

MCS package ambidexterity in Swedish SBUs

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ABSTRACT

This thesis investigates how the package of management control systems (MCSs) can be 'designed and used' to facilitate for ambidextrous orientation within strategic business units (SBUs). Also, the thesis investigates what characterizes SBUs with different levels of ambidexterity. After performing cluster analysis, using questionnaire data from 71 Swedish SBUs, our taxonomy shows that the SBUs with highest values of ambidexterity are characterized by; *analyzer*-type strategies and low levels of predictability and competition intensity in their environments. These SBUs also have well-balanced MCS packages on an aggregated level, in terms of exploitative and explorative 'design and use' of the individual MCSs. Moreover, the results show significant (1% level) correlations between different ambidexterity concepts, indicating a relation between MCS 'design and use' and ambidextrous firm behavior.

Keywords: Ambidexterity, MCS package, management control systems, exploitation, exploration, firm behavior.

Acknowledgments

We would like to send a special thanks to our tutor, Torkel Strömsten, for giving us the opportunity to take part in the international research project. Also, Torkel have provided us with valuable comments and suggestions during the writing process.

We would also like to thank our associates within the international research project, Maria and Andrea, for good cooperation regarding data collection and processing.

This thesis would not have been possible without the contribution from the organizations and individuals that have chosen to participate in the international project; thus providing us with a data set, as well as with useful insights during the interview process. Many thanks to those who have contributed.

Lastly, we would like to send a special thanks to our cohabitants David Rönqvist and Magnus Ekeberg, who have continuously supported us during our lengthy thesis work.

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List of abbreviations

**	Significant at the 1% level
AIS	Accounting Information System
CEO	Chief Executive Officer
G&B	Gibson and Birkinshaw
M&S	Malmi and Sandelin
MCS	Management Control Systems
Mgmt/Mgr	Management/Manager
MIS	Management Information System
OPEX	Operating Expenditures
TMT	Top Management Team
SMEs	Small and Medium-sized Enterprises
SBU	Strategic Business Unit
r	Pearson's product-moment correlation coefficient

1 Introduction

In this section, the background and purpose of the thesis is presented, as well as its delimitations and disposition.

1.1 Background

In recent years, the concept of ambidexterity has gained an increasing interest within organizational research. The reason behind this escalating interest is that empirical studies have shown a clear relation between ambidextrous firm behavior and improved performance (He & Wong, 2004; Lubatkin et al., 2006; Gibson & Birkinshaw, 2004). The concept of ambidexterity first evolved within the field of organizational learning. As of today, ambidexterity is defined as the simultaneous execution of two opposing firm behaviors; exploitation and exploration (March, 1991; Tushman & O'Reilly, 1996). The concept is therefore discussed in terms of a balancing act. Raisch and Birkinshaw (2008, p. 376) claim that ambidexterity is currently shaping a new paradigm within organizational research. Consequently, the research within the area is of an explorative nature. As theory is in its infancy and conceptualization is still in progress, systematic evidence is hard to produce. Thus, in this thesis we hope to contribute to the theoretical development of ambidexterity concepts by taking an exploratory rather than confirmatory approach.

Using questionnaire data from 71 Swedish strategic business units (SBUs), the focus of this thesis will be to investigate how an ambidextrous orientation can be achieved by means of the 'design and use' of management control systems (MCSs). Investigation of MCSs as a package has been called for by researchers in later years, as it is assumed the MCSs are interrelated, and thus should not be studied in isolation (Malmi & Brown, 2008). Research on MCS packages could, according to Malmi and Brown (2008, p. 288), broaden the understanding of "*how to design MCS in order to produce the desired outcomes*". Despite the argument for studying MCS as a package, the empirical research within the area is limited and the design question regarding MCS packages remains unanswered. Malmi and Sandelin have initiated an international research project, to investigate this further. This thesis has its point of departure within this project. The MCSs of the Swedish SBUs will therefore be studied as an integrated whole, to capture how they cooperatively work to facilitate the balancing act of exploitative and explorative behaviors.

Moreover, research has shown that the internal context of a company facilitates for ambidexterity (Gibson & Birkinshaw, 2004). As this thesis is an exploratory study, it will further investigate the existence of an association between different concepts of ambidexterity.

1.2 Purpose and research question

Even though the number of published articles within the research area of ambidexterity is increasing, there are still few empirical studies. The phenomenon of ambidextrous behavior is poorly understood and theory suffers from shortcomings. One shortcoming is the lack of a concise theoretical framework - which might be explained by the contingency-based foundation of the theoretical concept (Hotz, 2010). Thus, we see a gap in previous research and therefore the purpose of this thesis is to contribute to the development of the research area concerning the concept of ambidexterity. The thesis will have an exploratory approach and an empirical study is conducted on large Swedish companies.

The aim of this thesis is to investigate the extent of *MCS package ambidexterity* within Swedish SBUs and what environmental and internal factors that can explain it. After analyzing questionnaire data from interviews with managers of strategic business units (SBUs) in 71 large Swedish firms, we hope to contribute to the understanding of how the design of control systems can create an ambidextrous orientation for SBUs whereby they can improve their future performance. Our research question follows:

How can an ambidextrous orientation be achieved within SBUs through the 'design and use' of MCS packages? - And what characterizes SBUs with different levels of ambidexterity?

1.3 Delimitations

In this thesis, there will be no focus on the relation between strategy and *individual* MCS design, as this has been thoroughly discussed and examined in previous literature. Further, the thesis does not cover the relation between ambidexterity and firm performance as well as the relation to firm survival, as positive relations already have been established in previous studies (He & Wong, 2004; Lubatkin et al., 2006; Gibson & Birkinshaw, 2004). Thus, we will take these positive performance and survival effects as given and focus on *how an ambidextrous orientation within organizations can be achieved*.

1.4 Disposition

The thesis is structured as follows. First, the theoretical framework is outlined. Secondly, the method is described. Third, the empirical findings are shown. Fourth, the results are analyzed and discussed. Lastly, conclusions are drawn and the implications for future research are discussed.

2 Theoretical framework

In this section, the theoretical framework of our thesis is outlined. First, different concepts of ambidexterity are discussed and second, the idea to investigate MCSs as an integrated package is incorporated. The section ends by linking these two research areas together, which provides the theoretical foundation of this thesis.

2.1 Ambidexterity

Within organizational research, the concept of ambidexterity is generally considered as the simultaneous execution of, as well as a balancing act between, exploitative and explorative firm behavior. As ambidexterity is proven to enhance both performance and the probability of firm survival, the area has gained a lot of attention. Raisch and Birkinshaw (2008, p. 376) claim that ambidexterity is currently shaping a new paradigm within organizational research. Consequently, the research within the area still has an explorative nature, as theory is in its infancy and conceptualization is still in progress.

2.1.1 Performance and firm survival

In their study, He and Wong (2004) test the ambidexterity hypothesis and investigate how ambidexterity influences firm performance in context of firms' approach to technological innovation. Based on a sample of 206 manufacturing firms, their study shows first, that interaction between exploitative and explorative orientations has a positive relation with sales growth and second, that imbalance between the orientations is negatively related to sales growth. Moreover, He and Wong (2004) argue that the tension between exploitation and exploration should be managed on a continuous basis.

Also Gibson and Birkinshaw (2004, p. 215) find support in their research for a mediating role of ambidexterity between internal context and performance. They have, by asking individuals how they separately perceive the internal context and the business unit performance, found support of their hypothesis: *"Ambidexterity mediates the relationship between context – as captured by the interaction of discipline, stretch, support and trust – and business unit performance."*

Probst and Raisch (2005) examine the logic of organizational crises. They argue that in order to prevent failure and achieve long-term success, firms need to balance the four success factors; *growth rate, ability to change, visionary leadership* and a *success-oriented culture*. They conclude that in times of crisis, firms can employ either transformation or stabilization programs to recover the balance. Raisch and Birkinshaw's (2008, p. 400) interpretation is that *"balanced firms are less prone to failure than firms with a one-sided orientation"*. Thus, the long-term contribution to firm survival could be just as important as the short-term performance effects.

As described in section 1.3 *Delimitations* the positive relationship between ambidexterity and firm performance as well as ambidexterity and firm survival have been proved by previous studies within the area. Therefore, this is considered as a given fact in this thesis.

2.1.2 Defining ambidexterity

Based on previous research, ambidexterity is defined as the simultaneous execution of exploitation and exploration. The concept is therefore a balancing act between the two behaviors. In this thesis it is assumed that the larger focus on both behaviors, the higher level of ambidexterity is achieved. However, if a company puts equal focus on both, it is considered as behaving ambidextrous – whether it is on a high or low level. This is the definition of ambidexterity we will use when investigating the extent of *MCS package ambidexterity* within Swedish SBUs.

2.1.3 Exploitation and exploration

The two twin concepts of exploitation and exploration have become known in literature, as organizational adaption has been more frequently discussed. The two concepts have however been used in different meanings, which requires a clarification of the context wherein the different definitions have emerged.

2.1.3.1 Defining the concepts

The twin concepts were first discussed in terms of organizational learning (Gupta, Smith & Shalley, 2006). According to Gupta, Smith and Shalley (2006) there seem to be a consensus within the research field that exploration refers to learning and innovation within organizations. However, a similar consensus is missing regarding the meaning of exploitation. Some view the two concepts as different types of learning, and some as the presence versus absence of learning. March (1991, p. 85) states that *“The essence of exploitation is the refinement and extension of existing competencies, technologies and paradigms”* and that *“the essence of exploration is experimentation with new alternatives”*, thus implying that both activities can be assumed to contain a certain degree of learning. Even though we agree with this view of organizational learning, it is of minor importance to our thesis.

He and Wong (2004, p. 481) have captured a more general view of the twin concepts when stating: *“Exploration implies firm behaviors characterized by search, discovery, experimentation, risk taking and innovation, while exploitation implies firm behaviors characterized by refinement, implementation, efficiency, production and selection.”* Thus, exploration and exploitation can be seen as two different concepts of firm behavior and not as pure strategies. This is the definition of the twin concepts that we adapt in our thesis.

2.1.3.2 Are exploitation and exploration two ends of a continuum or orthogonal?

According to March (1991) both exploitation and exploration are necessary for long-term adaption. He does however see the two as incompatible to each other as he argues that the concepts are competing about scarce resources. The more resources put on exploration, the

fewer is left for exploitation. This argument is however met with skepticism as it is argued that some resources, like information and knowledge, are not necessarily scarce, but can rather be shared without limitations between the two concepts (Gupta, Smith & Shalley, 2006). Katila and Ahuja (2002 cited in Gupta, Smith & Shalley, 2006) have instead conceptualized exploitation and exploration as orthogonal variables. The view of the twin concepts being orthogonal is adapted in our thesis, as it is logical when applying the conceptualization of ambidexterity that we describe in later sections.

2.1.3.3 Structural ambidexterity versus "punctuated equilibrium"

Tushman and O'Reilly (1996) examine patterns in organizational evolution. They argue that due to the increasing pace of change, the competitive environment of firms is unlikely to remain stable. Periods of gradual change will be interrupted by significant discontinuities ("punctuated equilibria"). Thus, while internal congruence drives short-term performance, successful firms may suffer from inertia when they face revolutionary change. They call this "the success syndrome". They therefore argue that, *"ambidextrous organizations are needed if the success paradox is to be overcome. The ability to simultaneously pursue both incremental and discontinuous innovation and change results from hosting multiple contradictory structures, processes, and cultures within the same firm"*. (Tushman & O'Reilly, 1996, p. 24)

Although consensus exists that both exploitation and exploration are needed to gain long-term success, there is no consensus in how to achieve the balance between the two. There are several competing views answering this question.

The first view is called *structural ambidexterity*. Ambidextrous organization design is described to comprise loosely connected subunits, with different aims. The exploitative units are often large with centralized processes and culture, while the explorative units are smaller, with more decentralized processes. Thus, the assumption is that the two type of units work simultaneously, but highly detached from each other. On the other hand, *punctuated equilibrium* constitutes an alternative view of how to achieve ambidexterity. It describes a temporal cycling between exploitation and exploration, where longer periods of exploitation are interrupted by short and intense exploration periods, which ends up in a balancing act between the two concepts within a single unit. (Gupta, Smith and Shalley, 2006)

2.1.4 Contextual ambidexterity

Gibson and Birkinshaw (2004) develop the concept of ambidexterity further and dismiss both structural ambidexterity and punctuated equilibrium as ways of achieving ambidexterity. The alternative concept, that they call *"Contextual ambidexterity"*, is defined as *"the behavioral capacity to simultaneously demonstrate alignment and adaptability across an entire business unit"* (Gibson & Birkinshaw, 2004, p. 209). This implies that the subunits do not have to be loosely connected; rather the analysis can be conducted within

a single unit. This is the approach used in this thesis, as ambidexterity is investigated within single SBUs. This concept will be referred to as *G&B Contextual ambidexterity*.

2.1.4.1 Conditions for contextual ambidexterity

Gibson and Birkinshaw (2004) build their interpretation of contextual ambidexterity on a concept developed by Ghoshal and Bartlett (1994). The concept identifies four attributes that are behavior framing for individuals within an organization. First, *discipline* is used to encourage the organization's members to strive to meet all expectations generated by their commitments. Discipline is conceived by having clear standards of performance, an open system for fast feedback and consistency in applying sanctions. Second, *stretch* is used to make members strive for more ambitious objective. This is reached by having a shared ambition, by developing a collective identity and by creating a feeling of individual contribution to the overall purpose of the organization. Third, *trust* encourages members to rely on the commitments of each other. This is achieved by involvement in decision processes regarding the individuals that are affected and staffing of positions with people who are and are seen to be competent. Last, *support* means lending assistance to others. This is achieved by having mechanisms allowing for information exchange, freedom of initiative at lower levels and having senior managers in the role of providing guidance and help, instead of exercising authority. (Ghoshal & Bartlett, 1994; Gibson & Birkinshaw, 2004)

Gibson and Birkinshaw (2004) see these four attributes as forming the internal context of an organization. The more these four attributes are applied, the higher likeliness that the organization has good conditions to form an ambidextrous behavior.

2.1.4.2 Outcome of contextual ambidexterity

According to Gibson and Birkinshaw (2004), managers can 'design and use' MCSs to shape the internal control context. The outcome of *G&B Contextual ambidexterity* is therefore appreciated as the extent to which the package of MCSs is ambidextrous. This is measured by Gibson and Birkinshaw (2004) by looking at what actual steering effects the package of MCSs is perceived to facilitate for within the organization.¹ This measure is hereafter referred to as *G&B MCS package ambidexterity*.

¹ See section 11.2.2 *G&B MCS Package ambidexterity* in Appendix 3.

2.1.5 Summary of previous research within the area of ambidexterity

In this table, important contributions to the development of ambidexterity research are summarized.

Article	Research question	Theory	Method/data	Key findings
March 1991	How can the process of organizational learning be understood?	Organizational learning and adaptation.	Conceptual paper. Models the development of knowledge in organizations.	Tendency to emphasize exploitation in adaptive processes (predictable returns). The tendency becomes self-destructive in the long-run as it degrades organizational learning.
Ghoshal and Bartlett 1994	What factors influence "managerial choices" and individual actions within the firm?	Organizational context. Focus on behavior framing attributes.	Longitudinal field study in one firm.	Establishment of stretch, trust, discipline and support enables and motivates <i>distributed initiative</i> and <i>mutual cooperation</i> . Jointly they support organizational learning.
Gibson and Birkinshaw 2004	Which conditions give rise to contextual ambidexterity, and what are the consequences for business unit performance?	Organizational ambidexterity. Build on organization context literature (Ghoshal & Bartlett 1994).	Survey data supported by interviews of 4195 individuals in 41 business units.	Ambidexterity is related to organizational context dimensions and mediates the relation between context and performance. Ambidexterity is related to high performance.
Tushman and O'Reilly 1996	How can firms successfully manage evolutionary and revolutionary change?	Organizational evolution.	Qualitative study of large firms.	Organizational structure, culture and management can help firms to be ambidextrous and thus manage evolutionary and revolutionary change.
He and Wong 2004	How do exploitation and exploration jointly influence firm performance?	Ambidexterity and performance. Focus on technological innovation.	Survey data from 206 manufacturing firms.	Interaction between exploration and exploitation is positively related with sales growth. Relative imbalance between the strategies is negatively related to sales growth.
Probst and Raisch 2005	Why do successful firms collapse at the height of their success? How can firms prevent failure?	Organizational crisis. "The Burnout Syndrome" and "The Premature Aging Syndrome".	In-depth study of 100 large organizational crises.	Most firms grow and change too rapidly, have too powerful managers and develop an excessive success culture. If, instead, firms lack these factors, they age prematurely, causing failure. To stay successful, firms need to balance the extremes.

Table 1. Summary of important contributions in ambidexterity research.

2.2 MCS package

G&B Contextual ambidexterity is assumed to create an internal environment for MCSs to function within. As this internal environment is complex, the MCSs cannot be assumed to function completely isolated from each other. This view is supported by Malmi and Brown (2008), who argue that MCSs need to be studied as a package of systems. Also, as Otley (1980, p. 422) stated; “*it is explicitly recognized that AIS design, MIS design, organizational design and the other control arrangements of the organization ... form a package which can only be evaluated as a whole*”. Thus, the individual control system is seen as a part of the wider control structure of the organization, and the appropriateness of the system is influenced by other planning and control systems. Moreover, Malmi and Brown (2008, p. 288) argue that inclusion of administrative and cultural controls as part of the MCS package could broaden the understanding of “*how to design MCS in order to produce the desired outcomes*”.

Malmi and Brown (2008) discuss three challenges when it comes to studying MCSs as a package: i) defining MCS as a concept, ii) determining what should be included in MCSs as a package and iii) the complex nature of large MCSs. As discussed below, Malmi and Brown (2008) provides a framework for studying MCSs. The aim of the framework is to help future research reveal and examine the relations between different subsystems in the wider control package.

2.2.1 Malmi and Brown’s (2008) framework

Malmi and Brown (2008) present a framework for studying MCS as a package. Their proposed framework includes five main groups of management controls: *Planning, Cybernetic controls, Rewards and compensation, Administrative controls* and *Cultural controls*.² Further, they assume the controls and control systems to be used to direct employee behavior.

First, *Planning controls* set the goals and standards for the organization, as well as the expectations of employee behavior and effort. There are two main approaches to planning, long-run planning with strategic focus and short-term action planning with tactical focus. Planning controls are “*ex ante*” (Flamholtz et al., 1985 cited in Malmi & Brown, 2008). Second, *Cybernetic controls* contain quantifiable measures that capture the underlying processes, by which standards and targets are to be achieved. The controls include feedback process and variance analysis so outcomes can be compared with standards. Cybernetic components of the MCS include budgets, financial and non-financial measures, and hybrid measures. (Green & Welsh, 1988 cited in Malmi & Brown, 2008) Third, *Rewards and compensation controls* create goal congruence between individuals and teams within the organization and the organization itself. Rewards and compensations are supposed to motivate and enhance the effort of organizational members and thus increase performance

² See Malmi and Brown (2008) and Brown (2005) for further details and references.

(Bonner & Sprinkle, 2002 cited in Malmi & Brown, 2008). Fourth, *Administrative controls* are divided into three groups: organizational structure and design, internal governance and policies and procedures. Administrative controls affect the contacts and collaborations between units, distribute authority and accountability and constrain behaviors and actions (Abernethy & Chua, 1996; Merchant & Van der Stede, 2007 cited in Malmi & Brown, 2008). Last, *Cultural controls* influence the thoughts and actions of organizational members through beliefs, values and social norms (Flamholtz et al., 1985 cited in Malmi & Brown, 2008).

Cultural Controls						
Clans		Values			Symbols	
Planning		Cybernetic Controls				Reward and Compensation
Long range planning	Action planning	Budgets	Financial Measurement Systems	Non Financial Measurement Systems	Hybrid Measurement Systems	
Administrative Controls						
Governance Structure		Organisation Structure			Policies and Procedures	

Figure 1. The framework as depicted by Malmi and Brown (2008, p. 291).

2.2.2 Strategic typologies

In previous research, the relationship between strategy and the ‘design and use’ of *individual* MCSs has been heavily emphasized. As the research within the area is extensive, it is hardly neglected. However, in this thesis, the strategic typologies of previous research are used as descriptive variables for SBUs with different levels of ambidextrous behavior.

Miles and Snow et al. (1978) discuss the process of organizational adaptation. In their model of adaptive processes, “the adaptive cycle”, managers are subject to strategic choices that are categorized into three generic problems: entrepreneurial, engineering and administrative problems. Defenders, prospectors and analyzers use different strategies as they move through the adaptive cycle to solve these problems. *Defenders* strive for stability and try to secure a limited part of the total market. They focus on producing a narrow line of products efficiently. *Prospectors* engage in the search for new product and market opportunities. Here, being innovative and flexible is more important than high profitability. *Analyzers* are mixed organizations that can combine aspects of both defenders and prospectors. Analyzers balance the need for efficiency in stable domains with the need for flexibility in changing domains. Analyzers thus need differentiated administrative systems.

Porter’s (1980,1985 cited in Langfield-Smith, 1997) competitive framework considers the strategic positioning of the firm in relation to its market and competitors. Porter (1980,

1985) outlined three generic competitive strategies: cost leadership, differentiation and focus. A firm with *cost-leadership* strategy competes on having lower costs than its rivals. Cost leaders benefit from economies of scale and tight cost control and are thus able to set lower prices, which appeals to price-sensitive consumers. With *differentiation* strategy, firms produce unique and high-quality products that are sold at higher prices. Further, the *focus* strategy firm targets a limited set of the market.

2.2.2.1 Relating the twin concepts to strategic typologies

According to Hotz (2010), more exploitative strategies are oriented towards efficiency. Of the above mentioned strategic typologies, he classifies Porter's *cost-leadership strategy* and Miles and Snow's *defenders* as having strong exploitative characteristics. Further, he says that explorative strategies are innovation-oriented. Of the above mentioned, the *differentiation* strategy of Porter and the *prospectors* of Miles and Snow are seen as having strong explorative characteristics.

2.2.2.2 Criticism against strategic typologies

Chenhall (2003, p. 152) criticize previous MCS research for focusing on how MCS should be formed to fit with different strategic archetypes. Instead he argues that the view of strategy should be dynamic and MCS should help managers to combine structures, technologies and environmental conditions in order to enhance performance. MCS is thus a tool for implementing strategies, but also provides learning and information used in strategy formulation (Chenhall, 2003).

2.2.3 Implications for the MCS package

The *role and design* of the MCS differs between defenders and prospectors in a similar way as for cost leaders and differentiators (Langfield-Smith, 1997). Defenders/cost leaders have formal, detailed and broad scope MCSs, focused on reducing uncertainty. Efficiency is important, activities are standardized and control is centralized. On the other hand, prospectors/differentiators cannot use comprehensive MCSs, as environmental changes require the firms to be able to respond rapidly. The MCS consist of flexible processes and aggregated measures. Project teams and broad job descriptions are used to support innovation. (Langfield-Smith, 1997; Chenhall, 2003)

Regarding *cost control*, defenders/cost leaders are more associated with tight cost control compared to prospectors/differentiators. The focus of defenders/cost leaders is on efficiency so costs are translated into goals and budgets and then closely monitored. (Langfield-Smith, 1997; Chenhall, 2003)

The *rewarding of performance* can take either an objective or subjective approach. Research has found that in defenders and cost leaders, an objective and formal approach is usually taken. In contrast, prospectors and differentiators have been found to use a more subjective and informal approach, as they are exposed to a larger extent of environmental

uncertainty and success factors are harder to quantify. (Langfield-Smith, 1997; Chenhall, 2003)

Simons (1990 cited in Langfield-Smith, 1997) indicates how the controls are utilized by firms with different strategies. The defender, acting in a stable environment, use diagnostic controls for many controllable aspects of the low-cost strategy, while interactive controls are used for technological change as it could destabilize the firm's competitive position. For the prospector, interactive controls consisted of planning and budgeting systems. Due to the uncertain environment, planning and budgeting were used for setting the agenda and to stimulate debate on actions and strategy.

2.2.3.1 MCS characteristics ascribed to exploration and exploitation

The characteristics of MCSs can be attributed to either the concept of exploitation or exploration, as shown in the table below.

Control system	Exploitation	Exploration
Strategic planning		
Content and specificity	Extensive and specific planning	Less extensive
Frequency	Frequent review and revision	Less frequent
Short-term planning		
Action autonomy	Top-down	Autonomous
Target autonomy	Top-down	Autonomous
Content	Comprehensive	Freedom for tradeoffs
Frequency	Fixed	Adjusted dynamically
Performance measurement and evaluation		
Cost control	Fixed	Flexible
Broadness	More measures, objective	Less measures and more aggregate measures, subjective
Stretch	Less stretch	Stretch
Diagnostic use	More diagnostic use	Less diagnostic use
Interactive use	Less interactive use	More interactive use
Frequency	Frequent evaluation	Less frequent
Rewards and compensation		
Rewarding formula	More measures	Less measures and more aggregate measures, higher level
Objectivity	Objective	Subjective
Equity	Individual behavior	Collective achievement, collaboration
Organization structure and management processes		
Governance structure	Less: Cross-boundary, frequent meetings, active rotation, extensive participation	Cross-boundary, frequent meetings, active rotation, extensive participation
Information environment	Less information exchange	Rich information exchange
Decision authority	Less decision authority	Subordinate autonomy
Rules and procedures - ethical behavior	-	Ethical controls needed if performance pressure (stretch)
Rules and procedures - strategic search activities	Extensive rules and procedures	Trust and subordinate freedom
Organization culture and values		
Recruitment, training, socialization	-	Emphasize cultural integrity

Table 2. MCS characteristics with exploitative and explorative orientation. Based on Malmi and Sandelin's (2010b) construct review and previous MCS research.

2.3 MCS package ambidexterity

2.3.1 Defining MCS package ambidexterity

As explained in section 2.1.4.2 *Outcome of contextual ambidexterity*, *G&B Contextual ambidexterity* is facilitating for the extent of ambidexterity within the MCS package, which is measured by *G&B MCS package ambidexterity*. However, since the aim of this thesis is to examine how the ‘design and use’ of MCS packages can facilitate an ambidextrous behavior, the measure developed by Gibson and Birkinshaw (2004) is considered to be insufficient. Therefore, we have developed our own measure by looking deeper into the ‘design and use’ of MCS packages. We simply call this *MCS package ambidexterity*. Thus, our measure and *G&B MCS package ambidexterity* are both measuring the same concept, but with two different point of departures.

In sum, we agree with Gibson and Birkinshaw (2004), that the ‘design and use’ of MCSs are forming the internal control context. Further, we emphasize that this context facilitates for the individual MCSs to function together as a package. Depending on how well they work as an integrated whole, the higher values of ambidexterity can be achieved within the MCS package. Therefore, the definition of *MCS package ambidexterity* is the extent to which the ‘design and use’ of MCS packages facilitates balance between exploitative and explorative behavior.

2.3.2 Organizational ambidexterity

Whereas *MCS package ambidexterity* facilitates balance between exploitative and explorative behavior, organizational ambidexterity is seen as the outcome of this balancing act. Thus, organizational ambidexterity measures the perception of why and how the organization succeeds, in terms of ambidextrous behavior. The concept of organizational ambidexterity was brought up by Malmi and Sandelin (2010b) in the construct review for the international research project; thereby we label it *M&S Organizational ambidexterity*. In this thesis, *M&S Organizational ambidexterity* is assumed to be strongly influenced by *MCS package ambidexterity*.

2.3.3 The assumed linkage between the ambidexterity concepts

Based on the framework of Malmi and Brown (2008), as well as Gibson and Birkinshaw’s (2004) findings; we assume that MCS ‘design and use’ form *G&B Contextual ambidexterity*, which in turn is seen to facilitate for the *MCS package ambidexterity*. Further, we assume that *MCS package ambidexterity* contributes to the level of *M&S Organizational ambidexterity*.



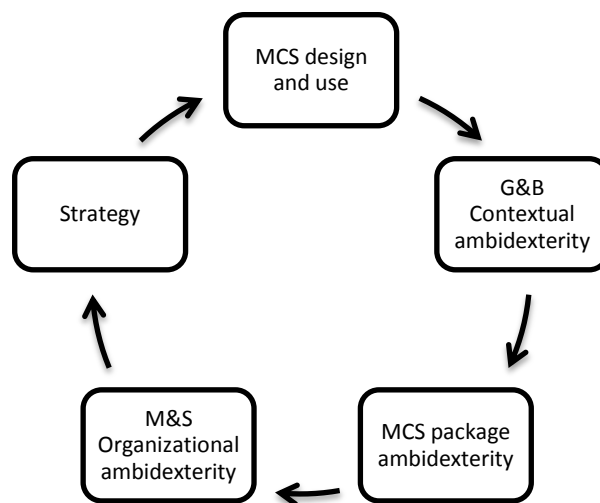
Figure 2. The assumed linkage between the different concepts of ambidexterity.

2.4 Summary of theoretical framework

Ambidexterity as a concept attracts attention, as studies have shown a positive relation to both performance and firm survival. Ambidexterity is generally defined as the simultaneous execution and the balancing act between exploitative and explorative firm behavior. The twin concepts are seen as orthogonal and the level of analysis is single SBUs.

It is further assumed that individual MCSs should not be analyzed in isolation, but rather as a package to enhance the understanding of the interaction between them. The measure of *MCS package ambidexterity* is based on the 'design and use' of the MCS package, as with regards to exploitation and exploration within the respective control systems. The development of this measure is guided by the implications provided by previous MCS and ambidexterity research. Also, previous research has shown clear influence of strategy on the design of MCSs, which is why this will be checked for and used as a descriptive variable in the analysis.

The concepts of ambidexterity are assumed to be linked to each other. The initial 'design and use' of individual MCSs are seen to influence the behavior framing attributes, upon which *G&B Contextual ambidexterity* is built. Next, a linkage between *G&B Contextual ambidexterity* and *MCS package ambidexterity* is assumed. Further, *M&S Organizational ambidexterity* is seen as the outcome of *MCS package ambidexterity*. Firm behavior, in terms of *M&S Organizational ambidexterity*, will affect the strategies that are undertaken by firms. This closes the circle below; as strategies are often assumed to influence MCS 'design and use'.



3 Methodology

In this section, the methodology of the thesis is discussed. First, the international research project is described. Second, the research process of our thesis is outlined. Third, the modeling of the ambidexterity measures is specified. Fourth, we perform a cluster analysis. Lastly, reliability and validity is discussed.

3.1 The international research project

Teemu Malmi and Mikko Sandelin, at *Aalto University - School of Economics* in Finland, have initiated an international research project within the area of management control. In their research proposal, Malmi and Sandelin (2010a) pinpoint that even though it has been acknowledged that management accounting systems are dependent upon other control and information systems, it has not been accounted for in previous research. Rather, previous research has focused upon examining interrelationships between single MCSs. Malmi and Sandelin (2010a) argue that *“even the most established theories in MCS research have produced inconclusive findings about MCS, not to speak of the MCS packages”*. Therefore, their initiated project aims to study: i) *The contingent nature of MCS packages*, ii) *Interrelationships and design of MCS packages* and iii) *Effectiveness of MCS packages*.

In spring 2011, there were twelve European countries participating in the research project. The countries were then in different stages of the research process – some had finished the data collection while some had not yet begun. In each country a sample of the largest companies were selected and asked to participate. The intention is that each country will nationally analyze the data, which will be used for publications of books and education material. On an international level, the data will be used for the purpose of the research project.

3.1.1 Questionnaire

3.1.1.1 Development of the questionnaire

Within the international research project a questionnaire was formed (Malmi & Sandelin, 2010a). The framework of Malmi and Brown (2008) was used to frame the research phenomenon. As discussed in section 2.2.1 *Malmi and Brown’s (2008) framework*, it includes five main groups of management controls. A comprehensive literature review was performed by Malmi and Sandelin, with the aim to operationalize the theoretical constructs. The literature review covered research in the areas of MCSs, strategic planning, strategic management and organizational design. Subsequently, a construct review was written, to explain and justify the questions included in the questionnaire. Further, Malmi and Sandelin’s questionnaire was evaluated by six practitioners and five academic experts, and thereafter rephrased to improve on the form and content. (Malmi & Sandelin, 2010a)

3.1.1.2 Content of the questionnaire

The questionnaire sections cover six control systems as well as the internal and external contexts of the SBUs. The covered MCSs are: A) *Strategic planning: Content and Process*, B)

Short-term planning: Content and Process, C) Performance measurement and evaluation, D) Rewards and Compensation, E) Organizational structure & Management processes and F) Organization culture and values. The last section is: G) Organization and Environment. By including numerous questions and constructs in each section, the questionnaire is expected to allow for examination of MCSs as a package (Malmi & Sandelin, 2010a).

3.1.1.3 Structure of the questionnaire

All but one of the questions in the sections A-F are formed in a structured manner. In research this means that the questions do not leave room for other answers than the alternatives given in the questionnaire (Trost, 2007). The mere part of the questions is formulated as statements to which the interviewee must take a stand, often on a scale from 1-7 (e.g. disagree – agree). Some questions ask the interviewee to choose one of suggested alternatives (e.g. A, B, C, D or E). The only non-structured question regards different performance measures upon which rewards are based, which naturally are specific to individual SBUs.

3.1.2 Sample

3.1.2.1 Level and unit of analysis

The level and unit of analysis in the project is strategic business units (SBUs). This level of analysis is selected because a larger variety of MCS practices is likely at lower organizational levels. Thus, these lower levels are unsuitable due to the state of infancy in theoretical knowledge about possible MCS package configurations. Moreover, the intended interviewees are the CEOs or other managing directors within the SBUs. These have been chosen to capture how SBU top management control and manage their subordinates. (Malmi & Sandelin, 2010a)

Different definitions of ‘SBUs’ have been used in literature. In practice, they have been equalized to business areas or divisions. However, the main criterion when identifying the SBUs for the international research project was a high level of autonomy regarding strategies and the implementation of these. Thus, independent SBUs are identified for the purposes of the project; each SBU shall face a different competitive environment than other units within the firm and be independent of other units’ inputs and outputs. (Malmi & Sandelin, 2010a)

3.1.2.2 Sampling criteria

In addition to the abovementioned SBU-criterion, there are two more sampling criteria needed to be fulfilled within the international research project. First, each industry category should to some extent be evenly distributed in the sample. This criterion is used to be able control for industry effects and enable analysis of industry variances regarding MCS packages. Second, the sample is adjusted for size measured by headcounts. The assumption is that *“the larger the SBU is, the more sophisticated needs the MCS package be”* (Malmi & Sandelin, 2010a, p. 8). These criteria make the sample selective and thus not random.

Further, the sample is not restricted to listed companies. In Finland the sample consists of 250 SBUs. (Malmi & Sandelin, 2010a)

3.1.3 Data collection

Even though a formal questionnaire is developed, the data is collected by conducting face-to-face interviews, during which the questionnaire is filled in. There are several reasons supporting this way of procedure. First, as the questionnaire is very comprehensive covering many areas, the number of questions is large. Thus, if the questionnaire were sent by email the risk of not receiving any response would be large. Second, the typical threats of surveys – validity and reliability – have to be handled, as questions may be differently interpreted by respondents than initially intended when developing the questionnaire. Therefore, it is essential to control for the interpretations of the questions in each interview situation. Third, the interviews allow for additional information exchange regarding actual management control practices, as the interviewees often think out loud and thereby provide more information than asked for in the formal questionnaire. The face-to-face approach also allows for better guidance by the interviewers, when definitions need to be explained. The choice of having a formal questionnaire was based on the possibilities to use quantitative research methods. Thus, it enables statistical analyses like cluster analysis and exploratory and confirmatory factor analyses. (Malmi & Sandelin, 2010a)

3.2 Our research

3.2.1 The request

In our position as master students, we were asked to participate in the international research project by our tutor. Our task has been to conduct interviews, and thereby we were allowed to take part of the data collected nationally in Sweden.

3.2.2 Sample

The sampling of Swedish SBUs was conducted at Örebro University. The SBUs have been selected using the criteria described in the research proposal by Malmi and Sandelin. First, firms were chosen based on having a headcount of more than 500 employees. Secondly, these firms were adjusted for industry belonging, to get an even distribution between the sectors of manufacturing, 'trade and retail' and services. The sample derived from *Affärsdata* consisted of 187 firms. The firms selected in Sweden were divided between three collaborating universities according to geographical convenience; Stockholm School of Economics, University of Gothenburg and Örebro University. The University of Gothenburg and Örebro University conducted their interviews during fall 2010. The Stockholm School of Economics conducted interviews during spring 2011. Of the selected 187 firms, 71 SBUs chose to participate in the project. Thus, the participation rate was 38%.

3.2.3 Data collection

3.2.3.1 Process

The process of collecting data in form of conducting interviews, in the manner described in section 3.1.3 *Data collection*, started with initial telephone contact with either the interviewee or his or hers assistant. Secondly, an e-mail with background information about the international research project was sent to the interviewee. In a third step, the response from the intended interviewee was received. In the case of positive response an appointment was made to conduct the interview.

The interviews were held at the offices of the respondents – often in the own office or in a conference room. First, the respondent was asked to shortly present the SBU's operations and organization. Thereafter, the questionnaire was filled in. The interviewers had the task to support the respondents; to answer questions about different definitions and how certain concepts were to be interpreted and to guide the interviewee to answer the questions at the right level of analysis.

3.2.3.2 Standardization

The procedure of interviewing was tried to be kept as standardized as possible, to avoid interviewer influence on the respondent's answers to the questions. The question should not only be the same, but also be posed in the same way. Further, the respondents should understand the questions in the same way (Hussey & Hussey, 1997). However, even though the interview environment was similar for all interview situations, the individual engagement and interest differed among the respondents and the interaction between interviewers and interviewees also differed accordingly. It is an important element of an interview that the interviewee feels comfortable together with the researchers, and that they trust the promise of confidentiality to be kept (Trost, 2007). The standardization of the questionnaire itself is high, although two different versions were used. The two versions contained the same questions but in two different languages: Swedish and English. The interviewees were given the option to choose which version they preferred to use. Further, different pairs of interviewers have conducted the interviews at the different universities. Even though not intended, the interviewers might have interpreted the constructs behind the questions differently. In that case, the interpretations could have affected the interviewers' way of guiding the interviewees and thereby also affected the results from different universities. However, extensive discussions regarding construct interpretation were conducted before performing the interviews.

3.2.4 The challenge in finding the right research question

Normally when conducting a questionnaire survey, the purpose of the research is given by the initiator. According to Trost (2007) both the purpose and the definitions of concepts and indicators must be clearly specified before going through with the survey. Further, the purpose of the study shall be the determining factor when selecting the method to use for collecting and analyzing the results.

Since the questionnaire was developed to fulfill the purposes of the international research project, which aims to further bring understanding to the MCS research, we wanted to participate in this development. As we had no influence upon the construction of the questionnaire, our challenge was to find a research question that was of contemporary interest and that also could be answered by the collected data. We aimed for a research question that would capture the concept of ambidexterity. However, we were unable to follow a normal procedure as described by Trost (2007), since the type of data was known to us before we had formulated a research question for the thesis.

3.2.5 Quantitative approach

Often, the choice between qualitative and quantitative methods is given by looking at how the main question and purpose are formulated (Trost, 2007). Studies within management control are often of a qualitative nature, but quantitative studies are also used. In our case, we chose to conduct a quantitative study, given the character of the data available to us.

3.3 Model specification

3.3.1 Selection of questions

To be able to answer our research question – *How can an ambidextrous orientation be achieved within SBUs through the ‘design and use’ of MCS packages?* – we build a model based on a selection of questions from the questionnaire. These questions function as indicators of either exploitation or exploration for each control system and form the basis for our *MCS package ambidexterity* measure.

3.3.1.1 Indicators

The construct review written by Malmi and Sandelin (2010b) guided the choice of which questions should be used as indicators of exploitation and exploration. The MCS characteristics ascribed to each of the twin concepts are summarized in Table 2. The selection was discussed with an academic expert within the area of management research. Four questions were selected for each of the management control systems – two as indicators of exploitation and two as indicators of exploration – from Sections A-F in the questionnaire. The chosen questions are indicated in Appendix 3. The indicators were measured on a scale from 1-7, and questions that were not measured on this scale initially were therefore rescaled.

3.3.2 Measurement of aggregated values of exploitation and exploration

First, the values of exploitation and exploration for each control system were constructed and secondly, weight together to produce the aggregated measure for each SBU. The weights were derived from the respondents themselves, as they were asked to appreciate the importance of each control system.

3.3.3 Measurement and values of MCS package ambidexterity

With inspiration from Gibson and Birkinshaw (2004), we decided to use the aggregated measures of exploitation and exploration to calculate the value of ambidexterity for the individual SBUs. As ambidexterity implies simultaneous execution and balancing of the twin concepts, and in accordance with the method used by Gibson and Birkinshaw (2004), the measures of exploitation and exploration are simply multiplied with each other to gain the value of *MCS package ambidexterity*.

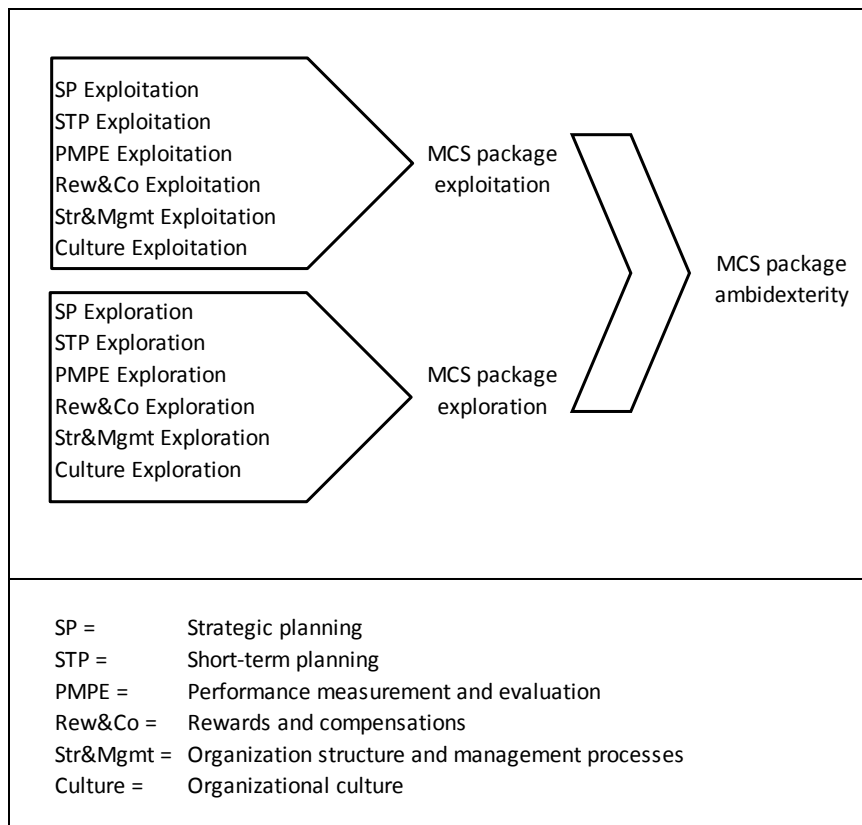


Figure 3. Our model for MCS package ambidexterity.

Also, for the purpose of deeper analysis, the ambidexterity measures for each individual MCS were calculated by multiplying the exploitative and explorative measures for each individual system. The approach is described by Figure 1 in Appendix 1.

3.3.4 Measurement and values of other ambidexterity measures

3.3.4.1 G&B Contextual ambidexterity

G&B Contextual ambidexterity is captured by question G3 in the questionnaire, where a-d measures *performance management context* (discipline and stretch) and e-h measures *social context* (support and trust).³

³ See section 11.2.1 *G&B Contextual ambidexterity* in Appendix 3.

3.3.4.2 G&B MCS package ambidexterity

G&B MCS package ambidexterity is captured by question G4 in the questionnaire, where a-c measures *alignment* (exploitation) and d-f measures *adaptability* (exploration).⁴

3.3.4.3 M&S Organizational ambidexterity

In the construct review, Malmi and Sandelin (2010b) design one question to capture organizational ambidexterity. *M&S Organizational ambidexterity* is captured by question G5, where a-c measures explorative factors and d-f measures exploitative factors.⁵

3.4 Cluster analysis

In this thesis quantitative data will be analyzed with an exploratory approach. An exploratory data analysis is used to summarize, describe and display the data collected (Hussey & Hussey, 1997). To perform the analysis two types of cluster analysis will be conducted followed by a correlation analysis, using Pearson's correlation.

We use Hair et al.'s (1998) six-stage model-building approach for cluster analysis. It includes the following steps:

1. Objective and clustering variables
2. Research design
3. Assumptions
4. Deriving clusters and assessing fit
5. Interpretation of the clusters
6. Validation and profiling

While step 1-4 are covered below, Step 5 *Interpretation of the clusters* and Step 6 *Validation and profiling* are covered in later sections. Step 5 is covered in section 4.1 *Interpretation of clusters*. From step 6, validation is covered in section 3.6 *Reliability and validity* and cluster profiling is covered in the results and analysis sections of the thesis.

3.4.1 Step 1: Objective and clustering variables

Cluster analysis aims to combine observations into homogenous groups based on specific variables (Sharma, 1996, p.187). The choice of clustering variables is guided by the research objective. To examine groups of firms characterized by different levels of *MCS package ambidexterity* we base the cluster analysis on the values of exploitation and exploration for each observation. After the clusters have been formed, the differences between the clusters in terms of ambidexterity measures, strategy, value drivers and other firm and environmental characteristics are analyzed.

⁴ See section 11.2.2 *G&B MCS package ambidexterity* in Appendix 3.

⁵ See section 11.2.3 *M&S Organizational ambidexterity* in Appendix 3.

3.4.2 Step 2: Research design

According to Hair et al. (1998, p. 482) the researcher need to consider three issues before starting the clustering procedure:

1. Are there outliers and should they be deleted?
2. What distance or similarity measure should be used?
3. Should data be standardized?

3.4.2.1 Outliers

Outliers are observations that are very different from all other observations. They distort the structure in the data and make the clusters unrepresentative of the true population structure. (Hair et al., 1998, p. 482). Also the k-means cluster analysis, which we use, is very sensitive to outliers. It is therefore recommended that these be removed from the initial analysis (Norušis, 2012, p.390).

To detect outliers we made a scatterplot of the initial dataset with respect to the aggregated measures of exploitation and exploration for each SBU. The scatterplot visualizes the data and indicates that one of the observations could be an outlier, marked with a red arrow in the plot (see Figure 4). We delete this observation, as an outlier could have substantial effects on the k-means clustering procedure.

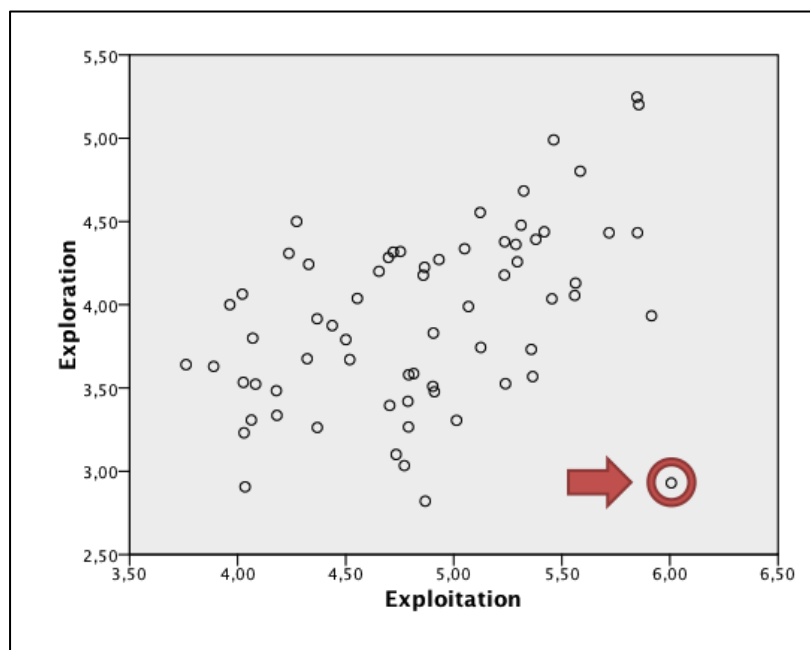


Figure 4. Scatterplot based on exploitation and exploration. Outlier marked by red circle.

3.4.2.2 Distance measure

With hierarchical clustering, there are several measures for similarity or distance between cases that can be used to form homogenous groups. The researcher needs to select an appropriate criterion (Norušis, 2012, p.378). The most commonly used measure for clustering procedures is the Euclidean distance (Hair et al., 1998, p. 486). This measure can

be used in its simple or squared form, with the squared form having the advantage of not having to take the square root. The Euclidean distance between two points **p** and **q** is given by:

$$d(p, q) = \sqrt{\sum_{i=1}^n (q_i - p_i)^2}$$

Thus, the squared Euclidean distance is just the sum of the squared differences. We use the squared Euclidean distance, as it is the recommended distance measure for Ward's method, which we use (Hair et al., 1998, p. 486).

3.4.2.3 Standardization

Since many distance measures are sensitive to differing scales, the researcher should consider standardizing the data. Variables with greater dispersion have greater impact on the distance measures, and thus implicitly get a greater weight when forming the clusters (Hair et al., 1998, p. 489). However, since the clustering variables in this thesis are both based on a scale from 1-7, the implicit weighting is not considered as a problem.

3.4.3 Step 3: Assumptions

Cluster analysis neither requires normality, linearity nor homoscedasticity, which are important in many statistical inference techniques. The main assumptions in cluster analysis relates to multicollinearity and representativeness of the sample. (Hair et al., 1998, p. 490)

3.4.3.1 Multicollinearity

In cluster analysis, multicollinear variables are implicitly weighted more heavily in the distance measure. Multicollinearity can thus act as *"a weighting process not apparent to the observer but affecting the analysis nonetheless"* (Hair et al., 1998, p. 491). The researcher should thus examine the cluster variables for multicollinearity and make sure that there are equally many variables in each dimension or set of variables. It is also possible to use a distance measure that compensates for multicollinearity (Hair et al., 1998, p. 491). However, as we only use two variables in the cluster analysis in this thesis, multicollinearity is not considered to be a problem.

3.4.3.2 Representativeness of the sample

In cluster analysis, a sample of observations is often used to represent the structure of the population. It is therefore important that the sample is representative of the population so that the results can be generalized to the population of interest (Hair et al., 1998, p. 491). In this thesis, the population considered is SBUs within Sweden's largest firms. Since many of these firms are represented in our sample, the representativeness should be relatively good.

3.4.4 Step 4: Deriving clusters and assessing fit

To perform the partitioning process, a clustering algorithm must be selected and the number of clusters that should represent the data must be decided on. These two decisions have substantial impact on the results and their interpretability (Hair et al., 1998, p. 491). There are two main types of procedures to be used in cluster analysis: hierarchical and nonhierarchical algorithms. The nonhierarchical procedures will be referred to as K-means clustering. According to Hair et al. (1998, p. 498) a combination of the two methods can be advantageous, as the benefits of both the hierarchical and nonhierarchical procedures will then be gained. The approach to use both methods is adopted in this thesis.

3.4.4.1 Hierarchical clustering

First, a hierarchical cluster analysis is used to determine the number of clusters and profile the cluster centers. Here an agglomerative approach is used. This approach starts with each observation being a single cluster itself. The clusters are then merged together step by step, based on the distances between the clusters, until they are all gathered into one large group. This way to proceed helps finding the appropriate number of clusters, and will provide a good overview of the clustering procedure. It is possible to use the hierarchical cluster analysis due to the relatively low number of observations in our sample. If there were thousands of observations, this type of analysis would become overly complex, as it requires a distance or similarity matrix between all pairs of cases (Norušis, 2012, p.388).

As the method for combining clusters, we use Ward's method, as it avoids the problems with "chaining" of observations and minimizes the within-cluster differences (Hair et al., 1998, p. 503). Also, Ward's method and average linkage are considered the best available hierarchical procedures for combining clusters (Hair et al., 1998, p. 498). A disadvantage of the hierarchical procedure is that early combinations tend to persist through the analysis and thus can generate artificial results (Hair et al., 1998, p. 498).

3.4.4.2 Selecting a cluster solution

An important issue in cluster analysis is selecting the number of clusters to be formed. However, there exists no standard or objective selection procedure to guide the researcher. Instead, several criteria and guidelines (called "stopping rules") have been developed, which should be complemented by practical judgment, theoretical foundations and common sense. (Hair et al., 1998, p. 499)

In our thesis, we consider two to six clusters manageable to analyze based on the firms' exploitative and explorative orientations. The final cluster solution is thus chosen from this interval. To select a suitable cluster solution, we started by looking at the agglomeration schedule (Table 1 in Appendix 1). Here, the agglomeration coefficient shows the within-cluster sum of squares at each step (Norušis, 2012, p. 388). As one can see from the table, the within-cluster sum of squares increases as clusters are joined. When the coefficient is small, it indicates that homogenous groups are merged. Thus, the agglomeration coefficient can be used as a stopping rule, by looking for large increases in value or large percentage

increases. While this stopping rule has tended to be fairly accurate, it usually indicates too few clusters (Milligan & Cooper, 1985, cited in Hair et al., 1998, p. 503). Table 2 in Appendix 1 shows the percentage change in the agglomeration coefficient for ten to two clusters. Large increases can be seen when going from four to three clusters and two to one clusters. Similarly, Figure 5 visualizes the agglomeration coefficient and number of clusters. The “elbows” at two and four clusters indicate that these could be suitable solutions to represent the structure in the data (Sharma, 1996, p. 200).

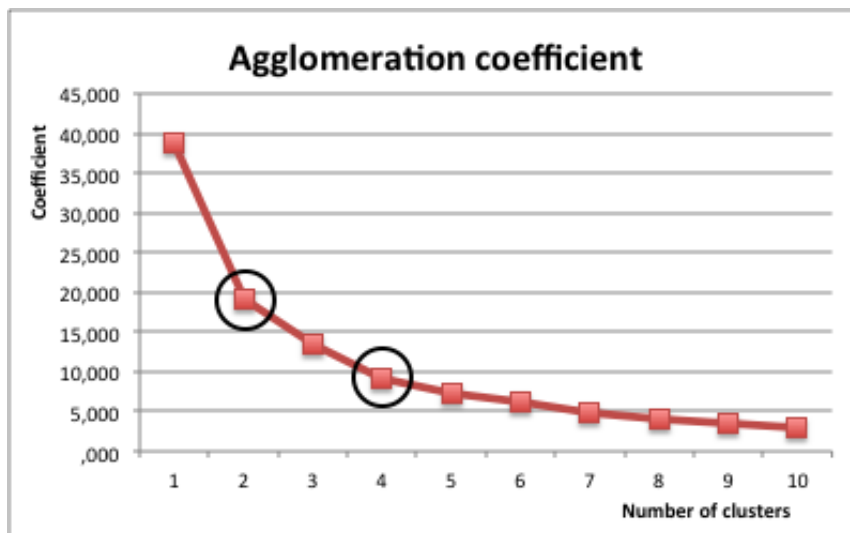


Figure 5. Agglomeration coefficient and number of clusters in hierarchical clustering.

Since the selection of a final cluster solution is rather subjective, Hair et al. (1998, p. 500) recommends the researcher to take great care in ensuring practical significance of the cluster solution. However, after performing the next step of the analysis, the K-means clustering, two and four clusters did not generate results of practical significance for our purposes. Rather, after testing different solutions and studying the dendrogram in Figure 2 in Appendix 1 we decided on five clusters, as it gave the most interpretable solution for our data. Based on the dendrogram this solution seems to generate rather homogenous groups. We believe this approach to be suitable as the stopping rule based on the agglomeration coefficient tends to indicate too few clusters. According to Norušis (2012, p. 377) there is no right or wrong answer as to how many clusters you should have, but rather one should look at the characteristics of the clusters at each stage and decide on an interpretable solution with “a reasonable number of fairly homogenous clusters”. Further, no outliers were detected in the dendrogram after performing the hierarchical procedure.

3.4.4.3 K-means clustering

After finding the appropriate number of clusters and profiling the cluster centers, a K-means cluster analysis is conducted to “fine-tune” the results. This type of cluster analysis requires that the number of clusters be identified beforehand; wherefore the hierarchical cluster analysis is first performed. In the initial stage of analysis, the *K* cluster centers (“seed points”) needs to be specified. *Parallel threshold methods* (like the K-means procedure in

SPSS) select seed points randomly or as user-supplied points (Hair et al., 1998, p. 497). In this thesis, we use the cluster centers from the hierarchical procedure as initial seed points. In the K-means procedure, each individual observation is assigned to the cluster for which its distance to the cluster mean is the smallest. The K-means algorithm then repeatedly re-estimates the mean of each cluster until the change between two iterations is small enough. We have set the maximum number of iterations to 10, as this is the default in SPSS (Norušis, 2012, p. 390). We also checked that this was enough after performing the K-means procedure. Last, when all observations are clustered, the cluster centers are recomputed a final time and the clusters can then be described (Norušis, 2012, p. 391).

3.5 Correlations

Correlations between our measure for *MCS package ambidexterity* and the measures of *G&B Contextual ambidexterity* and *M&S Organizational ambidexterity* are calculated. The aim is to investigate whether the measure we have created is linked with these other measures. For the purpose of comparison, the same correlations are calculated, but with the *G&B MCS package ambidexterity* measure. Pearson's product-moment correlation coefficient (r) is used to measure the correlations. The correlation coefficient provides a measure of the strength of association between two variables (Hussey & Hussey, 1997). The sample correlation coefficient is defined as follows (Newbold et al., 2007, p. 65-66):

$$r = \text{Corr}(x, y) = \frac{\text{Cov}(x, y)}{s_x s_y} = \left(\frac{1}{n-1} \right) \frac{\sum_{i=1}^n (x_i - \bar{x})(y_i - \bar{y})}{s_x s_y}$$

where $\bar{x}$ and $\bar{y}$ are the sample means, and s_x and s_y are the sample standard deviations for the two variables.

3.6 Reliability and validity

3.6.1 Reliability

With the term reliability it is meant that a survey is stable and not exposed to influence of random circumstances. It is assumed that if a survey has high reliability, the same result would be achieved if the survey was conducted at another point in time. According to Trost (2007), reliability is a comprehensive term, consisting of several components.

Precision concerns the way interviews are conducted and how the answers are registered. As discussed in the chapter 1.2.3.2. *Standardization*, the procedure of data collection had high precision regarding the registration of the questions. Also, the way the interviews were conducted was as standardized as possible. However, the personal meeting between individuals is naturally hard to standardize and this aspect might have influenced the precision negatively.

Objectivity regards the role of the interviewer when answers are registered. Before starting conducting the interviews, we had a thorough discussion with our tutor regarding how the constructs and the meaning of certain questions were to be understood and explained to

interviewees to minimize the impact that we as interviewers might have. Also, our tutor had frequent contact with other professors involved in the project in Europe regarding these issues.

Last, *consistency* brings up the time aspect. To ensure consistency one must anticipate that the research phenomenon or attitudes within the research area will not change. The research areas of MCS packages and ambidexterity are still under development (Malmi & Brown, 2008; Raisch & Birkinshaw, 2008). Thus, the theoretical framework suffers from infancy. Thereby, the consistency of the research areas and also this thesis must be considered low.

3.6.1.1 Subjectivity

In the field of strategy research, Bowman and Ambrosini (1997) criticize the structure of having only one single respondent representing a company. In their empirical study, they show evidence that perceptions about strategy within a top management team often differ. Within the international research project, the choice has been made to interview only single respondents from the respective SBUs. According to the arguments of Bowman and Ambrosini (1997), this way to proceed could be considered unreliable. However, other contributions in the same field claim the opposite. Hambrick (1981) stated that the CEO is the only one being able to give accurate answers about the intended strategy of a company. Further, Snow and Hrebiniak (1980, p.320) argues that *“top managers have the best vantage point for viewing the entire organizational system”* and are thus better informed than managers at lower levels. Also, Malmi and Sandelin (2010a) argue in their research proposal that having two respondents was considered, but that the additional costs outweighed the benefits. Especially, they pinpoint that conflicting views from the two respondents would be a problem, and that averaging their answers would not resolve it. Thus, even further interviews in the same SBU would be needed in that case (Malmi & Sandelin, 2010a).

3.6.2 Validity

Validity is a matter of measurement accuracy – it is established if the questions measure what they are intended to measure (Frankfort-Nachmias & Nachmias, 1996). The problem of validity arises because of the very nature of social sciences, as the measurement itself is indirect (Troost, 2007).

3.6.2.1 Content validity

There are two types of content validity – *face validity* and *sampling validity*. Face validity concerns *“the extent to which the researcher believes that the instrument is appropriate”* (Frankfort-Nachmias & Nachmias, 1996, pp. 166). The researcher can therefore test the questionnaire by consulting experts. If the experts agree with the viewpoint of the researcher, the questionnaire can be said to have face validity. (Frankfort-Nachmias & Nachmias, 1996). Malmi and Sandelin have in total let six practitioners and five academic experts make statements and evaluate the questionnaire. Thereby, it can be argued that the face validity of the questionnaire used in this thesis is relatively high.

Concerning *sampling validity*, questions and indicators should represent the qualities measured (Frankfort-Nachmias & Nachmias, 1996). We have chosen specific questions from the questionnaire to serve as indicators of exploitation and exploration. The validity of these selected questions as indicators have been tested by letting an academic expert, within the research field of management control, give comments and recommendations. As an expert has been consulted, the sampling validity can be considered good.

3.6.2.2 Empirical validity

Empirical validity concerns the connection between the measurement instrument and the measurement outcomes. It is assumed that if the measurement instrument has validity, the relation between the outcomes and the real existing relationship between observed variables should be strong (Frankfort-Nachmias & Nachmias, 1996, pp. 167). This is tested by estimating *predictive validity*. In cluster analysis, predictive validity is examined when the researcher makes a prediction that some variable will vary across the clusters based on strong theoretical foundations. This is tested after the clusters have been formed, and if significant differences are found, predictive validity is established (Hair et al., 1998, p. 501). However, as this is an exploratory study, it is implied that the theoretical foundations must be further developed. Therefore, predictive validity will be a matter for future studies.

3.6.2.3 Validation of the cluster solution

Validity of the cluster solution can be assessed by using different hierarchical methods or by choosing random initial seed points for the K-means procedure (Hair et al., 1998, p. 512). In our case, we used the average-linkage-between-groups method for the hierarchical procedure to test validity. When conducting this analysis, 11 out of 66 observations changed cluster belonging. However, the approach gave very similar cluster sizes and profiles as the initial analysis, thus indicating that “true” differences exist among firms (Hair et al., 1998, p. 512).

4 Empirical results

In this section the results from the conducted cluster analysis is presented, along with the results from the calculated correlations between the measures of different concepts of ambidexterity.

4.1 Interpretation of clusters

As described in the six-stage-modeling by Hair et al. (1998), Step 5 is to interpret the clusters. Thus it should be described how the clusters differ in terms of the clustering variables by using the final cluster centers (Hair et al., 1998, p. 500). The final clusters are depicted in Figure 6 and the cluster centers are described in Table 3. As can be seen in Table 5, the clusters are ranked and ordered from highest level of *MCS package ambidexterity* to lowest level of *MCS package ambidexterity* to facilitate further analysis. Table 4 shows the number of observations in each cluster.

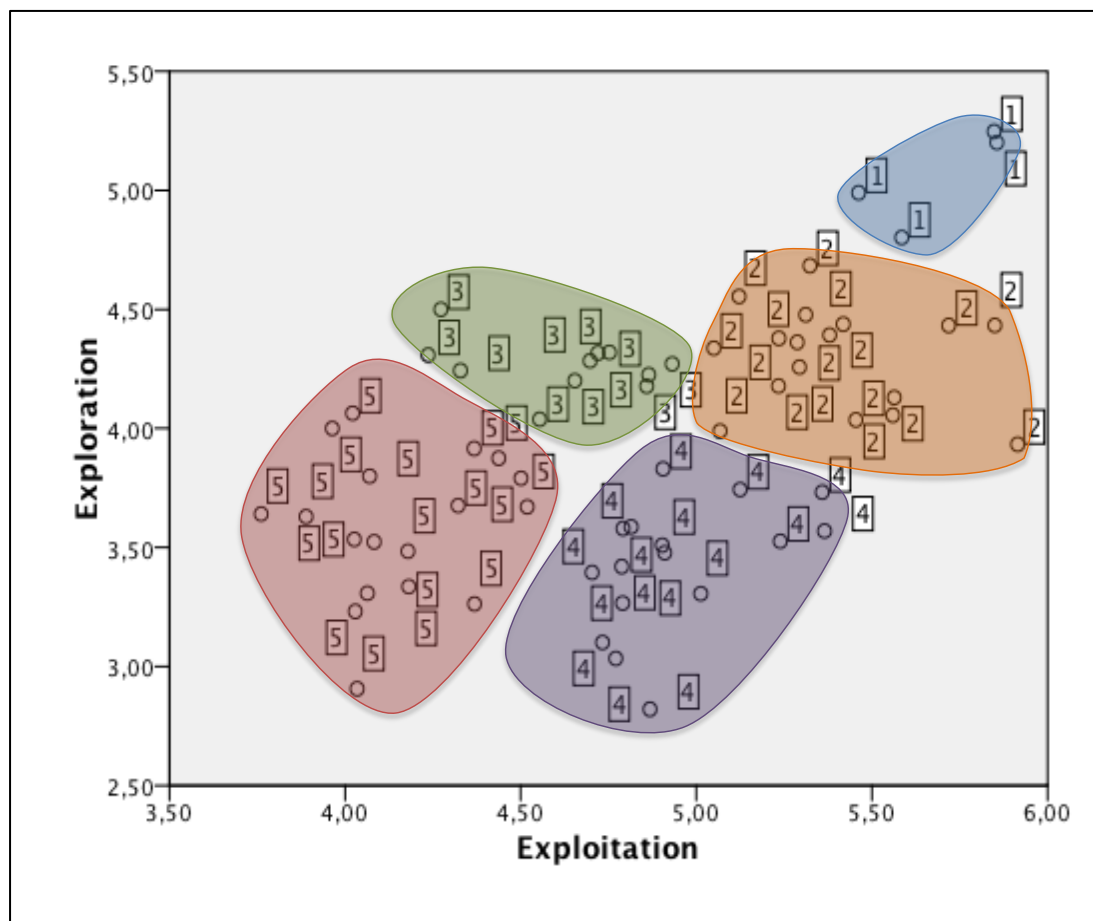


Figure 6. Final cluster solution based on the clustering variables *MCS package Exploitation* and *MCS package Exploration*. Labels in the plot indicate cluster belonging.

Final Cluster Centers					
	Cluster				
	1	2	3	4	5
Exploitation	5,69	5,40	4,62	4,94	4,16
Exploration	5,06	4,30	4,26	3,43	3,59

Table 3. Final cluster centers with K-means clustering.

As seen from Figure 6 and Tables 3 and 4 the following characterizes each cluster; Cluster 1 consists of 4 SBUs with high values on both exploitation and exploration. Cluster 2 comprises of 17 SBUs with somewhat lower values on both variables compared to Cluster 1, especially the value of exploration is lower. Cluster 3, containing 11 SBUs, is characterized by balance between the two dimensions. Cluster 4, comprising 16 SBUs, is characterized by lower levels of exploration in comparison to Cluster 3. Lastly, cluster 5, with 18 SBUs, is characterized by low values on both variables.

Number of Cases in each Cluster		
Cluster	1	4,000
	2	17,000
	3	11,000
	4	16,000
	5	18,000
Valid		66,000
Missing		4,000

Table 4. Number of firms in each cluster.

MCS package ambidexterity		
Cluster	1	28,8
	2	23,2
	3	19,7
	4	17,0
	5	14,9

Table 5. MCS package ambidexterity in each cluster.

4.2 Profiling the cluster solution

The last step of cluster analysis, in Hair's et al.'s six-stage-model, is to describe how the clusters differ on relevant variables that were not included in the clustering process, thus finding the characteristics of the identified clusters (Hair et al., 1998, p. 501). The variables used for profiling are: strategy, value drivers, environmental complexity and hostility, environmental predictability, number of SBU employees, ambidexterity measures, composition of MCS package and emphasis on individual MCSs. Most of these variables

(except for number of employees, ambidexterity and emphasis), are measured on a scale from 1 to 7. Tables 3-12 in Appendix 2 summarize the descriptive statistics for each variable.

4.2.1 Strategy focus and value drivers

4.2.1.1 Strategy focus

The different strategies included in the data analysis are Low price strategy, Rapid product introductions, Product innovation and Customer understanding. The level of focus on each strategy is analyzed in relation to the level of focus on each strategy in the other clusters, thus a between-cluster comparison is conducted. The mean values for the SBUs in each cluster, regarding strategy focus, are presented in the table below.

Strategies (between-cluster comparison)				
Cluster	Low price	Customer understanding	Rapid introductions	Product innovations
1	1,3	5,3	4,5	5,5
2	2,6	5,1	4,8	4,4
3	2,1	5,0	4,0	4,3
4	2,6	4,4	3,7	3,8
5	2,7	4,7	3,7	3,3

Table 6. Strategies (between-cluster comparison). Green fields indicate high strategy focus, red fields indicate low strategy focus.

Compared to the SBUs in other clusters, the SBUs in Cluster 1 have a clear focus on Customer understanding and Product innovation, and a very low focus on Low price strategies. In Cluster 2, the SBUs have a high extent of focus on Rapid introductions, but also on Low price strategies and Customer understanding, compared to the SBUs in other clusters. Furthermore, the SBUs in Cluster 3 have an average level of focus on all strategies. In Cluster 4, the SBUs have a high level of focus on Low price strategies. Moreover, they have low focus Customer understanding and Rapid introductions, compared to the SBUs in other clusters. Last, the SBUs in Cluster 5 have a high extent of focus on Low price strategies and low focus on Product innovation and Rapid introductions, compared to the SBUs in other clusters.

4.2.1.2 Value drivers

The SBUs were asked about the focus they put on different value drivers; Financial results, Customer relations, Employee relations, Operational performance, Quality, Alliances, Supplier relations, Environmental performance, Innovation, Community, Lobbying. The perception of what is considered as important does not differ substantially between the clusters, but only the level of focus on each value driver.

Value drivers (within-cluster comparison)					
Cluster	1	2	3	4	5
Financial results	7,0	6,4	6,4	6,3	6,6
Customer relations	7,0	6,6	6,5	6,3	6,2
Employee relations	6,75	6,4	5,6	5,3	5,6
Operational performance	6,50	6,3	5,6	5,6	5,2
Quality	6,75	6,1	5,4	5,6	5,6
Alliances	4,0	4,2	3,1	3,6	3,3
Supplier relations	4,8	5,2	4,7	4,5	3,9
Environmental performance	5,8	5,2	4,3	4,2	3,9
Innovation	5,5	5,1	4,3	4,5	4,8
Community	4,3	5,4	4,2	4,4	3,9
Lobbying	3,8	4,3	2,9	3,9	2,6

Table 7. Value drivers (within-cluster comparison). Green fields indicate high focus, red fields indicate low focus.

From Table 7, it can be seen that all clusters had Financial results and Customer relations as common important value drivers, which they all put a high level of focus upon. Cluster 2 showed high values also on Employee relations. In sum, the SBUs in Cluster 1 had the highest level of focus on most value drivers and the SBUs in Cluster 5 had the lowest level of focus.

4.2.1.3 Summary for strategy focus and value drivers

The table below provides a summary of the topics described above.

	Cluster 1	Cluster 2	Cluster 3	Cluster 4	Cluster 5
Strategy focus (between-cluster comparison)	Low focus on Low price strategy	Low price strategy	Average focus on all strategies	Low price	High focus on Low price strategy
	Customer understanding	Customer understanding		Low focus on Customer understanding	
		Rapid introductions		Low focus on Rapid introductions	
	Product innovation				Low focus on Product innovation
Value drivers (between-cluster comparison)	Highest level of focus on value drivers.	-	-	-	Lowest level of focus on value drivers.
Value drivers (within-cluster comparison)	Financial results	Financial results	Financial results	Financial results	Financial results
	Customer relations	Customer relations	Customer relations	Customer relations	Customer relations
		Employee relations			

Table 8. Empirical results for each cluster regarding strategy and value drivers.

4.2.2 Environmental factors

4.2.2.1 Complexity in environment

When measuring environmental complexity, two aspects are investigated; first, the extent of how diversified customer requirements are, and second, the extent of how diversified competitor strategies are from each other.

Complexity (between-cluster comparison)		
Cluster	Diverse cust. requirements	Diverse compet. strategies
1	3,00	4,25
2	3,71	3,76
3	3,82	3,27
4	2,88	3,81
5	4,00	3,44

Table 9. Complexity (between-cluster comparison). Green fields indicate high values, red fields indicate low values.

The SBUs in Cluster 1 have customers with non-diversified requirements and their competitors have to a high extent different strategies. The SBUs in Cluster 2 have diversified customer requirements, and average values on the measure of diversified competitor strategies. Further, the SBUs in Cluster 3 have customers with highly diversified requirements and their competitors have non-diversified strategies. In Cluster 4, the SBUs' customers have non-diversified requirements and the cluster experience average values of diverse competitor strategies. Last, SBUs in Cluster 5 have highly diverse customer requirements and their competitors have non-diversified strategies.

4.2.2.2 Predictability

The SBUs were asked to indicate the predictability of certain aspects in their environment on a scale from 1 to 7. The indicators used for predictability relate to Customers, Suppliers, Competitors, Technological, Regulatory and Economic, as can be seen in Table 6 in Appendix 2. An average of the predictability values for these indicators was calculated for each cluster. The results are shown in Table 10.

Predictability (between-cluster comparison)	
Cluster	Average predictability
1	4,25
2	4,80
3	4,23
4	4,67
5	4,78

Table 10. Predictability (between-cluster comparison). Green fields indicate high values, red fields indicate low values.

In Clusters 1 and 3, the predictability of environmental factors is low compared to the other clusters. For Cluster 2, 4 and 5, the predictability is considered to be high.

4.2.2.3 Hostility in environment

Hostility is measured by the extent of how intense the competition in the market is. The average measures of competition intensity for each cluster are shown in the table below.

Hostility (between-cluster comparison)	
Cluster	Competition intensity
1	4,75
2	5,24
3	5,73
4	5,25
5	5,39

Table 11. Hostility (between-cluster comparison). Green fields indicate high values, red fields indicate low values.

For the SBUs in Cluster 1, the intensity of competition is low compared to the other clusters. The SBUs in Cluster 2 and 4 experience an average value of competition intensity. In Cluster 3, the SBUs face the highest values of competition intensity. Also in Cluster 5, the SBUs experience high competition intensity.

4.2.2.4 SBU employees

The clusters differ in the number of SBU employees. Cluster 1 contains the smallest SBUs measured by headcount, while Cluster 2 contains the largest. The SBUs in Clusters 1, 4 and 5 have few employees, while the SBUs in Clusters 2 and 3 have many employees.

SBU Employees	
Cluster	Employees
1	1294
2	7186
3	6431
4	2089
5	1692

Table 12. SBU employees. Green field indicates many employees, red field indicates few employees.

4.2.2.5 Summary table for environmental factors

The table below provides a summary of the environmental factors.

	Cluster 1	Cluster 2	Cluster 3	Cluster 4	Cluster 5
Complexity (between-cluster comparison)	Non-diverse customer requirements	Diverse customer requirements	Diverse customer requirements	Non-diverse customer requirements	Highly diverse customer requirements
	Diverse competitor strategies	Mean values of Diverse competitor strategies	Non-diverse competitor strategies	Mean values of Diverse competitor strategies	Non-diverse competitor strategies
Predictability	Low	Very high	Low	High	Very high
Hostility (between-cluster comparison)	Low values of competition intensity	Mean values of competition intensity	Highest values of competition intensity	Mean values of competition intensity	Above average values of competition intensity
SBU Employees	Few employees	Many employees	Many employees	Few employees	Few employees

Table 13. Empirical results for each cluster regarding environmental factors.

4.2.3 Ambidexterity measures, orientation of individual MCSs and emphasis

4.2.3.1 Ambidexterity

The results for different ambidexterity measures, discussed in section 3.3.3 *Measurement and values of other ambidexterity measures*, are presented below. Since the clusters are ranked based on the *MCS package ambidexterity* measure, it is interesting to see whether the ranking is consistent for the other ambidexterity measures. If so, the assumption about the linkage between the concepts is supported.

Ambidexterity measures (between-cluster comparison)			
Cluster	G&B Contextual ambi.	G&B Package ambi.	M&S Organizational ambi.
1	35,0	25,2	33,4
2	32,7	29,2	28,5
3	27,4	23,1	22,9
4	25,6	22,5	24,0
5	24,9	21,9	19,8

Table 14. Ambidexterity measures (between-cluster comparison). Green fields indicate high values, red fields indicate low values.

Cluster 1 shows the highest values of *G&B Contextual ambidexterity* as well as of *M&S Organizational ambidexterity*. The cluster also has a high value of the *G&B MCS package ambidexterity*. Cluster 2 shows the highest value of *G&B MCS package ambidexterity*, as well as the next highest values of *G&B Contextual ambidexterity* and *M&S Organizational ambidexterity*. Moreover, Cluster 3 shows average values of *G&B Contextual ambidexterity* and *G&B MCS package ambidexterity*, and below average value of *M&S Organizational ambidexterity*. Cluster 4 shows below average values of *G&B Contextual ambidexterity* and *G&B MCS package ambidexterity*, and an average value of *M&S Organizational ambidexterity*. Finally, Cluster 5 shows the lowest values on all measures of ambidexterity.

4.2.3.2 MCS ambidexterity of the individual MCSs

Ambidexterity measures for each individual MCS are investigated, which are presented in Table 9 in Appendix 2. It is of interest to see which individual MCSs that possesses the highest levels of ambidexterity, since these contribute to the aggregated *MCS package ambidexterity*. The individual control systems are i) Strategic planning, ii) Short-term planning, iii) Performance measurement and evaluation, iv) Rewards and compensations, v) Organizational structure & Management processes and vi) Organizational culture and values. Table 15 displays the mean values of ambidexterity for the respective control systems within the package.

Ambidexterity in individual MCSs (within-cluster comparison)					
Cluster	1	2	3	4	5
Strategic planning	19,1	13,9	12,3	12,5	9,2
Short-term planning	32,9	18,8	23,5	16,3	18,3
Perf. meas. and evaluation	27,3	29,9	21,8	21,8	18,4
Rewards and compensations	24,3	19,8	18,1	11,4	14,7
Structure and mgmt proc.	33,9	22,6	19,4	20,0	13,1
Organizational culture	25,0	28,4	21,5	17,9	15,3

Table 15. Ambidexterity in individual MCSs (within-cluster comparison). Green fields indicate the two most ambidextrous MCSs within each cluster's MCS package.

In Cluster 1, it is the control systems of Short-term planning and Organizational structure & Management Processes that are the most ambidextrous within the cluster MCS package. For Cluster 2, the most ambidextrous control systems are Performance measurement and evaluation together with Organizational culture. Further, Cluster 3 has Short-term planning and Performance measurement and evaluation as the most ambidextrous control systems within its MCS package. In Cluster 4, it is Performance measurement and evaluation as well as Organizational structure & Management Processes that are the most ambidextrous. Last, Cluster 5 has high ambidexterity in the control systems of Short-term planning and Performance measurement and evaluation.

In sum, Performance measurement and evaluation is the most ambidextrous control system among the clusters, followed by Short-term planning and Organizational structure & Management Processes.

4.2.3.3 Exploitation and exploration for individual MCS

In this section, the ambidexterity measure of each single control system is broken down in parts: the measures of exploitation and exploration for each MCS are investigated. This is done in order to capture different structures that enable *MCS package ambidexterity*. In Table 16, the values of exploitation and exploration for the individual control systems are presented.

Exploitation and exploration in individual MCS (within-cluster comparison)						
Cluster		1	2	3	4	5
Strategic planning	Exploit	5,0	5,1	3,9	4,8	3,4
	Explore	3,6	2,8	3,2	2,6	2,6
Short-term planning	Exploit	6,4	5,8	5,3	6,1	5,4
	Explore	5,1	3,2	4,5	2,8	3,5
Perf. meas. and evaluation	Exploit	4,5	5,5	4,7	5,2	4,5
	Explore	5,9	5,4	4,6	4,3	4,1
Rewards and compensations	Exploit	6,5	5,4	4,7	4,0	4,3
	Explore	3,8	3,6	3,7	2,7	3,6
Structure and mgmt proc.	Exploit	5,3	4,3	4,2	4,4	3,6
	Explore	6,5	5,3	4,8	4,5	3,7
Organizational culture	Exploit	4,8	5,4	4,4	4,7	3,8
	Explore	5,0	5,3	4,8	3,8	4,1

Table 16. Exploitation and exploration in individual MCSs (within-cluster comparison). Green fields indicate an overweight of either of the twin concepts, while blue areas indicate balance between the two. The cut off value for being classified as balanced is 0.1.

In most cases, the exploitation measure has a higher impact on the ambidexterity measure for the single control system, than the measure of exploration. For the control systems of Strategic planning, Short-term planning and Rewards and compensation, this orientation is true for all clusters.

However, for the remaining control systems some exceptions can be seen. For example, the control systems of Performance measurement and evaluation and Organizational structure & Management processes are balanced in two out of five clusters. Also, Organizational structure & Management processes are more explorative than exploitative in the remaining clusters, as shown in Table 16. Further, the control system of Organizational culture is balanced in one cluster and a more explorative orientation in several clusters.

4.2.3.4 Emphasis on management control systems

In the questionnaire, the SBUs were asked to distribute 100 points between different types of control systems, depending on how they put emphasis on them respectively. The different control systems were Cybernetic control, Administrative control, Organizational culture, Automatic command and direct control, Leading by own example and Participative coaching. As shown in Table 17, the emphasis within all clusters was high on Cybernetic controls. Also, all but Cluster 1 put high emphasis on Organizational culture. Cluster 1 instead put high emphasis on Administrative controls.

Emphasis on individual MCSs (within-cluster comparison)					
Cluster	1	2	3	4	5
Cybernetic systems	33,0	26,2	20,3	34,1	25,0
Administrative systems	19,5	14,4	16,8	14,3	16,1
Organization culture	15,0	23,2	29,3	19,4	19,2
Autocr. com. & direct control	6,3	5,3	8,1	7,4	7,8
Leading by own example	13,8	15,3	13,4	13,4	16,1
Participative coaching	12,5	15,6	12,3	12,3	15,8

Table 17. Emphasis on individual control systems (within-cluster comparison). Green fields indicate the two most emphasized control systems within each cluster.

4.2.3.5 Summary for ambidexterity measures and MCS orientation

The table below provides a summary of the abovementioned variables; ambidexterity measures, orientation of individual MCSs and control emphasis.

	Cluster 1	Cluster 2	Cluster 3	Cluster 4	Cluster 5
Ambidexterity (between-cluster comparison): G&B Contextual, G&B MCS package and M&S Organizational	Highest value of G&B contextual ambidexterity	Above average on G&B contextual ambidexterity	Average value of G&B contextual ambidexterity	Below average value of G&B contextual ambidexterity	Lowest values on all ambidexterity measures
	Above average on G&B MCS package ambidexterity	Highest value of G&B MCS package ambidexterity	Average value of G&B MCS package ambidexterity	Below average value of G&B MCS package ambidexterity	
	Highest value of M&S organizational ambidexterity	Above average on M&S organizational ambidexterity	Low value of M&S organizational ambidexterity	Average value of M&S organizational ambidexterity	
Which individual control systems in the MCS package have the highest level of ambidexterity?	Organizational structure & Management Process	Performance measurement & evaluation	Short-term planning	Performance measurement & evaluation	Performance measurement & evaluation
	Short-term planning	Organizational culture	Performance measurement & evaluation	Organizational structure & Management Process	Short-term planning
Orientation of individual MCSs	3 more exploitative 0 balanced 3 more explorative	3 more exploitative 2 balanced 1 more explorative	3 more exploitative 1 balanced 2 more explorative	5 more exploitative 1 balanced 0 more explorative	4 more exploitative 1 balanced 1 more explorative
Emphasis (within-cluster comparison)	Cybernetic control	Cybernetic control	Cybernetic control	Cybernetic control	Cybernetic control
	Administrative systems				
		Organization culture	Organization culture	Organization culture	Organization culture

Table 18. Empirical results for each cluster regarding ambidexterity measures and structure of MCS package.

4.3 Results from correlations between ambidexterity measures

4.3.1 G&B Contextual ambidexterity and MCS Package ambidexterity

As proposed by theory (Gibson & Birkinshaw, 2004), a SBU's *Contextual ambidexterity* creates conditions for ambidexterity in the MCS package. Therefore, Pearson's correlation is calculated between the measures of the two concepts. Two different correlations are controlled for. First, the correlation between *G&B Contextual ambidexterity* and *MCS package ambidexterity* is calculated. Thereafter, the correlation between *G&B Contextual ambidexterity* and *G&B MCS package ambidexterity* is calculated to enable comparison.

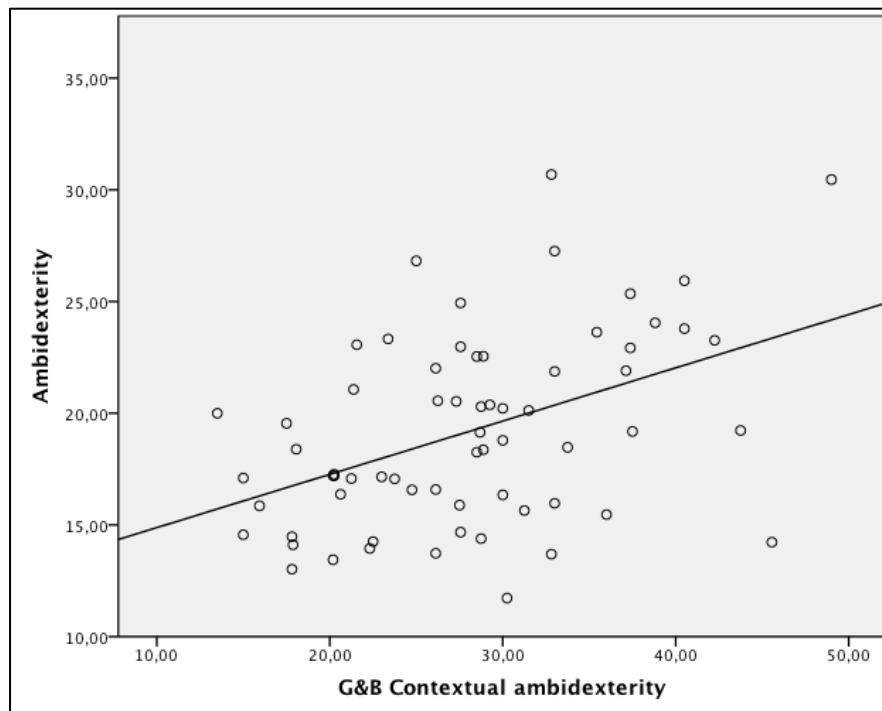


Figure 7. Plot of the *G&B Contextual ambidexterity* and *MCS package ambidexterity* measures for each observation.

Correlations			
		G&B Contextual ambidexterity	Ambidexterity
G&B Contextual ambidexterity	Pearson Correlation	1	,442**
	Sig. (1-tailed)		,000
	N	66	66
Ambidexterity	Pearson Correlation	,442**	1
	Sig. (1-tailed)	,000	
	N	66	66

**, Correlation is significant at the 0.01 level (1-tailed).

Table 19. Pearson correlation between *G&B Contextual ambidexterity* and *MCS package ambidexterity*.

As shown in the plot and table above, there is a positive association between *G&B Contextual ambidexterity* and our measure of *MCS package ambidexterity*. The correlation of 0.442 is significant at the 1% level.

4.3.1.1 G&B Contextual ambidexterity and G&B MCS Package ambidexterity

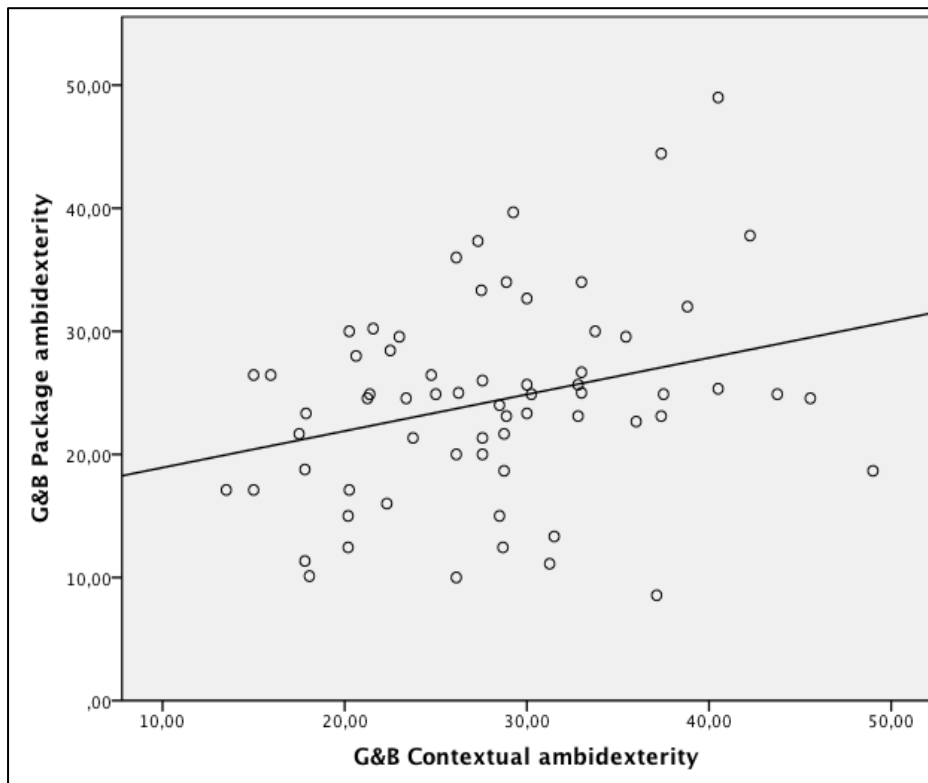


Figure 8. Plot of the *G&B Contextual ambidexterity* and *G&B MCS package ambidexterity* measures for each observation.

Correlations			
		G&B Contextual ambidexterity	G&B Package ambidexterity
G&B Contextual ambidexterity	Pearson Correlation	1	,290**
	Sig. (1-tailed)		,009
	N	66	66
G&B Package ambidexterity	Pearson Correlation	,290**	1
	Sig. (1-tailed)	,009	
	N	66	66

** . Correlation is significant at the 0.01 level (1-tailed).

Table 20. Pearson correlation between *G&B Contextual ambidexterity* and *G&B MCS package ambidexterity*.

As shown by the plot and table above, there is a positive association between *G&B Contextual ambidexterity* and *G&B MCS package ambidexterity*. The correlation of 0.290 is rather low, but significant at the 1% level.

4.3.2 MCS package ambidexterity and M&S Organizational ambidexterity

The ambidexterity within the MCS package is assumed to influence the *M&S Organizational ambidexterity*, which measures the perception of SBU success. The data analysis shows a positive correlation between the ambidexterity concepts. Also here, Pearson's correlation is used. Again, two correlations are controlled for. First, the correlation between *MCS package ambidexterity* and *M&S Organizational ambidexterity* is calculated and second, the correlation between *G&B MCS package ambidexterity* and *M&S Organizational ambidexterity* is calculated.

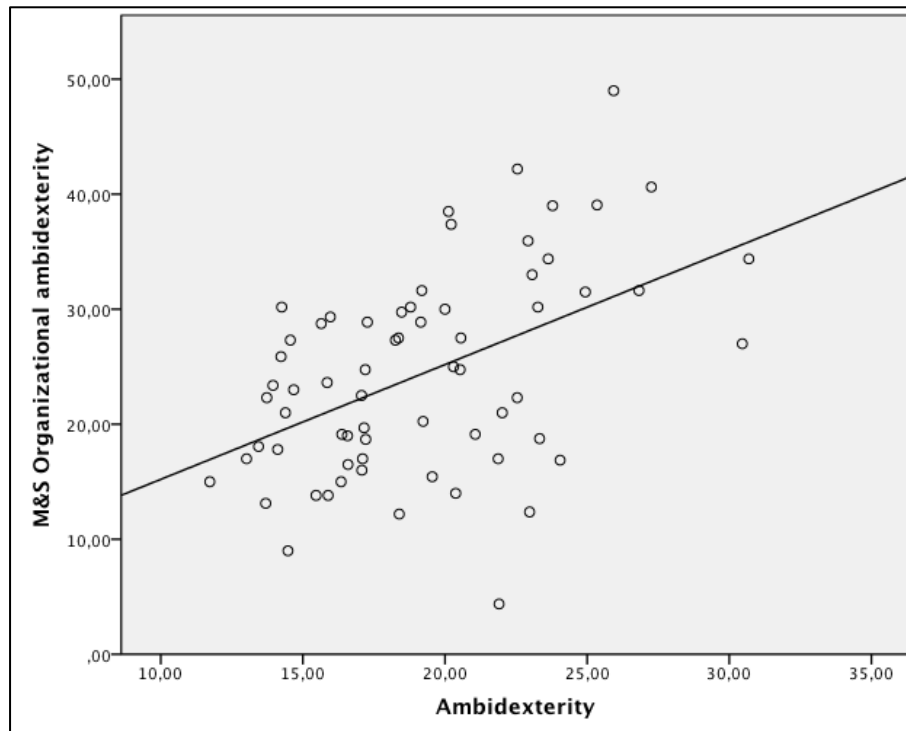


Figure 9. Plot of the *MCS package ambidexterity* and *M&S Organizational ambidexterity* measures for each observation.

Correlations			
		Ambidexterity	M&S Organizational ambidexterity
Ambidexterity	Pearson Correlation	1	,481**
	Sig. (1-tailed)		,000
	N	66	66
M&S Organizational ambidexterity	Pearson Correlation	,481**	1
	Sig. (1-tailed)	,000	
	N	66	66

** . Correlation is significant at the 0.01 level (1-tailed).

Table 21. Pearson correlation between *MCS package ambidexterity* and *M&S Organizational ambidexterity*.

The correlation between *MCS package ambidexterity* and *M&S Organizational ambidexterity* is 0.481, thus slightly higher than the correlation between *G&B Contextual ambidexterity* and *MCS package ambidexterity*, which was 0.442. The correlation is significant (1% level).

4.3.2.1 G&B MCS package ambidexterity and M&S Organizational ambidexterity

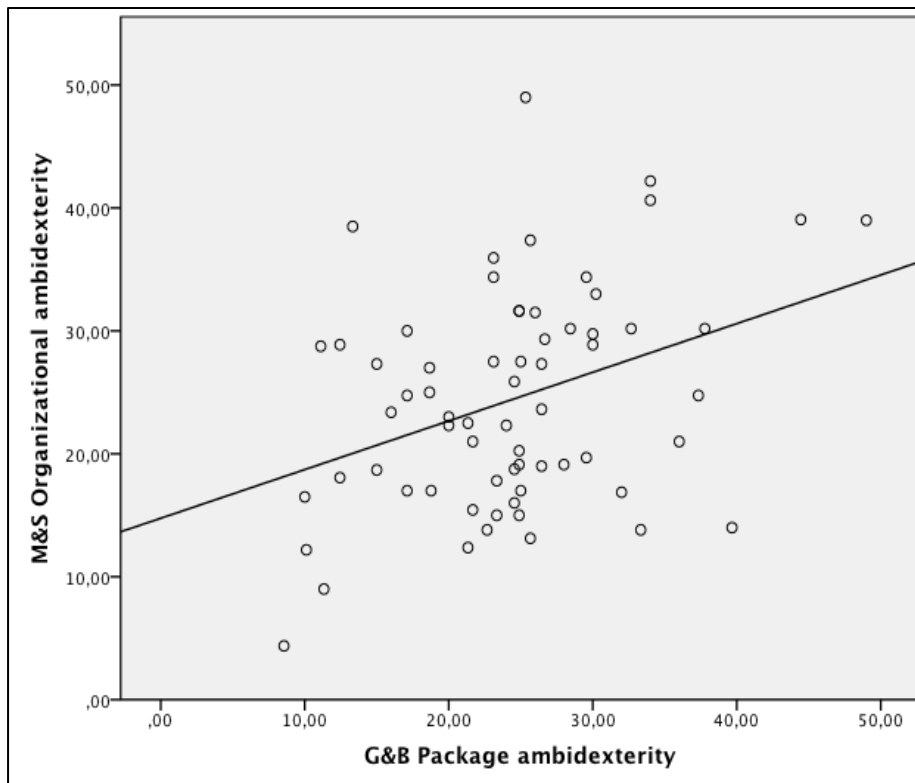


Figure 10. Plot of the *G&B MCS package ambidexterity* and *M&S Organizational ambidexterity* measures for each observation.

Correlations			
		G&B Package ambidexterity	M&S Organizational ambidexterity
G&B Package ambidexterity	Pearson Correlation	1	,363**
	Sig. (1-tailed)		,001
	N	66	66
M&S Organizational ambidexterity	Pearson Correlation	,363**	1
	Sig. (1-tailed)	,001	
	N	66	66

** . Correlation is significant at the 0.01 level (1-tailed).

Table 22. Pearson correlation between *G&B MCS package ambidexterity* and *M&S Organizational ambidexterity*.

The correlation between *G&B MCS package ambidexterity* and *M&S Organizational ambidexterity* is 0.363, thus slightly higher than the correlation between *G&B Contextual ambidexterity* and *G&B MCS package ambidexterity*, which was 0.290. The correlation is significant at the 1% level.

5 Analysis

In this section, the results that were reported in the previous section are analyzed. First, the characteristics of the clusters are investigated. Second, the ambidexterity measures and their linkages are examined.

5.1 Investigating the clusters

To answer our research question regarding *what characterizes SBUs with different levels of ambidexterity*, we investigate the properties of each cluster.

5.1.1 Cluster 1

The strategy focus of the SBUs in Cluster 1 is on Product innovation and Customer understanding, relative to the other clusters. According to Hotz (2010), innovation-oriented strategies imply higher focus on exploration. Regarding Customer understanding, we assume that this is based on the organization's knowledge of their customers' behavior. Thus, this strategy would imply exploitation of the knowledge base. Together the strategies of Product innovation and Customer understanding require both exploration of new product domains and exploitation of knowledge base concerning customers. Further, Cluster 1 put low focus on Low price strategies, which Hotz (2010) refers to as exploitation oriented. It can therefore be concluded that Cluster 1 has both exploitative and explorative focus regarding strategies, which according to Hotz (2010) would imply a mix of defender and prospector strategies. More, Cluster 1 has the highest level of focus on value drivers in comparison with other clusters, as described in Table 8. This implies that many different value drivers are addressed within these SBUs, thus both of more explorative and exploitative nature.

Concerning the environmental conditions described in section 4.2.2 *Environmental factors*, Cluster 1 confronts low complexity regarding customers but the opposite regarding competitor strategies. The environment is further recognized by low predictability, which enhances the complexity in the SBUs' environment. However, the hostility in terms of competition intensity is relatively low, in comparison to the other clusters. These parameters do not indicate any clear environmental pattern for Cluster 1. One reason could be that different customer segments are targeted by competitors, explaining the usage of different strategies and the low competition intensity. According to Jansen et al. (2005, p. 352, cited in Raisch & Birkinshaw, 2008, p. 394), high complexity and intensity in the environment can force organizations to behave ambidextrous, which does not seem to be the case for the SBUs in Cluster 1, considering the customer and competitor behaviors. Still, as the environment is perceived to have low predictability, this might be the coercive force to behave ambidextrous. Also, an unpredictable environment is seen to require a certain degree of exploration, in order not to fall into inertia (Tushman & O'Reilly, 1996), which partially explains the strategy focus of Cluster 1.

The SBUs in the cluster put high emphasis on Cybernetic control and Administrative control. These systems also contribute to the level of *MCS package ambidexterity*, as it is Short-term

planning and Organizational Structure & Management Processes that are the individual MCSs with highest individual values of ambidexterity within the SBU's MCS packages, as seen in Table 15. In general this cluster has equal number of individual MCSs that either has higher value on exploitation or exploration. *MCS package ambidexterity* is thus achieved at an aggregated level, by combining individual MCSs which are either more exploitative or more explorative in their design and use. This is supported by the cluster position in Figure 6. Further, the structure of the MCS package might be more easily administrated for the SBUs within this cluster compared to SBUs within other clusters, as they have the lowest average number of employees. This is supported by Tushman and O'Reilly, (1996), as they argue that complexity and interdependence increase *structural inertia* as firms grow.

To summarize, SBUs in Cluster 1 are recognized by high levels of *MCS package ambidexterity*. Further, the cluster has the highest level of *G&B Contextual ambidexterity*. The high level of *G&B Contextual ambidexterity* implies that the design and use of MCSs creates an internal context, in which the MCS package works as an integrated whole supporting both exploitative and explorative behavior. This notion is also supported by the high levels of *M&S Organizational ambidexterity*; as it is a measure of SBU success factors in terms of exploitative and explorative related actions. In sum, the measures of the different ambidexterity concepts, supports the assumption of a linkage between them.

5.1.2 Cluster 2

The strategy focus of the SBUs in Cluster 2 is on Low price and Customer understanding, which are defined as exploitation related strategies. Also, Cluster 2 has focus on Product innovation strategy, which is seen to be exploration related (Hotz, 2010). Thus, based on the reasoning of Hotz (2010), this cluster can be characterized as a analyzer with defender influences, as described by Miles and Snow (1978). In relation to the strategy focus, it seems reasonable that Cluster 2 put most focus Financial results and Customer relations. Further, the cluster also has Employee relations as value drivers, indicating a high dependence upon the employees to reach financial targets. Thus, the SBUs in Cluster 2 seem to be human capital intensive, which is consistent with the industry belongings in Table 12 in Appendix 2 and the large number of SBU employees.

Furthermore, the SBUs in Cluster 2 appear to operate in a stable market, with high predictability and average values of complexity, as seen in Table 13. Thus, the high values of ambidexterity measures do not seem to be driven by environmental factors. As can be seen from Table 3, the *MCS package ambidexterity* measure is heavily influenced by the aggregated measure of exploitation. Thus, it is possible that the SBUs in Cluster 2 are suffering from what Tushman and O'Reilly (1996) refer to as the *success syndrome*. While exploitative behavior create short-term success, the preparation for environmental changes might be low, which can hurt the long-term performance and survival of these SBUs. In comparison, Cluster 1 has a more balanced *MCS package ambidexterity* measure than Cluster 2, which implies that Cluster 2 is less prepared for discontinuities and revolutionary

change. Further, Tushman and O'Reilly (1996) argue that due to increasing pace of change, the competitive environment is unlikely to remain stable, which means that Cluster 2 currently is in a worse position than Cluster 1.

Within the cluster, Cybernetic controls and Organizational Culture are the most emphasized control systems. Also, Organizational culture and Performance measurement and evaluation - a cybernetic control system - have the highest individual values of ambidexterity within the MCS packages of the cluster. Together, Cybernetic control and Organizational culture contribute to the high value of *MCS package ambidexterity* in Cluster 2. The cluster achieves its high level of *MCS package ambidexterity* partially by having two MCSs that are balanced, in combination with one MCS that has higher individual level of exploration than exploitation. The remaining three MCSs are more exploitative than explorative, which contributes to the overemphasis on exploitation for the MCS package.

In sum, the SBUs in Cluster 2 show high values on *MCS package ambidexterity*, although the packages are biased towards exploitation. The cluster possesses the next highest value of *G&B Contextual ambidexterity* in comparison to the other clusters. Thus, since there is an assumed linkage between *G&B Contextual ambidexterity* and *MCS package ambidexterity*, the cluster positioning in Figure 6 is logical. Moreover, as the relationship implies that the MCSs are working as an integrated package, the high value of *M&S Organizational ambidexterity* is a reasonable outcome.

5.1.3 Cluster 3

As stated in section 4.2.1 *Strategy focus and value drivers*, Cluster 3 has average focus on all strategies, compared to the other clusters. However, within the cluster, the SBUs have highest strategy focus on Customer understanding, which is exploitation related, but also on Rapid introductions and Product innovation, which are exploration related (Hotz, 2010). Altogether, the cluster has a strategy focus that is rather balanced between the concepts of exploitation and exploration. Thus, the cluster can be described as an analyzer, based on the reasoning of Hotz (2010). Further, the cluster has average focus on most value drivers in comparison to the other clusters, which is consistent with the level of *MCS package ambidexterity* and the cluster position in Figure 6.

The environment in which the cluster operates is characterized by low predictability and has the highest value of competition intensity of all clusters. The low predictability enhances the complexity of the cluster environment. As discussed by Raisch and Birkinshaw (2008, p. 394), environmental dynamism increases the confrontation of the tension between exploitation and exploration,. Thus the low predictability, together with the high competition intensity might force the SBUs in the cluster to strive for ambidexterity, by addressing both exploitative and explorative action (Jansen et al., 2005 cited in Raisch & Birkinshaw, 2008, p. 394). According to Raisch and Hotz (*in press*, cited in Raisch & Birkinshaw, 2008, p. 394-395) a balanced orientation can be a necessity when facing a highly hostile environment.

The SBUs in Cluster 3 put emphasis on Cybernetic controls and Organizational culture. Further, the individual MCS that are most ambidextrous in the MCS package are Short-term planning and Performance measurement and evaluation, of which the latter is balanced. Altogether, the ambidexterity in the MCS package is achieved by having three MCSs that are more exploitative, two MCSs that are more explorative and one MCS that is balanced. Thus, on an aggregated level, the MCSs package can be considered as balanced. However, the level of *MCS package ambidexterity* is relatively low in comparison to Cluster 1.

To summarize, the SBUs in Cluster 3 demonstrate average values of *G&B Contextual ambidexterity*, which is consistent with the level of *MCS package ambidexterity*, thus showing a linkage between the concepts. However, the cluster shows below average values of *M&S Organizational ambidexterity*, compared to the other clusters. This breaks the general pattern of linkages between the ambidexterity concepts that were observed in Cluster 1 and 2. Thus, in the case of Cluster 3, the *MCS package ambidexterity* does not facilitate for *M&S Organizational ambidexterity* to the expected extent.

5.1.4 Cluster 4

Cluster 4 contains SBUs with focus on Low price strategies. Further, they show low focus on Customer Understanding and on Rapid introductions. The first two is according to Hotz (2010) exploitation oriented, while the latter is exploration oriented. These together indicate a bias towards exploitative strategies similar to the defender strategy described by Miles and Snow (1978). The SBUs focus on Financial results as an important value driver, which can be seen as a compatible approach to the indicated strategies.

Further, the SBUs in Cluster 4 operate in an environment characterized by low complexity, as the customer requirements are non-diverse and the predictability is high. Further, the cluster experience mean values of diverse competitor strategies and competition intensity. Therefore, the environmental factors do not contribute as a coercive force to execute ambidextrous activities in the way described by Raisch and Hotz (*in press*, cited in Raisch & Birkinshaw, 2008). The environmental conditions are convenient for exploitative behavior, which characterize the cluster on almost all parameters. Also, the environment allows for practice of the defender strategy. Being exploitatively oriented allows for evolutionary change, but will create obstacles when facing revolutionary change, due to *structural* and *cultural inertia*, as argued by Tushman and O'Reilly (1996). In sum, Cluster 4 might suffer from the *success syndrome*.

The emphasis within the cluster lays on Cybernetic controls and Organizational culture, of which the former is often applied in alignment with a defender strategy. Further, Performance measurement and evaluation - a cybernetic control system – together with Organizational structure & Management Processes are the two MCSs with highest individual values of ambidexterity within the cluster's MCS packages. The low level of *MCS package ambidexterity* is explained by having five MCSs of exploitative character and one balanced, while none of the MCSs within the package is exploration oriented. Thus, the MCS package

design can be characterized as strongly biased towards exploitation, as can be seen in Table 3.

The SBUs in Cluster 4 experience the next lowest level of *G&B Contextual ambidexterity* as well as *MCS package ambidexterity*, indicating a linkage between the concepts. However, the level of *M&S Organizational ambidexterity* is higher than for Cluster 3. Thus, based on the ranking in terms of *MCS package ambidexterity* measures, the general pattern of the linkage between the ambidexterity concepts is broken. Even though the MCS package is unbalanced and has a low level of ambidexterity, it facilitates for more *M&S Organizational ambidexterity* than anticipated.

5.1.5 Cluster 5

Cluster 5 has high focus on Low price strategies and low focus on Product innovation and Rapid introductions. This indicates that the strategies are of a exploitative nature (Hotz, 2010). Thus, following the reasoning by Hotz (2010), the SBUs in this cluster can be considered as defenders. Like in Cluster 4, defenders use financial results as value driver, which also is prioritized by Cluster 5.

The environment is characterized by highly diverse customer requirements and high competition intensity. According to Raisch and Hotz (*in press*, cited in Raisch & Birkinshaw, 2008) these factors would function as a coercive force to behave in ambidextrous way. However, the non-diverse competitor strategies and high predictability diminish the environmental complexity. Thus, the environment of Cluster 5 can be considered as balanced in terms of complexity and hostility. Further, the high predictability together with high competition intensity indicate a mature market.

The SBUs in Cluster 5 emphasize Cybernetic controls and Organizational culture. As the emphasis is put on these types of controls, it could imply that the SBUs have established a stable organizational structure over time. This makes it hard to change the pattern of actions to increase the level of *MCS package ambidexterity* in the future, as the SBUs could suffer from *structural inertia* (Tushman & O'Reilly, 1996). In Cluster 5, the individual MCSs that are the most ambidextrous within the cluster's MCS package are Performance measurement and evaluation and Short-term planning, which both are considered as cybernetic controls. Furthermore, the *MCS package ambidexterity* is achieved by having four more exploitative, one more explorative and one balanced MCS. The MCS package of Cluster 5 is more balanced than the MCS package of Cluster 4. However, the level of *MCS package ambidexterity* is lower, both in comparison to the unbalanced Clusters 2 and 4, but also substantially lower than its balanced counterparts in Cluster 1 and 3, as seen in Table 5.

To summarize, the SBUs in Cluster 5 have the lowest values on both *G&B Contextual ambidexterity*, *MCS package ambidexterity* and on *M&S Organizational ambidexterity*. This follows the general pattern of linkages between the ambidexterity concepts that were observed in Cluster 1 and 2, and also partially in Cluster 3 and 4.

5.2 Ambidexterity measures

To answer our research question regarding *how an ambidextrous orientation can be achieved within SBUs*, we investigate the association between ambidexterity concepts.

5.2.1 The linkage between the concepts of ambidexterity

According to the theoretical framework, there is a chain of linkages between the different concepts. Thus, the relative level of ambidexterity in the beginning of the chain should affect values in the following steps.



Figure 11. The assumed linkage between the different concepts of ambidexterity.

As was seen in the analysis, the linkages between the different concepts of ambidexterity are consistent for most of the clusters. Thus, the ordering of the clusters in the initial cluster analysis, which is based on the *MCS package ambidexterity* measure, is valid for the measures of *G&B Contextual ambidexterity* and predominantly valid for *M&S Organizational ambidexterity*. From the results (see section 4.1 *Interpretation of clusters* and section 4.2.3.1 *Ambidexterity*) Cluster 1 and 2 are the most ambidextrous and Cluster 5 the least ambidextrous. This pattern is coherent over all the different types of ambidexterity measures, indicating an association between the variables, as discussed above. Regarding *M&S Organizational ambidexterity*, Clusters 3 and 4 switched places when ordering the clusters based on this measure, indicating that the relation between *MCS package ambidexterity* and *M&S Organizational ambidexterity* is not perfect. However, this is considered as a minor deviation, as the ordering of the majority of clusters is consistent based on this ambidexterity measure.

The association between the measures was further investigated by examining the correlation between the variables (see section 4.3 *Results from correlations between ambidexterity measures*). The correlation coefficient is used to indicate the strength of the association between different ambidexterity measures. *G&B Contextual ambidexterity* was considered an antecedent to *MCS package ambidexterity*, and *M&S Organizational ambidexterity* as something shaped by *MCS package ambidexterity*. Significant (at the 1% level) correlations were found between these measures and our measure of *MCS package ambidexterity*, thus indicating positive relationships between the variables. Further, a relationship between *MCS package ambidexterity* and *M&S Organizational ambidexterity* was expected, as the ‘design and use’ of the MCS packages should reinforce the organizational capacity for ambidexterity.

5.2.2 MCS package ambidexterity – Our measure and G&B’s measure

By studying Table 8 in Appendix 2, it can be seen that our measure of *MCS package ambidexterity* has a smaller spread between the lowest and the highest value for each cluster compared to G&B’s measure. This lower spread is expected, since our measure is constructed from more questions, i.e. two for exploitation and two for exploration on each of the six MCS; rather than the total of six questions in Gibson and Birkinshaw’s model. Thus, as averages are used in both models, more questions increase the chances of ending up “in the middle”, if firms have not consistently answered high or low on exploitative or explorative indicators relating to the different MCS.

Even though the spread is lower for our measure, the results show that it is better correlated with both *G&B Contextual ambidexterity* and *M&S Organizational ambidexterity*.⁶ Regarding *G&B Contextual ambidexterity*, our measure has a correlation of 0.442 while G&B’s measure has a correlation of 0.290. Since the relation between *G&B Contextual ambidexterity* and *G&B MCS package ambidexterity* has been tested in previous studies (Gibson & Birkinshaw, 2004) it is interesting to find that the results are supported in the Swedish data. Concerning *M&S Organizational ambidexterity* our measure has a correlation of 0.481 and G&B’s measure a correlation of 0.363. All these correlations are significant at the 1% level, as can be seen in Tables 19-22. Thus it seems that our *MCS package ambidexterity* measure captures some further aspects than G&B’s. This is reasonable, as G&B’s measure is only based on three questions, while our measure is based on 24 questions. Also, our measure allows for a deeper examination of the MCS package configuration than does G&B’s measure.

⁶ See Tables 19-22.

6 Discussion and general insights

In this section, we start by discussing the similarities between the clusters. Next, we provide a taxonomy for the clusters; based on the observed differences. Last, we examine MCS package 'design and use' that facilitates for SBU ambidexterity.

6.1 Similarities among the clusters

Firstly, we observe that all clusters have higher aggregated values of exploitation than exploration in their MCS packages, as can be seen from Table 3. This might be explained by the firm size. Since all the SBUs in the sample are part of large firms, they are expected to be rather mature. Thus, an exploitative orientation can be justified as these firms have already established their product and market domain. Consequently, the focus is mainly on efficiency and effectiveness; rather than on innovation and flexibility. Furthermore, while the returns of exploration are unsure, exploitation generates predictable returns. Therefore, exploitative behavior often looks favorable in the short-term (March, 1991), which might influence the decision process of top managers, as they design and use the MCS packages.

A further similarity observed among the clusters is in the use of strategies. When making a within-cluster comparison, the strategies do not differ substantially. Most of the clusters claim to compete; foremost by means of Customer understanding; secondly by means of both Product innovation and Rapid introductions; and least by means of Low price strategies. Thus, the clusters do only differ when looking at the level of emphasis on respective strategy, as discussed in previous sections. This observation implies that despite size, large firms need to consider their customers' needs and wants and cannot simply compete by low prices. It can therefore be concluded that 'Low price' as a strategy is not sufficient on a standalone basis in the business climate wherein the SBUs operate.

Another observation, linked to the use of strategies, is the emphasis on the value drivers 'Customer relations' and 'Financial results' within all clusters. Moreover, all clusters emphasize Cybernetic controls, which might be explained by firm size, as larger organizations require more sophisticated and complex systems for monitoring behavior (Malmi & Sandelin, 2010a). As part of larger firms, the SBUs in the sample should have access to the resources and formal administrative systems, that can either assist or hinder large firms in their achievement of ambidexterity. Thus, they should not be as dependent as smaller firms on the top management team (TMT) to achieve ambidexterity (Lubatkin et al., 2006). Organizational culture is also emphasized as an important control system in most of the clusters, which can be explained by having mature companies with institutionalized values. Moreover, industry belongings are rather mixed in the clusters, as can be seen from Table 12 in Appendix 2, indicating that the achievement of ambidexterity is not strongly dependent on the SBU's area of business. Altogether, it can be seen that SBUs within large firms operating in Sweden have a high focus on efficiency and customer needs.

6.2 Taxonomy of the clusters

From the analysis, a taxonomy is developed, depicted in Figure 12. Based on our findings, each cluster has been personified.

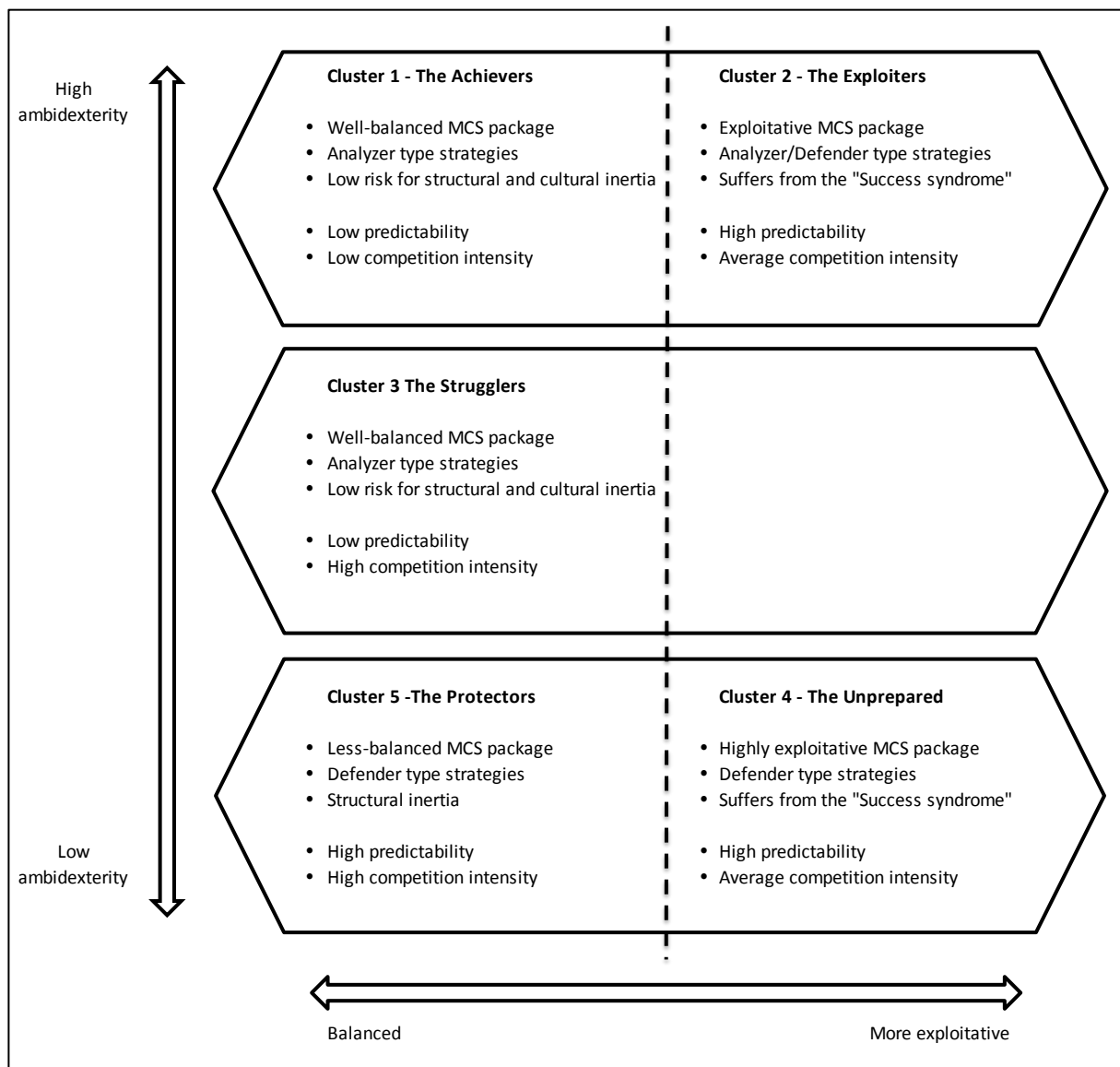


Figure 12. Taxonomy of the clusters based on the cluster profiling.

First, Cluster 1 is labeled as *The Achievers*. The titling is based on the proof of a balanced MCS package, with high levels of *MCS package ambidexterity*. *Achievers* are practicing analyzer type strategies - containing exploitative and explorative elements - which are allowed for by the environmental conditions wherein they operate. The low environmental predictability and low competition intensity are contributing to the achievement of ambidexterity, as these factors are influencing the way MCSs are 'designed and used' by top managers at an initial stage.

Second, Cluster 2 is named *The Exploiters*. *Exploiters* achieve a high level of *MCS package ambidexterity*, but with a bias towards exploitative 'design and use'. They operate in a

stable and predictable environment, and thus are not forced to balance their exploitative and explorative behaviors to the same extent as the *Achievers*.

Third, Cluster 3 is labeled *The Strugglers*. This title is based on the environmental hostility and unpredictability faced by the SBUs in this cluster. *Strugglers* achieve *MCS package ambidexterity* by having a balanced MCS package, but with somewhat lower levels of the ambidexterity measure than the *Achievers*. Due to the environmental aggressiveness, the *Strugglers* are forced to behave ambidextrous. As a positive consequence, they are less likely to fall into structural and cultural inertia.

Fourth, Cluster 4 is named *The Unprepared*. The naming is based on the fact that these SBUs are operating in a convenient environment and emphasize exploitative 'design and use' of the MCS packages. Due to this short-term approach assumed by top managers, the SBUs might not be prepared for sudden and rapid environmental changes. As a result of this approach, the long-term survival is threatened.

Fifth, Cluster 5 is labeled *The Protectors*. This titling is based on the defender type strategies employed by the SBUs in the cluster. Also, the structure of the MCS packages is biased towards exploitative 'design and use', when looking at the individual systems. Nevertheless, the MCS packages of the *Protectors* are more balanced on an aggregated level than the ones designed and used by the *Unprepared*.

While balance is achieved by *Achievers*, *Strugglers* and *Protectors*, the *Exploiters* and *The Unprepared* lack this balance in their MCS packages. This imbalance might be hard to overcome, as a coercive force to encourage a more balanced 'design and use' of the MCS package is missing. Further, both the *Exploiters* and *The Unprepared* might suffer from the 'Success syndrome', which makes it difficult to break the pattern without external incentives, as they now are benefiting from the short-term returns of exploitative behavior.

6.3 MCS package ‘design and use’ facilitating ambidexterity

To answer our research question regarding *how MCS packages can create conditions for an ambidextrous orientation*, we deepen the analysis by comparing two extremes. The *Achievers* and *The Unprepared* constitute two extremes in terms of cluster positioning; see Figure 12. They differ both in level of ambidexterity as well as in balance within the MCS package. Thus, we summarize their MCS characteristics in the table below.

MCS characteristics					
		Cluster 1 - The Achievers		Cluster 4 - The Unprepared	
Strategic planning	Exploit	4,5	Detailed and specific	4,9	Detailed and specific
		5,5	High accuracy	4,6	High accuracy
	Explore	4,8	Infrequent review	3,2	Frequent review
		2,5	Limited participation	1,9	Very limited participation
Short-term planning	Exploit	6,6	Top-down target setting	6,1	Top-down target setting
		6,3	Comprehensive short-term plans	6,2	Comprehensive short-term plans
	Explore	4,0	Some autonomy regarding action plans	2,5	Low autonomy regarding action plans
		6,3	Action plans adjusted dynamically	3,0	Fixed action plans
Performance measurement and evaluation	Exploit	4,6	OPEX are rather fixed	5,1	OPEX are rather fixed
		5,0	Diagnostic use of budgets	5,3	Diagnostic use of budgets
	Explore	6,3	Interactive use of budgets	3,6	Less interactive use of budgets
		5,8	Subjectivity in performance evaluation	4,9	Subjectivity in performance evaluation
Rewards and compensations	Exploit	6,5	Objectivity regarding compensations	5,2	Objectivity regarding compensations
		6,5	Individual rewards	2,8	Less customization of rewards
	Explore	4,5	Subjectivity regarding compensations	3,4	Less subjectivity regarding compensations
		3,0	Low extent of collective rewards	2,0	Low extent of collective rewards
Structure and management processes	Exploit	4,8	Top mgmt have high degree of influence	4,4	Top mgmt have high degree of influence
		5,8	Guidelines for strategic search activities	4,4	Guidelines for strategic search activities
	Explore	6,3	Broad mgmt groups within units	4,7	Broad mgmt groups within units
		6,8	Free access to broad-scope information	4,4	Free access to broad-scope information
Organizational culture	Exploit	4,8	Socialization and mentoring programs	5,2	Socialization and mentoring programs
		4,8	Specific vision statement	4,3	Specific vision statement
	Explore	5,5	Subordinate rotation	3,7	Low extent of subordinate rotation
		4,5	Motivation and responsibility sharing	4,0	Some motivation and responsibility sharing

Table 23. MCS characteristics for the *Achievers* and *The Unprepared*.

6.3.1 MCS characteristics for Achievers and The Unprepared

As can be seen from Table 16, *Achievers* have higher values of exploitation than exploration in *Strategic planning*, *Short-term Planning* and *Rewards & Compensation*. Further, *Achievers* have higher values of exploration than exploitation in *Performance measurements and evaluation*, *Organizational structure & Management processes* and *Organizational culture*. On the other hand, *The Unprepared* have higher values of exploitation than exploration in all control systems except for *Organizational structure & Management processes*, which is balanced.

Regarding the *Strategic planning* of *Achievers*, it produces ends that are detailed and can be achieved with certainty, which are infrequently reviewed. However, there is limited participation of subordinates when setting the strategic ends. For *The Unprepared*, the strategic ends are more frequently reviewed.

In *Short-term planning*, *Achievers* have top-down target setting and comprehensive short-term plans. Action plans are adjusted dynamically and some autonomy exist in their formulation. For *The Unprepared*, action plans are set by SBU top management and seldom updated.

Regarding the *Performance measurement and evaluation* of *Achievers*, top management seeks to control operating expenditures and therefore these are rather fixed. Subjectivity is applied when performance are measured. Also, both *diagnostic* and *interactive* controls are used by top management, which is consistent with an analyzer type strategy (Simons, 1990 cited in Langfield-Smith, 1997). *The Unprepared* use budgets less interactively; i.e. they are not used to provide a recurring agenda for subordinate activities.

Concerning *Rewards and compensations*, *Achievers* apply objectivity as predetermined criteria are used in rewarding. However some degree of subjectivity exists as the amount of bonus is adjusted for actual circumstances. Further, rewards are individually rather than collectively based. For *The Unprepared*, customizations of rewards are not applied and the compensations are less subjective.

In the *Organizational structure & Management processes* of *Achievers*, SBU top management has high degree of influence when prioritizing activities and specific guidelines exist for strategic search activities. However, subordinates have free access to broad scope information and the managements groups are broad in their constellations. *The Unprepared* use these controls in a similar way.

Regarding *Organizational culture*, *Achievers* use socialization and mentoring programs for new managers and emphasize vision statements that are so specific that they can guide decisions regarding business opportunities. Rotation of subordinates is seen as important, and values are used to motivate employees to share responsibility. *The Unprepared* do not use subordinate rotation as a precondition for promotion.

6.3.2 What differs between Achievers and The Unprepared?

As can be seen from the analysis above, *Achievers* emphasize 'design and use' of MCSs that facilitate both exploitative and explorative behavior, while *The Unprepared* emphasize explorative controls to a lesser extent. This is the reason to why *The Unprepared* have imbalance in their MCS packages. Also, the values in Table 23 are generally higher for *Achievers*, thus meaning that they obtain higher levels of *MCS package ambidexterity*. The MCS package 'design and use' of *The Unprepared* is characterized by a more top-down approach when controlling subordinate behavior, while the *Achievers* are more dynamic in their approach to control. The example of the *Achievers* show that it is not required having balance within each individual MCS. Rather, *MCS package ambidexterity* can be achieved on an aggregated level by having balance between MCSs with contradicting orientations.

7 Conclusions and implications for future research

In this section, we summarize our findings and discuss the implications for future research.

7.1 Summing up

The aim of this thesis was to investigate *how the 'design and use' of MCS packages can create an ambidextrous orientation within Swedish SBUs*, as well as *what characterizes SBUs with different levels of ambidexterity*. The focus was on SBUs in 71 large Swedish companies. Cluster analysis was employed to uncover the structure in the data. Using cluster analysis, we have identified five clusters with different solutions regarding MCS package 'design and use', and different levels on each of the ambidexterity measures. A taxonomy was provided based on these clusters; presenting the different firm and environmental characteristics.

Further, we have looked at the associations between different ambidexterity measures; to see how ambidexterity can be achieved within SBUs. We have shown that our measure of *MCS package ambidexterity* is correlated with both *G&B Contextual ambidexterity* and *M&S Organizational ambidexterity*. These correlations indicate that the 'design and use' of MCSs can create an internal control context, in which the MCS package works as an integrated whole. Thus, it can be concluded that focusing on the behavior framing attributes of discipline, stretch, trust and support will facilitate for simultaneous execution of exploitative and explorative behavior; which was observed for the *Achievers*. The lack of these behavior framing attributes, indicated by low levels of *G&B Contextual ambidexterity*, caused the low values of ambidexterity in *The Unprepared* and the *Protectors*. Furthermore, it was noted that to create an ambidextrous orientation within SBUs, each individual MCS does not need to be balanced on its own. Rather, depending on how well the MCSs function together as an integrated whole, the higher values of ambidexterity can be achieved within the MCS package.

To further analyze the MCS characteristics that facilitate for ambidextrous behavior, we compared two extremes: the *Achievers* with higher levels of ambidexterity and balanced MCS packages; and *The Unprepared* with lower levels of ambidexterity and imbalanced MCS packages. By using our own measure of *MCS package ambidexterity*, rather than the measure developed by Gibson and Birkinshaw (2004), we were able to describe the MCS characteristics of the two extremes in more detail. Further, we have avoided some of the caveats in previous MCS research by using a comprehensive framework for MCS packages, which treat the management controls as an integrated system, rather than as individual and independent parts.

While our thesis contributes to the research within the areas of MCS and ambidexterity, some limitations should be noted. First, as the thesis has an exploratory approach, follow-up studies are needed to confirm the findings. Especially, the relevance of our measure for *MCS package ambidexterity* needs to be tested in other settings. Second, cluster analysis always

generates a solution, whether there is a structure in the data or not,⁷ wherefore caution should be used when generalizing to other populations. Also, the example of the Achievers is based on only four SBUs, which further enhance the need for carefulness when generalizing. Further concerns regarding the method have been covered in section 3.6 *Reliability and validity*.

7.2 Implications for future research

At the time of our thesis, the data collection for the international project had just begun. Therefore, international comparisons will be an area for future research; as data become available. It would then be interesting to see how ambidextrous the MCS packages in Swedish SBUs are, as compared to other countries.

In future studies, it would also be interesting to investigate the development of ambidexterity over time; to capture the effects on long-term survival and performance. This will only be possible if further data collections are conducted within the international project or in other studies, and if the data is accumulated in a database.

Since the research area of ambidexterity is in its infancy, further studies should explore and develop the concept. Moreover, since several definitions of the concept exist - with different assumptions regarding achievement of ambidexterity - it is important that future studies are clear in their conceptualizations and assumptions; to ensure consistency and comparability over time. Further, theory and research methods within the area of ambidexterity should be developed to capture the dynamic nature of strategies, MCS package 'design and use', and firm behavior, as well as their interrelations.

⁷ See Hair et al. (1998).

8 References

8.1 Published books and articles

- Abernethy, M.A. & Chua, W. 1996, "A Field Study of Control System "Redesign": The Impact of Institutional Processes on Strategic Choice", *Contemporary Accounting Research*, vol. 13, no. 2, pp. 569-606. Cited in Malmi, T. & Brown, D.A. 2008, "Management control systems as a package—Opportunities, challenges and research directions", *Management Accounting Research*, vol. 19, no. 4, pp. 287-300.
- Bonner, S.E. & Sprinkle, G.B. 2002, "The effects of monetary incentives on effort and task performance: theories, evidence, and a framework for research", *Accounting, Organizations & Society*, vol. 27, no. 4, pp. 303-345. Cited in Malmi, T. & Brown, D.A. 2008, "Management control systems as a package—Opportunities, challenges and research directions", *Management Accounting Research*, vol. 19, no. 4, pp. 287-300.
- Bowman, C. & Ambrosini, V. 1997, "Using Single Respondents in Strategy Research", *British Journal of Management*, vol. 8, 119-131.
- Brown, D.A. 2005, "Management control systems as a coupled package: an analytical framework and empirically grounded implications", University of Technology, Sydney. Cited in Malmi, T. & Brown, D.A. 2008, "Management control systems as a package—Opportunities, challenges and research directions", *Management Accounting Research*, vol. 19, no. 4, pp. 287-300.
- Chenhall, R.H. 2003, "Management control systems design within its organizational context: findings from contingency-based research and directions for the future", *Accounting, Organizations & Society*, vol. 28, no. 2, pp. 127-168.
- Flamholtz, E.G., Das, T.K. & Tsui, A.S. 1985, "Toward an Integrative Framework of Organizational Control", *Accounting, Organizations & Society*, vol. 10, no. 1, pp. 35-50. Cited in Malmi, T. & Brown, D.A. 2008, "Management control systems as a package—Opportunities, challenges and research directions", *Management Accounting Research*, vol. 19, no. 4, pp. 287-300.
- Frankfort-Nachmias, C. & Nachmias, D. 1996, "Research methods in the social science", 5th Edition, Hodder Arnold, UK.
- Ghoshal, S. & Bartlett, C. 1994, "Linking organizational context and managerial action: the dimensions of quality of management", *Strategic Management Journal*, vol. 15, pp. 91-112.
- Gibson, C.B. & Birkinshaw, J. 2004, "The antecedents, consequences, and mediating role of organizational ambidexterity", *Academy of Management Journal*, vol. 47, no. 2, pp. 209-226.
- Green, S.G. & Welsh, M.A. 1988, "Cybernetics and Dependence: Reframing the Control Concept", *Academy of Management Review*, vol. 13, no. 2, pp. 287-301. Cited in Malmi, T. & Brown, D.A. 2008, "Management control systems as a package—Opportunities, challenges and research directions", *Management Accounting Research*, vol. 19, no. 4, pp. 287-300.
- Gupta, A.K., Smith, K.G. & Shalley, C.E. 2006, "The Interplay between Exploration and Exploitation", *Academy of Management Journal*, vol. 49, no. 4, pp. 693-706.
- Hair, J.F., Anderson, R.E., Tatham, R.L. & Black, W.C. 1998. "Multivariate Data Analysis", 5th Edition, Prentice-Hall, New Jersey.

- Hambrick, D. C. 1981, "Strategic Awareness within Top Management Teams", *Strategic Management Journal*, vol. 2, pp. 263-279.
- He, Z. & Wong, P. 2004, "Exploration vs. Exploitation: An Empirical Test of the Ambidexterity Hypothesis", *Organization Science*, vol. 15, no. 4, pp. 481-494.
- Hotz, F. 2010, "Organizational Ambidexterity: A Multi-Level Perspective on Organizational Alignment", Dissertation of the University of St. Gallen, Dissertation no. 3773, Schaan, Gutenberg Druck.
- Hussey, J. & Hussey, R. 1997, "Business Research: A practical guide for undergraduate and post graduate students", Macmillan Press Ltd, UK.
- Jansen, J. J. P., van den Bosch, F. A. J., & Volberda, H. W. 2005, "Exploratory innovation, exploitative innovation, and ambidexterity: The impact of environmental and organizational antecedents", *Schmalenbach Business Review*, vol. 57, pp. 351-363. Cited in Raisch, S. & Birkinshaw, J. 2008, "Organizational Ambidexterity: Antecedents, Outcomes, and Moderators", *Journal of Management*, vol. 34, no.3, pp. 375-409.
- Katila, R. & Ahuja, G. 2002, "Something old, something new: A longitudinal study of search behavior and new product introduction", *Academy of Management Journal*, vol. 45, pp. 1183-1194. Cited in Gupta, A.K., Smith, K.G. & Shalley, C.E. 2006, "The Interplay between Exploration and Exploitation", *Academy of Management Journal*, vol. 49, no. 4, pp. 693-706.
- Langfield-Smith, K. 1997, "Management control systems and strategy: A critical review", *Accounting, Organizations and Society*, vol. 22, no. 2, pp. 207-232.
- Lubatkin, M.H., Simsek, Z., Ling, Y. & Veiga, J.F. 2006, "Ambidexterity and Performance in Small- to Medium-Sized Firms: The Pivotal Role of Top Management Team Behavioral Integration", *Journal of Management*, vol. 32, no. 5, pp. 646-672.
- Malmi, T. & Brown, D.A. 2008, "Management control systems as a package—Opportunities, challenges and research directions", *Management Accounting Research*, vol. 19, no. 4, pp. 287-300.
- March, J.G. 1991, "Exploration and Exploitation in Organizational Learning", *Organization Science*, vol. 2, no. 1, pp. 71-87.
- Merchant, K.A. & Van der Stede, W.A. 2007, "*Management control systems*", Prentice Hall, Pearson Education Limited, Harlow, Essex, England. Cited in Malmi, T. & Brown, D.A. 2008, "Management control systems as a package—Opportunities, challenges and research directions", *Management Accounting Research*, vol. 19, no. 4, pp. 287-300.
- Miles, R.E., Snow, C.C., Meyer, A.D., Coleman, J. & Henry J. 1978, "Organizational Strategy, Structure, and Process", *Academy of Management Review*, vol. 3, no. 3, pp. 546-562.
- Milligan, G.W. & Cooper, M.C. 1985, "An examination of procedures for determining the number of clusters in a data set", *Psychometrika*, vol. 50, no. 2, pp. 159-179. Cited in Hair, J.F., Anderson, R.E., Tatham, R.L., Black, W.C., 1998. *Multivariate Data Analysis*, 5th Edition. Prentice-Hall, New Jersey.
- Newbold, P., Carlson, W.L. & Thorne, B. 2007, "Statistics for Business and Economics", 6th Edition, Pearson Education, New Jersey.

- Norušis, M. J. 2012, "IBM SPSS Statistics 19 Statistical Procedures Companion", Pearson, USA.
- Otley, D.T. 1980, "The Contingency Theory of Management Accounting: Achievement and Prognosis", *Accounting, Organizations & Society*, vol. 5, no. 4, pp. 413-428.
- Porter, M. E. 1980, "Competitive Strategy", New York: Free Press. Cited in Langfield-Smith, K. 1997, "Management control systems and strategy: A critical review", *Accounting, Organizations and Society*, vol. 22, no. 2, pp. 207-232.
- Porter M. E. 1985, "Competitive Advantage", New York: Free Press. Cited in Langfield-Smith, K. 1997, "Management control systems and strategy: A critical review", *Accounting, Organizations and Society*, vol. 22, no. 2, pp. 207-232.
- Probst, G. & Raisch, S. 2005, "Organizational crisis: The logic of failure." *Academy of Management Executive*, vol. 19, no. 1, pp. 90-105.
- Raisch, S. & Birkinshaw, J. 2008, "Organizational Ambidexterity: Antecedents, Outcomes, and Moderators", *Journal of Management*, vol. 34, no.3, pp. 375-409.
- Raisch, S., & Hotz, F. *in press*, "Shaping the context for learning: Corporate alignment initiatives, environmental munificence, and firm performance". In S. Wall, C. Zimmermann, R. Klingebiel, & D. Lange (Eds.), "Strategic reconfigurations: Building dynamic capabilities in rapid-innovation-based industries". Cheltenham, UK: Edward Elgar. Cited in Raisch, S. & Birkinshaw, J. 2008, "Organizational Ambidexterity: Antecedents, Outcomes, and Moderators", *Journal of Management*, vol. 34, no.3, pp. 375-409.
- Sharma, S. 1996, "Applied Multivariate Techniques", John Wiley & Sons, USA.
- Simons, R. 1990, "The Role of Management Control Systems in Creating Competitive Advantage: New Perspectives", *Accounting, Organizations & Society*, vol. 15, no. 1, pp. 127-143. Cited in Langfield-Smith, K. 1997, "Management control systems and strategy: A critical review", *Accounting, Organizations and Society*, vol. 22, no. 2, pp. 207-232.
- Snow, C. C. & Hrebiniak, L. G. 1980, "Strategy, Distinctive Competence and Organizational Performance", *Administrative Science Quarterly*, vol. 25, pp. 317-336.
- Trost, J. & Hultåker, O. 2007, "Enkätboken", 3rd Edition, Studentlitteratur, Sweden.
- Tushman, M.L. & O'Reilly III, C.A. 1996, "Ambidextrous organizations: Managing evolutionary and revolutionary change", *California management review*, vol. 38, no. 4, pp. 8-30.

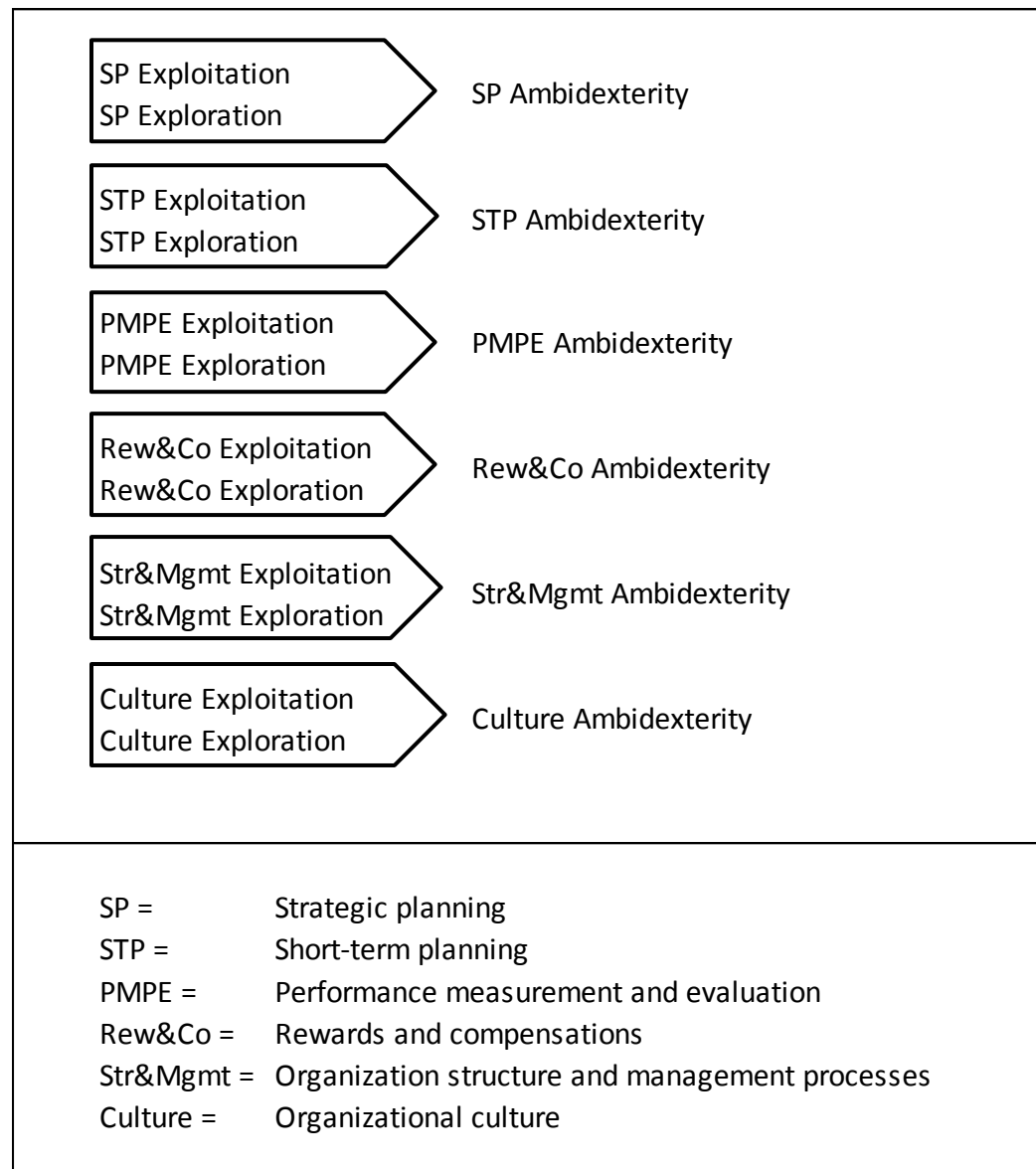
8.2 Unpublished references

- Malmi, T. & Sandelin, M. 2010a, "Management control systems as a package - configurations, interrelationships, and effectiveness of MCS", *Research Proposal (Aalto University School of Economics)*.
- Malmi, T. & Sandelin, M. 2010b, "Management control systems as a package - configurations, interrelationships, and effectiveness of MCS", *Construct Review (Aalto University School of Economics)*.

9 Appendix 1 Figures and tables from methodology

9.1 Figure 1 Modeling ambidexterity measures for individual MCSs.

This figure depicts how the ambidexterity measure for each individual MCS is calculated. The measure is derived by multiplying the measures of exploitation and exploration for each individual system.



9.2 Table 1 Agglomeration schedule

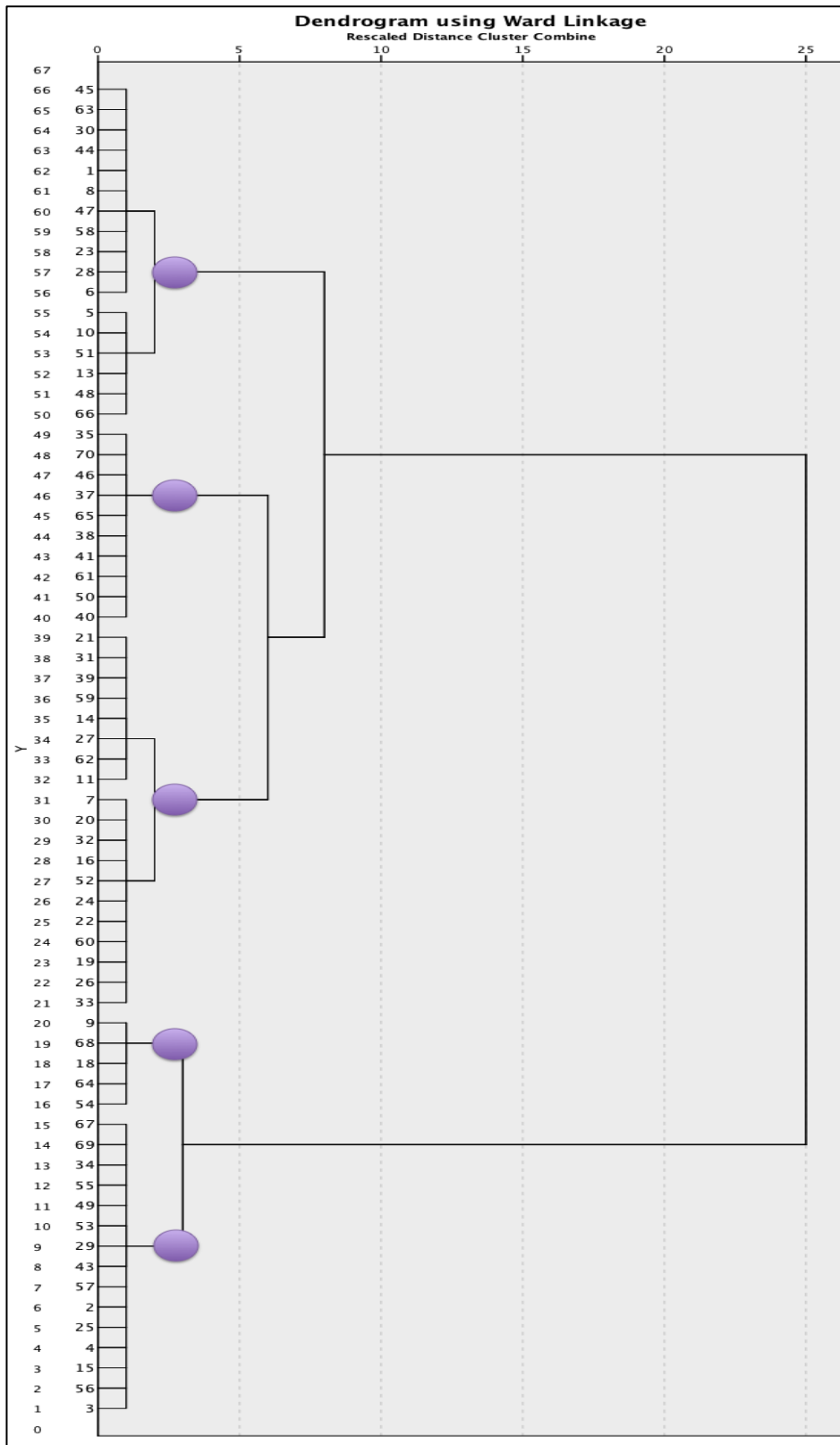
This table presents the agglomeration schedule for hierarchical cluster analysis, using Ward's method. The coefficient in the fourth column represents the within-cluster sum of squares when combining clusters at each stage.

Agglomeration Schedule						
Stage	Cluster Combined		Coefficients	Appears		Next Stage
	Cluster 1	Cluster 2		Cluster 1	Cluster 2	
1	45	63	,000	0	0	28
2	41	61	,001	0	0	8
3	30	44	,001	0	0	28
4	9	68	,002	0	0	55
5	37	65	,004	0	0	18
6	49	53	,005	0	0	29
7	39	59	,007	0	0	36
8	41	50	,009	2	0	26
9	29	43	,010	0	0	20
10	4	15	,013	0	0	24
11	23	28	,016	0	0	40
12	16	52	,019	0	0	35
13	21	31	,023	0	0	44
14	19	26	,027	0	0	39
15	1	8	,030	0	0	27
16	34	55	,035	0	0	43
17	35	70	,042	0	0	38
18	37	38	,048	5	0	45
19	7	20	,056	0	0	32
20	29	57	,063	9	0	29
21	22	60	,072	0	0	51
22	2	25	,080	0	0	54
23	5	10	,089	0	0	30
24	4	56	,099	10	0	50
25	14	27	,110	0	0	36
26	40	41	,122	0	8	45
27	1	47	,137	15	0	41
28	30	45	,155	3	1	46
29	29	49	,175	20	6	43
30	5	51	,200	23	0	53
31	18	64	,225	0	0	42
32	7	32	,250	19	0	47
33	13	48	,276	0	0	37
34	67	69	,302	0	0	49

35	16	24	,331	12	0	47
36	14	39	,361	25	7	44
37	13	66	,392	33	0	53
38	35	46	,426	17	0	57
39	19	33	,466	14	0	51
40	6	23	,516	0	11	56
41	1	58	,566	27	0	46
42	18	54	,622	31	0	55
43	29	34	,680	29	16	49
44	14	21	,740	36	13	48
45	37	40	,801	18	26	57
46	1	30	,876	41	28	56
47	7	16	,956	32	35	58
48	14	62	1,037	44	0	52
49	29	67	1,127	43	34	59
50	3	4	1,256	0	24	54
51	19	22	1,423	39	21	58
52	11	14	1,630	0	48	61
53	5	13	1,845	30	37	60
54	2	3	2,087	22	50	59
55	9	18	2,465	4	42	62
56	1	6	2,927	46	40	60
57	35	37	3,477	38	45	63
58	7	19	4,184	47	51	61
59	2	29	4,964	54	49	62
60	1	5	6,107	56	53	64
61	7	11	7,328	58	52	63
62	2	9	9,258	59	55	65
63	7	35	13,548	61	57	64
64	1	7	19,175	60	63	65
65	1	2	38,844	64	62	0

9.3 Figure 2 Dendrogram

The figure shows the dendrogram for hierarchical cluster analysis. The chosen cluster solution indicated by purple dots.



9.4 Table 2 Percentage changes in agglomeration coefficient

The table presents the percentage change in the agglomeration coefficient to the next stage, in the hierarchical procedure with Ward's method.

Number of clusters	Agglomeration coefficient	Percentage change in coefficient to next level
10	2,9	19%
9	3,5	20%
8	4,2	19%
7	5,0	23%
6	6,1	20%
5	7,3	26%
4	9,3	46%
3	13,5	42%
2	19,2	103%
1	38,8	-

10 Appendix 2 Characteristics of the clusters

Tables 3-12 show different descriptive statistics for the clusters.

10.1 Table 3 Measures of strategy

This table presents the measures of focus put on each strategy within the cluster. In the analysis, a between-cluster comparison of these measures is used to present the level of focus on different strategies.

Descriptive Statistics						
Cluster		N	Minimum	Maximum	Mean	Std. Deviation
1	Strat_Low_price	4	1,00	2,00	1,2500	,50000
	Strat_Rapid_intro	4	3,00	5,00	4,5000	1,00000
	Strat_Prod_innov	4	4,00	7,00	5,5000	1,29099
	Strat_Custom_und	4	5,00	6,00	5,2500	,50000
	Valid N (listwise)	4				
2	Strat_Low_price	17	1,00	6,00	2,5882	1,46026
	Strat_Rapid_intro	17	1,00	7,00	4,8235	1,42457
	Strat_Prod_innov	17	1,00	7,00	4,3529	1,86886
	Strat_Custom_und	17	1,00	7,00	5,0588	1,51948
	Valid N (listwise)	17				
3	Strat_Low_price	11	1,00	5,00	2,0909	1,37510
	Strat_Rapid_intro	11	2,00	6,00	4,0000	1,41421
	Strat_Prod_innov	11	1,00	7,00	4,2727	1,90215
	Strat_Custom_und	11	1,00	7,00	5,0000	1,94936
	Valid N (listwise)	11				
4	Strat_Low_price	16	1,00	5,00	2,5625	1,45917
	Strat_Rapid_intro	16	1,00	6,00	3,6875	1,62147
	Strat_Prod_innov	16	1,00	7,00	3,8125	2,28674
	Strat_Custom_und	16	1,00	7,00	4,3750	1,45488
	Valid N (listwise)	16				
5	Strat_Low_price	18	1,00	7,00	2,7222	1,84089
	Strat_Rapid_intro	18	2,00	6,00	3,7222	1,40610
	Strat_Prod_innov	18	1,00	7,00	3,3333	1,90973
	Strat_Custom_und	18	1,00	7,00	4,7222	1,63799
	Valid N (listwise)	18				

10.2 Table 4 Measures of value drivers

The measures in Table 4 present the importance measure of different value drivers for each cluster. These are used for within-cluster comparison in analysis to see if the value drivers differ in importance, depending on the strategy focus of respective cluster.

Descriptive Statistics						
Cluster		N	Minimum	Maximum	Mean	Std. Deviation
1	VD_Fin_res	4	7,00	7,00	7,0000	,00000
	VD_Custom_rel	4	7,00	7,00	7,0000	,00000
	VD_Empl_rel	4	6,00	7,00	6,7500	,50000
	VD_Oper_perf	4	5,00	7,00	6,5000	1,00000
	VD_Quality	4	6,00	7,00	6,7500	,50000
	VD_Alliances	4	3,00	5,00	4,0000	,81650
	VD_Supplier_rel	4	1,00	7,00	4,7500	2,62996
	VD_Environm_perf	4	3,00	7,00	5,7500	1,89297
	VD_Innovation	4	5,00	7,00	5,5000	1,00000
	VD_Community	4	2,00	7,00	4,2500	2,21736
	VD_Lobbying	4	2,00	7,00	3,7500	2,36291
	Valid N (listwise)	4				
2	VD_Fin_res	17	5,00	7,00	6,4118	,61835
	VD_Custom_rel	17	5,00	7,00	6,6471	,60634
	VD_Empl_rel	17	6,00	7,00	6,4118	,50730
	VD_Oper_perf	17	4,00	7,00	6,2941	,84887
	VD_Quality	17	4,00	7,00	6,0588	,89935
	VD_Alliances	17	2,00	7,00	4,2353	1,39326
	VD_Supplier_rel	17	2,00	7,00	5,2353	1,48026
	VD_Environm_perf	17	2,00	7,00	5,2353	1,60193
	VD_Innovation	17	2,00	7,00	5,1176	1,79869
	VD_Community	17	2,00	7,00	5,3529	1,49755
	VD_Lobbying	17	1,00	7,00	4,2941	1,79460
	Valid N (listwise)	17				
3	VD_Fin_res	11	5,00	7,00	6,3636	,80904
	VD_Custom_rel	11	5,00	7,00	6,5455	,68755
	VD_Empl_rel	11	4,00	7,00	5,6364	1,12006
	VD_Oper_perf	11	4,00	7,00	5,6364	,80904
	VD_Quality	11	1,00	7,00	5,3636	1,74773
	VD_Alliances	11	1,00	6,00	3,0909	1,75810
	VD_Supplier_rel	11	1,00	6,00	4,7273	1,48936
	VD_Environm_perf	11	2,00	7,00	4,2727	1,55505
	VD_Innovation	11	2,00	6,00	4,2727	1,42063
	VD_Community	11	2,00	6,00	4,1818	1,53741
	VD_Lobbying	11	1,00	7,00	2,9091	1,97254
	Valid N (listwise)	11				
4	VD_Fin_res	16	3,00	7,00	6,3125	1,07819
	VD_Custom_rel	16	4,00	7,00	6,2500	,85635
	VD_Empl_rel	16	4,00	7,00	5,3125	,87321
	VD_Oper_perf	16	3,00	7,00	5,6250	1,14746
	VD_Quality	16	4,00	7,00	5,5625	1,09354
	VD_Alliances	16	1,00	6,00	3,5625	1,59034
	VD_Supplier_rel	15	3,00	6,00	4,4667	1,06010
	VD_Environm_perf	16	1,00	7,00	4,1875	1,97379
	VD_Innovation	16	1,00	7,00	4,5000	1,96638
	VD_Community	16	1,00	7,00	4,3750	2,18708
	VD_Lobbying	16	1,00	7,00	3,8750	1,99583
	Valid N (listwise)	15				
5	VD_Fin_res	18	6,00	7,00	6,6111	,50163
	VD_Custom_rel	18	4,00	7,00	6,1667	,92355
	VD_Empl_rel	18	3,00	7,00	5,5556	1,29352
	VD_Oper_perf	18	4,00	6,00	5,1667	,61835
	VD_Quality	18	4,00	7,00	5,6111	,77754
	VD_Alliances	18	1,00	7,00	3,2778	1,70830
	VD_Supplier_rel	18	1,00	7,00	3,9444	1,83021
	VD_Environm_perf	18	2,00	6,00	3,9444	1,25895
	VD_Innovation	18	2,00	7,00	4,8333	1,75734
	VD_Community	18	1,00	7,00	3,9444	1,62597
	VD_Lobbying	18	1,00	7,00	2,6111	1,71974
	Valid N (listwise)	18				

10.3 Table 5 Measures of environmental complexity and hostility

Table 5 presents measures of the descriptive variables regarding; environmental complexity in terms of diverse customer requirements and diversified competitor strategies; and hostility in terms of competition intensity in the market. The measures are used in analysis to characterize the clusters.

Descriptive Statistics						
Cluster		N	Minimum	Maximum	Mean	Std. Deviation
1	Compl_Div_require	4	2,00	4,00	3,0000	,81650
	Compl_Div_strat	4	3,00	5,00	4,2500	,95743
	Compl_Intense	4	2,00	6,00	4,7500	1,89297
	Valid N (listwise)	4				
2	Compl_Div_require	17	1,00	6,00	3,7059	1,61108
	Compl_Div_strat	17	1,00	6,00	3,7647	1,30045
	Compl_Intense	17	1,00	7,00	5,2353	1,85504
	Valid N (listwise)	17				
3	Compl_Div_require	11	1,00	7,00	3,8182	1,77866
	Compl_Div_strat	11	2,00	6,00	3,2727	1,27208
	Compl_Intense	11	4,00	7,00	5,7273	1,10371
	Valid N (listwise)	11				
4	Compl_Div_require	16	1,00	6,00	2,8750	1,62788
	Compl_Div_strat	16	2,00	7,00	3,8125	1,79699
	Compl_Intense	16	1,00	7,00	5,2500	1,73205
	Valid N (listwise)	16				
5	Compl_Div_require	18	1,00	7,00	4,0000	1,84710
	Compl_Div_strat	18	1,00	7,00	3,4444	1,61690
	Compl_Intense	18	1,00	7,00	5,3889	1,68519
	Valid N (listwise)	18				

10.4 Table 6 Measures of environmental predictability

The table presents the components of the aggregated predictability measures used in analysis, as an additional indication of complexity. The indicators are Customers, Suppliers, Competitors, Technological, Regulatory and Economic.

Descriptive Statistics						
Cluster		N	Minimum	Maximum	Mean	Std. Deviation
1	Pred_Custom	4	5,00	6,00	5,2500	,50000
	Pred_Suppliers	4	3,00	6,00	4,5000	1,29099
	Pred_Compet	4	1,00	6,00	4,2500	2,36291
	Pred_Technologic	4	4,00	6,00	5,0000	,81650
	Pred_Regulatory	4	1,00	6,00	3,5000	2,08167
	Pred_Economic	4	2,00	4,00	3,0000	1,15470
	Pred_Average	4	3,33	4,67	4,2500	,61614
	Valid N (listwise)	4				
2	Pred_Custom	17	1,00	6,00	4,4118	1,73417
	Pred_Suppliers	17	3,00	7,00	5,3529	,86177
	Pred_Compet	16	3,00	7,00	4,9375	1,48183
	Pred_Technologic	17	4,00	7,00	5,5294	,94324
	Pred_Regulatory	17	2,00	7,00	4,5882	1,22774
	Pred_Economic	17	1,00	7,00	3,8824	1,57648
	Pred_Average	17	3,17	6,60	4,8000	,86771
	Valid N (listwise)	16				
3	Pred_Custom	11	1,00	7,00	3,4545	2,06706
	Pred_Suppliers	11	3,00	5,00	4,5455	,82020
	Pred_Compet	11	2,00	7,00	4,4545	1,50756
	Pred_Technologic	11	3,00	6,00	5,0000	1,09545
	Pred_Regulatory	11	4,00	7,00	5,1818	,87386
	Pred_Economic	11	1,00	5,00	2,7273	1,42063
	Pred_Average	11	2,83	5,83	4,2273	,88592
	Valid N (listwise)	11				
4	Pred_Custom	16	2,00	7,00	4,4375	1,50416
	Pred_Suppliers	16	2,00	7,00	5,0000	1,26491
	Pred_Compet	16	2,00	7,00	4,5625	1,50416
	Pred_Technologic	16	3,00	7,00	5,1250	1,36015
	Pred_Regulatory	16	1,00	7,00	4,5625	1,96532
	Pred_Economic	16	2,00	7,00	4,3125	1,40089
	Pred_Average	16	2,67	6,17	4,6667	,95258
	Valid N (listwise)	16				
5	Pred_Custom	18	1,00	6,00	4,9444	1,51356
	Pred_Suppliers	18	3,00	7,00	5,3889	1,03690
	Pred_Compet	18	1,00	7,00	4,1667	1,72354
	Pred_Technologic	18	4,00	7,00	5,3889	1,24328
	Pred_Regulatory	18	2,00	7,00	5,2222	1,39560
	Pred_Economic	17	1,00	6,00	3,4706	1,41940
	Pred_Average	18	3,33	6,17	4,7778	,70941
	Valid N (listwise)	17				

10.5 Table 7 Number of employees on firm and SBU level

The table presents the average number of employees for firm and SBU. The number of SBU employees is used as a descriptive variable in the analysis.

Descriptive Statistics						
Cluster		N	Minimum	Maximum	Mean	Std. Deviation
1	Firm Employees	2	990	1382	1186,00	277,186
	SBU Employees	4	174	3300	1293,50	1380,544
	Listed	4	1,00	2,00	1,5000	,57735
	Valid N (listwise)	2				
2	Firm Employees	12	545	6786	3119,08	2187,136
	SBU Employees	17	8	80000	7185,82	18896,924
	Listed	17	1,00	2,00	1,5294	,51450
	Valid N (listwise)	12				
3	Firm Employees	8	538	4103	1444,50	1189,450
	SBU Employees	10	540	42475	6431,40	12862,586
	Listed	10	1,00	2,00	1,7000	,48305
	Valid N (listwise)	7				
4	Firm Employees	13	507	7641	1756,69	1900,377
	SBU Employees	15	28	5500	2089,20	1819,060
	Listed	16	1,00	2,00	1,3750	,50000
	Valid N (listwise)	12				
5	Firm Employees	15	510	3518	1628,07	1090,122
	SBU Employees	18	140	8000	1691,78	2013,910
	Listed	18	1,00	2,00	1,6667	,48507
	Valid N (listwise)	15				

10.6 Table 8 Aggregated measures for different ambidexterity concepts

This table shows the aggregated measures of the different ambidexterity concepts for each cluster. The measure called ambidexterity in the table is the measure of *MCS package ambidexterity*, upon which the clusters are ordered and ranked. The *G&B Contextual ambidexterity* and the *M&S Organizational ambidexterity* are used in analysis and for the calculations of correlation between the concepts. The measure of *G&B MCS package ambidexterity* is used for comparison and validation of the *MCS package ambidexterity* measure developed within this thesis.

Descriptive Statistics						
Cluster		N	Minimum	Maximum	Mean	Std. Deviation
1	Ambidexterity	4	26,82	30,69	28,8060	2,05005
	G&B Contextual ambidexterity	4	25,00	49,00	34,9531	10,07929
	G&B Package ambidexterity	4	18,67	34,00	25,1667	6,44413
	M&S Organizational ambidexterity	4	27,00	40,63	33,4063	5,69391
	Valid N (listwise)	4				
2	Ambidexterity	17	20,22	25,93	23,1952	1,39499
	G&B Contextual ambidexterity	17	21,56	42,25	32,7022	6,45997
	G&B Package ambidexterity	17	8,56	49,00	29,2092	9,37210
	M&S Organizational ambidexterity	17	4,38	49,00	28,4890	12,06526
	Valid N (listwise)	17				
3	Ambidexterity	11	18,25	21,06	19,7031	1,00536
	G&B Contextual ambidexterity	11	17,50	43,75	27,3750	7,18043
	G&B Package ambidexterity	11	10,11	39,67	23,0606	9,15671
	M&S Organizational ambidexterity	11	12,19	38,50	22,8693	7,64135
	Valid N (listwise)	11				
4	Ambidexterity	16	13,73	20,00	16,9830	1,82244
	G&B Contextual ambidexterity	16	13,50	37,50	25,5781	6,55162
	G&B Package ambidexterity	16	11,11	32,67	22,4861	7,26657
	M&S Organizational ambidexterity	16	9,00	31,63	24,0130	6,59524
	Valid N (listwise)	16				
5	Ambidexterity	18	11,72	17,20	14,9369	1,56949
	G&B Contextual ambidexterity	18	15,00	45,56	24,8681	8,13124
	G&B Package ambidexterity	18	10,00	33,33	21,8642	5,79817
	M&S Organizational ambidexterity	18	13,13	30,19	19,7639	5,18901
	Valid N (listwise)	18				

10.7 Table 9 Measures of ambidexterity for individual MCSs

Table 9 shows the measure of ambidexterity for each individual MCS within respective cluster. These measures are used to see which of the MCSs in the MCS package that contributes to the aggregated level of *MCS package ambidexterity*.

Descriptive Statistics						
Cluster		N	Minimum	Maximum	Mean	Std. Deviation
1	SP Ambidexterity	4	7,50	31,50	19,0625	11,01207
	STP Ambidexterity	4	26,00	40,63	32,8750	6,02858
	PMPE Ambidexterity	4	11,00	42,00	27,2625	15,53198
	Rewards&Compensation Ambidexterity	4	16,25	28,00	24,3125	5,43666
	Structure&Mgmt Ambidexterity	4	31,50	37,50	33,9063	2,89283
	Culture Ambidexterity	4	12,00	45,50	25,0000	14,38170
	Valid N (listwise)	4				
2	SP Ambidexterity	17	7,50	26,00	13,9265	5,11967
	STP Ambidexterity	17	9,00	39,06	18,7610	7,06330
	PMPE Ambidexterity	17	21,00	41,60	29,9324	6,09664
	Rewards&Compensation Ambidexterity	17	4,00	49,00	19,7500	12,12758
	Structure&Mgmt Ambidexterity	17	7,50	38,50	22,6324	8,11170
	Culture Ambidexterity	17	11,00	49,00	28,3824	8,77279
	Valid N (listwise)	17				
3	SP Ambidexterity	11	5,00	18,00	12,2500	4,71699
	STP Ambidexterity	11	10,06	36,75	23,4773	7,03264
	PMPE Ambidexterity	11	6,45	30,00	21,8000	7,85799
	Rewards&Compensation Ambidexterity	11	5,25	30,25	18,0682	8,60457
	Structure&Mgmt Ambidexterity	11	12,00	28,75	19,3977	5,73117
	Culture Ambidexterity	11	8,00	39,00	21,5000	7,86766
	Valid N (listwise)	11				
4	SP Ambidexterity	16	4,00	26,00	12,4844	7,28953
	STP Ambidexterity	16	6,25	25,00	16,3438	6,52112
	PMPE Ambidexterity	16	11,90	36,00	21,8125	6,17696
	Rewards&Compensation Ambidexterity	16	1,00	32,50	11,3906	9,13919
	Structure&Mgmt Ambidexterity	16	6,88	33,00	20,0234	7,61703
	Culture Ambidexterity	16	10,50	33,00	17,9219	6,77908
	Valid N (listwise)	16				
5	SP Ambidexterity	18	1,50	20,25	9,1528	5,02595
	STP Ambidexterity	18	10,94	26,00	18,3472	5,00447
	PMPE Ambidexterity	18	6,40	31,90	18,3694	6,67311
	Rewards&Compensation Ambidexterity	18	3,00	27,50	14,6667	7,21110
	Structure&Mgmt Ambidexterity	18	2,63	20,25	13,0903	4,58835
	Culture Ambidexterity	18	8,75	20,00	15,2778	3,74646
	Valid N (listwise)	18				

10.8 Table 10 Measures of exploration and exploitation for individual MCS

The ambidexterity measures for the individual MCSs in Table 9 are in this table split up into its components of exploitation and exploration. These measures are used in analysis to investigate how each MCS within the clusters MCS package is oriented. The measures describe the 'design and use' of each cluster MCS package.

Descriptive Statistics						
Cluster		N	Minimum	Maximum	Mean	Std. Deviation
1	SP Exploitation	4	2,50	7,00	5,0000	1,87083
	SP Exploration	4	2,50	4,50	3,6250	1,03078
	STP Exploitation	4	5,75	7,00	6,4375	,51539
	STP Exploration	4	4,00	6,25	5,1250	,96825
	PMPE Exploitation	4	2,20	6,50	4,4500	2,12053
	PMPE Exploration	4	5,00	7,00	5,8750	,85391
	Rewards&Compensation Exploitation	4	6,00	7,00	6,5000	,40825
	Rewards&Compensation Exploration	4	2,50	4,50	3,7500	,86603
	Structure&Mgmt Exploitation	4	4,50	6,00	5,2500	,64550
	Structure&Mgmt Exploration	4	5,75	7,00	6,5000	,61237
	Culture Exploitation	4	3,00	7,00	4,7500	1,70783
	Culture Exploration	4	4,00	6,50	5,0000	1,08012
Valid N (listwise)	4					
2	SP Exploitation	17	4,00	6,50	5,0588	,74755
	SP Exploration	17	1,50	5,00	2,7941	1,03167
	STP Exploitation	17	4,75	6,50	5,8088	,43776
	STP Exploration	17	1,50	6,25	3,2353	1,14725
	PMPE Exploitation	17	4,10	6,50	5,5059	,87355
	PMPE Exploration	17	4,50	6,50	5,4412	,70450
	Rewards&Compensation Exploitation	17	3,00	7,00	5,3824	1,17964
	Rewards&Compensation Exploration	17	1,00	7,00	3,6471	1,95068
	Structure&Mgmt Exploitation	17	1,50	6,00	4,2647	1,28838
	Structure&Mgmt Exploration	17	4,00	7,00	5,2941	,85803
	Culture Exploitation	17	2,00	7,00	5,3529	1,12867
	Culture Exploration	17	3,50	7,00	5,2647	,86815
Valid N (listwise)	17					
3	SP Exploitation	11	2,50	5,50	3,8636	,77753
	SP Exploration	11	1,50	5,00	3,1818	1,16775
	STP Exploitation	11	3,75	6,25	5,3409	1,02636
	STP Exploration	11	1,75	7,00	4,5000	1,37386
	PMPE Exploitation	11	2,50	6,00	4,6909	1,03388
	PMPE Exploration	11	1,50	5,50	4,5909	1,17937
	Rewards&Compensation Exploitation	11	3,50	6,00	4,7273	1,05744
	Rewards&Compensation Exploration	11	1,50	7,00	3,7273	1,60255
	Structure&Mgmt Exploitation	11	2,00	6,00	4,2273	1,31079
	Structure&Mgmt Exploration	11	3,00	7,00	4,7955	1,28364
	Culture Exploitation	11	3,00	6,50	4,4091	,94388
	Culture Exploration	11	2,00	6,00	4,8182	1,10165
Valid N (listwise)	11					
4	SP Exploitation	16	3,00	6,50	4,7500	1,11056
	SP Exploration	16	1,00	4,00	2,5625	1,16369
	STP Exploitation	16	4,00	7,00	6,1250	,84656
	STP Exploration	16	1,00	5,25	2,7500	1,23153
	PMPE Exploitation	16	3,40	7,00	5,1500	,98590
	PMPE Exploration	16	3,00	6,00	4,2500	,98319
	Rewards&Compensation Exploitation	16	1,00	6,50	4,0000	1,61245
	Rewards&Compensation Exploration	16	1,00	6,50	2,6875	1,57982
	Structure&Mgmt Exploitation	16	2,50	6,00	4,4063	1,11383
	Structure&Mgmt Exploration	16	2,75	6,25	4,5156	1,22973
	Culture Exploitation	16	2,50	7,00	4,7188	1,29059
	Culture Exploration	16	1,50	5,50	3,8438	,97841
Valid N (listwise)	16					
5	SP Exploitation	18	1,50	5,50	3,4167	1,06066
	SP Exploration	18	1,00	4,50	2,6111	1,17643
	STP Exploitation	18	3,00	6,50	5,3889	1,00814
	STP Exploration	18	1,75	6,50	3,4861	1,04485
	PMPE Exploitation	18	1,60	6,50	4,4500	1,27936
	PMPE Exploration	18	3,00	5,50	4,1111	,69780
	Rewards&Compensation Exploitation	18	1,00	7,00	4,3333	1,48522
	Rewards&Compensation Exploration	18	1,00	7,00	3,5833	1,68252
	Structure&Mgmt Exploitation	18	1,50	5,00	3,5556	1,01299
	Structure&Mgmt Exploration	18	1,75	5,25	3,6528	,89582
	Culture Exploitation	18	2,50	5,00	3,8056	,85987
	Culture Exploration	18	3,00	5,50	4,0556	,76483
Valid N (listwise)	18					

10.9 Table 11 Measures of emphasis on the different types of controls

Table 11 displays the measures of the emphasis that the SBUs in respective cluster put on different types of controls. These are used in analysis to see whether the types of controls emphasized are in alignment with the strategy focus.

Descriptive Statistics						
Cluster		N	Minimum	Maximum	Mean	Std. Deviation
1	Emph_Cybernetic	4	12,00	65,00	33,0000	22,64214
	Emph_Adm_struct	4	10,00	30,00	19,5000	8,22598
	Emph_Org_cult	4	5,00	25,00	15,0000	9,12871
	Emph_Aut_com	4	5,00	10,00	6,2500	2,50000
	Emph_Lead_own	4	5,00	20,00	13,7500	7,50000
	Emph_Particip	4	5,00	20,00	12,5000	8,66025
	Valid N (listwise)	4				
2	Emph_Cybernetic	17	5,00	60,00	26,1765	14,63402
	Emph_Adm_struct	17	5,00	30,00	14,4118	8,26936
	Emph_Org_cult	17	10,00	50,00	23,2353	12,23994
	Emph_Aut_com	17	,00	15,00	5,2941	4,83173
	Emph_Lead_own	17	5,00	30,00	15,2941	7,17430
	Emph_Particip	17	5,00	50,00	15,5882	12,35950
	Valid N (listwise)	17				
3	Emph_Cybernetic	10	,00	40,00	20,2500	11,57404
	Emph_Adm_struct	10	5,00	30,00	16,7500	7,64217
	Emph_Org_cult	10	15,00	60,00	29,2500	12,80462
	Emph_Aut_com	10	5,00	10,00	8,1250	2,44736
	Emph_Lead_own	10	5,00	30,00	13,3750	8,41729
	Emph_Particip	10	5,00	30,00	12,2500	7,85723
	Valid N (listwise)	10				
4	Emph_Cybernetic	16	10,00	70,00	34,0764	16,00338
	Emph_Adm_struct	16	5,00	45,00	14,2639	10,24529
	Emph_Org_cult	16	,00	40,00	19,4444	11,61629
	Emph_Aut_com	16	,00	22,22	7,3889	6,81320
	Emph_Lead_own	15	,00	50,00	13,4074	11,26651
	Emph_Particip	16	5,00	30,00	12,2569	6,55609
	Valid N (listwise)	15				
5	Emph_Cybernetic	18	,00	40,00	25,0000	10,14599
	Emph_Adm_struct	18	,00	30,00	16,1111	7,18568
	Emph_Org_cult	18	5,00	50,00	19,1667	10,18216
	Emph_Aut_com	18	,00	25,00	7,7778	6,23610
	Emph_Lead_own	18	5,00	60,00	16,1111	11,95033
	Emph_Particip	18	10,00	40,00	15,8333	8,08957
	Valid N (listwise)	18				

10.10 Table 12 Industry belonging

In Table 12, the industry distribution of the SBUs within each cluster is presented. The industry belonging are used as a descriptive variable in the analysis.

Firm Industry					
Cluster		Frequency	Percent	Valid Percent	Cumulative Percent
1	Computer consultancy	1	25,0	25,0	25,0
	Fuel	1	25,0	25,0	50,0
	Mining	1	25,0	25,0	75,0
	Technology	1	25,0	25,0	100,0
	Total	4	100,0	100,0	
2	Construction	2	11,8	11,8	11,8
	Employment activities	1	5,9	5,9	17,6
	Freight transport	1	5,9	5,9	23,5
	Health/residential care	3	17,6	17,6	41,2
	Mining	1	5,9	5,9	47,1
	Motor vehicles	2	11,8	11,8	58,8
	Passenger transport	3	17,6	17,6	76,5
	Security activities	1	5,9	5,9	82,4
	Technical consultancy	1	5,9	5,9	88,2
	Technology	1	5,9	5,9	94,1
	Travel agency	1	5,9	5,9	100,0
	Total	17	100,0	100,0	
3	Health care	1	9,1	10,0	10,0
	Machinery	2	18,2	20,0	30,0
	Manufacturing	1	9,1	10,0	40,0
	Metal products	1	9,1	10,0	50,0
	Retail sale	1	9,1	10,0	60,0
	Technical consultancy	1	9,1	10,0	70,0
	Technology	2	18,2	20,0	90,0
	Travel agency	1	9,1	10,0	100,0
	Total	10	90,9	100,0	
	Missing	1	9,1		
	Total	11	100,0		
4	Business services	1	6,3	6,3	6,3
	Education	1	6,3	6,3	12,5
	Employment activities	1	6,3	6,3	18,8
	Food	3	18,8	18,8	37,5
	Fuel	1	6,3	6,3	43,8
	Health care	1	6,3	6,3	50,0
	Machinery	1	6,3	6,3	56,3
	Paper products	2	12,5	12,5	68,8
	Retail sale	2	12,5	12,5	81,3
	Retail trade	1	6,3	6,3	87,5
	Waste management	2	12,5	12,5	100,0
	Total	16	100,0	100,0	
5	Computer consultancy	1	5,6	5,6	5,6
	Construction	1	5,6	5,6	11,1
	Food	3	16,7	16,7	27,8
	Freight transport	1	5,6	5,6	33,3
	Metal products	3	16,7	16,7	50,0
	Motor vehicles	1	5,6	5,6	55,6
	Passenger transport	1	5,6	5,6	61,1
	Pharmaceuticals	1	5,6	5,6	66,7
	Retail trade	1	5,6	5,6	72,2
	Security activities	1	5,6	5,6	77,8
	Technical consultancy	2	11,1	11,1	88,9
	Technology	1	5,6	5,6	94,4
	Transport	1	5,6	5,6	100,0
	Total	18	100,0	100,0	

11 Appendix 3 Questionnaire

Due to copyright, only limited parts of the questionnaire can be presented in the Appendix. We have therefore chosen to present only the questions relating to the ambidexterity measures and not any of the questions functioning as indicators or descriptive variables.

11.1 Selection of questions

The following questions have been chosen to function as either indicators of exploration or exploitation for the modeling of the *MCS package ambidexterity* measure used in the thesis. The questions are selected from the questionnaire of Malmi and Sandelin.

MCS	Question	MCS	Question
Strategic Planning		Rewards & compensation	
	A2 c		D2 d
	A2 d		D3 a
	A3		D2 c
	A4		D3 b
	A5		D5 b
Short Term Planning		Organizational Structure & Management Process	
	B2		E3 j
	B4 a		E4 e
	B1		E1 g
	B3		E2 e
	B5		E5 a
			E5 b
			E5 c
Performance Measurement and evaluation		Organizational Culture and Values	
	C1		F1 h
	C2 c		F2 g
	C2 e		F1 b
	C3 h		F2 c
	C7		F3

11.2 Measures of ambidexterity

The following questions from Malmi and Sandelin's questionnaire have been used to measure *G&B Contextual ambidexterity*, *G&B MCS package ambidexterity* (Gibson & Birkinshaw, 2004) as well as *M&S Organizational ambidexterity* (Malmi & Sandelin, 2010b).

11.2.1 G&B Contextual ambidexterity

G3. What extent do you agree with the statements? *Performance management systems as a whole package help you to...*

	Disagree					Agree	
	1	2	3	4	5	6	7
a. set challenging/aggressive goals to subordinates	1	2	3	4	5	6	7
b. issue creative challenges to subordinates instead of narrowly defining tasks	1	2	3	4	5	6	7
c. reward or punish subordinates based on rigorous measurement of business performance	1	2	3	4	5	6	7
d. hold subordinates accountable for their performance	1	2	3	4	5	6	7
e. give subordinates sufficient autonomy to do their jobs well	1	2	3	4	5	6	7
f. push decisions down to the lowest appropriate level	1	2	3	4	5	6	7
g. give subordinates ready access to information that they need	1	2	3	4	5	6	7
h. make subordinates to base their decisions on facts and analysis, not politics	1	2	3	4	5	6	7

11.2.2 G&B MCS Package ambidexterity

G4. What extent do you agree with the following statements? *Performance management systems as a whole package in this organization...*

	Disagree					Agree	
	1	2	3	4	5	6	7
a. works coherently to support the overall objectives of this organisation	1	2	3	4	5	6	7
b. causes us to waste resources on unproductive activities	1	2	3	4	5	6	7
c. gives people conflicting objectives so that they end up working at cross-purposes	1	2	3	4	5	6	7
d. encourages people to challenge outmoded traditions/ practices/ sacred cows	1	2	3	4	5	6	7
e. is flexible enough to allow us to respond quickly to changes in our markets	1	2	3	4	5	6	7
f. evolves rapidly in response to shifts in our business priorities	1	2	3	4	5	6	7

11.2.3 M&S Organizational ambidexterity

G5. What extent do you agree with the following statements? *Our organization succeeds because we...*

	Disagree				Agree		
a. are able to explore and develop new technologies	1	2	3	4	5	6	7
b. are able to create innovative products/services	1	2	3	4	5	6	7
c. find creative solutions to satisfy our customers' needs	1	2	3	4	5	6	7
d. find new customer segments and needs	1	2	3	4	5	6	7
e. increase the level of automation in our operations	1	2	3	4	5	6	7
f. fine-tune our offerings in order to keep our current customers satisfied	1	2	3	4	5	6	7
g. deepen and create long-lasting customer relationships	1	2	3	4	5	6	7
h. collaborate extensively with different organizations	1	2	3	4	5	6	7