



CONFIGURATIONS OF COMBINATIVE CAPABILITIES FOR HIGH-
LEVEL ORGANIZATIONAL ABSORPTIVE CAPACITY

A COMPARATIVE METHOD

C.J.A. van den Elsaker
Student number: 461930
October 2018

Part-time Master of Science in Business Administration
Rotterdam School of Management, Erasmus University
Strategic Management

Coach: Associate Professor Dr. R. Olie
Co-reader: Assistant Professor Dr. M. Cholakova

This research represents the authors' master's thesis as the final part of MSc. Business Administration of Rotterdam School of Management (RSM). The copyright of the master thesis rests with the author. The author declares that the work presented in this thesis is original and that all sources that have been used are referenced. The author is solely responsible for its contents. Rotterdam School of Management (RSM) is only responsible for the educational coaching and cannot be held liable for the content.

Preface

Hereby, I am presenting to you my master's thesis that is part of the part-time Master of Science in Business Administration curriculum at Rotterdam School of Management, Erasmus University. The past two years have been challenging, but also very rewarding and fun. I would like to take the opportunity to thank some people without whom this thesis would not have been possible.

First of all, I would like to thank Dr. Rene Olie, my thesis coach, for supporting and guiding me throughout the process of my thesis. Thank you for your time, patience, extensive feedback, and motivating words.

Secondly, I would like to thank my co-reader, Dr. Magdalena Cholakova, for providing feedback and good direction in the area of fuzzy set qualitative comparative analysis.

Thirdly, I would also like to dedicate a special thank you to my partner, Daniel, without whom the past two years would not have been possible. Thank you for your relentless support and unconditional faith in me.

Last but not least, I would like to express my gratitude to my parents for their support throughout my studies.

C.J.A. van den Elsaker

September 2018

Executive summary

Knowledge is considered to be the most valuable resource of the firm and a dominant source of developing sustainable competitive advantage (Grant, 1996). Tsai (2001) argued that the ability to recognize and access new knowledge and to assimilate it is a source of competitive advantage. This ability is defined as absorptive capacity. Jansen et al. (2005) studies organizational mechanisms that are associated with absorptive capacity, namely combinative capabilities. A firm's combinative capabilities synthesize and apply current and acquired knowledge and can be seen as an important determinant of absorptive capacity (Kogut & Zander, 1992). Combinative capabilities consist of systems, coordination, and socialization capabilities (Van den Bosch et al., 1999). Up until now, these capabilities were only studied in isolation of each other and its effect on absorptive capacity. However, this study argues that studying systemic interactions between combinative capabilities, rather than in isolation, provides a more complete and accurate representation on how organizations reach a high level of absorptive capacity. This argument is based on two assumptions. First, previous studies show synergy between combinative capabilities (for example, low formalization requires high participation in decision making). It is therefore that the assumption is that combinative capabilities are part of a given context and thus not likely to exist in isolation.. Second, the idea of equifinality, whereas more ways can lead to the same outcome. For example, Mintzberg's (1979) work resulted in five different configurations of organizational design that all could lead to high firm performance. Current studies only provide positive or negative correlations between a capability and absorptive capacity.

Therefore, the purpose of this study was to identify configurations of combinative capabilities that generate high-level absorptive capacity by using a comparative approach. By taking a more holistic perspective this thesis distinguishes itself from conventional quantitative methods previously used on this topic. This study was focused on systemic interactions between conditions, rather than in isolation, and the results provided a more complete and accurate representation on how organizations can reach a high level of absorptive capacity.

Data was derived from an online survey consisting of ten cases (a total of 52 respondents). All participating organizations were classified as knowledge-intensive firms, as the concept of absorptive capacity centers around knowledge, to create homogeneity in the sample. This thesis used a fuzzy set comparative analysis method (fsQCA), whereas all variables were carefully measured and calibrated into set membership scores between 0 and 1.

The study showed that there is not a single determinant of combinative capabilities that by itself is sufficient to explain high-level absorptive capacity. This provides evidence that combinative capabilities must be jointly considered. Connectedness proved to be a necessary condition for high-level absorptive capacity and is consistently present as a key ingredient in all configurations. Furthermore, the fuzzy set comparative analysis generated five different configurations leading towards high-level absorptive capacity. To measure the robustness of the results two additional checks have been performed. Increasing the consistency threshold did not lead to distinct differences, which enhances the reliability of the findings. The negated analysis did show overlap with the findings, which makes the findings of this thesis not completely robust. Even though the findings provide new insights, they should be interpreted with care and not be considered entirely flawless. All findings, configurations through which best practices can emerge, have been converted to propositions as directions for future research.

This study shows that comparative methodologies can enhance insights into a phenomena on which traditional approaches remained ambiguous, by looking at individual conditions in a coherent whole. Furthermore, it enhances current theories on combinative capabilities and absorptive capacity. This study concluded with four propositions that can be used for future reference. The results of this study, five different configurations, can help organizations to recompose their combinative capabilities when in a higher level of absorptive capacity is needed.

Table of content

Preface.....	2
Executive summary.....	3
1. Introduction	7
1.1. Problem definition.....	7
1.2. Research question.....	9
1.3. Research aim	10
1.4. Research outline	10
2. Literature review.....	11
2.1. Absorptive capacity.....	11
2.2. Combinative capabilities	13
2.2.1. Systems capabilities	14
2.2.2. Coordination capabilities	16
2.2.3. Socialization capabilities	19
2.3. The need for configurational approach	22
2.4. Configurational framework.....	24
3. Methodology.....	26
3.1. Research method	26
3.2. Case selection.....	28
3.3. Data collection.....	28
3.4. Case overview	29
3.4.1. Case descriptions	30
3.5. Variable operationalization and calibration	31
3.5.1. Causal conditions	31
3.5.2. Outcome of interest.....	35
3.6. Correlation analysis.....	36
4. Analysis and Results.....	38
4.1. Necessary conditions.....	38
4.2. Configurations for high absorptive capacity	38
4.3. Robustness checks.....	41
4.4. Propositions.....	44

5. Discussion.....	48
5.1. Discussion	48
5.2. Implications.....	49
5.2.1. Theoretical implications.....	49
5.2.2. Managerial implications.....	49
5.3. Limitations	50
5.4. Future directions.....	51
References.....	53
Appendix I: Descriptive Statistics	59
Appendix II: Truth table	60
Appendix III: Survey (in Dutch).....	63
Appendix IV: Parsimonious solution negated analysis	65

1. Introduction

Because in today's economy firms are under high pressure to innovate and knowledge is considered to be the most valuable resource of the firm (Grant, 1996), the concept of absorptive capacity keeps its relevance. Organizations with a high level of absorptive capacity are more likely to explore and exploit opportunities for innovation by recognizing new external knowledge, value it, and exploit it (Cohen & Levinthal, 1990). Obviously, these outcomes have important theoretical as well as managerial implications. The past three decades many researchers have studied the concept of absorptive capacity, its outcome, and how organizational mechanisms are associated with the concept (Volberda, Foss, & Lyles, 2010). For example, Jansen et al. (2005) discusses the (isolated) effect of systems, coordination, and socialization capabilities on absorptive capacity. However, these capabilities influence one another, for example cross-functional interfaces depend on social relations, as employees are more willing to work together when there is trust. Simultaneously, trust develops through cooperative activities (Putnam, 1993). Moreover, Galbraith (1973) argues that low formalization requires more participation in decision making. This shows that these capabilities can be viewed as interconnected and should therefore be researched as a whole, rather than in isolation. Which distinct configurations of the coordination, systemization, and socialization of knowledge explain a high level of absorptive capacity, is yet to be explained. This thesis assumes that a change in one condition leads to a change in other conditions and that high-level absorptive capacity can therefore be reached in multiple ways.

The current level of analysis of studies on this topic is predominantly focused on traditional methodologies as opposed to more holistic perspectives. The aim of this thesis is to enhance perspective on the relationship between combinative capabilities and absorptive capacity, by using a configurational approach, to define configurations that lead to high level absorptive capacity. Finally, this thesis generates inductive propositions linking configurations of combinative capabilities to absorptive capacity.

This introductory chapter will deliberate on a few topics. The relevance of this topic is discussed and will be concluded with a problem definition and research question. This is followed by defining the research aim followed by the research outline.

1.1. Problem definition

The knowledge-based theory of the firm considers knowledge to be the most valuable resource of the firm and a dominant source of developing sustainable competitive advantage

(Grant, 1996). In particular, the ability to recognize and access new knowledge and to assimilate it is truly a source of competitive advantage (Tsai, 2001). Cohen & Levinthal (1990) define this ability as absorptive capacity: "... *A firm's ability to identify, assimilate, and apply valuable external knowledge*". Other studies view the construct of absorptive capacity as key to a firm's competitive advantage and existence, as a high level of absorptive capacity increases the amount and productivity of knowledge (Lane, Koka, & Pathak, 2006; Zahra & George, 2002). Organizational knowledge enables the organization to recognize new knowledge as valuable, assimilate it, transform it, and finally exploit it within the firm. This is in line with Zahra & George's (2002) research where they distinguish among four dimensions of absorptive capacity that constitute *potential* and *realized absorptive capacity*. Knowledge acquisition and assimilation being part of potential absorptive capacity and knowledge transformation and exploitation being part of realized absorptive capacity. Firms need to manage these dimensions successfully to achieve superior performance.

Studies on absorptive capacity mostly focus on prior related knowledge, as a determinant of a firm's absorptive capacity, or on the outcomes of absorptive capacity. Prior related knowledge contributes to the ability to recognize the value of new knowledge, assimilate it, and apply it to commercial ends (Cohen & Levinthal, 1990). Prior related knowledge is important to the concept of absorptive capacity as it enhances organizational learning. Prior related knowledge helps individuals to recognize new knowledge, "make sense of it", and to eventually apply this new knowledge. Although prior related knowledge seems to be a necessary condition for absorptive capacity, it also seems to be insufficient to view prior related knowledge as the only determinant of absorptive capacity (Lichtenthaler, 2009). Internal mechanisms can also influence a firm's level of absorptive capacity. Van den Bosch, Volberda, & De Boer (1999) find that organizational forms and combinative capabilities are internal mechanisms that raise levels of absorptive capacity. In their research, on the basis of two case studies, they develop a framework that offers insight on how knowledge environments coevolve with the development of organization forms and combinative capabilities. Kogut & Zander (1992) introduce the concept of a combinative capability to synthesize and apply current and acquired knowledge. Combinative capabilities play a key role in leveraging organizational knowledge. According to Cohen & Levinthal (1990) combinative capabilities are important because "... *an organization's absorptive capacity is not resident in any single individual but depends on the links across a mosaic of individual capabilities*" (1990, p. 133). Van den Bosch et al. (1999) distinguish three types of combinative capabilities a firm has at its disposal, namely coordination, systems capabilities, and socialization capabilities.

Combinative capabilities illustrate how an organization systemizes, coordinates, and socializes knowledge within the firm. Based on the framework of Zahra & George (2002), Jansen, Van den Bosch, & Volberda (2005) further assess the differing effects of combinative capabilities on a unit's potential and realized absorptive capacity. They find that coordination capabilities (i.e., cross-functional interfaces, participation, and job rotation) mostly increase the potential absorptive capacity of organizational units, whereas socialization capabilities (i.e., connectedness and socialization tactics) mainly increase a unit's realized absorptive capacity. However, different types of combinative capabilities only have been researched in isolation of each other. No insights, however, have been gained into how combinative capabilities can be designed in such a way that a firm's absorptive capacity can reach its full potential. Kogut & Zander (1992) also state that recombining a firm's capabilities effect individual and organizational learning processes. They argue that learning is a product of system, coordination, and socialization capabilities to facilitate the exploration and exploitation of new external knowledge. Exploring and exploiting new external knowledge is thus nested within a high-order set of recipes of combinative capabilities and should be studied as a whole rather than in isolation.

A configurational approach suggests that organizations are best understood as sets of interconnected structures and practices, rather than as modular or loosely coupled entities whose components can be understood in isolation. It is therefore that I argue that, from a methodological point of view, outcomes of previous studies that have assessed the connection between combinative capabilities and absorptive capacity are inherently incomplete and should be considered as a whole.

1.2. Research question

In this thesis, I take a holistic approach to contribute to the current literature on absorptive capacity. The objective of this thesis is to identify configurations of combinative capabilities that positively influence the level of absorptive capacity. I adopt insights from previous studies on the concept of absorptive capacity, combinative capabilities, and set-theoretic methods. Findings will be analyzed using a fuzzy set qualitative comparative analysis (fsQCA). Instead of analyzing how organizational antecedents individually effect the level of absorptive capacity, I will identify configurations of combinative capabilities that explain high-level absorptive capacity in order to generate configurational propositions for future research.

This study aims at providing an answer to the following question:

What configurations of coordination, systems, and socialization capabilities lead to high-level organizational absorptive capacity?

1.3. Research aim

The aim of this research is twofold. First, it contributes to the development of the theory of absorptive capacity and combinative capabilities. More specifically, it makes a contribution by using a different methodological approach to both concepts. A fuzzy set qualitative comparative analysis (fsQCA) is relatively new within organizational science. This method uses the advantages of both qualitative and quantitative methods. It allows for a deeper understanding on how organizational mechanisms can be put in configurational sets that lead to a firm's higher level of absorptive capacity. As organizational mechanisms can be seen as interconnected structures, it seems evident to research them as a whole, rather than individually. Secondly, the research provides practical insights for organizations that are continuously confronted with external developments and, therefore, want more insight on how to enable the organization to coordinate, socialize, and systemize knowledge to better absorb and exploit new knowledge.

1.4. Research outline

The structure of this research is organized as follows. The first chapter serves as an introduction of the topic and the relevance of this thesis. Furthermore, it addresses the gap in current literature followed by research question and research aim for this study. The chapter concludes with a preliminary overview of the research design. Chapter two provides a literature review, which serves as a backdrop for understanding the theories and concepts used in this thesis. The chapter concludes with the presentation of the configuration research model. Chapter three provides a detailed insight into the comparative method used followed by the case selection and description of the cases. The chapter concludes with a detailed section on the operationalization and calibration of the variables and the outcome of interest. Chapter four presents the analysis and results of this thesis, concluding with propositions linking configurations of combinative capabilities to absorptive capacity. The final chapter presents a discussion and conclusion of this thesis, including this thesis' implications, limitations, and suggestions for further research.

2. Literature review

This chapter describes and evaluates the literature and concepts that are relevant to this research. A number of definitions will be explained in order to provide an image of the context of this research. The literature will be discussed based on a number of fundamental articles that lay the foundation of the concepts of absorptive capacity and combinative capabilities. In the concluding paragraph the configurational model of this research will be presented.

2.1. Absorptive capacity

The term absorptive capacity was first captured by Kedia & Bhagat (1988) in a conceptual model of technology transfer across nations. They view absorptive capacity as a presumed moderating influencer depending on the size of the organization (local versus cosmopolitan), the existence of technological knowledge, and differences in strategic management between transacting firms. However, the contribution of Cohen & Levinthal (1990) is generally acknowledged to serve as the founding paper on the concept of absorptive capacity. They define absorptive capacity as the ability to identify, assimilate, transform, and apply external knowledge.

The term absorptive capacity resonates in multiple theories, including the knowledge-based theory of the view. According to this theory, knowledge is seen as the most valuable resource a firm has at its disposal. In line with this theory of the firm, a high level of absorptive capacity leads towards a better developed knowledge base within organizations. Grant (1996) emphasizes the importance of transferability, not only between organizations, but also within the organization. Moreover, it also stresses the concept of absorptive capacity as *knowledge receipt*, where knowledge absorption depends on one's ability to add new knowledge to existing knowledge. To further enhance knowledge flows within the organization a shared language is important. Shared language allows for optimal communication between organizational units and/or individuals (Cohen & Levinthal, 1990). Conversely, too much overlap of knowledge may limit quick integration of externally acquired knowledge (Cohen & Levinthal, 1990; Volberda et al., 2010).

The term absorptive capacity can also be viewed from the perspective of dynamic capabilities. The term 'dynamic' refers to the ability to renew competences in changing environments, and the term 'capabilities' emphasizes the role of strategic management in adapting and exploiting these competences to match the requirements of a dynamic environment. Overall, a dynamic capabilities approach refers to the ability to renew, enlarge,

and adapt competences over time (Teece et al. 1997). Cohen & Levinthal (1990) point out that: “... *an organization’s absorptive capacity is not resident in any single individual but depends on the link across a mosaic of individual capabilities*”. Based on this perspective, Zahra & George (2002) suggest that absorptive capacity consists of two subsets, *potential* and *realized* absorptive capacity, and defines this in four dimensions. The acquisition and assimilation of knowledge falls under potential absorptive capacity. Organizations that have a focus on potential absorptive capacity are able to continuously renew their knowledge base. Realized absorptive capacity involves the transformation and exploitation of knowledge, which reflects the organization’s capacity to leverage the knowledge that has been absorbed. These four dimensions build on each other to yield absorptive capacity. However, if organizations only focus on potential absorptive capacity the result might be that knowledge is acquired and assimilated, but the organization is not able to transform and exploit this new knowledge. On the other hand, if the focus is only on realized absorptive capacity organizations may achieve short-term profits through transformation and exploitation, but they will not be able to recognize and value new external knowledge (Jansen et al., 2005).

Previous studies placed a great deal of emphasis on prior related knowledge. Cohen & Levinthal (1990) argue that it is the most important determinant of absorptive capacity. Learning theories emphasize the importance of prior related knowledge, since it enables individuals to process and use new knowledge more easily. However, Cohen & Levinthal (1990) also state that: “... *a firm’s absorptive capacity is not simply the sum of the absorptive capacities of its employees*” (1990, p. 131). They argue that it also depends on the transfer of knowledge across and within units, the structure of communication, and the distribution of knowledge within the firm.

Previous studies reveal that the higher the level of absorptive capacity, the more likely that an organization will be more proactive in exploiting new knowledge. Ultimately, a high level of absorptive capacity positively affect innovation and firm performance and will result in a competitive advantage (Lichtenthaler, 2009). Van den Bosch et al. (1999) posit that organizational mechanisms and organizational forms influence the level of absorptive capacity. They argue that the organizational forms can influence the level of absorptive capacity positively as well as negatively, since the organizational form of an organization is strongly associated with its structure of knowledge processing activities.

In sum, it can be concluded that the concept of absorptive capacity has a rich and multidimensional background. Current research has primarily focused on the role of absorptive capacity in the field of learning (e.g. Tsai, 2001), R&D (e.g. Cohen & Levinthal, 1990),

business performance (e.g. Lane et al., 2001), and knowledge transfer (e.g. Kedia & Bhagat, 1988). There seems to be a general consensus on the definition of absorptive capacity, presented by Cohen & Levinthal (1990), but the framework from Zahra & George (2002) is also widely cited and can be viewed as an extension to the concept of absorptive capacity. Most studies focus on prior related knowledge and the outcomes of absorptive capacity, less is known about the supporting role of combinative capabilities.

2.2. Combinative capabilities

A firm's combinative capabilities synthesize and apply current and acquired knowledge and can be seen as an important determinant of absorptive capacity (Kogut & Zander, 1992). This is in line with Cohen & Levinthal (1994) who state that absorptive capacity is built on a set of closely related competences to evaluate, assimilate, and apply external knowledge. Similarities can be found in how Eisenhardt & Martin (2000) define dynamic capabilities: “... *The firm's processes that use resources—specifically the processes to integrate, reconfigure, gain and release resources—to match and even create market change. Dynamic capabilities thus are the organizational and strategic routines by which firms achieve new resource configurations as markets emerge, collide, split, evolve, and die*” (2000, p. 21). For the purpose of this study I will use the term combinative capabilities by the definition of Kogut & Zander (1992).

Prior related knowledge interacts with combinative capabilities, which describe how organizations systemize, coordinate, and socialize knowledge. Van den Bosch et al. (1999) builds on the work of Kogut & Zander (1992) by distinguishing three types of combinative capabilities: (1) systems capabilities, (2) coordination capabilities, and (3) socialization capabilities. These capabilities can either contribute to or hinder the process of knowledge transfers and, therefore, affect absorptive capacity (Van den Bosch et al., 1999). They address several organizational aspects, such as the structure and distribution of knowledge across organizational units (systems capabilities), or enable the externalization of tacit knowledge through coordination and socialization capabilities (Van den Bosch, van Wijk, & Volberda, 2003).

The next paragraphs will go more in-depth on the different types of combinative capabilities and its current findings in relation to absorptive capacity.

2.2.1. Systems capabilities

Systems capabilities refer to procedures, manuals, and directions often used to integrate explicit knowledge (Van den Bosch et al., 1999). Nonaka (1994) calls this process “combination”, creating explicit knowledge from explicit knowledge, where explicit knowledge refers to codified knowledge, more digital, that can be communicated in formal, systematic language. Van den Bosch et al. (1999) describe system capabilities as the degree to which behaviors are programmed in advance of their execution. In this way, one can conclude that these capabilities are formalized, explicit, and adjustable by management. It enables individuals to exchange and combine explicit knowledge through formal exchange mechanisms, such as formal language, IT systems, and manuals. Van den Bosch et al. (1999) argue that the main benefit of systems capabilities is that they eliminate the need for additional communication and coordination among subunits and individuals (Galbraith, 1973; Van den Bosch et al., 1999). Galbraith (1973) proposes that high system capabilities reduce the amount of communication and decision making as most responses are preplanned. In their research, Jansen et al. (2005) distinguish two organizational mechanisms associated with systems capabilities; formalization and routinization.

Formalization is the degree to which rules define roles, procedures, instructions, authority relations, standards, and approvals (Hall, Haas, & Johnson, 1967). The degree of formalization depends on how processes are laid down in written documents (e.g. instructions, manuals, and procedures) and/or formal systems. This way individuals will be limited to depart from established behavior (Jansen et al., 2005). Organizations need to formalize their processes to some extent in order to assimilate and exploit new knowledge. Formalization may be used to insure the predictability of performance through closely monitoring conformity. Also, formalization enables organizations to store best practices, which makes knowledge use more efficient to exploit, apply, and implement (Lin & Germain, 2003; Zander & Kogut, 1995). However, if individuals rely on instructions and rule this might reduce their ability to explore and exploit new knowledge as it constrains an individual to deviate from established behavior. Less formalized organizations are likely to make greater use of new information (Hage & Aiken, 1967). One of the consequences of low formalization is the lack of clear job descriptions and the loss of knowledge when not stored in formal systems.

Formalization is considered to have three subconstructs (Hage & Aiken, 1967; Aiken & Hage, 1968), which are still being used in current studies on formalization. First, *job codification* measures the degree to which job descriptions are specified. In other words, it measures to what extent individuals have the autonomy to do as they please regarding to

knowledge transfer. Second, *rule observation* measures the degree to which job occupants are supervised in conforming to standards established in job codification. Third, *job specificity* measures the degree to which procedures defining jobs are spelled out. The last two constructs, rule observation and job specificity, represent the degree of work standardization. The overall degree of formalization is not represented by all three sub-constructs separately, but by the interaction between the sub-constructs. Thus, the joint effect of the three sub-constructs represents the overall degree of formalization (Bodewes, 2002)

Jansen et al. (2005) find that formalization does not increase potential absorptive capacity nor does it decrease potential absorptive capacity. The enhancing effect was as strong as the impeding effect. They conclude that the acquisition and assimilation of new external knowledge needs to be formalized to some extent in order to assimilate and exploit new knowledge. The effect of formalization on organizations could possibly enhance absorptive capacity by storing prior experiences and therefore enabling employees to better recognize and assimilate new external knowledge. When employees come across new external knowledge and understand it, they therefore will be better able to value it (Adler & Borys, 1996).

In relation to other combinative capabilities, Galbraith (1973) argues that low formalization requires more participation in decision making, as no preplanned responses are available. Moreover, high formalization decreases social interaction and therefore an innovative and cooperative working environment (Chen & Huang, 2007). However, as will be seen later on in this chapter, socialization and formalization can strengthen one another depending on how organizations choose to arrange their socialization tactics.

In sum, the effects of formalization are twofold. First, formalization enables organizations to store knowledge, which makes knowledge use more efficient to exploit, apply, and implement. Moreover, formalization limits individuals to depart from established behavior as preplanned responses are available. Secondly, formalization also shows negative effects, since reliance on standard procedures and rules might reduce exploration and exploitation of new external knowledge. Hence, one might expect that the presence and absence of formalization both can have a positive effect on absorptive capacity.

Routinization refers to the development of a sequence of actions that require relatively little attention (Galunic & Rodan, 1998). Routinization is characterized by tasks that are repetitious and invariable and, therefore, limits individuals to deviate from expected task handling (Hage & Aiken, 1969; Jansen et al., 2005; Perrow, 1967). Moreover, it ensures that inputs are transformed to outputs (Perrow, 1967). Routine tasks eliminates the need for further communication and coordination, as employees know what to do and how to do it (De Boer,

Van den Bosch, & Volberda, 1999). Individuals develop automatic patterns of behavior and this increases their understanding of task relationships. Moreover, routines in a firm provide for efficient structures that support collective action and decrease the efforts spent on decision-making and implementation (Cohen & Bacdayan, 1994).

According to Perrow's (1967) model two dimensions determine (non-) routinization, namely task variety and task analyzability. *Task variety* is the frequency of unexpected and novel events that occur in the conversion process. Organizations that display a low variety in tasks experience considerable certainty about the occurrence of future activities (high routinization). With high variety in tasks organizations cannot predict future problems (low routinization). *Task analyzability* refers to how individuals respond to problems (Van de Ven & Delbecq, 1974). With high task analyzability individuals typically follow a well-designed path to resolve problems (high routinization). In contrast to low task analyzability in which there is no procedure that tells a person how to respond to a problem (low routinization).

Jansen et al. (2005) find that routinization negatively influences both potential and realized absorptive capacity. Their study revealed that routinization obstructs the incorporation of newly acquired and existing knowledge. Routinization supports individuals in developing structured tasks, so that little attention is required in order to transform inputs to outputs. Nonaka (1994) argues that routinization limits creative thinking and the creation of new knowledge, but that simply increasing the variety of tasks is not sufficient to raise the quality of knowledge.

In sum, routinization can support organizations by allowing efficient coordinated action, but also limit an organization's ability to identify, transform, and apply external knowledge. In relation to absorptive capacity, I expect routinization to have a negative impact and will be absent in a high-level configuration to reach absorptive capacity.

2.2.2. Coordination capabilities

Coordination capabilities refer to the coordination of knowledge within the firm. It increases knowledge exchange and integration cross-departmental and across hierarchical boundaries (Henderson & Cockburn, 1994). Coordination capabilities are built over time and are therefore path-dependent (Van den Bosch et al., 1999). Organizations develop coordination capabilities through cross-functional interfaces, job rotation, and participation in decision-making processes (Cohen & Levinthal, 1990; Van den Bosch et al., 1999; Jansen et al., 2005). Coordination capabilities focus on lateral interactions, the connection between departments and

team members. Moreover, a strong link with socialization capabilities is expected. For socialization capabilities the foundation of trust is key. Trust can be developed through the use of coordination capabilities. Additionally, coordination capabilities depend on the level of connectedness, as employees are more willing to work together when there is trust. Simultaneously, trust develops through cooperative activities (Putnam, 1993).

Cross-functional interfaces refer to lateral forms of communication for the integration of multiple departments of an organization. Task forces, liaison positions, and teams are identified to enable knowledge exchange (Gupta & Govindarajan, 2000). Cross-functional interfaces can take a variety of different forms for different purposes, but generally they consist of a group of individuals with different backgrounds within an organization (Denison, Hart, & Kahn, 1996) or have the characteristic of creating multiple knowledge relationships between departments (Cohen & Levinthal, 1990). Cross-functional teams are defined as project groups with individuals from more than one functional department (Brown & Eisenhardt, 1995; Olsen, Walker, & Ruekert, 1995). Cross-functional interfaces are beneficial for deepening knowledge flows across subunits and other lines of authority. One of the biggest advantages of cross-functional interfaces are the diversity of backgrounds and perspectives, as it supports the idea generation process, improves creativity, and innovativeness of organizations (Brown & Eisenhardt, 1995; Cohen & Levinthal, 1990; Sethi, Smith, & Park, 2001).

In relation to absorptive capacity, Cohen & Levinthal (1990) stress the importance of cross-functional interfaces such as relationships between functional areas, personal contact across functions, and liaison roles in each unit for raising a firm's absorptive capacity by creating a desirable amount of redundancy within subunits. Jansen et al. (2005) find that cross-functional interfaces do not increase knowledge exploitation, but do contribute to knowledge transformation. However, they state that using many cross-functional teams, task forces, and liaison persons might eventually hurt knowledge transformation as too much redundancy might occur among unit members.

Taken all together, previous studies argue the importance of cross-functional interfaces for deepening knowledge flows and stimulating innovative behavior. On the other hand, cross-functional interfaces might not be the main determinant for absorptive capacity (Jansen et al., 2005). I do expect that the connection between cross-functional interfaces and connectedness can lead to a high level of absorptive capacity, since cooperative activities and trust seem to be interrelated (Putnam, 1993).

Job rotation refers to the lateral transfer of employees between positions (Campion, Cheraskin, & Stevens, 1994). Firms stimulate job rotation to acquire new knowledge and skills

(Ortega, 2001). Cohen & Levinthal (1990) argue that job rotation creates a diversity of knowledge, leading to diversity in backgrounds, which increases problem-solving skills and stimulates the generation of new ideas and reduces redundancy. Moreover, a variety in knowledge supports explorative learning (McGrath, 2001). Campion et al. (1994) provide evidence that job rotation leads to improved knowledge and skills.

In the literature, different terms are used to describe the mobility of personnel across organizational units/departments, such as personnel movement, personnel rotation, job rotation, internal transfer, and personnel transfer. This study refers to intrafirm mobility, where staff members move from a subunit to a peer subunit of the same parent firm (Madsen, Mosakowski, & Zaheer, 2003). Moreover, as this study defines job rotation as the lateral transfer of employees in an organization, it refers to any change in assignment, usually indicated by a change in title or department (Campion et al., 1994).

Job rotation enhances diversity of backgrounds, which increases problem-solving skills (Cohen & Levinthal, 1990). However, Jansen et al. (2005) find that job rotation has relatively little impact on a firm's level of absorptive capacity, only that it increases knowledge transformation. As job rotation supports individuals to develop new organizational contacts this might indeed increase the knowledge transfer between subunits.

In sum, the main advantage of job rotation is that it facilitates knowledge transfer and develops organizational contacts. The expectation is that job rotation will not be a single determinant for absorptive capacity, as it has relatively little impact on a firm's level of absorptive capacity. However, the expectation is that job rotation supports the development of socialization capabilities and, if taken together, will have a positive influence on absorptive capacity.

Participation in decision making refers to which extent employees can participate in higher-level decision-making processes (Hage & Aiken, 1967; Jansen et al., 2005). Khandwalla (1977) claims that when employees can participate in decision making processes, this can lead towards knowledge integration and absorption. It is therefore that Van den Bosch et al. (1999) argues that low levels of participation result in low levels of knowledge sharing. Conversely, high levels of participation result in high levels of knowledge sharing, because of the high diversity of backgrounds. Participants with a diversity in background allows for interplay among a diversity of opinions and perspectives and leads to a rich internal network of diverse information (Hage & Aiken, 1967; Jansen et al., 2005).

Hage & Aiken (1967) find a positive relationship between high participation in decision-making and program change, and a negative relation between innovation and hierarchy of

authority (for example close hierarchic supervision. Jansen et al. (2005) find that participation in decision-making triggers individuals to acquire new external knowledge and that it increases knowledge transformation.

In relation to other combinative capabilities, Galbraith (1973) suggests that participation in decision-making is required when formalization is low, as no preplanned responses are available. This leads to the believe that when formalization is high, less participation is required, since it requires less communication and decision-making each time a situation is repeatedly encountered.

In sum, participation in decision-making increases knowledge sharing and transformation, but does not seem to be an important determinant for absorptive capacity. However, in combination with other variables, one might expect a strong relationship with system capabilities in order to achieve absorptive capacity.

2.2.3. Socialization capabilities

Socialization capabilities may influence absorptive capacity by specifying broad, tacitly understood rules for appropriate action under unspecified contingencies (Camerer & Vepsalainen, 1988). It entails common codes for communication and the ‘culture’ or dominant value (Henderson & Cockburn, 1994; Teece et al., 1997). Socialization capabilities refer to the ability of the organization to create a shared ideology and a culture in terms of a system of beliefs and ideas (Van den Bosch et al., 1999). Just like with coordination capabilities, socialization capabilities develop over time and are therefore path-dependent. Jansen et al. (2005) distinguish two organizational mechanisms related to socialization capabilities; connectedness and socialization tactics.

Connectedness, also referred to as the density of linkages, refers to a structural aspect of social relations, as it serves as a governance mechanism and facilitates the exchange of knowledge (Jansen et al., 2005; Jaworski & Kohli, 1993; Rowley, Behrens, & Krackhardt, 2000). Dense networks that are developed are path-dependent and provide the basis for trust and cooperation (Nahapiet & Ghosal, 1998). Connectedness improves communication and fosters commonality of knowledge, which facilitates and increases the efficiency of knowledge exchange (Galunic & Rodan, 1998; Kogut & Zander, 1992). Moreover, it enables organizations to gain mutual understanding regarding goals and implementation (Rindfleisch & Moorman, 2001). On the other hand, previous studies are also concerned with the impact of connectedness as it diminishes access to divergent perspectives, leads to an overload of information, and

produces collective blindness (Nahapiet & Ghosal, 1998; Sethi, Smith, & Park, 2001). Jansen et al. (2005) provide empirical evidence that connectedness positively influences potential absorptive capacity and, in particular, the assimilation of new knowledge. Establishing dense networks of ties within units is needed for units to assimilate, transform, and exploit new external knowledge (Jansen et al., 2005).

Connectedness provides the basis for trust and encourages cooperative behavior (Nahapiet & Ghosal, 1998; Putnam, 1993) and seems a necessary condition for establishing cross-functional interfaces. Simultaneously, as trust develops through cooperative activities (Putnam, 1993) it seems evident that there is a strong relation between both constructs. Moreover, a high level of connectedness reduces rule violations and therefore reduces monitoring processes (Nahapiet & Ghoshal, 1998; Putnam, 1993). Socialization capabilities can also be developed through job rotation, as it increases an employee's network and transfer of company culture (Campion, Cheraskin, & Stevens, 1994).

In sum, one can expect connectedness to be a present condition for achieving high-level absorptive capacity. Moreover, a strong link with coordination capabilities is expected, especially with cross-functional interfaces and job rotation. The foundation of trust seems to be key, with can be developed through the use of coordination capabilities. Coordination capabilities depend on the level of connectedness, as employees are more willing to work together when there is trust. Simultaneously, trust develops through cooperative activities (Putnam, 1993).

Socialization tactics, or shared social experiences, cover the cognitive aspect of social relations by structuring shared socialization experiences (Jansen et al., 2005). Van Maanen & Schein (1979) define socialization tactics as "... ways in which the experiences of an individual in transition from one role to another are structured for him by others of the organization (p. 34, 1979)". It leads to strong social norms and beliefs which will be easily transferred to newcomers within the organization. Nonaka (1994) calls this "socialization", where knowledge is created through shared experiences. Van Maanen & Schein (1979) distinguish six tactics associated with socialization.

The first two categorizations of socialization tactics, collective versus individual and formal versus informal, differ in terms of the context in which organizations provide information to newcomers (Jones, 1986). First, with *collective socialization*, newcomers go through a common set of learning experiences and are designed to produce uniformity. The newcomer is expected to accept status quo, including the values and attitudes that go with such status. Organizations practicing *individual socialization* put newcomers through unique

learning experiences, letting them explore their own role in the organization (Van Maanen & Schein, 1979). Second, formal versus informal socialization deals with the setting in which information is presented to newcomers. *Formal socialization tactics* is the practice of formal training. Newcomers are separated from other organizational members and trained in a particular skill. This is contrary to *informal socialization*, where newcomers are taught on-the-job.

The second two categorizations of socialization tactics, sequential versus random and fixed versus variable, deal with the content of the information given to newcomers via socialization. *Sequential socialization* provide newcomers with explicit information concerning the sequences of learning steps. In contrast to *random socialization*, where newcomers randomly learn about tasks as and when they appear on the job. *Fixed tactics* provides newcomers with a fixed timeline associated with completing every step in the learning process. On the other hand, *variable tactics* provides no information about when learning tasks need to be completed.

The last two categorizations of socialization tactics are serial versus disjunctive and investiture and divestiture. *Serial socialization tactics* provides formal support to newcomers, such as experienced staff members training newcomers, serving as a role model or mentor them. *Disjunctive socialization* provides no formal support to newcomers. Second, investiture versus divestiture tactics reflect social or interpersonal aspects of the socialization process. *Investiture* (vs. *divestiture*) builds on the identity and personal characteristics of the newcomer, instead of rejecting, disconfirming and stripping them away.

Based on these six tactics, Jones (1986) collectively refers to individual, informal, random, variable, disjunctive, and divestiture tactics as *individualized socialization tactics*. The opposite ends are collectively referred to as *institutionalized socialization tactics*. Institutionalized socialization tactics reflects a socialization process that is structured and formalized (Ashforth, Saks, & Lee, 1998). It reduces uncertainty and encourages newcomers to passively accept rules and predefined roles. Conversely, it might limit newcomers to search for new knowledge beyond the standards. Individualized socialization lacks structure, which can increase uncertainty and anxiety amongst newcomers (Jones, 1987). It can be used to intentionally provoke innovative behavior, but it socializes newcomers mostly by default rather than design (Ashforth et al., 1998).

Previous research suggests that institutional socialization is positively associated with a mechanistic organizational structure (Ashforth et al., 1998). A structured and formal socialization process is likely to be seen as functional for formalized organizations, given their tendency to reproduce the status quo and using hierarchy to get greater control over

newcomers' attitude and behavior. Cohen & Levinthal (1990) argue that socialization tactics hinder the ability to tap into new external knowledge sources, since it encourages employees to interpret and act to situations in a predictable way. However, Jansen et al. (2005) provide evidence that socialization tactics do not disrupt potential absorptive capacity and have positive effect on realized absorptive capacity.

In sum, how organizations organize their socialization tactics determines how newcomers find their way in the organization. While institutional socialization tactics reduce uncertainty amongst newcomers and encourages them to act in a predictable way, it might hinder innovative behavior and therefore the ability to explore and exploit new knowledge. Individual socialization tactics are mostly defined by what they are not (e.g. they do not involve grouping newcomers, they provide no information about different steps in the learning process and time line, they do not involve the use of a mentor) and are therefore more developed by default. In relation to absorptive capacity, I expect institutional socialization tactics to be present at organizations that also exhibit high system capabilities. Subsequently, I expect high formalization and institutional socialization tactics to be closely related by both being present in a configuration. Conversely, I expect individualistic socialization tactics and low systems capabilities to be closely related.

2.3. The need for configurational approach

The following section discusses the synergy between combinative capabilities and the need for studying them as a whole in a configurational approach. The second section provides insight into the emerge of configurational thinking.

Previous studies enhanced knowledge on how combinative capabilities strengthen or weaken one another. Galbraith (1973) argued that high system capabilities reduce the amount of communication and decision making each time a situation is repeatedly encountered. Conversely, low formalization requires more participation in decision making, as no preplanned responses are available. Thus, one can expect that high participation in decision making requires high formalization. With the implementation of cross-functional interfaces, such as self-contained teams, the need for participation in decision making seems evident, because the team has all the resources it needs to perform tasks (Galbraith, 1973). Cross-functional interfaces depend on the level of connectedness, as employees are more willing to work together when there is trust. Simultaneously, trust develops through cooperative activities (Putnam, 1993). Socialization capabilities can be developed through job rotation, as it increases

an employee's network and transfer of company culture (Campion, Cheraskin, & Stevens, 1994).

Mintzberg (1979) argues that if an organization's structure fits well, they combine to create organizations that perform well. Mintzberg's (1979) work resulted in five basic configurations, namely; the simple structure, the machine bureaucracy, the professional bureaucracy, the divisionalized form, and the adhocracy. For example, the simple structure combines low system capabilities, high participation in decision making whereas the machine bureaucracy is defined by high system capabilities, through formalization and standardization, low participation in decision making and collective socialization tactics to ensure uniformity. The professional bureaucracy shows similarities with the machine bureaucracy, except participation in decision making is high as employees demand control over their work. The divisionalized and adhocracy form show more integration of cross-functional interfaces, through teams and task forces, job rotation, and lower formalization and routinization of tasks.. Mintzberg's (1979) configurations show that different configurations can lead to a similar outcome and underlines the importance of studying different capabilities as a whole, rather than in isolation. The lack of knowledge on how elements of combinative capabilities must be aligned, interact and/or complement one another in relation to absorptive capacity has been previously mentioned, yet is still unexplored (Raisch & Birkinshaw, 2008; Miller, 1982).

Conventional quantitative research answers to problems through various cross-case analysis using correlational techniques (Fiss, Cambre & Marx, 2013). This type of research is based on the idea that different variables influence the outcome to different degrees. Conventional quantitative research tries to isolate, to the extent possible, variables from each other to measure the impact on the outcome of interest. Unlike configurational thinking, that argues that the effect of a causally relevant variable are context dependent. Thus, different configurations can affect outcomes differently as well. Comparative research requires systematic specification of key conditions and how they are expected to influence the outcome of interest. In earlier years, comparative methods and configurational thinking were already present, yet less advanced than nowadays. For example, Khandwalla (1977) argues that combinations of dimensions of top management philosophy (among which, participating in decision making) were more powerful predictors of organizational performance than individual dimensions. Conversely, wrong combinations led to low organizational performance. Hage & Aiken (1967) also used a comparative method to find out that a high degree of participation, a low degree of job codification, and a high degree of job satisfaction are most highly associated with a high rate of program change. Even though the outcome of interest, program changes,

differs from this thesis similarities can be found in the conditions used. Throughout the years, configurational theories in strategy and organization have emerged and advanced by identifying configurations that shed new light on how organizations function (Miller, 2017). Linear techniques, as used by Khandwalla (1977) and Hage & Aiken (1967), do not capture important distinctions in relationships among configurations (Ragin, 2000). The emerge of QCA provided researchers with a standard way of generating configurations and testing robustness of configurations. Throughout the years, QCA showed that it can handle causal complexity and enabled researchers to “... *unpack situations of first and second-order equifinality, substitution, or complementary effects between elements*” (Greckhamer, Fiss & Aguilera, 2018). I consider the joint effect of coordination, systems, and socialization capabilities, because different configurations may still lead to absorptive capacity. As seen in this literature review, no evidence was found that one capability by itself is sufficient to strengthen a firm’s absorptive capacity. Moreover, all conditions of combinative capabilities presented advantages as well as disadvantages. As the combinations are interrelated, one might assume that a change in one condition leads to a change in other conditions. It is therefore that I assume that combinative capabilities can be conceived most advantageously as variables in a system.

2.4. Configurational framework

Based on the literature review, this section proposes a configurational framework to establish the configurations between systems capabilities, coordination capabilities, and socialization capabilities that lead to an optimal fit to achieve a high level of absorptive capacity on firm level. Previous research suggests that combinative capabilities allow firms to synthesize and apply current and acquired knowledge. These capabilities influence a firm’s absorptive capacity and are, therefore, considered as an important determinant of the concept. Although previous research supports the inclusion of systems, coordination, and socialization capabilities, their effects as part of configurations are unexplored. In the previous section I argued the existence of synergy between combinative capabilities by discussing outcomes of previous studies and the need for a configurational approach.

The aim of this study is to examine and systematically compare different configurations of combinative capabilities that lead to a higher absorptive capacity. Therefore, it proposes the following configurational framework (figure 1):

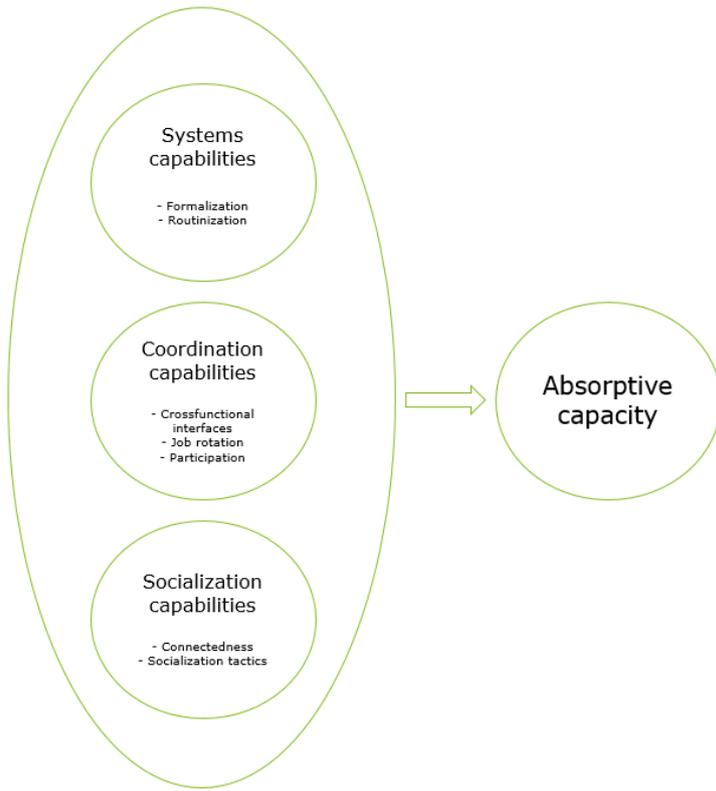


Figure 1: Configurational framework

3. Methodology

The following chapter will discuss the methodological approach to record and analyze data. The first paragraph discusses the chosen type of research and research strategy, which also includes an elaboration on the concept of (fuzzy set) Qualitative Comparative Analysis (QCA). This is followed by a description of the sample, which defines the selection of organizations and respondents. The next part discusses the operationalization and calibration of the variables and the outcome of interest. This chapter concludes with a correlation analysis.

3.1. Research method

This thesis aims to identify different configurations of combinative capabilities that lead to a higher level of absorptive capacity. To identify these configurations a fuzzy set comparative analysis (fsQCA) is used. Early studies on configurations of organizational design (e.g. Galbraith, 1973; Mintzberg, 1979; Millen & Friesen, 1984) were to develop conceptual typologies or to recognize and distinguish organizational phenomena (Miller, 2017). Less emphasis was placed on the relationship between variables and the outcome of interest. Up until now, little is known about configurations of combinative capabilities in relation to absorptive capacity. We do know that systems, coordination, and socialization capabilities influence one another and influence absorptive capacity, but only when these capabilities are isolated from one another. Therefore, deductive research would not be suitable for this study. Hence, I choose to approach the research question inductively by theory building.

The past two decades QCA has evolved in organization theory, yet conventional quantitative methods continue to prevail. QCA differs from other conventional regression analysis methods as it uses the advantage of both qualitative (*case-oriented*) and quantitative (*variable-oriented*) techniques (Rihoux & Ragin, 2009). QCA enables detailed analysis of how causal conditions contribute to outcomes (Fiss, 2011). It is based on the idea of *equifinality*, whereas more ways can lead to the same outcome. More conventional techniques, such as traditional correlation analysis, assume causal symmetry because correlations are *symmetric* by nature. If one would model the reverse effect of high level absorptive capacity, the results of a correlation analysis would be the same except for the sign of the coefficients (Fiss, 2011). Configurational thinking assumes causal *asymmetry*, where sets of conditions might differ if the outcome is present or absent. It allows to examine the necessary and sufficiency of conditions for a given outcome (Misangy et al., 2016). This leads to an important limitation of traditional methods, as variables are studied in isolation of each other. Variables are part of a

given context and thus are not likely to exist in isolation. Another advantage is QCA is the use of a formal language (Boolean algebra) which allows for replicability (Rihoux & Ragin, 2009). In sum, QCA allows for a holistic approach on how combinative capabilities (as causal conditions) influence a firm's level of absorptive capacity (as outcome of interest) and therefore provides as a solid methodological approach that can fully incorporate the relationship among both constructs (Greckhamer et al., 2008).

QCA consists of multiple variants, such as crisp set QCA (csQCA) and fuzzy set QCA (fsQCA). CsQCA reflects to the analysis of dichotomous data reflecting the membership of cases either as 0/fully out or 1/fully in. Rihoux & Ragin (2009) argue that this is also the main limitation of csQCA as it only allows variables to be seen as either heterogenous (fully in) or completely homogenous (fully out). The variables presented in this thesis cannot be simply seen as completely heterogenous or homogenous since organizational mechanisms are never fully absent or present. This leads to the advantage of using fsQCA, where partial membership degrees between 0 and 1 are allowed.

FsQCA aims to compose several configurations leading to the outcome of interest. The analysis consists of multiple steps. First, all data will be put into set membership values ranging from 0 to 1. The value 0 refers to non-memberships and 1 refers to complete membership. For example, if the variable cross-functional interfaces has a membership degree of 0, it means this particular case has no cross-functional interfaces present. If this variable has a membership degree of 1 this would mean that the case shows many cross-functional interfaces such as relationships between functional areas, personal contact across functions, and liaison roles. The calibration of data can easily be done with fsQCA software, one only needs to define three anchor points. The three anchor points can be indicated as followed: the value that indicates when full membership is reached, the value that defines the cross-over point, and the value that indicates when full non-membership is reached.

The second step in fsQCA is constructing a truth table. A truth table is a data matrix with 2^k rows, where k stands for the number of causal conditions used in the analysis. Each row shows a specific combination of variables and the table lists all possible combinations (Fiss, 2011). The truth table shows which combinations most frequently lead to the specified outcome and how consistent these combinations are leading to the specified outcome. Ultimately the truth table lead to three types of solutions, namely; parsimonious solution, intermediate solution, and complex solution. Both solutions will be discussed in chapter four.

3.2. Case selection

For the purpose of this study data was collected from ten different organizations. Each organization represents one case. This choice was made in order to examine and systematically compare an organization's combinative capabilities and absorptive capacity with other organizations. Ten cases is, in QCA, categorized as a "small-N research" (Rihoux & Ragin, 2009).

To create a homogenous sample, cases were selected based on two criteria. First, as the concept of absorptive capacity centers around knowledge, cases were selected when labelled as knowledge-intensive firms. Knowledge-intensive firms are organizations that sell their knowledge as a product and where knowledge has more importance than other outputs (Starbuck, 1992). Secondly, to minimize the influence of external factors, cases needed to be employed in the professional services industry in The Netherlands.

To ensure all cases operated in a similar environment, environmental dynamism ($\alpha = .81$) was measured on a 7 point disagree/agree scale, based on existing items designed by Volberda & Van der Weert (Quick Scan Flexibility survey). The average score of all cases was 4.47 (s.d. = 0.93), which suggested that all cases experience similar environmental dynamism (medium to high).

With regards to the respondents of the cases, all respondents function on a (junior) manager level or higher. This choice was made since this research depends on a broader view of the organization. This way it tries to minimize incomplete responses due to possible ignorance. On average, respondents are employed at the organization for over 5 years. The cases for this thesis were reached through personal and business connections. All cases were represented by one contact person who was responsible for finding a minimum of five respondents within the organization. Contact was made through e-mail and follow-up questions were discussed over the phone.

3.3. Data collection

This thesis mainly builds on the results of survey that was held among 52 respondents. An online survey was held amongst all respondents, consisting of 55 questions on all related variables and including 5 general questions about the organization. More details on the content of the survey will be discussed in the next section. To ensure confidentiality I agreed not to reveal the names of the participating organizations. Respondents were only asked to enter the name of the organization as this was needed to make sure that results were placed in the corresponding case. During the analysis, for example when inconsistencies appeared, contact

was made with respondents for follow-up questions. The interrater reliability was measured and ranged from .62 to .93. Kappa values between 0.61 to 0.80 indicate substantial agreement and kappa values between 0.81 and 1.00 indicate almost perfect or perfect agreement between respondents within a case (Landis & Koch, 1977). The interrater reliability is further specified in the case overview (table 1).

3.4. Case overview

Below one can find a summarized overview of all cases participating in this thesis, followed by short case descriptions. The summarized overview (table 1) provides an overview of all cases and their area of expertise to show homogeneity amongst the cases. Additional elements, such as number of employees, (de)centralization of activities, and (inter)national context, are documented for the use of the analysis. The interrater reliability scores indicate substantial and almost perfect agreement between respondents within a case.

Case	Areas of focus	# employees (The Netherlands)	# respondents	Centralized / Decentralized	International / National	Interrater reliability
1	Consulting	30	7	Centralized	National	.82
2	Recruitment, Consulting	300	5	Centralized	International	.76
3	Recruitment	1000	5	Centralized	International	.85
4	Audit, Consulting, Tax, Risk Advisory	5000	5	Centralized	International	.62
5	Recruitment	50	5	Centralized	National	.93
6	Finance, Consulting, ERP, BPS	400	5	Decentralized	National	.90
7	Audit, Tax, Advisory, Consulting	4800	5	Centralized	International	.92
8	Assurance, Tax, Business Services	4500	5	Centralized	International	.93
9	Recruitment, Employment services, HR consulting	4200	5	Centralized	International	.78
10	Audit, Advisory, Tax	3000	5	Centralized	International	.91

Table 1: Case overview

3.4.1. Case descriptions

Case 1: The organization is a small-sized national consultancy firm consisting of 30 employees and two offices. The organization focuses on local government and the social domain and offers interim management and strategic advice. Supporting activities are centrally organized. Gross profit was estimated at €9 million in 2017.

Case 2: This organization is a large international listed recruitment and consulting company. It employs more than 7000 employees worldwide of which approximately 300 employees work in The Netherlands. In 2017 gross profit in The Netherlands was estimated to be around €74 million. Group support services are centrally organized.

Case 3: This organization employs around 1000 employees and was founded in The Netherlands in the year 2000. The company quickly grew to become one of the largest recruitment agencies in The Netherlands. Currently the organization is based in two countries, servicing a total of eight European countries. Gross profit was estimated to be over €200 million in 2017. Support services is centrally organized.

Case 4: This company is one of the largest professional services firms worldwide and was founded in the mid-1800s. The organization focuses on audit, consulting, tax, risk advisory, and financial advisory services. About 265.000 professionals are employed worldwide, of which over 5000 work in The Netherlands. In The Netherlands, gross profit was estimated around €815 million in 2017. Supporting activities, such as finance, marketing, and HR, are centralized.

Case 5: This company is a small-sized Dutch employment agency, founded in 2003, and specializes in high executive positions. The company employs 50 professionals. Gross profit was estimated on €15 million in 2017. Supporting activities are centralized.

Case 6: This medium-sized company focuses on finance and control consulting, business process solutions, and ERP solutions offering both specialist advice and provide highly educated staff for support or project education. The company is based in The Netherlands and employs around 400 professionals. The gross profit for 2017 was estimated around €40 million. Supporting activities are decentralized.

Case 7: The organization employs around 240.000 professionals, of which around 4800 work in The Netherlands. The organization is one of the largest firms in audit, tax, and advisory related services. In 2017 their net turnover was estimated around €770 million in The Netherlands. Supporting activities, such as finance, marketing, and HR, are also centralized. Globally, the organization employs over 37.000 professionals of which more than 4000 are employed in The Netherlands.

Case 8: This international, listed company employs around 4500 professionals in The Netherlands. Their services focus on assurance, tax, advisory, and business consulting and is seen as one of the largest professional services firms of the world. In The Netherlands, gross profit of 2017 was estimated at € 800 million. Internal services are centralized.

Case 9: This listed company is one of the largest employment agencies internationally as well as in The Netherlands and was founded around 1960. Internationally, the company employs around 38.000 professionals. In The Netherlands, gross profit was estimated to be around €3,333 million. The company focuses on recruitment, temporary employment, and offers HR consulting services. Support services are centrally organized at the Dutch head quarter.

Case 10: This company is one of the largest professional services firms in the world focusing on audit, advisory, consulting, and tax services. The numbers of 2017 show a gross profit of €620 million within The Netherlands. The organization employs over 3000 professionals in The Netherlands.

3.5. Variable operationalization and calibration

The next section deals in greater detail with the 7 different causal condition and the outcome of interest, how they were measured and subsequently calibrated. All elements were measured on a 7 point disagree/agree scale and based on existing items. The scales used to measure the variables were validated for internal reliability by calculation of Cronbach alphas and will be discussed per variable. Descriptive statistics before and after calibration can be found in appendix I. The questionnaire can be found in Appendix III.

3.5.1. Causal conditions

Systems capabilities

Formalization ($\alpha = .81$): To measure formalization, a total of three questions with existing measurements were adopted from Jaworski & Kohli (1993). Originally the questions were designed by Deshpande & Zaltman (1982) for measuring factors affecting marketing managers' attention to market research information. Jaworski & Kohli (1993) then adopted these measurements for formalization and transformed the questions to become focused on the organization perspective. The final measure was an average of the three items of all respondents per case. The internal reliability of this scale was measured by calculation of the Cronbach

alpha of the average which resulted in 0.81. A value greater than 0.70 indicates an acceptable level of reliability (Easterby, Thorpe, & Jackson, 2015).

Full membership was reached when formalization is high, e.g. all tasks are written down in documents or put in formal systems, employee is constantly being checked for rule violations and all decisions need to be approved on forehand. Full non-membership was reached when formalization is low, e.g. employees can make their own rules in doing their job, employees are allowed to make decisions without any approval from higher executives and information is not formally written down or stored in formal systems.

Routinization ($\alpha = .66$): To measure the extent to which tasks in an organization were invariable, uniform or predictable, measurement scales were adopted from Whitey, Daft, & Cooper (1983). The items were slightly altered in order to cover the organization perspective instead of solely an organizational unit. In total, three items assessed routinization. The final measure was an average of the three items of all respondents per case. The internal reliability resulted in .66, which is a little bit lower than the needed 0.70, but can be considered acceptable as reliability of the used scale was proven to be reliable in the past with a score of 0.73 (Jansen et al., 2005).

Full membership in routinization was reached when the degree of routinization was set as high, meaning tasks are repetitious and invariable and employees feel that their tasks are same from day-to-day. Full non-membership was defined as a low degree of routinization, when employees do not have an understandable sequence of steps to follow in doing their work and when employees view their work as highly variable on a day-to-day basis.

Measure	Scale items	Anchor points
<i>Formalization</i>	1	0 = Low formalization: no job descriptions, no general rules, and no work manuals
	4	0,5 = Formalization is present, but there is room for making decisions without approvals or vice versa
	7	1 = High formalization through job descriptions, general rules, and work instructions
<i>Routinization</i>	1	0 = Tasks do not have to be performed in a specific sequence of steps and tasks are highly variable on a day-to-day basis.
	4	0,5 = There is a balance between repetitive tasks and the variety of tasks
	7	1 = Tasks are repetitious, invariable and the same from day-to-day

Coordination capabilities

Cross-functional interfaces ($\alpha = .87$): The items to measure cross-functional interfaces were adopted from Jaworski & Kohli (1993) and covers if ideas and concepts are communicated cross-departmental and if management demands periodical cross-departmental meetings to

exchange new developments, foreseen difficulties, and accomplishments. In total, two items assessed cross-functional interfaces. The final measure was an average of the two items of all respondents per case. The internal reliability resulted in a Cronbach alpha of 0.87, which is well above the cut-off value of 0.70.

A high degree of cross-functional interfaces (full membership) was reached when organizations emphasize deepening knowledge flows by organizing periodical cross-departmental meetings and share ideas and new concepts through multiple layers of the organization. Full non-membership was set when employees were not involved in any cross-departmental activities and if no platform for information sharing was available.

Job rotation ($\alpha = .57$): For the measurement of job rotation two items were fully adopted from Jansen et al. (2005). Both questions tapped the extent to which employees were rotated between different functions and/or departments. The final measure was an average of the two items of all respondents per case. The internal reliability indicated .57, which indicates a low level of internal reliability. However, the used scale was proven to be reliable in the past with a score of 0.77 (Jansen et al., 2005). Moreover, the lower score might be the result of the small sample used in this study.

Full membership was reached when employees are regularly rotated between different functions as well as different departments. Organizations that for example offer the possibility for cross-departmental and foreign exchanges, specialized traineeships and/or become part-time available for knowledge exchange for improving quality working groups are measured in a high degree of job rotation. Full non-membership was reached when organizations do not offer any possibilities for rotation between functions and/or departments.

Participation in decision making ($\alpha = .87$): A construct for measuring to what extent employees are part of the decision making was adopted (Dewar, Wetten, & Boje, 1980; Deshpande & Zaltman, 1982). All items measured to what extent respondents were part in the decision on the adoption of new or existing products or in the decision to delete existing products. In total, three items assessed participation in decision making. The final measure was an average of the three items of all respondents per case. The internal reliability was measured as 0.87, indicated high internal consistency.

To reach full membership employees need to be involved in the decision-making process if services are to be added, removed and/or adjusted. Full non-membership involves only top management making all decisions when it comes to their services.

Measure	Scale items	Anchor points
<i>Cross-functional interfaces</i>	1	0 = No cross-departmental meetings are organized, new ideas and concepts are not shared throughout the organization
	4	0,5 = Cross-departmental meetings are organized annually, new ideas and concepts are only shared once approved
	7	1 = Cross-departmental meetings are frequently organized, new ideas and concepts are always shared with employees
<i>Job rotation</i>	1	0 = Employee has no opportunities for rotation between departments and/or functions
	4	0,5 = Organization offers limited possibilities for rotation
	7	1 = Organization offers many possibilities for rotation
<i>Participation in decision-making</i>	1	0 = Employees do not get to participate in decision-making processes
	4	0,5 = Employees can participate in decision-making process, but most is done by higher management
	7	1 = All employees are able to participate in decision-making processes

Socialization capabilities

Connectedness ($\alpha = .70$): To measure formalization, existing measurements were adopted from Jaworski & Kohli (1993). The items questions respondents whether individuals in organizations were networked to various levels of the hierarchy, for example through informal “hall talk” with individuals from other departments and being able to talk to anyone regardless of rank or position. In total, two items assessed connectedness. The final measure was an average of the two items of all respondents per case. The internal reliability was measured as 0.70, indicating an acceptable level of reliability.

Full membership was reached when connectedness was measured as high. A high degree of connectedness was reached when employees can easily talk to anyone within the organization and has easy access to employees in other departments. Full non-membership entails when employees are not able to simply interact with higher executives due to hierarchical boundaries. Moreover, when departments are physically separated from one another it will decrease the possibility to engage in informal conversations with other departments.

Socialization tactics ($\alpha = .70$): Based on a study by Van Maanen & Schein (1979), Jones (1986) constructed items to measure *collective* versus *individual* socialization tactics. Collective socialization tactics lets newcomers go through the same set of learning experiences, for example boot camps, welcome trainings, and management training sessions. Individual socialization tactics puts newcomers, in isolation of others, through a more or less set of unique experiences, like trainee assignments and on-the-job learning (Van Maanen & Schein, 1979). In total, four items assessed an organization’s socialization tactics. The final measure was an average of the two items of all respondents per case. The internal reliability was measured as 0.70, indicating an acceptable level of reliability.

When organizations spend all of their time on collective socialization tactics, full membership was reached. Newcomers go through the same set of learning experiences by for example doing standardized (online) courses and have a formal welcoming day for all new hires. Other employees are highly involved with new recruits in common, job related activities. Organizations that display individual socialization tactics were measured as full non-membership. These organizations design personalized trainings or assignments for newcomers or they leave newcomers alone to discover their own role and responsibility within the organization.

Measure	Scale items	Anchor points
<i>Socialization tactics</i>	1	0 = Individual oriented, newcomers are left on their own to figure out their role in the organization
	4	0,5 = Organization shows both individual as well as collective socialization tactics
	7	1 = Collective oriented, all newcomers go through the same set of learning experiences
<i>Connectedness</i>	1	0 = No possibilities to have access to other departments, hierarchical boundaries
	4	0,5 = Employees have easy access to other, but hierarchical levels are present OR vice versa.
	7	1 = Employees can easily talk to one another, no hierarchical boundaries

3.5.2. Outcome of interest

Absorptive capacity

In the previous chapter the concept of absorptive capacity was discussed and viewed as a ‘rich’ concept, which has proved to be difficult to measure in the past (Volberda et al., 2010). For example, indirect measures of absorptive capacity through R&D spending, R&D intensity, and number of patents has been previously criticized (Spender & Grant, 1996). This study uses a direct measure of the construct ($\alpha = .84$), which was also done by e.g. Lane et al. (2001), Jansen et al. (2005), and Lichtenthaler (2009) by breaking down components of absorptive capacity and measuring elements of the concept separately. The items for measuring the acquisition, assimilation, transformation, and exploitation was fully adopted from Jansen et al.’s (2005) empirical research. In total, twenty-one items assessed an organization’s socialization tactics. The final measure was an average of the twenty-one items of all respondents per case. Internal reliability was measured as .84, which indicates a high level of reliability.

Full membership was reached when the average weighted of all four elements of absorptive capacity was high. This means that the organization is able to acquire, assimilate, transform, and exploit knowledge to the fullest. Full non-membership was reached when the average of

all four elements of absorptive capacity was low. Organization with full non-membership are not able to transfer knowledge from outside to practice.

Measure	Scale items	Anchor points
Absorptive capacity	1	0 = Low degree of absorptive capacity
	4	0,5 = Medium degree of absorptive capacity
	7	1 = High degree of absorptive capacity

3.6. Correlation analysis

The results of the correlation analysis are presented in table (2). It shows multiple correlations with the 0.05 significance level:

- Formalization and participation in decision making ($r = .68, p < .05$);
- Routinization and participation in decision making ($r = .68, p < .05$);
- The level of formalization and routinization ($r = .66, p < .05$);
- Socialization tactics and formalization ($r = .64, p < .05$);
- Socialization tactics and routinization ($r = .70, p < .05$);
- Connectedness and participation in decision making ($r = .76, p < .05$);
- Connectedness and routinization ($r = .65, P < .05$);
- Absorptive capacity and job rotation ($r = .73, p < .05$).

All of above variables have positive correlation coefficients. This leads to the expectation that a high level of one variable goes well together with a high level of the other variable.

Table (2) shows two correlations with the 0.01 significance level:

- Connectedness and formalization ($r = .82, p < .01$);
- Absorptive capacity and cross-functional interfaces ($r = .83, p < .01$).

Both correlations have positive correlation coefficients and are expected to positively influence one another. These findings can be explained. Cross-functional interfaces are expected to positively influence absorptive capacity, as for example cross-functional teams depend on a diversity of backgrounds and prior related knowledge. We expect connectedness to be effected by the level of formalization. As high formalization minimizes the need for further communication it also might affect the social networks and ties of an organization.

Next to the many significant correlation, low correlations were found as well. One would expect a significant relationship between connectedness and job rotation ($r = .04, p > .05$), as job rotation increases an employee's network and transfer of an organization's culture (Campion, Cheraskin, & Stevens, 1994). The same goes for the low significance level

between cross-functional interfaces and participation in decision making ($r = .05, p > .05$). When cross-functional interfaces are in place, the need for participating in decision making seems logical. Self-steering teams have all resources they need to perform their tasks and should therefore be able to participate in decision making (Galbraith, 1973).

Means, Standard Deviations, and Correlations										
Variable	Mean	s.d.	1	2	3	4	5	6	7	8
1. Cross-functional interfaces	4.42	1.61	1							
2. Job rotation	4.32	1.14	.61	1						
3. Participation in decision-making	3.70	1.29	.05	-.07	1					
4. Formalization	4.04	1.23	-.05	.01	-.68*	1				
5. Routization	4.30	0.70	-.01	.48	-.68*	.66*	1			
6. Socialization tactics	4.65	0.88	.46	.59	-.41	.64*	.70*	1		
7. Connectedness	5.99	0.84	.29	.04	.76*	-.82**	-.65*	-.32	1	
8. Absorptive capacity	5.27	0.65	.83**	.73*	.09	.18	.16	.58	.10	1

** . Correlation is significant at the 0.01 level
 * . Correlation is significant at the 0.05 level

Table 2: Means, standard deviations, and correlations

4. Analysis and Results

In this chapter the analysis and final results are presented. The first section of this chapter presents the analysis and results of the research question that was set in the first chapter. This section concludes with presenting high performance configuration leading to the outcome of interest. The second section presents the robustness check that have been performed. The chapter concludes with a final summary.

4.1. Necessary conditions

A necessity analysis was performed, by selecting a consistency benchmark of $>.90$, to check if one of more conditions necessary to the outcome of interest. Next to the consistency benchmark one needs to look at high coverage scores that indicate if a necessary condition is also empirically relevant (Ragin, 2008; Schneider & Wagemann, 2012).

Necessity analysis found connectedness an empirically relevant necessary condition for absorptive capacity (consistency=0.97, coverage=0.86). As shown in the next paragraphs, connectedness is included in all solutions, thereby consistently linked to a high degree of absorptive capacity. This shows that connectedness is an important ingredient for a firm's absorptive capacity

4.2. Configurations for high absorptive capacity

Configurations that lead to a high level of absorptive capacity are specified by fsQCA through the presence or absence of different combinative capabilities. Results were produced and analyzed by using the fsQCA 2.5 software. The software calibrated all responses into set memberships using the compute function of the software. The compute function allows one to set 3 qualitative anchors: full membership, full nonmembership, and a cross-over point. More details about the calibration was provided in the previous chapter. Appendix I provides insight into the descriptives of the variables before and after calibration. After calibration all items that scored 0.5 were adjusted by adding 0.001, as was recommended by Ragin (2008), to ensure no cases are dropped out due to ambiguity (Fiss, 2011). To construct the truth table, all variables were selected as well as the outcome of interest. The truth table then shows all possible combinations, including the number of cases that shows a particular combination and the consistency for those combinations. The truth table is included in appendix II. For generating high performance configurations the (solution) frequency threshold was set on 2. The consistency threshold was set on >0.8 , as recommended by Ragin (2008). In total 5 cases fell

into configurations meeting or exceeding the minimum solution frequency and all 5 cases also exceeded the minimum consistency threshold. Finally, the standard analysis presents us with two solutions: the parsimonious and intermediate solution. The parsimonious and intermediate solution are different on the basis of easy and difficult counterfactuals (Ragin, 2008). The parsimonious solution is based on many assumptions that assess a plausible outcome of a combination of cases that do not exist. However, parsimonious solutions are valuable because they show which causal conditions can be considered as “core” causal conditions. Core causal conditions are those that are both part of the parsimonious and intermediate solution (Fiss, 2011). The opposite of core causal conditions are peripheral conditions, conditions that are eliminated from the parsimonious solution and only appear in the intermediate solution (Fiss, 2011). The parsimonious solution displays the following two solutions:

High level of absorptive capacity¹ =

1. Cross-functional interfaces * Job rotation * ~Participation * ~Formalization *
Routinization * Socialization tactics * Connectedness
2. ~Cross-functional interfaces * Job rotation * ~Participation * Formalization *
Routinization * Socialization tactics * Connectedness

Table 3 shows the notation that visualizes the different intermediate solutions that lead to a high level of absorptive capacity. Large full circles indicate core conditions that were also present in the parsimonious solution, whereas the small full circles indicate peripheral conditions not present in the parsimonious solution. Large circles with a cross-out indicate the absence of a core condition and small circles with a cross-out indicate the absence of a peripheral condition. Blank spaces indicate the “don’t care” situation: the causal condition may be either present or absent (Fiss, 2011).

¹ The multiplication sign (*) can be read as ‘and’ (A and B) and the tilde (~) illustrates a negation (for example: A and B but not C).

	Configurations of high absorptive capacity				
	1	2	3	4	5
Formalization	⊗	●	●	⊗	●
Routinization	⊗	●	●	●	●
Cross-functional interfaces		⊗		●	●
Job rotation	⊗		⊗	●	●
Participation in decision-making	●	⊗	⊗	⊗	●
Socialization tactics	⊗	●	●	●	●
Connectedness	●	●	●	●	●
Raw coverage	0.327654	0.425950	0.423329	0.385321	0.327667
Unique coverage	0.096986	0.079948	0.039319	0.066841	0.036710
Consistency	0.957854	1.000000	1.000000	1.000000	1.000000
Cases	1, 5	4, 7, 8, 10	2, 4	3, 9	10
Overall solution coverage		0.740511			
Overall solution consistency		0.980903			

Table 3: Configurations of high absorptive capacity

The presented solutions in table 3 show five pathways exhibiting acceptable consistency (>0.8). The solutions indicate the presence of both core and peripheral conditions (large versus small circles) as well as blank spaces indicating the condition maybe either present or absent. As discussed in the previous chapter, the idea of equifinality applies as more solutions are leading towards the same outcome. According to Ragin (2008), set-theoretic coverage measures empirical relevance or importance by assessing the degree to which a cause or causal combination “accounts for” instances of an outcome. Keeping this in mind, one can conclude that configuration 2 and 3 are most relevant in indicating high organizational absorptive capacity. Both configurations cover for approximately 42-43% of the cases in which the level of absorptive capacity shows high performance, which covers a substantial proportion of the outcome. The total solution coverage covers 74% of the cases in which the level of absorptive capacity shows high performance. The overall solution consistency demonstrates that 98% of the cases are consistent with the outcome, which is above the recommended threshold of 0.8. This illustrates that the solutions that are presented form a reliable explanation for the performance of absorptive capacity.

Solution 1 indicates the existence of a successful configuration that combines connectedness as core condition and exhibits low formalization. Furthermore, the peripheral conditions suggest participation in decision-making as present condition with the absence of routinizing tasks, job rotation, and socialization tactics. Cross-functional interfaces can be either present or absent without changing the outcome. In sum, the configuration presents a

solution for high performance on absorptive capacity when organizations exhibit low system capabilities (low routinization and low formalization), no (or minimal) opportunities for job rotation, removing hierarchical boundaries, and focus on letting employees participate in decision-making, individual socialization tactics.

Solution 2 presents a solution with the highest coverage and consistency compared to other solutions presented. The solution presents only core conditions leading towards a high level of absorptive capacity. Formalizing processes and developing structured tasks supports this configuration. Removing hierarchical boundaries and emerge newcomers in the same set of learning experiences supports the organizational absorptive capacity within this solution. Moreover, with regards to coordination capabilities, the solution suggests the absence of cross-functional interfaces and participation in decision-making.

Solution 4 and 5 suggests that there are trade-offs between high formalization and high participation in decision-making. If organizations choose to let employees make their own decisions and rules on the job, but leave the decision-making process when it comes to adjusting, adding or removing products or services to top management, this will benefit the outcome of interest. Solution 5 suggests that employees need to be bound by the approval of higher executives, but will need be involved in the decision-making process.

Almost all solutions share the presence of collective socialization tactics and all solutions share the presence of connectedness as a necessary condition for high absorptive capacity

4.3. Robustness checks

To measure the robustness of the results several additional checks have been conducted. First, the consistency threshold was changed from 0.8 to 0.95. By increasing the consistency threshold, fewer truth table rows are used for logical minimization (Schneider & Wagemann, 2012). By increasing the consistency threshold the results will be more consistent, but show lower coverage. The decision to increase the consistency threshold to 0.95 was due to the fact that all possible combinations in the truth table already presented a raw consistency above the recommended threshold of 0.9 (Ragin, 2008). After running the analysis, the parsimonious solution appeared to be identical compared to a consistency threshold of 0.8. The intermediate results are presented in table 2.

Robustness check: Configurations of high absorptive capacity

	1	2	3	4	5
Formalization	⊗	●	●	⊗	●
Routinization	⊗	●	●	●	●
Cross-functional interfaces	●	⊗		●	●
Job rotation	⊗		⊗	●	●
Participation in decision-making	●	⊗	⊗	⊗	●
Socialization tactics	⊗	●	●	●	●
Connectedness	●	●	●	●	●
Raw coverage	0.273919	0.425950	0.423329	0.385321	0.327667
Unique coverage	0.044561	0.079948	0.039319	0.066841	0.036710
Consistency	1.000000	1.000000	1.000000	1.000000	1.000000
Overall solution coverage		0.688087			
Overall solution consistency		1.000000			

Table 4: Robustness check: Configurations of high absorptive capacity

Compared to the original configurations in table 3, table 4 shows results that are almost completely similar. The only difference was noticed in configuration 1 where the presence of cross-functional interface was added as a core condition. All in all, no differences were found in 4 out of 5 configurations, which illustrates that the configurations are highly robust which enhances the reliability.

A second robustness check was performed by testing low-performing configurations. This was done by performing a negated analysis; configurations for the non-occurrence of the outcome of interest (Schneider & Wagemann, 2012). Fiss (2011) argues for the analysis of low performance configurations as this emphasizes the asymmetric understanding of causality. Moreover, performing a negated analysis also generates insight how the presence and absence of conditions might play crucially different roles in producing the outcome of interest (Schneider & Wagemann, 2012). A negated score was produced by subtracting a case's score for the presence of absorptive capacity from 1 (full membership). The results from the negated analysis led to one intermediate solution when the consistency threshold was set on 0.8. The parsimonious solution is included in appendix IV. The configuration is presented below in table 5.

Negated analysis: Configurations of low absorptive capacity

	1
Formalization	⊗
Routinization	⊗
Cross-functional interfaces	⊗
Job rotation	⊗
Participation in decision-making	●
Socialization tactics	⊗
Connectedness	●
<hr/>	
Raw coverage	0.805907
Unique coverage	0.805907
Consistency	0.900943
Overall solution coverage	0.805907
Overall solution consistency	0.900943

Table 5: Negated analysis: Configurations of low absorptive capacity

Ideally, the outcome of the negated analysis would have minimal overlap with the original configurations, since this would lead to ambiguity in what way a high level of absorptive capacity can be reached. The result presented in the negated analysis shows similarities with the first configuration from the original results. This configuration was also discussed in the first robustness check and comes down to the presence or absence of cross-functional interface in an organization. If all conditions are configured as presented in the original first configuration it seems that if cross-functional interfaces are present it would lead to a high level of absorptive capacity. But, if all conditions are configured as presented in the original first configuration and one would add the absence of cross-functional interfaces this would lead to the non-occurrence of absorptive capacity. All in all, the analysis suggests that cross-functional interfaces can play a crucial part in the level of absorptive capacity. The negated analysis mostly differs from the original configuration in terms of core and peripheral conditions. Connectedness is suggested as a core condition for achieving a high level of absorptive capacity and a peripheral condition in the negated analysis. For participation in decision-making it is the other way around. The absence of routinization is a peripheral condition for achieving a high level of absorptive capacity, whereas it appears to be a core condition for the non-occurrence of absorptive capacity.

One can conclude that the findings presented are not completely robust. Although the first robustness check showed reliability on the generated configurations for high level of absorptive

capacity, the second robustness check pointed out the overlap with the first original configuration. Ideally the negated analysis would not have any overlap with the high level absorptive capacity configurations and would have generated more possible configurations for the non-occurrence of absorptive capacity. Even though the findings provide new insights, they should be interpreted with care and not be considered entirely flawless.

4.4. Propositions

These findings corroborate the need to study the joint effects of combinative capabilities in relation to absorptive capacity rather than in isolation. One can argue that absorptive capacity and combinative capabilities should be understood in terms of organizational configurations on how these organizational mechanisms relate and combine to strengthen an organization's absorptive capacity. The impact of any single condition, such as formalization, is dependent on the influence of other conditions, i.e. coordination and socialization capabilities. For example, contrary to previous research that argue that argue that routinization of knowledge negatively influences absorptive capacity as it limits creative thinking and the creation of new knowledge (Nonaka, 1994; Jansen et al., 2005), this thesis finds that the presence of routinization can enhance absorptive capacity through the influence of other capabilities. Although the importance of traditional methods will not be undermined, one can argue that routinization on its own cannot explain a high degree of absorptive capacity. As shown in this thesis, routinization of knowledge become salient when combined with other capabilities, such a strong socialization capabilities. Importantly, this entails that strong routinization capabilities not always have a negative impact on absorptive capacity when measuring routinization in combination with other conditions instead of in isolation.

Table (3) presents five optimal pathways for organizations trough which best practices can emerge. Almost all pathways included the (core) presence of socialization capabilities, except for configuration 1 (e.g. case 1 and case 5) which favors individual socialization tactics over collective socialization tactics. The following section will go deeper into the different pathways and concludes with a proposition.

The first path suggests that the presence of high connectedness (strong social norms and beliefs) and the (relative) possibility for subordinates to participate in decision-making processes in combination with low formalization, (relatively) low routinization, (relatively) low opportunities for job rotation, and individual socialization tactics positively influences an organization's ability to identify, transform, and apply external knowledge. This configuration

arose from case 1 and 5, the smallest organizations (30 to 50 employees) participating in this study. Both cases present organizational flexibility by avoiding unnecessary rules and procedures and support employees to be part of decision-making processes. Moreover, these smaller organizations emphasize personal empowerment, by letting employees make their own decisions, define their own role in the organization. Job rotation possibilities are limited, due to the small size of the organization. However, they do exhibit job rotation in the form of frequently changing assignments and roles due to their role as consultant. The combination of conditions allows both organizations to explore and exploit new external knowledge on a high level. According to the literature review, this pathway is in line with earlier predictions. A positive connection between high participation in decision-making and low formalization and low formalization and individual socialization tactics was suspected. Moreover, routinization was expected to negatively influence a firm's absorptive capacity. Hence, I propose:

Proposition 1: The combination of low system capabilities, individual socialization tactics, and (relative) participation in decision-making positively influences an organization's ability to identify, transform, and apply external knowledge.

Configuration 2 and 3 (table 3) suggest that system capabilities are core conditions that need to be present to support the process of knowledge absorption. With formalization and routinization, less attention is required when tasks and rules are set and clear. Employees know how to perform their tasks and are limited in making their own rules and decisions (Jansen et al, 2005). Removing hierarchical boundaries and emerge newcomers in the same set of learning experiences also contributes the transference and absorption of new knowledge. Moreover, with regards to coordination capabilities, the solution suggests the absence of cross-functional interfaces and participation in decision-making. Configuration 2 arose from the findings in case 4, 7, 8, and 10, the largest players in audit, assurance, and tax. These cases present a high level of formalization and routinization, such as rules, procedures, and standardized job descriptions. The need for this is understandable, as these firms are dealing with many rules, regulations, and compliance levels, all to avoid risking penalties and damaging reputation. To make sure all employees respond in known ways, these cases all prefer collective socialization tactics over individual collective tactics by organizing standard welcoming days and standard packages of online trainings for all newcomers. Even though these cases present multiple hierarchical levels, employees feel that they can easily talk to one another. Hierarchical levels are more felt when it comes to decision-making processes, which is mostly done by high executives that are

part of top management teams. Finally, cross-functional interfaces are absent due to the organizational structure, there is a clear separation line between operational departments (e.g. Audit, Tax, Consulting). Solution 3 is similar to configuration 2, whereas one case occurred in both configurations (case 4). The difference is found in how the organization coordinates knowledge. Either cross-functional interfaces is absent (core condition) and job rotation is classified as ‘don’t care’ condition, or job rotation is absent (peripheral condition) and cross-functional interfaces is marked as ‘don’t care’. Literature suggested a strong relationship between coordination capabilities and socialization capabilities, based on how trust (the base of socialization capabilities) is developed through cooperative activities (the base of coordination capabilities). However, both pathways conclude that coordination capabilities should be absent. This would suggest that when all capabilities are present, this would potentially negatively influence absorptive capacity. However, configuration 5 (table 3) proposes all conditions to be present. Configuration 5 (table 3) proposes all conditions to be present. Almost all conditions are presented as a core condition, with the exception of participation in decision making with relatively high presence. This combination arose from case 6, a medium-size organization with a focus on finance consulting. When observing this case it shows that all conditions are indeed present, but the degree of presence varies. The use of formal systems, clearly defined roles and targets support the formalization and routinization of knowledge. However, as consultants are mostly deployed at clients, working manuals and instructions are limited. The questionnaire scores were just above the cross-over point and therefore systematically considered as more “in” than “out”. Taken all together, configuration 5 proposes all capabilities to be present, but an in-depth case analysis shows discrepancies. Moreover, the combination between high formalization and collective socialization tactics was also expected, given their tendency to reproduce the status quo and using hierarchy to get greater control over newcomers’ attitude and behavior (Ashforth et al., 1998). Hence, the following propositions are:

Proposition 2: High systems capabilities, high socialization capabilities, and high coordination capabilities negatively influences an organization’s ability to identify, transform, and apply external knowledge.

Proposition 3: The combination of high system capabilities, low participation in decision-making, and collective socialization tactics positively influences an organization’s ability to identify, transform, and apply external knowledge.

Configuration 4 (table 3) proposes core presence of routines, socialization capabilities, cross-functional interfaces, and possibilities for job rotation. On the other hand, it requires low formalization and no participation in decision making processes by subordinates, both as core conditions. As formalization and participation in decision-making is are both absent, this combination might suggest that formalization in terms of job descriptions and work manuals are present but subordinates have no influence on decision making nor can they make their own decisions without approval. This configuration arose from case 3 and 9, both large international employment and recruitment agencies. Both organizations make a clear distinction in job profiles, which explains the presence of routinization as tasks and targets are structured and clearly defined. Furthermore, both organizations show strong socialization capabilities through the creation of a shared ideology and a strong culture. This is evident from the many social internal events employees can attend, explaining the presence of cross-functional interfaces, as well as homogeneous profile of employees working in the organization. For example, open positions emphasize the search for a specific 'DNA'. The size of both organizations can explain the presence of job rotation opportunities. Literature confirms the positive effect between cross-functional interfaces, job rotation, and connectedness. Including low formalization might suggest that the level of trust positively influences cooperate activities and thus formalization becomes irrelevant when routinization is present. Routinization of tasks thus ensures that little attention is required in order to transform inputs to outputs. Even though routinization was found to negatively impact absorptive capacity (Jansen et al., 2005), this might suggest that routinization becomes salient when combined with other capabilities. This leads to the following proposition:

Proposition 4: The combination of cross-functional interfaces, job rotation, connectedness, routinization, and low formalization positively influences an organization's ability to identify, transform, and apply external knowledge.

5. Discussion

The first section will discuss the main contributions and overall findings of this study. The second part will go more in depth on the theoretical and managerial implications, followed by the limitations of this thesis. This chapter concludes with providing possible suggestions for future research.

5.1. Discussion

The overall goal of this study was to identify possible configurations of combinative capabilities for developing absorptive capacity at the organizational level. Subsequently, this thesis created a more holistic perspective on both concepts by using a configurational approach instead of traditional correlation methods. By focusing on systemic interactions between conditions, rather than in isolation, the results provided a more complete and accurate representation on how organizations can coordinate, systemize, and socialize their knowledge to reach a high level of absorptive capacity. This study therefore contributes to configurational analysis and absorptive capacity literature on several fronts.

First, this study showed that there is not a single determinant of combinative capabilities that by itself is sufficient to explain high-level absorptive capacity. This provides evidence that combinative capabilities must be jointly considered. Connectedness proves to be a necessary condition for high-level absorptive capacity and is consistently present as a key ingredient in all configurations.

Second, this study reveals five different pathways that can lead to a high level of absorptive capacity. This shows that different configurations of combinative capabilities can generate an equifinal outcome. The pathways consisted of different combinations of systems, coordination, and socialization capabilities. 74% of all involved organizations displaying a high of absorptive capacity can be explained by these five pathways. The overall solution consistency demonstrates that 98% of the cases are consistent with the outcome, which is above the recommended threshold of 0.8 (Ragin, 2008).

Third, this study concluded with four propositions that can be used for future reference. This thesis inductively uncovered the existence of multiple combinations leading to a high level of absorptive capacity, but does not exclude the possibility that more configurations are possible.

In sum, this thesis builds on and extends previous work on combinative capabilities and absorptive capacity, by going beyond conventional quantitative methods and advocating a

comparative approach, QCA. Specifically, this study extends the work of Jansen et al. (2005) by using the same variables and outcome of interest, but studying them as a whole by providing context through the use of cases. Directions for future research are to examine and test the generated propositions from this thesis.

5.2. Implications

In this section the theoretical and managerial objectives of this research are discussed. At first the theoretical implications are examined, after which the managerial implications will be addressed.

5.2.1. Theoretical implications

This thesis contributed to literature in multiple ways. Firstly, this study shows that comparative methodologies can enhance insights into a phenomena on which traditional approaches remained ambiguous. To the best of the author's knowledge a configurational approach has never been used for the concept of absorptive capacity, nor for combinative capabilities. The results of this study show that different configurations can explain an organization's absorptive capacity, which was up until now unknown. This enhances current theories by explaining how system-, coordination-, and socialization capabilities combine to explain a high level of absorptive capacity.

Secondly, this study contributes to academical knowledge by overcoming limitations associated with a traditional correlational approach. The use of fsQCA provided a valuable insight by looking at individual conditions in a coherent whole. This study complemented current academic knowledge by providing an overarching insight of combinative capabilities that used to be studied independently. It therefore treats individual conditions as an interactive whole rather than treating the individual conditions in isolation. As such, it resolves the problem that studying individual conditions in isolation does not resemble reality considering that organizations are likely to embody multiple conditions at the same time.

5.2.2. Managerial implications

Next to theoretical implication, the findings of this study are also relevant for organizations. The identification of different pathways that positively influence an organization's ability to explore, assimilate, and exploit new external knowledge offers valuable insights. The results of this study can help organizations to recompose their systematization, coordination, and

socialization of knowledge. This study provides an easy-to-use overview of configurations that positively effects absorptive capacity. Whereas previous research made useful suggestions regarding individual variables and its effect on absorptive capacity, combinative capabilities and its effect on absorptive capacity have only been researched in isolation and never as a whole. These high performance configurations can therefore have a large impact on the outcomes of absorptive capacity for a firm's competitive advantage, innovation and R&D, exploration/exploitation of knowledge, and overall performance (Volberda et al., 2010).

5.3.Limitations

The next section will discuss the limitations of this thesis. First, an empirical limitation of this study is that the number of conditions is relatively high for only ten cases. This leads to the possibility that contradictions influence the results of this study (Liebersohn, 2004; Marx, 2006). In other words, it might show effects where there are none. The robustness check also showed that the results are not completely robust. Even though reliability on the generated configurations proved to be sufficient, the overlap in the negated analysis was not sufficient. Ideally the negated analysis would not have any overlap with the high level absorptive capacity configurations and would have generated more possible configurations for the non-occurrence of absorptive capacity. However, transparency was ensured by guiding the reader through the QCA application process (Liebersohn, 2004). This has been done by providing a clear case selection, selecting conditions in a theoretically and empirically informed way, explaining how conditions are calibrated using theoretical knowledge, including all data before and after calibration, and returning to cases when discrepancies arose. Even though the findings provide new insights, they should be interpreted with care and not be considered entirely flawless.

Secondly, more determinants can be used to study the impact on absorptive capacity. This thesis focused on the combinative capabilities that influence absorptive capacity, thereby extending the work of Jansen et al. (2005) and partly the work of Van den Bosch et al. (1999). As such, the variables used for this study are proven to be key to absorptive capacity. Moreover, by using a holistic approach this study goes beyond previous work of aforementioned authors.

Finally, one can argue that the sample of this study is not completely homogenous, since the number of employees varies from 30 to 5000. A potential limitation is that smaller organizations are more limited in exhibiting coordination capabilities due to the organizational size. Different interpretations could potentially influence the responses in the questionnaire. For example, the interpretation of job rotation and cross-functional interfaces might differ

between an organization of 30 employees compared to an organization of 5000 employees. Two cases consisted of a small number of employees, but did display both job rotation and cross-functional interfaces (but significantly lower compared to other cases). The possibility to return to cases during the analysis was used to minimize this limitation. Both smaller cases were asked how they interpreted job rotation and cross-functional interfaces and to give examples on how this was embedded in the organization. The interpretation and explanation of both cases were in line with the theoretical assumptions as described in the literature review. Job rotation was interpreted as the change in assignments but without a formal change in title or department. Both cases are involved in consultancy assignments and change assignment at least once a year, explaining similar scores to the question “Employees in our unit are regularly rotated between different functions”. The second question related to job rotation, “Employees in our unit are regularly rotated between different subunits”, was scored with the lowest skill item available. During assignments both cases find that they frequently work together with other colleagues with different backgrounds (cross-functional interfaces). One case also frequently engages in meetings designed to exchange new knowledge in terms of concepts and ideas, explaining a score that was found similar in other cases. The other case did not engage in these type of meetings, explaining the lowest score compared to the other cases. All in all, these insights did not prove the need to define different measurements or to drop both cases entirely. This information was used to provide more insights into the first configuration (table 3) and to support the development of proposition 1.

5.4. Future directions

Ever since the publication of Jansen et al. (2005) article on combinative capabilities and absorptive capacity, both constructs have remained a popular topic of investigation. Although literature on the concept of absorptive capacity is extensive there are still promising areas for future research. The outcome of this study has illustrated the potential of configurational analysis on combinative capabilities and absorptive capacity. However, as discussed in the limitations of this study, the results of this study should be interpreted due to the size of the sample in combination with the number of conditions used. Further research is therefore needed, preferably with a large sample size to reduce the possibility of contradictions.

Another suggestion for future research would be to test the propositions of this thesis. The propositions were developed by the outcome of the configurations, theoretical knowledge, and by in-depth knowledge of all cases. As the configurations showed to be not completely robust,

the propositions primarily focused on combinations of combinative capabilities that were unexpected, surprising, or contradicting to earlier studies rather than proposing to test full configurations.

References

- Adler, P., & Borys, B. (1996). Two types of bureaucracy: Enabling and coercive. *Administrative Science Quarterly*, 41(1), 61-89.
- Aiken, M., & Hage, J. (1968). Organizational interdependence and intra-organizational structure. *American Sociological Review*, 33(6), 912-912.
- Amit, R., & Schoemaker, P. J. H. (1993). Strategic assets and organizational rent. *Strategic Management Journal*, 14(1), 33.
- Ashforth, B. E., Saks, A. M., & Lee, R. T. (1998). Socialization and newcomer adjustment: The role of organizational context. *Human relations*, 51(7), 897-926.
- Bodewes, W. (2002). Formalization and innovation revisited. *European Journal of Innovation Management*, 5(4), 214-223.
- Brown, S. L., & Eisenhardt, K. M. (1995). Product development: Past research, present findings, and future directions. *Academy of Management Review*, 20(2), 343-378.
- Camerer, C., & Vepsäläinen, A. (1988). The economic efficiency of corporate culture. *Strategic Management Journal*, 9(S1), 115-126.
- Campion, M., Cheraskin, L., & Stevens, M. (1994). Career-Related antecedents and outcomes of job rotation. *The Academy of Management Journal*, 37(6), 1518-1542.
- Chen, C. J., & Huang, J. W. (2007). How organizational climate and structure affect knowledge management—The social interaction perspective. *International journal of information management*, 27(2), 104-118.
- Chesbrough, H. (2003). *Open innovation: The new imperative for creating and profiting from technology*. Boston, MA: Harvard Business School Press.
- Cohen, M. D., & Bacdayan, P. (1994). Organizational routines are stored as procedural memory: Evidence from a laboratory study. *Organization Science*, 5(4), 554-568.
- Cohen, W., & Levinthal, D. (1990). Absorptive-capacity - a new perspective on learning and innovation. *Administrative Science Quarterly*, 35(1), 128-152.
- De Boer, M., Van den Bosch, F., & Volberda, H. (1999). Managing organizational knowledge integration in the emerging multimedia complex. *Journal of Management Studies*, 36(3), 379-398.
- Denison, D. R., Hart, S. L., & Kahn, J. A. (1996). From chimneys to cross-functional teams: Developing and validating a diagnostic model. *Academy of Management journal*, 39(4), 1005-1023.
- Deshpande, R., & Zaltman, G. (1982). Factors affecting the use of market research information: A path analysis. *Journal of Marketing Research*, 19(1), 14-14.

- Dewar, R., Whetten, D., & Boje, D. (1980). An examination of the reliability and validity of the Aiken and Hage scales of centralization, formalization, and task routineness. *Administrative Science Quarterly*, 25(1), 120-120.
- Easterby-Smith, M., Thorpe, R., & Jackson, P. (2015). *Management and business research* (Fifth edition. ed.). Los Angeles: SAGE.
- Eisenhardt, K. M., & Martin, J. A. (2000). Dynamic capabilities: What are they? *Strategic Management Journal*, 21(10/11), 1105-1121.
- Fiss, P. C. (2007). A set-theoretic approach to organizational configurations. *Academy of Management Review*, 32(4), 1180-1198.
- Fiss, P. C. (2011). Building better causal theories: A fuzzy set approach to typologies in organization research. *Academy of Management Journal*, 54(2), 393-420.
- Fiss, P., Cambré, B., & Marx, A. (2013). *Configurational theory and methods in organizational research* (Research in the sociology of organizations, v. 38). Bingley, United Kingdom: Emerald.
- Galbraith, J. (1973). *Designing complex organizations* (Addison-Wesley series on organization development). Reading, Mass.: Addison-Wesley
- Galunic, D., & Rodan, S. (1998). Resource recombinations in the firm: Knowledge structures and the potential for schumpeterian innovation. *Strategic Management Journal*, 19(12), 1193-1201.
- Grandori, A., & Furnari, S. (2008). A chemistry of organization: Combinatory analysis and design. *Organization Studies*, 29(3), 459.
- Grant, R. (1996). Toward a knowledge-based theory of the firm. *Strategic Management Journal*, 17, 109.
- Greckhamer, T., Misangyi, V., Elms, H., & Lacey, R. (2008). Using qualitative comparative analysis in strategic management research: An examination of combinations of industry, corporate, and business-unit effects. *Organizational Research Methods*, 11(4), 695-695.
- Greckhamer, T., Furnari, S., Fiss, P., & Aguilera, R. (2018). Studying configurations with qualitative comparative analysis: Best practices in strategy and organization research. *Strategic Organization*
- Gupta, A., & Govindarajan, V. (2000). Knowledge flows within multinational corporations. *Strategic Management Journal*, 21(4), 473-496.
- Hage, J., & Aiken, M. (1967). Relationship of centralization to other structural properties. *Administrative Science Quarterly*, 12(1), 72-72.
- Hage, J., & Aiken, M. (1969). Routine technology, social structure, and organization goals. *Administrative Science Quarterly*, 14(3), 366-376

- Hall, R., Johnson, N., & Haas, J. (1967). Organizational size, complexity, and formalization. *American Sociological Review*, 32(6)
- Henderson, R., & Cockburn, I. (1994). Measuring competence? Exploring firm effects in pharmaceutical research. *Strategic Management Journal*, 15(S1), 63-84.
- Jansen, J., Van den Bosch, F., & Volberda, H. (2005). Managing potential and realized absorptive capacity: How do organizational antecedents matter? *Academy of Management Journal*, 48(6), 999-1015.
- Jaworski, B., & Kohli, A. (1993). Market orientation: Antecedents and consequences. *Journal of Marketing*, 57(3), 53-53.
- Jones, G. (1986). Socialization tactics, self-Efficacy, and newcomers' adjustments to organizations. *Academy of Management Journal*, 29(2), 262-279.
- Khandwalla, P.N. (1977). The chemistry of effective management. *The Journal for Decision Makers*, 2(2), 151-164.
- Kedia, B. L., & Bhagat, R. S. (1988). Cultural constraints on transfer of technology across nations: Implications for research in international and comparative management. *The Academy of Management Review*, 13(4), 559-571.
- Kogut, B., & Zander, U. (1992). Knowledge of the firm, combinative capabilities, and the replication of technology. *Organization Science*, 3(3), 383-397.
- Landis, J., & Koch, G. (1977). The Measurement of Observer Agreement for Categorical Data. *Biometrics*, 33(1), 159-174.
- Lane, P. J., Koka, B. R., & Pathak, S. (2006). The reification of absorptive capacity: A critical review and rejuvenation of the construct. *Academy of Management Review*, 31(4), 833-863.
- Lane, P., Salk, J., & Lyles, M. (2001). Absorptive capacity, learning, and performance in international joint ventures. *Strategic Management Journal*, 22(12), 1139-1161.
- Lichtenthaler, U. (2009). Absorptive capacity, environmental turbulence, and the complementarity of organizational learning processes. *Academy of Management Journal*, 52(4), 822-822.
- Lieberson, S. (2004). Comments on the Use and Utility of QCA. *Qualitative Methods*, 2(2), 13-14.
- Lin, X., & Germain, R. (2003). Organizational structure, context, customer orientation, and performance: Lessons from Chinese state-owned enterprises. *Strategic Management Journal*, 24(11), 1131-1151.
- Madsen, T. L., Mosakowski, E., & Zaheer, S. (2003). Knowledge retention and personnel mobility: The nondisruptive effects of inflows of experience. *Organization Science*, 14(2), 173-191.

- Marx, A. (2006). Towards more robust model specification in QCA results from a methodological experiment. American Sociological Association, Philadelphia, PA.
- McGrath, R. G. (2001). Exploratory learning, innovative capacity, and managerial oversight. *Academy of Management Journal*, 44(1), 118-131.
- Miller, D. (1982). Evolution and revolution: A quantum view of structural change in organizations. *The Journal of Management Studies*, 19(2), 131-131.
- Miller, D. (2017). Challenging trends in configuration research: Where are the configurations? *Strategic Organization*
- Mintzberg, H. (1979). *The structuring of organizations : A synthesis of the research (Theory of management policy series)*. Englewood Cliffs, NJ: Prentice-Hall.
- Misangyi, V. F., Greckhamer, T., Furnari, S., Fiss, P. C., Crilly, D., et al. (2016). Embracing Causal Complexity: The Emergence of a Neo-Configurational Perspective. *Journal of Management*, 43(1): 255–282.
- Nahapiet, J., & Ghoshal, S. (1998). Social capital, intellectual capital, and the organizational advantage. *Academy of Management. the Academy of Management Review*, 23(2), 242-266.
- Nonaka, I. (1994). A dynamic theory of organizational knowledge creation. *Organization Science*, 5(1), 14-37.
- Olson, E. M., Walker Jr, O. C., & Ruekert, R. W. (1995). Organizing for effective new product development: The moderating role of product innovativeness. *The Journal of Marketing*, 48-62.
- Ortega, J. (2001). Job rotation as a learning mechanism. *Management Science*, 47(10), 1361-1370
- Perrow, C. (1967). A framework for the comparative analysis of organizations. *American Sociological Review*, 32(1), 194-194.
- Putnam, R. (2013). *The prosperous community: social capital and public life*. The American Prospect, 13.
- Ragin, C. (2000). *Fuzzy-set social science*. Chicago, IL: University of Chicago Press.
- Ragin, C. C. (2008). *Redesigning social inquiry: Fuzzy sets and beyond*. Chicago: University of Chicago Press.
- Raisch, S., & Birkinshaw, J. (2008). Organizational ambidexterity: Antecedents, outcomes, and moderators. *Journal of Management*, 34(3).
- Rihoux, B., Ragin, C. C., & Sage Publications. (2009). *Configurational comparative methods: Qualitative comparative analysis (QCA) and related techniques*. Thousand Oaks: Sage.

- Rindfleisch, A., & Moorman, C. (2001). The acquisition and utilization of information in new product alliances: A strength-of-ties perspective. *Journal of marketing*, 65(2), 1-18.
- Rowley, T., Behrens, D., & Krackhardt, D. (2000). Redundant governance structures: An analysis of structural and relational embeddedness in the steel and semiconductor industries. *Strategic management journal*, 21(3), 369-386.
- Schneider, C., & Wagemann, C. (2012). *Set-theoretic methods for the social sciences : A guide to qualitative comparative analysis (Strategies for social inquiry)*. Cambridge: Cambridge University Press.
- Sethi, R., Smith, D. C., & Park, C. W. (2001). Cross-functional product development teams, creativity, and the innovativeness of new consumer products. *Journal of marketing research*, 38(1), 73-85.
- Spender, J., & Grant, R. (1996). Knowledge and the firm: Overview. *Strategic Management Journal*, 17 Spi 2, 5-9.
- Teece, D., Pisano, G., & Shuen, A. (1997). Dynamic capabilities and strategic management. *Strategic Management Journal*, 18(7), 509-533.
- Todorova, G., & Durisin, B. (2007). Absorptive capacity: Valuing a reconceptualization. *Academy of Management Review*, 32(3), 774-786.
- Tsai, W. (2001). Knowledge transfer in intraorganizational networks: Effects of network position and absorptive capacity on business unit innovation and performance. *Academy of Management Journal*, 44(5), 996-1004.
- Van de Ven, A. H., & Delbecq, A. L. (1974). A task contingent model of work-unit structure. *Administrative Science Quarterly*, 183-197.
- Van den Bosch, F., Volberda, H., & de Boer, M. (1999). Coevolution of firm absorptive capacity and knowledge environment: Organizational forms and combinative capabilities. *Organization Science*, 10(5), 551-568.
- Van Maanen, J., & Schein, E. H. 1979. Towards a theory of organizational socialization. In B. M. Staw (Ed.), *Research in Organizational Behaviour*, vol.1: 209-264. Greenwich, Conn.: JAI Press.
- Volberda, H. W., Foss, N. J., & Lyles, M. A. (2010). Absorbing the concept of absorptive capacity: How to realize its potential in the organization field. *Organization Science*, 21(4), 931-951.
- Withey, M., Daft, R., & Cooper, W. (1983). Measures of Perrow's work unit technology : An empirical assessment and a new scale. *Academy of Management Journal*, 26(1), 45-45
- Woodside, A. G. (2013). Moving beyond multiple regression analysis to algorithms: Calling for adoption of a paradigm shift from symmetric to asymmetric thinking in data analysis and crafting theory. *Journal of Business Research*, 66(4), 463.

Zahra, S., & George, G. (2002). Absorptive capacity: A review, reconceptualization, and extension. *Academy of Management Review*, 27(2), 185-203.

Zander, U., & Kogut, B. (1995). Knowledge and the speed of the transfer and imitation of organizational capabilities: An empirical test. *Organization Science*, 6(1), 76-92.

Appendix I: Descriptive Statistics

Descriptive statistics before calibration						
Variable	Mean	Std. Dev.	Minimum	Maximum	N Cases	Missing
Cross-functional interfaces	4.423	1.60851	1.80	7.00	10	0
Job rotation	4.319	1.14341	2.79	6.10	10	0
Participation in decision-making	3.698	1.29034	1.93	5.87	10	0
Formalization	4.043	1.23035	1.87	5.93	10	0
Routization	4.303	0.69948	2.71	5.00	10	0
Socialization tactics	4.650	0.8756	3.05	6.2	10	0
Connectedness	5.991	0.83953	4.20	7.00	10	0
Absorptive capacity	5.268	0.65435	4.06	6.46	10	0

Descriptive statistics after calibration						
Variable	Mean	Std. Dev.	Minimum	Maximum	N Cases	Missing
Cross-functional interfaces	0.570	0.283302	0.1	0.95	10	0
Job rotation	0.558	0.2235084	0.23	0.89	10	0
Participation in decision-making	0.432	0.2565463	0.11	0.87	10	0
Formalization	0.511	0.2342409	0.11	0.87	10	0
Routization	0.575	0.1520033	0.22	0.73	10	0
Socialization tactics	0.638	0.1722092	0.28	0.9	10	0
Connectedness	0.855	0.1118258	0.55	0.95	10	0
Absorptive capacity	0.763	0.1064002	0.51	0.92	10	0

Appendix II: Truth table

CFI	JOBR	PART	FORM	ROUT	SOCTAC	CONN	Number	Raw consist	PRI consist	SYM consist
0	1	0	1	1	1	1	3 (30%)	1,000000	1,000000	1,000000
1	1	0	0	1	1	1	2 (50%)	1,000000	1,000000	1,000000
1	1	1	1	1	1	1	1 (60%)	1,000000	1,000000	1,000000
1	0	1	0	0	0	1	1 (70%)	1,000000	1,000000	1,000000
1	0	0	1	1	1	1	1 (80%)	1,000000	1,000000	1,000000
0	0	1	0	0	0	1	1 (90%)	0,948113	0,476190	1,000000
0	0	0	1	1	1	1	1 (100%)	1,000000	1,000000	1,000000
1	1	1	1	1	1	0	0 (100%)			
1	1	1	1	1	0	1	0 (100%)			
1	1	1	1	1	0	0	0 (100%)			
1	1	1	1	0	1	1	0 (100%)			
1	1	1	1	0	0	1	0 (100%)			
1	1	1	1	0	0	0	0 (100%)			
1	1	1	0	1	1	1	0 (100%)			
1	1	1	0	1	0	1	0 (100%)			
1	1	1	0	1	0	0	0 (100%)			
1	1	1	0	0	1	1	0 (100%)			
1	1	1	0	0	0	1	0 (100%)			
1	1	1	0	0	0	0	0 (100%)			
1	1	0	1	1	1	1	0 (100%)			
1	1	0	1	1	1	0	0 (100%)			
1	1	0	1	1	0	0	0 (100%)			
1	1	0	1	0	1	1	0 (100%)			
1	1	0	1	0	1	0	0 (100%)			
1	1	0	1	0	0	1	0 (100%)			
1	1	0	1	0	0	0	0 (100%)			
1	1	0	0	1	1	0	0 (100%)			
1	1	0	0	1	0	1	0 (100%)			
1	1	0	0	0	1	0	0 (100%)			
1	1	0	0	0	0	1	0 (100%)			
1	1	0	0	0	0	0	0 (100%)			
1	0	1	1	1	1	1	0 (100%)			
1	0	1	1	1	1	0	0 (100%)			
1	0	1	1	1	0	1	0 (100%)			
1	0	1	1	1	0	0	0 (100%)			

1	0	1	1	0	1	1	0 (100%)			
1	0	1	1	0	1	0	0 (100%)			
1	0	1	1	0	0	1	0 (100%)			
1	0	1	1	0	0	0	0 (100%)			
1	0	1	0	1	1	1	0 (100%)			
1	0	1	0	1	1	0	0 (100%)			
1	0	1	0	1	0	1	0 (100%)			
1	0	1	0	1	0	0	0 (100%)			
1	0	1	0	0	1	1	0 (100%)			
1	0	1	0	0	0	1	0 (100%)			
1	0	1	0	0	0	0	0 (100%)			
1	0	0	1	1	1	0	0 (100%)			
1	0	0	1	1	0	0	0 (100%)			
1	0	0	1	0	1	1	0 (100%)			
1	0	0	1	0	1	0	0 (100%)			
1	0	0	1	0	0	0	0 (100%)			
1	0	0	1	0	0	0	0 (100%)			
1	0	0	0	1	1	1	0 (100%)			
1	0	0	0	1	1	0	0 (100%)			
1	0	0	0	1	0	1	0 (100%)			
1	0	0	0	1	0	0	0 (100%)			
1	0	0	0	0	1	1	0 (100%)			
1	0	0	0	0	1	0	0 (100%)			
1	0	0	0	0	0	1	0 (100%)			
1	0	0	0	0	0	0	0 (100%)			
0	1	1	1	1	1	1	0 (100%)			
0	1	1	1	1	1	1	0 (100%)			
0	1	1	1	1	1	0	0 (100%)			
0	1	1	1	1	1	0	0 (100%)			
0	1	1	1	0	1	1	0 (100%)			
0	1	1	1	0	1	0	0 (100%)			
0	1	1	1	0	0	1	0 (100%)			
0	1	1	1	0	0	0	0 (100%)			
0	1	1	0	1	1	1	0 (100%)			
0	1	1	0	1	1	0	0 (100%)			
0	1	1	0	0	0	0	0 (100%)			
0	1	0	1	1	1	0	0 (100%)			
0	1	0	1	1	0	1	0 (100%)			
0	1	0	1	1	0	0	0 (100%)			

0	1	0	1	0	1	1	0 (100%)			
0	1	0	1	0	1	0	0 (100%)			
0	1	0	1	0	0	1	0 (100%)			
0	1	0	1	0	0	0	0 (100%)			
0	1	0	0	1	1	1	0 (100%)			
0	1	0	0	1	1	0	0 (100%)			
0	1	0	0	1	0	1	0 (100%)			
0	1	0	0	1	0	0	0 (100%)			
0	1	0	0	0	1	1	0 (100%)			
0	1	0	0	0	1	0	0 (100%)			
0	1	0	0	0	0	1	0 (100%)			
0	1	0	0	0	0	1	0 (100%)			
0	1	0	0	0	0	0	0 (100%)			
0	0	1	1	1	1	1	0 (100%)			
0	0	1	1	1	1	0	0 (100%)			
0	0	1	1	1	0	0	0 (100%)			
0	0	1	1	0	1	1	0 (100%)			
0	0	1	1	0	1	0	0 (100%)			
0	0	1	1	0	0	1	0 (100%)			
0	0	1	1	0	0	0	0 (100%)			
0	0	1	0	1	1	1	0 (100%)			
0	0	1	0	1	1	0	0 (100%)			
0	0	1	0	1	0	1	0 (100%)			
0	0	1	0	1	0	0	0 (100%)			
0	0	1	0	0	1	1	0 (100%)			
0	0	1	0	0	0	1	0 (100%)			
0	0	0	1	1	1	0	0 (100%)			
0	0	0	1	1	0	0	0 (100%)			
0	0	0	1	0	0	1	0 (100%)			
0	0	0	1	0	0	0	0 (100%)			
0	0	0	0	1	1	1	0 (100%)			
0	0	0	0	1	1	0	0 (100%)			
0	0	0	0	1	0	0	0 (100%)			
0	0	0	0	1	0	1	0 (100%)			
0	0	0	0	0	1	1	0 (100%)			
0	0	0	0	0	1	0	0 (100%)			
0	0	0	0	0	0	1	0 (100%)			
0	0	0	0	0	0	0	1 (100%)			
0	0	0	0	0	0	0	0 (100%)			

Appendix III: Survey (in Dutch)

Algemene vragen

- Wat is de naam van uw organisatie?
- Wat is uw functie binnen de organisatie?
- Hoelang bent u in dienst bij de organisatie?
- Hoeveel medewerkers telt uw organisatie?
- Is uw organisatie centraal of decentraal ingericht?

Dynamiek

- Veranderingen in onze markt zijn zeer intens
- Klanten in onze markt vragen regelmatig compleet nieuwe producten
- In de markt waarin wij actief zijn, vinden continu veranderingen plaats
- Ons aanbod van diensten aan onze klanten verandert doorlopend
- In onze markt zijn er snelle en veelvuldige fluctuaties in omvang van te leveren producten
- In de markt waarin wij opereren, verandert iedere dag wel wat

Coördinatie vaardigheden

Cross-functionele interfaces

- In ons bedrijf worden plannen en ideeën met verschillende afdelingen gecommuniceerd
- Ons management vereist periodieke afdelingsoverschrijdende vergaderingen om nieuwe ontwikkelingen, problemen en prestaties uit te wisselen

Job rotatie

- In ons bedrijf roteren (wisselen) medewerkers regelmatig tussen verschillende functies
- In ons bedrijf roteren (wisselen) medewerkers regelmatig tussen verschillende afdelingen

Participatie in besluitvorming

- Ik neem deel aan besluiten om nieuwe producten/diensten toe te voegen aan ons assortiment
- Ik neem deel aan besluiten om bestaande producten/diensten verder uit te breiden
- Ik neem deel aan besluiten om bestaande producten/diensten te stoppen/verwijderen uit het assortiment

Systeemvaardigheden

Formalisatie

- In ons bedrijf kunnen medewerkers zelf beslissingen nemen zonder iemand anders te raadplegen
- In ons bedrijf hanteren werknemers hun eigen regels over hoe ze werken
- In ons bedrijf worden werknemers in de gaten gehouden dat ze de regels niet overtreden

Routines

- Mijn taken zijn vrijwel hetzelfde van dag tot dag
- Er is een duidelijke stappenvolgorde bij de uitvoering van mijn werk
- In ons bedrijf doen werknemers meestal hetzelfde werk op dezelfde manier

Socialisatievaardigheden

Socialisatie

- In de afgelopen zes maanden ben ik intensief betrokken geweest bij nieuwkomers in onze organisatie in gemeenschappelijke, werk gerelateerde trainingsactiviteiten
- Ons bedrijf plaatst alle nieuwkomers in dezelfde reeks leerervaringen

In ons bedrijf zien ervaren werknemers het adviseren of trainen van nieuwkomers als een van hun belangrijkste taken
Ik heb grotendeels zelf uit moeten zoeken wat mijn rol en taken waren

Verbondenheid

In ons bedrijf is het gemakkelijk om met vrijwel iedereen te praten, ongeacht rang of functie
In ons bedrijf is er volop gelegenheid voor informele gesprekjes in de wandelgangen met mensen van verschillende afdelingen

Absorptievermogen

Acquisitie

In ons bedrijf is er regelmatig contact met het hoofdkwartier om nieuwe kennis te verwerven
In ons bedrijf bezoeken werknemers regelmatig andere vestigingen van ons bedrijf
Ons bedrijf verzamelt informatie over onze branche of informele wijze (bijv. lunchen met zakelijke relaties, gesprekken met handelspartners, etc.)
Andere vestigingen van ons bedrijf worden nauwelijks bezocht
Ons bedrijf organiseert periodiek speciale ontmoetingen met klanten of derden om nieuwe kennis op te doen
In ons bedrijf benaderen werknemers regelmatig externe partijen zoals accountants, consultants of belastingconsulenten

Assimilatie

Ons bedrijf is traag in het herkennen van verschuivingen in onze markt (bijvoorbeeld concurrentie, regelgeving, demografie)
In ons bedrijf worden nieuwe mogelijkheden om onze klanten van dienst te zijn snel opgepikt
Ons bedrijf kan marktbehoeften snel analyseren en interpreteren

Transformatie

Ons bedrijf houdt regelmatig rekening met de gevolgen van veranderende marktbehoeften op het gebied van nieuwe producten en diensten
In ons bedrijf registreren en bewaren werknemers nieuwe kennis voor toekomstig gebruik
Ons bedrijf erkent snel het nut van nieuwe externe kennis boven bestaande kennis
In ons bedrijf worden nauwelijks ervaringen uit de praktijk gedeeld
Ons bedrijf grijpt moeizaam de kansen van nieuwe externe kennis aan
In ons bedrijf komen we regelmatig bijeen om de consequenties van markttrends en de ontwikkeling van nieuwe producten te bespreken

Exploitatie

In ons bedrijf is het duidelijk hoe activiteiten moeten worden uitgevoerd
In ons bedrijf worden klachten van klanten nauwelijks opgepikt
Ons bedrijf heeft een duidelijke verdeling van rollen en verantwoordelijkheden
Ons bedrijf kijkt voortdurend hoe we kennis beter kunnen benutten
Ons bedrijf heeft moeite met het implementeren van nieuwe producten en diensten
Ons bedrijf heeft een gemeenschappelijke taal met betrekking tot onze producten en diensten

Appendix IV: Parsimonious solution negated analysis

Parsimonious solution: Negated analysis

1. ~cross-functional interfaces * ~socialization tactics
2. ~cross-functional interfaces * ~routinization
3. ~cross-functional interfaces * ~formalization
4. ~cross-functional interfaces * participation in decision-making

Note:

The multiplication sign (*) can be read as ‘and’ (A and B) and the tilde (~) illustrates a negation (for example: A and B but not C).