Independent-Samples Kruskal-Wallis Test	.399	Retain the null hypothesis.
11	The medians of Rules are the same across categories of Group.	Independent-Samples Median Test	.574	Retain the null hypothesis.
12	The distribution of Rules is the same across categories of Group.	Independent-Samples Kruskal-Wallis Test	.767	Retain the null hypothesis.
13	The medians of Categorisation are the same across categories of Group.	Independent-Samples Median Test	.315	Retain the null hypothesis.
14	The distribution of Categorisation is the same across categories of Group.	Independent-Samples Kruskal-Wallis Test	.911	Retain the null hypothesis.

15	The medians of Integration are the same across categories of Group.	Independent-Samples Median Test	.979	Retain the null hypothesis.
16	The distribution of Integration is the same across categories of Group.	Independent-Samples Kruskal-Wallis Test	.990	Retain the null hypothesis.
17	The medians of Complexity are the same across categories of Group.	Independent-Samples Median Test	.323	Retain the null hypothesis.
18	The distribution of Complexity is the same across categories of Group.	Independent-Samples Kruskal-Wallis Test	.651	Retain the null hypothesis.
19	The medians of Logical reasoning are the same across categories of Group.	Independent-Samples Median Test	.085	Retain the null hypothesis.
20	The distribution of Logical reasoning is the same across categories of Group.	Independent-Samples Kruskal-Wallis Test	.234	Retain the null hypothesis.
21	The medians of Verbal Conceptualization are the same across categories of Group.	Independent-Samples Median Test	.501	Retain the null hypothesis.
22	The distribution of Verbal Conceptualization is the same across categories of Group.	Independent-Samples Kruskal-Wallis Test	.129	Retain the null hypothesis.
23	The medians of Judgement are the same across categories of Group.	Independent-Samples Median Test	.231	Retain the null hypothesis.
24	The distribution of Judgement is the same across categories of Group.	Independent-Samples Kruskal-Wallis Test	.585	Retain the null hypothesis.
25	The medians of Quick Insight are the same across categories of Group.	Independent-Samples Median Test	.979	Retain the null hypothesis.
26	The distribution of Quick Insight is the same across categories of Group.	Independent-Samples Kruskal-Wallis Test	.836	Retain the null hypothesis.
27	The medians of Gradual Improvement are the same across categories of Group.	Independent-Samples Median Test	.018	Reject the null hypothesis.
28	The distribution of Gradual Improvement is the same across categories of Group.	Independent-Samples Kruskal-Wallis Test	.060	Retain the null hypothesis.

Asymptotic significances are displayed. The significance level is .05.



**Appendix J: Mean Comparison Cognitive Styles – Three Sample Groups**

	Trial and	Reflective	Structured	Explorative	Reactive	Logical	Holistic	Integrative	Quick Insight	Intuitive	Metaphoric	Analytical	Learning	Memory
Group 1	1,60	7,00	7,30	4,20	3,60	8,40	8,50	10,00	12,90	12,00	4,20	4,50	10,80	10,00
Group 2	4,67	8,33	8,00	8,50	4,83	9,17	7,33	8,00	9,50	10,33	6,50	5,83	8,33	5,67
Group 3	2,38	7,92	7,15	4,62	3,31	9,00	9,00	8,15	11,92	10,54	4,54	5,85	11,92	8,69

## Appendix K: Spearman Correlation Analysis CPP – Demographics

Spearman Correlation Demographics		SST																
		Current	Potential	T38	RAND	REFL	STR	EXPL	IMPL	LOG	HOL	INTE	QINS	INTU	META	ANA	LRN	MEM
Age ranked	Correlation Coefficient	.091	.003	.024	-.134	.052	-.193	.037	-.042	-.061	.155	-.130	.229	-.244	.040	.190	.318	.032
	Sig. (2-tailed)	.638	.988	.900	.489	.788	.316	.849	.830	.753	.423	.503	.233	.202	.838	.324	.092	.870
	N	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29
Educational Background	Correlation Coefficient	.129	.173	.155	-.253	.184	-.190	.291	-.202	.026	.061	-.047	.105	.092	-.040	.051	-.176	-.150
	Sig. (2-tailed)	.504	.370	.422	.185	.040	.324	.126	.293	.894	.754	.808	.589	.636	.838	.793	.360	.436
	N	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29
Gender	Correlation Coefficient	.258	.208	.183	-.154	.017	.038	.017	-.157	.148	.101	-.117	.334	-.021	-.301	.050	.297	.233
	Sig. (2-tailed)	.177	.278	.343	.426	.931	.846	.931	.416	.444	.601	.545	.076	.914	.112	.795	.118	.223
	N	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29

Spearman Correlation Demographics		Use of Memory															
		Memory	Strategies	Pragmatic	Exploration	Analysis	Rules	Categorisation	Integration	Complexity	Logical reasoning	Verbal	Conceptualization	Judgement	Insight	Gradual Improvement	
Age ranked	Correlation Coefficient	-.108	-.088	.097	.179	.134	.004	.147	.021	.123	.174	.173	.149	.063	.366		
	Sig. (2-tailed)	.577	.651	.616	.352	.487	.982	.448	.912	.526	.366	.370	.441	.747	.051		
	N	29	29	29	29	29	29	29	29	29	29	29	29	29	29		
Educational Background	Correlation Coefficient	-.064	.106	.184	.221	.276	.086	-.265	.210	.200	.243	.132	.043	.116	-.144		
	Sig. (2-tailed)	.742	.585	.340	.249	.147	.657	.165	.275	.298	.205	.493	.823	.550	.456		
	N	29	29	29	29	29	29	29	29	29	29	29	29	29	29		
Gender	Correlation Coefficient	.116	.066	.141	.278	.212	.199	.212	.232	.245	.279	-.033	.183	.228	.336		
	Sig. (2-tailed)	.548	.732	.465	.144	.271	.301	.270	.225	.200	.143	.864	.343	.233	.075		
	N	29	29	29	29	29	29	29	29	29	29	29	29	29	29		

## Appendix L: Nonparametric Tests - SST Work Environment Scores – Age Ranked

### Hypothesis Test Summary

	Null Hypothesis	Test	Sig.	Decision
1	The medians of SST Current are the same across categories of Age ranked.	Independent-Samples Median Test	.654	Retain the null hypothesis.
2	The distribution of SST Current is the same across categories of Age ranked.	Independent-Samples Kruskal-Wallis Test	.596	Retain the null hypothesis.
3	The medians of SST Potential are the same across categories of Age ranked.	Independent-Samples Median Test	.730	Retain the null hypothesis.
4	The distribution of SST Potential is the same across categories of Age ranked.	Independent-Samples Kruskal-Wallis Test	.816	Retain the null hypothesis.

Asymptotic significances are displayed. The significance level is .05.

## Appendix M: Nonparametric Tests SST Work Environment Scores – Education

### Hypothesis Test Summary

	Null Hypothesis	Test	Sig.	Decision
1	The medians of SST Current are the same across categories of Educational Background.	Independent-Samples Median Test	.641	Retain the null hypothesis.
2	The distribution of SST Current is the same across categories of Educational Background.	Independent-Samples Kruskal-Wallis Test	.741	Retain the null hypothesis.
3	The medians of SST Potential are the same across categories of Educational Background.	Independent-Samples Median Test	.570	Retain the null hypothesis.
4	The distribution of SST Potential is the same across categories of Educational Background.	Independent-Samples Kruskal-Wallis Test	.634	Retain the null hypothesis.

Asymptotic significances are displayed. The significance level is .05.

## Appendix N: Nonparametric Tests SST Work Environment Scores - Gender

### Hypothesis Test Summary

	Null Hypothesis	Test	Sig.	Decision
1	The medians of SST Current are the same across categories of Gender.	Independent-Samples Median Test	.244	Retain the null hypothesis.
2	The distribution of SST Current is the same across categories of Gender.	Independent-Samples Kruskal-Wallis Test	.533	Retain the null hypothesis.
3	The medians of SST Potential are the same across categories of Gender.	Independent-Samples Median Test	.972	Retain the null hypothesis.
4	The distribution of SST Potential is the same across categories of Gender.	Independent-Samples Kruskal-Wallis Test	.626	Retain the null hypothesis.

Asymptotic significances are displayed. The significance level is .05.

## Appendix O: Overview International Strategic Management

	Objectives / What does it aim for? / Learning outcomes	Skills/ Abilities needed	Course Content	Teaching and assessment
<p><b>M.Sc. International Strategic Management</b></p> <p><i>Setup:</i></p> <ul style="list-style-type: none"> <li>-60ECTS</li> <li>-Compulsory core courses 30 ECTS</li> <li>-3 elective courses 5 ECTS each</li> <li>-Degree project 15 ECTS</li> </ul> <p><i>Entry requirements:</i></p> <ul style="list-style-type: none"> <li>-Undergraduate degree with minimum 3 years/ 180 ECTS</li> <li>-Minimum 60 ECTS in Business Administration</li> <li>-Excellent results from internationally recognised university</li> <li>-Strong English language communication skills</li> </ul>	<ul style="list-style-type: none"> <li>- Provide breadth and depth in central areas of strategic management</li> <li>-Train in advanced problem-solving skill</li> <li>-Introduce, explain and apply methodological aspects in business administration</li> <li>-Insight in current R&amp;D work</li> <li>-Provide knowledge in how to analyse, formulate and implement strategies</li> <li>-Skills in recognising challenges in business environment and ensure sustainable success</li> <li>-Learn (right) decision making</li> <li>-Ensure thorough understanding of strategic thinking</li> <li>- Stimulate students to develop knowledge &amp; critical understanding within ISM</li> <li>-Understand and apply models &amp; theories when analysing practical/theoretical challenges</li> <li>-How to use different research methods in the context business &amp; management related research</li> <li>-Develop competencies required by employers</li> <li>-Good communication skills</li> <li>-Work effectively in group work, with people from different background</li> <li>-Deal with high workload: Effective time-management</li> </ul>	<ul style="list-style-type: none"> <li>-Integrate knowledge, analyse, assess and deal with complex phenomena, even when limited information is available</li> <li>-Independently identifying and formulating issues and plans</li> <li>-Clear presentation and discussion of issues, having knowledge behind them</li> <li>-Work individually &amp; in groups with different cultures</li> <li>-Understand impact of cultural differences</li> <li>-Understand the role of a firm in a bigger system</li> <li>-Take different perspectives on problems</li> </ul>	<ul style="list-style-type: none"> <li>-Introduce basic models &amp; theories within the central areas of ISM</li> <li>-Additional perspectives &amp; models providing in-depth insight into practical and theoretical areas related to ISM</li> <li>-Conduct own research &amp; demonstrate ability to independently apply the accumulated knowledge</li> <li>-Challenging and exciting learning experience</li> <li>-State-of-the art research: Links to practice, solving real company issues</li> <li>-Latest thinking in comparative international strategic management</li> <li>- Putting learning into practice</li> <li>-State-of-the art research: Links to practice, solving real company issues</li> <li>-Latest thinking in comparative international strategic management</li> </ul>	<ul style="list-style-type: none"> <li>-Comparing theoretical concepts / models with real and complex problems</li> <li>-Mix of lectures, seminars, practical examples, guest lectures, case discussion, written &amp; oral assignments</li> <li>-Active participation in class expected</li> <li>-Individual responsibility for learning</li> <li>-Group work</li> <li>-Teachers assigning the groups</li> <li>-Attendance to all lectures recommended</li> </ul>

	<b>Objectives / What does it aim for? / Learning outcomes</b>	<b>Skills/ Abilities needed</b>	<b>Course Content</b>	<b>Teaching and assessment</b>
<b>BUSN 11 Strategic Management (Core course)</b> 7.5 ECTS	<ul style="list-style-type: none"> <li>-Achieve knowledge about strategic conditions for organisations and other types of organisational and the interplay with their environment</li> <li>-Applying knowledge in practical decision making</li> <li>-Thorough knowledge of the consequences for corporate management regarding:               <ul style="list-style-type: none"> <li>- Strategic decision making in knowledge and technology intensive industries</li> <li>-Implications of digital economy on strategy, organisational structure and networking</li> <li>-New business models in digital and knowledge-based industries</li> <li>-The situation when companies confront rapid changes and globalisation</li> <li>-Role of entrepreneurs in developing strategies challenging market threats</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>-Ability to use theories, models and concepts to analyse complex practical issues and suggest appropriate suggestions or solutions</li> <li>-Ability to integrate different models /concepts into coherent analysis</li> <li>-Present analysis, conclusion &amp; theory clearly and unambiguously</li> <li>-Integrate theory into coherent problem solving or analysis</li> <li>-Develop recommendations to strategic action in a complex situation</li> </ul>	<ul style="list-style-type: none"> <li>-Overview over different schools of strategic management: Classical business policy theory, industrial organisation economics, resource-based view</li> <li>-Discuss how changes in the marketplace pose challenges to strategic managers</li> <li>-Discuss different types of objectives for leadership in big corporation vs. small new ventures</li> </ul>	<ul style="list-style-type: none"> <li>-Lectures</li> <li>-Discussion</li> <li>-Legendary teacher</li> <li>-Two specific Group assignments</li> <li>-Written individual examination</li> </ul>
<b>BUSN 10 Corporate Governance in Theory and Practice (Core course)</b> 7.5 ECTS	<ul style="list-style-type: none"> <li>-Understanding of models of corporate governance systems &amp; their application in different contexts</li> <li>-Contemporary theories of corporate governance</li> <li>-Forms of regulation &amp; actors involved in regulation</li> <li>-contextual differences regarding the role of shareholders/stakeholders</li> <li>-Role &amp; function of auditor</li> <li>-Role &amp; function of board of directors</li> </ul>	<ul style="list-style-type: none"> <li>-Ability to apply theories and models to analyze corporate governance systems and the role of different actors</li> <li>-Ability to apply theories and models to analyze the role and function of different actors in the government of firms</li> <li>-Present analyses and conclusions clearly and unambiguously</li> </ul>	<ul style="list-style-type: none"> <li>-Promote theoretical perspectives &amp; empirical knowledge about corporate governance systems and its parts</li> <li>-Interaction of the different governance mechanisms</li> <li>-Focus on board of directors, auditors and top management</li> <li>-Course division in four parts</li> </ul>	<ul style="list-style-type: none"> <li>-Lectures</li> <li>-Classroom discussions</li> <li>-Guest lectures</li> <li>-Case study solved in a group</li> <li>-Written individual examination</li> </ul>

	<b>Objectives / What does it aim for? / Learning outcomes</b>	<b>Skills/ Abilities needed</b>	<b>Course Content</b>	<b>Teaching and assessment</b>
<b>BUSN 76: Performance Measurement and Management (Elective course)</b> 7.5 ECTS	<ul style="list-style-type: none"> <li>-Knowledge and understanding within performance measurement and management</li> <li>-Broad command of the field &amp; deeper knowledge of certain parts</li> <li>-Insight into current research and development work</li> <li>-Deeper methodological knowledge in the field of performance measurement and management</li> </ul>	<ul style="list-style-type: none"> <li>-Ability to integrate knowledge and to analyse, assess, and deal with complex phenomena, even when limited information is available</li> <li>-Ability to independently identify &amp; formulate issues and to plan &amp; carry out advanced tasks within specified time limits</li> <li>-Ability to clearly present &amp; discuss conclusions and the knowledge &amp; arguments behind them</li> <li>-Use theories and methodologies to analyse and assess practice</li> <li>-Have the ability to work in multicultural teams</li> </ul>	<ul style="list-style-type: none"> <li>-Process of measuring financial and non-financial performance of organisations</li> <li>-Process of managing people's decision-making &amp; behaviour based upon measured performance</li> <li>-Financial &amp; non-financial measures &amp; methods to establish key performance indicators that are linked to overall strategy &amp; objectives of an organisation</li> <li>-Use of measures in decision making</li> <li>-Human motivation and incentives</li> <li>-Judgment and choice bias when reading statistical bias</li> </ul>	<ul style="list-style-type: none"> <li>-Class-room experiments</li> <li>-Case assignments</li> <li>-Live-case (Real problem cases)</li> <li>-Lectures</li> <li>-Written individual examination</li> </ul>
<b>BUSN 14: Global Business and Sustainability (Elective course)</b> 7.5 ECTS	<ul style="list-style-type: none"> <li>-Wide knowledge and understanding of models of the role of sustainability in corporate and business level management from a global perspective</li> <li>-Contemporary theories of corporate social responsibility</li> <li>-Market &amp; firm value creation in relation to environmental and social sustainability</li> <li>-Stakeholder vs. shareholder perspectives on sustainability &amp; globalisation</li> <li>-Role of social and environmental sustainability &amp; its impact on firm strategies and managerial decision making</li> </ul>	<ul style="list-style-type: none"> <li>-Gather and integrate information</li> <li>-Ability to use theories, models and concepts to analyze complex strategic problems and to propose suitable solutions</li> <li>-Ability to present analyses and conclusions in a clear and consistent manner</li> <li>-Ability to assess impact of sustainability on firm strategies and strategic decision making &amp; to develop proposals for further development</li> <li>-Develop skills to respond to opportunities in ways that balance business-interests with wider social and resource implications</li> </ul>	<ul style="list-style-type: none"> <li>-Promote theoretical perspectives &amp; empirical knowledge about challenges of corporate activities in the context of sustainability</li> <li>-Managerial perspectives on the integration of business objectives with wider social and environmental well-being as a key function of contemporary management</li> <li>-Help students become knowledgeable and socially and environmentally responsible business leaders</li> <li>-Forward thinking learning experience, revealing the importance of sustainability to all sectors of global business</li> <li>-Outline how social and environmental sustainability influences the firm</li> </ul>	<ul style="list-style-type: none"> <li>-Lectures</li> <li>-Class room discussions</li> <li>-Guest lectures</li> <li>-Group assignment</li> <li>-Case studies</li> <li>-Paper seminar</li> <li>-Written individual examination</li> </ul>

	Objectives / What does it aim for? / Learning outcomes	Skills/ Abilities needed	Course Content	Teaching and assessment
<b>BUSN 64 Strategic Cost Management (Elective course)</b> 7.5 ECTS	<ul style="list-style-type: none"> <li>-Deep and thorough knowledge of investment analysis, credit analysis &amp; costing within a strategic framework</li> <li>-Give tools to investigate business problems</li> <li>-Specialized knowledge about investment planning &amp; costing on aggregate level</li> <li>-Knowledge about model building</li> <li>-Familiarization with major &amp; recent literature in the field</li> <li>-Introduce important research techniques</li> <li>-Deepened knowledge of investment planning in different contexts (companies &amp; public-sector enterprises)</li> <li>-Deepened knowledge about costing with a focus on the determination of capital cost in different settings</li> </ul>	<ul style="list-style-type: none"> <li>-Ability to critically examine &amp; discuss how economic theories and methods can be applied in different situations</li> <li>-Ability to independently &amp; critically handle quantitative &amp; qualitative empirical material and use scientific methods to analyze such material</li> <li>-Ability to present results in a clear, pedagogic and interesting manner</li> <li>-Able to search for, collect &amp; evaluate information from various sources (theoretical &amp; empirical literature within Business Administration)</li> <li>-Create &amp; use advanced models for investment analyses &amp; costing by means of Excel</li> <li>-Ability to undertake further studies with high degree of autonomy</li> <li>-Ability to independently formulate &amp; demarcate relevant business investment &amp; costing problems</li> <li>-Ability to choose adequate theoretical and empirical methods to analyze problems</li> </ul>	<ul style="list-style-type: none"> <li>-Investment planning, the theoretical methods and empirical observations from different contexts</li> <li>-Application of investment calculation methods in complex business situations</li> <li>-Costing &amp; pricing of products &amp; services in companies &amp; in technical infrastructure</li> <li>-Different principles for valuations of companies</li> <li>-Strategic Cost Management</li> <li>-Value creation and profitability analysis</li> </ul>	<ul style="list-style-type: none"> <li>-Lectures</li> <li>-2 Case assignments in groups</li> <li>-Individual written examination</li> </ul>
<b>BUSN 01 Corporate Finance and Value Management (Core course)</b> 5 ECTS	<ul style="list-style-type: none"> <li>-Knowledge of corporate valuation, especially of analyzing corporate performance, building a valuation model, calculation of the cost of capital &amp; testing, interpreting and presenting results of a valuation</li> <li>-Knowledge of value creation, especially value drivers &amp; measurement of creation of shareholder value</li> </ul>	<ul style="list-style-type: none"> <li>-Emphasis on problem solving, focus on analyse and solving corporate financial and governance problems</li> <li>-Ability to identify problems &amp; situations where theories learnt are applicable</li> <li>-Ability to communicate results and analyses &amp; conclusions of an empirical investigation clearly and unambiguously</li> <li>-Ability to use theories &amp; concepts to value companies and analyze corporate shareholder-value creation</li> </ul>	<ul style="list-style-type: none"> <li>-Capital budgeting &amp; corporate valuation</li> <li>-Present value techniques for valuing companies &amp; investments</li> <li>-Usage of financial statement data for business analysis &amp; valuation</li> <li>-Different models for measuring value creation &amp; emphasis on relation between economic value creation and corporate valuation</li> <li>-Relative valuation technique</li> <li>-Emphasis on developing skills in building advanced models for valuation in Excel</li> </ul>	<ul style="list-style-type: none"> <li>-Lectures</li> <li>-Exercises</li> <li>-Case assignment</li> <li>-Written examination</li> </ul>



	Objectives / What does it aim for? / Learning outcomes	Skills/ Abilities needed	Course Content	Teaching and assessment
<b>BUSN 17 Innovation Management (Core Course)</b> 5 ECTS	<p>Understanding of:</p> <ul style="list-style-type: none"> <li>-How innovation affects the competitive dynamics of international markets,</li> <li>-How managers can strategically manage innovation,</li> <li>-How managers can implement innovation strategies</li> <li>-Prepare for careers working with innovation, managing development of novel devices, methods or materials for application to commercial or practical purposes</li> <li>-Management of innovation as a central driver for competitive advantage</li> <li>-Introduce innovation management as a strategic process</li> </ul>	<ul style="list-style-type: none"> <li>-Ability to use theories and frameworks to:</li> <li>Assess competitive dynamics of a situation &amp; formulate a strategy for innovation</li> <li>-Ability to:</li> <li>-Understand central dilemmas &amp; trade-offs that pertains to the management of innovation,</li> <li>-Understand relevant social and ethical aspects that pertains the management of innovation,</li> <li>-Critically evaluate relevance and credibility of information &amp; knowledge</li> </ul>	<p>Divided into three parts:</p> <ul style="list-style-type: none"> <li>-First part: Understanding the industrial dynamics of innovation</li> <li>-Second part: How to formulate a strategy for innovation</li> <li>-Third part: How to implement an innovative project</li> </ul>	<ul style="list-style-type: none"> <li>-Lectures &amp; course literature around three modules (In alignment to the course content)</li> <li>-Active participation during lectures</li> <li>-Group assignment</li> <li>-Examination based on individual performance</li> </ul>

	Objectives / What does it aim for? / Learning outcomes	Skills/ Abilities needed	Course Content	Teaching and assessment
<b>BUSN 03 Research Methods (Core Course)</b> 5 ECTS	<ul style="list-style-type: none"> <li>-Relationship between theory, design &amp; methods in effectively addressing research questions</li> <li>-Ability to account for the function and structure of research problems &amp; their operationalisation</li> <li>-Ability to account for principles behind a literature review &amp; a theoretical framework</li> <li>-Ability to account for the key considerations affecting the design of a research project</li> <li>-Ability to account for different approaches and methods for collecting data through qualitative and quantitative approaches &amp; to explain their advantages &amp; disadvantages</li> <li>-Ability to account for different methods &amp; techniques for analyzing &amp; presenting data</li> <li>-Ability to account for how quality of a research is assessed</li> <li>-Ability to account for the structure of a thesis and the functions of various components</li> <li>-Ability to account for the ethical aspects of conducting and reporting research</li> </ul>	<ul style="list-style-type: none"> <li>-Critically analyze relationships between theory, design and methods</li> <li>-Critically analyze &amp; Argue about function &amp; structure of research problems</li> <li>-Practical skills needed to search, identify and structure relevant literature</li> <li>-Outline &amp; discuss key considerations affecting design of research project</li> <li>-Conduct data collection</li> <li>-Employ different methods and techniques for analysing &amp; presenting data</li> <li>-Ability to critically assess quality of research design</li> <li>-Ability to structure thesis &amp; connect its various components</li> <li>-Ability to conduct an argument about ethical aspects</li> <li>-Critically analyze key considerations affecting the design of a research project</li> <li>-Critically analyze &amp; critique different ways of analyzing and presenting data</li> </ul>	<ul style="list-style-type: none"> <li>-Various considerations &amp; approaches involved in planning &amp; executing an academic research project</li> <li>-Formulate a research problem, operationalize it into a research design that is appropriate given constraints on time &amp; resources</li> <li>-Conducting &amp; presenting a literature review, structuring a methodological approach in relation to suitable empirical materials &amp; applying appropriate methods for data collection &amp; analysis</li> <li>-Critically assess research work in terms of quality</li> <li>-Discuss various ethical aspects of social research in general and management research in particular</li> </ul>	<ul style="list-style-type: none"> <li>-Lectures and seminars structured in eight modules</li> <li>-Written individual examination</li> </ul>

	Objectives / What does it aim for? / Learning outcomes	Skills/ Abilities needed	Course Content	Teaching and assessment
<b>BUSN 09 Degree Project (Core Course)</b> 15 ECTS	<ul style="list-style-type: none"> <li>-Develop ability to conduct independent scientific study</li> <li>-Design &amp; conduct a study that addresses research question based upon appropriate methodological considerations &amp; relevant theories within areas covered by the Masters program</li> <li>-Ability to present study written &amp; orally</li> <li>-Understand different research philosophies, methodologies &amp; empirical methods</li> <li>-Understand basic assumptions and differences</li> <li>-Ability to conduct empirical research</li> </ul>	<ul style="list-style-type: none"> <li>-Competencies in the application of theories &amp; models to empirical data</li> <li>-Ability to communicate in English on issues, debates and problems</li> <li>-Ability to follow the development of knowledge in the field of strategic management through journal articles &amp; research-oriented books as well as more popular press</li> <li>-Can work both individually and as a member of a group with students from different cultures in order to solve practical problems &amp; manage a more extensive project</li> <li>-Select &amp; evaluate different theories &amp; research methods in relation to specific practical problems</li> <li>-Identify relevant research topics within international strategic management</li> <li>-Design &amp; carry out research independently</li> <li>-Ability to make assessments within international strategic management, taking into account relevant scientific, social and ethical aspects, and demonstrate an awareness of ethical aspects in research &amp; development works</li> </ul>	<ul style="list-style-type: none"> <li>-Final written master thesis</li> <li>-Oral presentation &amp; defense at a final seminar</li> <li>-Work independently &amp; in small groups</li> <li>-Design and conduct own study</li> <li>-Search &amp; selection of appropriate theoretical area &amp; research methodology, collection of relevant empirical data through field studies &amp; documentary research</li> <li>-Read &amp; discuss work of other students, opponent on another project</li> <li>-Discussant during intermediate seminars</li> <li>-Active participation in three final seminars</li> </ul>	<ul style="list-style-type: none"> <li>-Supervision</li> <li>-Discussion individually or in smaller groups of students</li> <li>-Examination primarily based on written master thesis, but performance during discussions &amp; final seminars are also considered</li> </ul>

Sources: Lund University (2018a), Lund University (2018b), Lund University (2018c)

## Appendix P: Detailed Description Courses

<b>Strategic Management</b>
The course aims at providing knowledge on how organisations can develop strategies to challenge market threats and manage their interplay with their environment. The skills addressed, refer to both systems and analytical thinking yet the latter one is more emphasised. The ability to integrate different models (systems thinking) is present but thorough knowledge of the consequences of corporate management and the analysis of complex practical issues (analytical thinking) are more in focus.
<b>Corporate Governance in Theory and Practice</b>
The course aims at understanding of models of corporate governance systems and how they can be applied in different contexts. The skills addressed, incorporate both analytical and systems thinking. Even though students are ought to learn analysing (analytical thinking) corporate governance systems, it is emphasised that this skill is to be applied in a systems-oriented context (systems thinking) of different actors and different contexts. Hence, the course is leaning more towards systems thinking.
<b>Performance Measurement and Management</b>
The course aims at receiving broad knowledge about the field of performance measurement and management as well as deeper knowledge of particular parts. The skills addressed, incorporate both analytical and systems thinking. Students are to analyse phenomena (analytical thinking) and integrate knowledge to deal with complexity under limited information (systems thinking). The course is therefore balancing between analytical and systems thinking.
<b>Global Business and Sustainability</b>
The course aims at providing a wide knowledge on sustainability and how market and firm value can be created in relation to environmental and social sustainability. The skills addressed, incorporate both analytical and systems thinking. Students are to develop the skill of analyse (analytical thinking) complex strategic problems and to integrate (systems thinking) knowledge received. Nevertheless, the course is leaning more towards system thinking as the focus is on developing the skills from a global perspective.
<b>Strategic Cost Management</b>
The course aims providing a deep and thorough knowledge of strategic cost management with specialised knowledge in particular fields. The skills addressed, include mainly analytical thinking and only partly systems thinking. The focus is mainly placed on critical examination and the ability to choose adequate methods for an analysis (analytical thinking). The skill of understanding the usability of different economic theories in different situations indicates a reference to systems thinking. Still systems thinking is addressed only to a minor extent and the course tends towards more analytical thinking.

<b>Corporate Finance and Value Management</b>
The course aims at teaching how to value corporation and especially how to analyse corporate performance. The skills addressed are focusing mainly on analysing & identifying situation of corporate financial and governance problems. Hence, the course is leaning more towards analytical thinking.
<b>Innovation Management</b>
The course introduces innovation management as a strategic process, creating an understanding of how innovation affects markets and how innovation can be managed in order to be a driver for competitive advantage. The skills addressed, incorporate both analytical and systems thinking. Emphasis is placed on using theories & frameworks to analyse (analytical thinking) to assess the competitive dynamics (systems thinking). Hence, the course is keeping a balance between analytical and systems thinking.
<b>Research Methods</b>
The course aims at understanding the relation between theory, design and methods to address a research question. The skills considered include both analytical and systems thinking. Critical analysis (analytical thinking) of theory, design, and methods as well as structuring (systems thinking) a research are major skills of this course. Hence, the course is keeping a balance between analytical and systems thinking.
<b>Degree Project</b>
The degree project incorporates the design and execution of a scientific study. Whereas the skills of selecting & evaluating different research methods mainly rely on analytical thinking. The ability to follow the development of knowledge in the field of strategic thinking as well as managing a more extensive project over 10 weeks point more towards systems thinking. Hence, the course is keeping a balance between analytical and systems thinking.

*Source: Lund University (2018c)*

