

# **Exploration of ambidexterity among SMEs in the Dutch Maritime sector**

How SMEs align exploitation of existing products and pursue  
exploration of product innovations

**Master of Science in Management of Technology**

MoT2910 MSc. Thesis Project  
Delft, June 2018  
Maarten Dubbeld 4057287

[ This page intentionally left blank ]

# **Exploration of ambidexterity among SMEs in the Dutch Maritime sector**

How SMEs align exploitation of existing products and pursue  
exploration of product innovations

**Maarten Dubbeld, 4057287, 11 June 2018**

**to obtain the degree of Master of Science in Management of Technology  
at the Delft University of Technology**

**Faculty of Technology, Policy and Management, Delft University of Technology,  
Jaffalaan 5, 2628 BX Delft, the Netherlands**

*It is not the strongest species that survive, nor the most intelligent,  
but the one that is most responsive to change.*

**Charles Darwin**

To be defended in public on June 25<sup>th</sup>, 2018

## **Graduation committee**

Chairperson: Prof. dr. C.P. (Cees) van Beers, Economics of Technology and Innovation  
First Supervisor: Dr. ing. V.E. (Victor) Scholten, Economics of Technology and Innovation  
Second Supervisor: Dr. J.H.R. (Ron) van Duin, Transport and logistics

[ This page intentionally left blank ]

## Preface

This master thesis is the end of my long journey towards completing my master's degree. I learned the value of a practical degree early on and during my vocational education I learned the importance of knowing the fundamentals of a profession. The analytical aspects of my Bachelor and my personal characteristics of being persistence, helped me to become the ambitious professional I am today. However, I learned to *'outdo yourself'* when I started working at the Rotterdam University. Being part of a team of professionals, who were able to make the programme from good to great, motivated me to start a Master of Science at TU Delft. For this I'm my former colleagues forever grateful. I started this program next to my fulltime job of teaching. Without the support of my colleagues at the HR during the MoT master, I would have never finished this programme as a part-time student.

This master's thesis is written in a period of ten months, next to my work as R&D manager at an SME. Here I experienced the importance of balancing between long term innovativeness and short-term sales of products. This thesis is the result of a multiple case study research among other SMEs and I would like to thank all interviewees for their time and contribution to this study.

I would like to speak my gratitude to my supervisors for their assistance during the writing of this thesis. I am grateful for the feedback and sessions we had to discuss my work. Without this I wouldn't have come this far.

Finally, I want to speak special gratitude towards Florian, my friends, family and colleagues who supported me in their own way.

Maarten Dubbeld

Delft, 11 June 2018

[ This page intentionally left blank ]

## Executive summary

Small and Medium-sized Enterprises (SMEs) struggle during a crisis period and bankruptcies occur. The European Union investigated such insolvencies and advised to invest in SMEs' innovation and quality of products. During a crisis however, SMEs change their strategy and tend to focus upon short-term profit in order to survive. How SMEs balance between these two contradicting strategies is seldom addressed. Therefore, this study explores how SMEs align their organisation upon short term exploitation of current products and explore long term product innovations simultaneously.

The two strategies have different characteristics. Pursuing exploitation make companies focus upon efficiency, process improvements, existing technologies and current customers. On the other hand, pursuing exploration make companies focus upon long term innovations, investments in knowledge absorption, adaption to new technologies and emerging markets. Academic literature defined balancing between exploitation and exploration within a company, as Organisational Ambidexterity.

Research on organisational ambidexterity mainly focusses on large companies and how they pursue ambidexterity. However, compared to large companies, SMEs have a practical problem since they have limited amounts of resources. Therefore this study aims to identify what is important, when SMEs explore product innovations without having to compromise their current production.

In a cases study research, ambidexterity in SMEs is measured. Based upon the Literature review four key concepts of ambidexterity are defined: Organisational structure, Absorptive capacity, Managerial behaviour and External environment. Indicators of ambidexterity, as used in other studies to large organisations, are used as measurement variables in the interview protocol. To conduct semi-structured interviews on location, a reasonable geographic proximity was chosen to demarcate this study. Access to SME executives, responsible for innovations and/or operations demarcated this study further to the Dutch Maritime sector. In total eleven semi-structured interviews have been conducted in nine companies. Fifteen statements with indicators of ambidexterity, measure how companies balance between exploitation, hybrid or explorative alignment.

The results show that a majority of six out of nine SMEs use an ambidextrous strategy. Three factors of ambidexterity are identified as relevant when SMEs align their ambidextrous organisation. First knowledge sharing is found to be essential for SMEs pursuing exploration, since they adapt to new technologies and create market changes. Second commonality among management team (MT) is important for SMEs who balance towards exploitation. To improve their efficiency, the company needs to align conflicting activities and commonality among the MT makes it more easily. Third market dynamism is found to have a moderating effect upon exploration. It was found that six of the nine cases aim to offer more to their existing customers, however they avoid to balance towards the other side of market and increase competitiveness. These cases want to balance in the middle between market dynamism and competitiveness, this explains why the majority uses ambidexterity.

The findings of this study contribute to the exploration of how SMEs align their organisation upon ambidexterity. SMEs balancing towards exploitation are associated with commonality in their MT and knowledge sharing is important when balancing towards exploration. Finally, the moderating effect of market dynamism upon exploration, as found in literature, is also found in the selected SMEs and clarifies why a majority of SMEs align their organisation upon ambidexterity.

*Keywords: Ambidexterity, SME, exploitation and exploration, Absorptive Capacity, Top Management Team.*

## Table of contents

Preface	v
Executive summary .....	vii
Table of contents.....	viii
List of figures & tables.....	x
1. Introduction .....	1
2. Research design .....	3
2.1. Problem statement.....	3
2.2. European SMEs and the Dutch Maritime sector .....	4
2.3. Theoretical research background.....	5
2.4. Theories in relation to concepts of ambidexterity .....	6
2.5. Research objective .....	7
2.6. Research questions.....	8
3. Organisational Ambidexterity literature review.....	10
3.1. Exploitative characteristics.....	11
3.2. Explorative characteristics.....	12
3.3. Ambidextrous behaviour .....	13
3.4. Key concepts in theories about ambidexterity .....	14
3.5. Ambidexterity in SMEs .....	18
3.6. Propositions.....	19
4. Research methodology .....	22
4.1. Research strategy .....	23
4.2. Research framework .....	24
4.3. Case selection.....	25
4.4. Reliability and validity of semi-structured interview .....	27
4.5. Data collection.....	27
5. Operationalisation of interview questions .....	29
5.1. Organisational structure.....	29
5.2. Knowledge inflows .....	32
5.3. Managerial behaviour of TMT .....	34
5.4. External environment.....	36
6. Cross-case analysis of multiple SMEs .....	38
6.1. Score description .....	39
6.2. Organisational structure.....	39
6.3. Knowledge sharing .....	40



6.4.	MT behaviour .....	41
6.5.	External environment.....	42
6.6.	Case conclusions.....	43
7.	Conclusion and Discussion.....	46
7.1.	Reflection upon propositions aspects .....	46
7.2.	Research questions.....	49
7.3.	Practical implications.....	52
7.4.	Research limitations .....	52
7.5.	Conclusion and future work .....	53
7.6.	Reflection.....	54
Bibliography		55
Appendix I.	Case descriptions .....	59
	Case A .....	59
	Case B .....	60
	Case C .....	61
	Case D.....	62
	Case E .....	63
	Case F.....	64
	Case G.....	66
	Case H.....	67
	Case I .....	68
Appendix II.	Interview protocol .....	70
Appendix II.	Original and reverse coded case scores .....	77

List of figures & tables

Figure 1. Conceptual framework: Four key concepts and their archetypes. .... 22

Figure 2. Research framework: four key concepts and three ambidextrous alignments for evaluation of multiple cases..... 24

Table 1. Theoretical perspective and four concepts ..... 7

Table 2: Reverse coded scores of exploitative, explorative and hybrid alignment in color..... 38

Table 3: Case scores of statement Q11 and Q12. .... 46

Table 4: Case scores of innovation, formalisation and knowledge flows. .... 47

Table 5: Statement thirteen commonality among company goals versus having no clear vision..... 48

Table 6: External environment of industry and customers..... 48

Table 6: Noticeable indicators of ambidexterity: Innovation, Connectedness, Market dynamism..... 50

Table 7: Case A-C Original and reverse scores and exploitative, explorative and hybrid approaches of individual scores..... 77

Table 8: Case D-E Original and reverse case scores and exploitative, explorative and hybrid approaches of individual scores. .... 78

Table 9: Case F-I Original and reverse case scores and exploitative, explorative and hybrid approaches of individual scores. .... 79

## 1. Introduction

The 2008/2009 economic and financial crisis made Small and Medium-sized Enterprises (SMEs) struggle. In Europe SMEs had to change their strategy to survive the crisis. On one hand companies made short term efficiency improvements and strategically focused upon exploitation. On the other hand, companies tend to be innovative and adopt changes in order to make a difference. These two activities have been explained by Tushman and O'Reilly (1996); the first is exploit the existing strategy and the second is to explore an uncertain future. Using both strategies as hybrid strategy has been defined in academic literature as *Organisational Ambidexterity*. In more recent studies to ambidexterity, the role of executives in SMEs is identified as important (Lubatkin, Simsek, Ling, & Veiga, 2006). But how executives pursue exploration of product innovations without compromising current production process is seldom addressed (O'Reilly & Tushman, 2013). Besides, compared to large companies, SMEs have to deal with limited amounts of resources. Therefore it is interesting to explore ambidexterity among SMEs and identify important factors of how SMEs align ambidexterity. Gaining more knowledge about *Organisational Ambidexterity* and *managerial behaviour* in SMEs could also improve the situation of SMEs.

Small and Medium-sized Enterprises are companies with fewer than 250 employees. During the crisis period about 600.000 SMEs went bankrupt in Europe. The EU urged members to take policy action upon these insolvencies and reported that “insolvencies require investments in innovation and quality of products” (European Union, 2016c, pp. 3,6). The Small Business Act (SBA) policy of the EU was introduced to stimulate entrepreneurship in European SMEs. This overarching framework aims to provide a SME policy, to “think small first” and help SMEs to gain sustainable growth.

The Netherlands has a strong SBA profile. The country ranks above EU average, in the majority of SBA areas. The countries international trade and open economy make them focus upon export. And due to the geographical location, water transport became one of the Dutch government strategic investments for innovation. One of the applicants for these investments is the Maritime sector. The Dutch “*Maritime cluster monitor 2017*” describes that more than 75% of sectors employment is active in SMEs and the sectors R&D investments is 3,4% of GDP (Bossche, Schijndel, Pol, & Sprengers, 2017). On the one hand these investments in innovations, new product developments and exploration of new technologies require *exploration*. On the other hand, investments in improving existing products, production process and quality requires companies to *exploit*, simultaneously pursuing *exploitation* and *exploration* requires ambidextrous alignment.

“Like larger firms, SMEs generally face the kind of competitive pressures to jointly pursue exploitation and exploration. However, SMEs lack the amount of resources and the kind of hierarchical administrative systems that can help or impede larger firms in managing their contradictory knowledge processes and, thus, affect the attainment of ambidexterity” (Lubatkin et al., 2006, p. 647). In order to contribute to this field of *Organisational Ambidexterity* and explore how SMEs balance ambidexterity, this research studies multiple cases in the Dutch Maritime sector.

Therefore this thesis tries to answer the following main research question:

*How can SMEs influence their short term exploitative and long term explorative balance?*

## Thesis outline

The next chapter presents the research design, starting with the problem statement and the background of the practical and theoretical problem. The demarcation of this study is done by defining one industry of the Dutch Maritime sector. At the end of chapter two, the research objective and research questions are presented.

In chapter three the literature review is presented, this chapter starts with describing the characteristics of exploitation, exploration and organisational ambidexterity. In this chapter, four key concepts are defined to categorise and operationalise ambidexterity in SMEs.

Chapter four describes the research methodology and framework. This chapter argues the choice for a multiple case study research. In figure 2 *research framework*, the four key concepts are presented again on the left. In the centre of this picture shows the use of these concepts as assessment criteria to explore ambidexterity in SMEs. During the case study multiple SMEs are confronted with statements about *Exploitation*, *Exploration* and *Ambidextrous* alignments, the last part to chapter four describes how cases are selected and the data is collected.

In chapters five the statements are presented in the interview protocol. These statements are based upon questionnaires as used in other studies to organisational ambidexterity. In total eleven interviewees in nine SMEs identified their company's ambidextrous behaviour, by giving a score upon each statement. Chapter six analyses the scores interviewees gave and draws conclusions at company level based upon the cross-case analysis. The individual descriptions, observations can be found in appendix I Case descriptions. However, the conclusions upon case level are presented at the end of chapter six.

Finally in chapter seven *Conclusion and Discussion* the findings of this study are presented. This chapter starts with the reflection upon the propositions. Thereafter the research questions are answered and the limitations of this study are discussed. The chapter concludes with the main findings, suggestions for future work and a personal reflection.

## 2. Research design

In the European Union Small and Medium-sized Enterprises are accounted for two-third of total employment and gain most value added, this makes SMEs the backbone of the economy (European Union, 2017b). Among other countries, SMEs in The Netherlands show a full recovery of the financial crisis. However the Maritime sector only showed a preliminary recovery in financial year 2016 (Bossche et al., 2017), this makes it interesting to focus this study upon SMEs in the Dutch Maritime sector. And since it is seldom addressed how executives balance between exploitation and exploration (O'Reilly & Tushman, 2013). This study contributes to the theory of *Organisational Ambidexterity* at SME level, by exploring:

*how SMEs balance exploration of long term developments and product innovations, without compromising the exploitation of current production.*

Given the limited amount of resources in SMEs, it's more difficult to allocate SME resources among conflicting activities. Besides during a crisis period, pressure upon pursuing the right strategy increases. Therefore it is interesting to identify what factors of organisational ambidexterity are important among Dutch SME in the Maritime sector. This study explores how SMEs pursue exploitation and exploration in their organisation. Gaining more knowledge about SMEs *organisational structure, knowledge development and managerial behaviour* in SMEs, could inform other SMEs how to improve their situation.

### 2.1. Problem statement

When SME have to deal with the contradictions of ambidextrous alignment, the limited amount of resources in SMEs causes one of the practical problems. For example the exploration of product innovations requires absorptive capacity to gain knowledge about new technologies. This involves investments in employees and requires time to gain new knowledge. This process is often disturbed once a new customer is found and a tight deadline needs to be met. Hence in development projects, the allocation of resources frequently changes from exploration to exploiting activities. These situations require organisational alignment and thoughtful managerial decisions of resource allocation. And because SMEs rarely look out more than a few months as it comes to strategic R&D planning and their technology roadmap (Holmes & Ferrill, 2005), it'll be more difficult for SMEs to be innovative and develop capacity to absorb the required knowledge about new technologies.

Among others, Bouten, Van der Duin, Scholten, and Verburg (2016) identified '*ambidexterity in SMEs*' as literature gap and focussed in their case study upon ambidexterity in one techno-SME. They used the "ambidexterity framework" as presented by Raisch and Birkinshaw (2008), to understand the context of organizational ambidexterity and how SMEs deal with different forms of exploitative, explorative activities in their hybrid strategy. They found that two of the five forms of the framework were applicable to their case. *Contextual ambidexterity* and *Structural ambidexterity* were identified, but they recommend future research to validate their results of organisational alignment.

This study aims to contribute to the theory of ambidexterity in SMEs, by exploring multiple SMEs and their ambidextrous behaviour. Given the limited amount of resources in SMEs it's more difficult to allocate the resources among conflicting activities. Therefore the focus of this study will be on: how SMEs align their company upon exploration of new technologies and product innovations, while the company produces their existing products simultaneously.

**Practical problem:** How SMEs pursue exploration of new technologies and simultaneously benefit of the exploitation of current products?

The questionnaire Bouten et al. (2016) used to measure the context of ambidexterity in SMEs was divided into several categories: *organization ambidexterity, managers exploration and exploitation activities, knowledge flows, management team and market characteristics*. This research builds upon their research framework in order evaluate ambidexterity in multiple SMEs organisations.

## 2.2. European SMEs and the Dutch Maritime sector

SMEs in Europe are defined as independent companies with fewer than 250 employees and sales less than 50 million. During the crisis the average number of employees among SMEs fell sharply and over a three years period, every year 200.000 firms in Europe went bankrupt. In their annual report on “European SMEs 2015/2016” the EU identifies approximately 99% of these bankruptcies as SMEs (European Union, 2016b, p. 3). This EU report urged member states to take policy action upon the bankruptcy of SMEs. “The business birth and dead are far from insignificant” and “the actual population of business is constantly changing” (European Union, 2016b, p. 59).

### Insolvencies of SMEs in Europe

The insolvencies of SMEs require investment in innovation and quality of products (European Union, 2016c, p. 6). The EU argues in an additional study to “Insolvencies and SMEs”, that the “lack of entrepreneurial skills and of formal strategic planning – which are usually correlated – has been also indicated as causes of SMEs bankruptcy” (as cited in European Union, 2016c, p. 4). SMEs have “an incentive in investing in conservative technologies rather than in innovative ones” and “this preference constitutes a detrimental environment for innovation” (as cited in European Union, 2016c, p. 7). These EU reports increase the need for evaluation of SME organisations in order to identify how SMEs successful balance between production of qualitative products and at the same time invest in new technologies to be innovative.

To improve the political approach to entrepreneurship in Europe, the European Commission adopted the Small Business Act (SBA) in 2008. This overarching framework aims to provide a SME policy, to “think small first” and help SMEs to gain sustainable growth (European Union, 2017c, p. 6). In 2011 the SBA review was launched in order to integrate the EU SME policy into the Europe 2020 strategy and present annual reports about SMEs. The SBA got a set of policy measures organised around 10 principles ranging from *entrepreneurship* and *responsive administration* to *internationalisation* and *financial access* (European Union, 2017a).

### Dutch SMEs and the Maritime sector

“The Netherlands has a strong SBA profile”, “Particular strengths remain entrepreneurship, ‘second chance’, ‘responsive administration’, ‘skills’ and ‘innovation’.” (European Union, 2017a, p. 1). In the Netherlands 64,4% of the employed persons are working in SMEs and they create the largest share of the countries value added (62,9%) (European Union, 2017a). Among others the Dutch SMEs show a full recovery of number of enterprises and value added (European Union, 2017b). The Dutch government strategically focus upon promoting entrepreneurship, skills and innovation (European Union, 2017a). This makes it relevant and interesting to demarcate this research upon SMEs active in one sector and located in the Netherlands.

As trading nation the Netherlands is internationally recognised of their entrepreneurial spirit and innovative behaviour (Government of the Netherlands, 2015). Since parts of the country lie below sea level, all kind of innovations among the water have been created. The innovative Delta Programme made the Dutch experts in water management and geographically the Netherlands got a strong strategic position with the estuary of the rivers Meuse, Rhine and Scheldt. Europe's largest port, the Rotterdam harbour, is seen as the 'gateway' to Europe (Government of the Netherlands, 2015). One of the sectors active in this area is the Dutch Maritime sector.

### Dutch Maritime sector

The Dutch Maritime sector contributes significantly to the Dutch position in the world's top 10 leading exporters (Government of the Netherlands, 2015). The Maritime sector gathers industries active in the water sector and provides 3,3% of GDP, employs around 271,500 people, which is 3.0% of total employment in the Netherlands in 2016 (Bossche et al., 2017, p. 11). Large subsectors in the cluster are *Ports, Offshore, Inland shipping, Shipbuilding, Maritime equipment supply, Dredging, and Water construction* (Bossche et al., 2017, p. 32). Strategically the Dutch government invests significantly in the Maritime sector, with a 3,4 % investment of GDP in R&D, the sector is above Dutch average of 1,5%, and even above the European 2020 goal of 3,0%. In 2016 the sectors value added declined, but employment increased in the sector, this means with more people less is money is earned (Bossche et al., 2017, p. 18). This urges companies to behave strategically and focus upon long term innovation but simultaneously improve short term efficiency.

Companies in the sector are located all over the country, but most employment is concentrated in the west, especially in the region around Rotterdam. Most people are directly working in the subsector *Ports* or are indirectly employed in relation this subsector. More than 75% of the Maritime sector's employment is working in the following sub sectors: *Ports, offshore, shipbuilding, Yacht building, inland shipping and maritime supplies*. More than three quarters of the companies in these subsectors are SMEs. The "*Maritime Cluster Monitor 2017*" describes financial year 2016 of these subsectors in detail and emphasises the preliminary recovery of the crisis period (Bossche et al., 2017, p. 29). Despite the recovery of the Dutch economy, the Maritime sector is still in dire straits, especially worlds freight overcapacity and the low oil price, postponed many projects and diminished the sectors expected recovery. The preliminary recovery of the 2008/2009 crisis, as identified in financial year 2016, makes it interesting to focus this case study upon Dutch SMEs active in the Maritime sector.

### 2.3. Theoretical research background

Improving the situation of SME insolvencies can be done by focussing upon innovation and quality of the firm's products. The EU identified these two variables as discriminant for the company's success (European Union, 2016c, p. 6). Their report also claims that "innovative firms will likely undergo less financial distress than other companies even in low-tech manufacturing sectors" (European Union, 2016c, p. 6). However once companies focus upon quality of products, it's possible that SMEs only focus upon improvements among the exploitation of their current business. In such case SMEs apply a more incremental innovation strategy in order to gain short term results. On the other hand the EU comment about the '*incentive of investing in conservative technologies*' rather than in innovative ones" (European Union, 2016c), requires improvements such as acquiring new technologies. These exploitation and exploration activities are seen as contradictory and face different opportunities,

goals, time of horizon, hence conflicts will rise and have to be managed. Consequently, SME face the challenge of balancing operational and innovation activities.

These two activities have been explained by Tushman as: the first is exploit the existing strategy and the second is to explore an uncertain future (Tushman, 2015). Other scientists also described “The notion of balance between exploitation and exploration, or between incremental and radical organizational adaptation” (as cited in Benner & Tushman, 2003, p. 3; Levinthal & March, 1993; March, 1991). The strategic behaviour of simultaneously handling these contradictory demands of exploitation and exploration, has been defined in academic literature as *Organisational ambidexterity* (Raisch, Birkinshaw, Probst, & Tushman, 2009).

Scholars in organization science agree that an organization’s long-term success depends on its ability to exploit its current capabilities, while simultaneously explore fundamentally new competencies. It is well understood that large and established firms frequently fail to explore and effectively adapt to changing environments (Birkinshaw, Zimmermann, & Raisch, 2016). Solutions for large firms to avoid such failure are well covered in literature, however the fact that SMEs lack the amount of resources and the hierarchical administrative systems, affect their attainment of ambidexterity (Lubatkin et al., 2006). How ambidextrous strategies apply to large firms has been amply examined by scholars, however there is a knowledge gap regarding Small and Medium-sized Enterprises, in particular for techno-SMEs (Bouten et al., 2016). Or as Fourné (2014, p. 79) describes: “future research is needed to uncover the extent to which managers across the hierarchy of SMEs are ambidextrous and what equips them to perform well on a variety of tasks”. And O'Reilly and Tushman (2013) more qualitative and in-depth studies are required to learn how leaders orchestrate the allocation of resources between the routine and new business domains, and how leaders manage the inevitable conflicts that arise.

In a study into ambidexterity and performance in SMEs, Lubatkin et al. (2006) identified managerial behaviour as essential to obtain ambidexterity. The managerial behaviour and executives decisions align SMEs into exploitation or exploration activities. These contradicting activities influence the social support of employees and subsequently the firm’s performance. Lubatkin et al. (2006) found that CEO’s with the leadership ability to foster greater behavioural integration among the members of his or her Top Management Team (TMT) is essential to attaining ambidexterity in SMEs. Another study found a positive relation between SMEs CEO transformational leadership and explorative innovations. (Friedman, Carmeli, & Tishler, 2016).

#### 2.4. Theories in relation to concepts of ambidexterity

Since ambidexterity has been amply examined within large firms, all kind of data measurements are already presented. This study uses the theories of *Organisational ambidexterity* in order to measure ambidexterity in Small and Medium-sized Enterprises and to explore how SMEs align the organisation between exploitation and exploration.

In the literature about *Organisational Ambidexterity*, multiple aspects have been identified. Among others, Gibson and Birkinshaw (2004); Tushman and O'Reilly (1996) identified organisational structures and strategic ambidextrous behaviour. The literature review of Raisch and Birkinshaw (2008) emphasised the strategic integration of ambidexterity. This review was used by Bouten et al. (2016) to identify two organisational alignments *Contextual ambidexterity* and *Structural ambidexterity* in one SME.



Organisational learning and balancing between exploitation and exploration was already identified as important by March (1991). And Cohen and Levinthal (1990) related a firms *absorptive capacity*, ‘*the ease of organisational learning*’, to technology adoption and diffusion of innovations. More recently Mom, Van Den Bosch, and Volberda (2007) identified the relation between knowledge flows and ambidextrous approaches.

The importance of leadership alignment once pursuing ambidexterity and implement both incremental and revolutionary change, has been identified by Tushman and O'Reilly (1996). In their literature review Raisch and Birkinshaw (2008) identified leadership based antecedents as one of the three approaches that enabled ambidexterity within an organisation. The importance of *managerial behaviour* in the management team and leadership styles were embedded in the theory development of Organisational Ambidexterity (Jansen, George, Van den Bosch, & Volberda, 2008; Lubatkin et al., 2006).

The fourth concept is the *external environment* and the organisational response upon market dynamics. On the one hand turbulent environments require adaption, radical innovation and focus upon new customers, however on the other hand suits efficiency and process management in more price competitive markets (Benner & Tushman, 2003). The influence of environmental dynamics can also be found in the framework, as Raisch and Birkinshaw (2008) presented, for understanding organisational ambidexterity. The next table sums the theories and the related concepts of ambidexterity.

Table 1. Theoretical perspective and four concepts

Theories	Concepts
Exploitative vs. explorative strategies	Organisational ambidexterity
Knowledge flows	Absorptive capacity
Transformative leadership and resource allocation	Managerial behaviour
Market dynamics	External environment

## 2.5. Research objective

In “The Innovators Dilemma”, Christensen (1997) explains why incumbent companies stumble for many reasons and sustain incremental improvements of established technologies. Christensen describes why new firms innovate easier with disruptive technologies because they are not tied to outdated values or organizational norms. One of the arguments for new firms being more innovative with disruptive technologies is the explorative behaviour and adaption to changing environments.

The EU identified investing in more conservative technologies rather than in innovative ones as one of the causes of the large amount of insolvencies among SMEs. In order to improve this situation SME have to become more successful in applying innovation strategies and know how to acquire new technologies. Especially in situations when SMEs face difficult decisions among the allocation of their limited resources, they have to understand what factors influence their strategy.

By evaluating multiple cases this research aims to identify how SMEs handle relevant factors of ambidextrous strategies. The research objective is to explore how SMEs align their organisation and to identify what factors are relevant in balancing ambidexterity. Meeting this objective will increase the understanding of how SMEs are able to successfully balance between exploitation and exploration. Increasing this knowledge will help other SMEs to learn how improve their innovation strategy and chances to long term success.

This study evaluates the strategic behaviour of SMEs by confronting multiple cases against concepts of ambidexterity. The assessment of SMEs organisational structure upon exploration, exploitation or hybrid alignment, will indicate how they handle the theories of knowledge flows, managerial activities and market dynamics.

## 2.6. Research questions

In order to achieve the research objective, this study evaluates how SME balance the short term exploitative and long term explorative alignment of their company. The practical problem of limited resources in SMEs make it more difficult to pursue exploration of new technologies and simultaneously benefit of the exploitation of current products. The organisational alignment and managerial behaviour has been identified as essential to obtain ambidextrous alignment. Increasing the knowledge about how leaders orchestrate the allocation of resources, also contributes to the theory of ambidexterity at SME level. In order to achieve the research objective, this research explores ambidextrous alignment in SMEs and identifies factors that influence this strategy, therefore main research question is:

**MQ** How can SMEs influence their short term exploitative and long term explorative balance?

Answering this question identifies relevant factors, SMEs use to balance between exploitation and exploration. Once other SMEs are informed about these factors, they might be able to improve their strategy and chances for long term success.

To answer the main research question and demarcate this research, three sub questions have been made. The first sub question is about ambidexterity and three alignments, namely pursuing *exploitation*, *exploration* or a *hybrid* model. The field of *Organisational Ambidexterity* describes aspects of ambidexterity in relation to these three alignments at the level of large organisations. In order to assess at SME level, theoretical key concepts will be identified first. Therefore the first sub research question is:

**RQ1** What are key concepts of ambidexterity that can be used to assess SMEs strategic behaviour?

In the case study these key concepts are used to categorise the assessment criteria. However, more details about assessment criteria are required to indicate the key concepts in contemporary events. These criteria determine if companies pursue exploitation, exploration or hybrid alignment. Therefore the second research question is about the archetypes of the key concepts and how these indicators can be used to measure SMEs ambidextrous alignment:

**RQ2** How to indicate SMEs alignment upon *exploitation*, *exploration* or *hybrid* activities?

The deduction of theoretical concepts of ambidexterity in the first research question and the indicators of ambidexterity in the second question, determine the theoretical boundaries of this study. In the exploration of SMEs, these concepts and indicators measure how SMEs align their organisation. The practical problem of SMEs and their limited amount of resources, increases the difficulty for SMEs to pursue ambidexterity. Therefore the third research question is about the extent of using exploitation versus exploration and how SMEs handle these indicators in contemporary events.

Since recent studies to ambidexterity in SMEs identified the role of executives as important, increasing the knowledge about this could help to improve the financial distress situations of SMEs. Their decisions of how to orchestrate the allocation of resources among exploitation or exploration are crucial for the company's long-term success. Thus, SMEs have to understand how to anticipate successfully upon factors in ambidextrous strategies.

In a case-study evaluation this research aims to explore how SMEs pursue exploration of new product innovations and simultaneously benefit of the exploitation of current products. The third sub question is about the evaluation of the three strategies and concepts of ambidextrous behaviour:

**RQ3:** How extensively is exploitation or exploration pursued in SMEs?

This question will be answered in the case study by measuring how SMEs balance the indicators of ambidexterity. The answer of RQ2 will identify the indicators, using these indicators as qualitative measurement variables in an ordinal scale, enables the use of a Likert scale and measuring the extent of pursuing ambidexterity. The result of these case study analyses, will indicate how multiple cases value different factors of ambidexterity.

This thesis is structured based upon answering the research questions. In the next chapter *Literature review* the theoretical concepts of ambidexterity will be explained. This chapter describes the innovators dilemma, exploitation & exploration activities and the complexity of balancing between these contradictory activities. In this chapter the first research question is answered by describing four key concepts of ambidexterity. This theoretical answer also describes indicators of ambidexterity of the second research question. Chapter four describes the research methodology and how the exploration of ambidexterity in SMEs is executed. The operationalisation of the interview questions in chapter five describes how the indicators of ambidexterity are used to in the structured-interview. After the theoretical answer upon the second research question the next chapter describes the exploratory findings. In chapter six cross-case analyses, the case conclusion identifies the strategy of each company in relation to the indicators of ambidexterity. The third research question is answered by the case scores and description about how the cases scored upon Organisational structure, Knowledge sharing, TMT behaviour and External environment. The thesis ends with a reflection upon the propositions who are presented after the literature review, summarising the answer upon the research questions and a description of the research limitation conclusion and future work.

### 3. Organisational Ambidexterity literature review

In the nineteen seventies Motorola started using their T-plan technology roadmap to describe technology push and market pull (Holmes & Ferrill, 2005). Gerdri, Vatananan, and Dansamasatid (2009) have been researching this strategy and suggest using a customised roadmap to integrate technologies. Today with the increasing globalisation and communication, the development time of innovations decreases and since “technological change represents a technological breakthrough” (Ortt & Schoormans, 2004, p. 301) new technologies advance at a breakneck pace. To stay competitive managers opt for synchronized development of technological capabilities and product design capabilities (Ho, Fang, & Lin, 2011). Research about how firms manage strategic dualities is still limited (Birkinshaw, Crilly, Bouquet, & Lee, 2016). Company’s executives have to make decisions in the allocation of resources in the operations of daily business. Simultaneously the exploration of technologies requires strategic planning and managerial focus upon their innovation strategy. Investments in innovations differ between industries, one of the quantified indicators is the EU IRI ‘Industrial R&D Investments’ indicator. The IRI may go up to 20% of company’s revenue (European Union, 2016a; PwC, 2016). This makes the decisions about assigning investments to explorative instead of more conservative exploitative strategies relevant to enhance knowledge about. Especially within SMEs since their executives face difficult decisions when they have to deal with the limited amount of employees and its restricted amount of financial resources.

In the “Innovators dilemma” Christensen (1997) explains why incumbent companies stumble for many reasons and sustain incremental improvements of established technologies. Christensen describes why new firms innovate easier with disruptive technologies because they are not tied to outdated values or organizational norms. One of the arguments for new firms being more innovative with disruptive technologies is the allocation of resources and the importance of customer requirements. In existing markets customer requirements are often interpreted as more important, but with disruptive technologies customers don’t know their needs yet, so disruptive technologies require new markets and old customers become less relevant.

In their book “*Lead and Disrupt*” O’Reilly and Tushman (2016) present their research findings of the last two decades, “how to solve this innovators dilemma”. They describe three ways of conceptual innovations. The first one is incremental innovation, which is about efficiency and improving products, processes and services cheaper or better. Second innovation is through discontinuous or radical changes in which improvements are made through a capability-destroying advance in technology. And finally minor changes in technologies but the focus is on integration of technologies in existing products or services that significantly change technological architectures. These last two more disruptive innovations are able to use emerging technologies in such a way that new markets are being created through the introduction of new products or services (O’Reilly & Tushman, 2016).

In their research about different kinds of innovations Abernathy and Clark (1985) applied an example of automotive innovations in their “Transilience map”. This quadrant got four innovation areas: the regular and niche innovations as incremental innovations and the revolutionary and architectural innovations as disruptive innovations. On the one side of this matrix incremental innovations require efficiency and quick response to market needs and create economies of scale. On the other side of this matrix their results explain the need for exploring new technologies and customer needs in order to create radical innovations with emerging technologies. Schumpeter (1942) already published his creative destruction theory about innovation and economic growth, he explained the need for

reducing the values of existing capabilities in order to create technological innovations. Historical evidence suggested that over time the industry was able to move between the four quadrants, but firms in one quadrant were replaced by firms using other strategies (Abernathy & Clark, 1985). Only a few firms were able to manage the transition to other innovation strategies, but most firms had to exit the industry (Tushman, Smith, Wood, Westerman, & O'Reilly, 2010). Abernathy and Clark (1985) explained that it's likely these firms faced the task of managing different kind of innovations at the same time.

In the evolutionary change of companies, different organisational innovation strategies and their environmental conditions have been identified. In the last two decades scholars in organization science agree that an organization's long-term success depends on its ability to both exploit its current capabilities, while simultaneously explore fundamentally new competencies (Levinthal & March, 1993; March, 1991). The two processes compete for slack resources, have different time horizons, and may even cannibalize on one another (Smith & Tushman, 2005). These two process of organisation's behaviour have been defined by Tushman and O'Reilly (1996) as organisational ambidexterity:

*The ability to simultaneously pursue both incremental and discontinuous innovation and change results from hosting multiple contradictory structures, processes, and cultures within the same firm.*

This definition led to a strategy where executives have to handle ambidexterity as strategy of balancing between the strategic agendas of exploration and exploitation (Tushman, 2015). And each strategy requires different organisational alignment, whether it'll be focussing on efficiency and existing markets, new markets with new technologies or a combination of both. Such balancing requires insight into factors that influence these strategies. To get a better understanding of these factors and decisions companies executives face, three approaches of exploitation, exploration and ambidexterity will be described in more detail.

### 3.1. Exploitative characteristics

In stable environments companies aim to exploit core competences and focus on refinement of existing technologies, efficiency, selection of best practices among production routines and extension of existing competences (March, 1991). Investments among these exploitation strategies are being made upon facts, well know details, time schemes and focussed on the existing capabilities (Tushman, 2015). Exploitation strategies align the company's structure and environmental conditions among well-defined roles, responsibilities and detailed job descriptions (O'Reilly & Tushman, 2013). The organisational structure is associated with mechanistic structures, tightly coupled systems, path dependence, routinization and control bureaucracy and stable markets (He & Wong, 2004). These companies face structural inertia and deepen their existing knowledge by established technological and customer competences (Benner & Tushman, 2003). Exploitation as part of ambidexterity has been described by Jansen, Tempelaar, Van den Bosch, and Volberda (2009), they found a strong relation between leadership style and ambidextrous behaviour. The transactional leaders exercise a more maintenance role and support the refinement, improvement and routinization of existing competences, products, and services. The team members were able to recombine existing knowledge, performed routine activities and standardized methodologies into regular work practices. These team members mainly use their current knowledge and skills in order to perform their tasks. Birkinshaw, Zimmermann, et al. (2016, p. 36) identified 'mobilization of resources' in

order to address opportunities and threats as “seizing” capability, where the current capabilities empowers front line managers to execute the exploitation strategy. These behaviours increase competences at particular activities, make companies able to reach economies of scale and therefore the focus upon exploitation makes future exploitation in the same domain more efficient.

Organisations solely concentrating on exploitative innovations may enjoy short-term-profit, as they develop greater and greater competence at particular activity such as production (Mihalache, Jansen, Van den Bosch, & Volberda, 2014). Hence this approach of only focussing on exploitation may lead to a competency trap as described by Levinthal and March (1993), this approach is a potentially self-destructive product of learning. These companies face the risk of not being able to respond adequately to changing environment, since they only focus on the needed competences. In their research Jansen, Kostopoulos, Mihalache, and Papalexandris (2016) found that this competency trap is associated with activities that help a team to refine, recombine and implement existing knowledge and skills only, otherwise refinement of existing knowledge may be at odds with the development of new skills and competences.

### 3.2. Explorative characteristics

The term exploration defines the long-term performance of an organization’s ability to adapt and change through innovation (Tushman & O’Reilly, 1996). Exploration is also described by Gibson and Birkinshaw (2004) as adaptability, which refers to the capacity to reconfigure activities in a business unit in order to quickly meet changing demands in the task environment. Exploring companies are rooted in variance-increasing activities, learning by doing and trial and error (Smith & Tushman, 2005). They facilitate to search for, experiment with, and development of new ideas and task related capabilities (Jansen et al., 2016). Their discovery’s, experimentation, risk taking and innovative behaviour helps them to be innovative with new technologies and emerging markets. Employees working with exploring strategies, often systematically search for new possibilities, offer creative ways of accomplishing their tasks and evaluate diverse options regarding the course of their work. The goal for exploring strategies is to figure out the future before competitors do (Tushman, 2015). Birkinshaw, Zimmermann, et al. (2016, p. 36) defined this explorative behaviour as “sensing” capability.

The company’s structure is associated with organic structures, loosely coupled systems, path breaking, improvisation, autonomy chaos and emerging markets and technologies (He & Wong, 2004). Their leaders often show transformation leadership styles and are able to encourage their teams to develop new skills, to come up with new ideas and promote their creativity (Jansen, Tempelaar, et al., 2009). Ahmadi, Khanagha, Berchicci, and Jansen (2017) found in their research a negative correlation between managers’ explorative behaviour and organisations regulatory focus. Their results show that managers’ willingness to experiment with a wide range of alternatives reduces organisational regulations and avoid inertia. They also found one conducive effect: promotion-focus on organizational context triggers exploratory activities in particular for managers with a higher promotion focus. And since long term goals requires managers activities to absorb new skills and knowledge, working with cross-functional teams and having a low functional tenure increases executives explorative behaviour (Mom, Fourné, & Jansen, 2015).

### 3.3. Ambidextrous behaviour

Ambidexterity is the state of being able to use right and left hands equally well. In organisational ambidexterity it refers to the ability of management to conduct both *exploitation* and *exploration* strategies successfully. In the traditional approach organisations emphasized only one strategy at the expense of the other (Birkinshaw, Crilly, et al., 2016). In his article, James March (1991) noted; the fundamental challenge companies face is the need to focus upon both strategies. By exploiting existing assets and capabilities and simultaneously providing sufficient exploration activities, companies are able to avoid being rendered irrelevant by changes in markets and technologies. The theory of balancing between exploitation and exploration has first been defined by Tushman and O'Reilly (1996) as organisational ambidexterity (Raisch et al., 2009, p. 685). Thereupon several studies have documented the effects of organisational ambidexterity, these results present a positive and robust link of companies performance and ambidextrous behaviour (O'Reilly & Tushman, 2013).

Organizational ambidexterity spans various factors of hitherto disconnected research fields and cuts across disciplines such as strategic management, leadership theory, organizational learning, and organizational design (Raisch et al., 2009). Since more researchers studied the theory of organisational ambidexterity, more evidence about strategic entrepreneurship and sustained performance has been found. Regarding the organisational structure, ambidexterity is presented as hybrid environment of mechanistic and organic structures (He & Wong, 2004). As such it involves creating a setting in which individual managers or units divide their attention between competing objectives. The dynamic alignment of employees between exploitation and exploration activities is one of the first tasks to reach an ambidextrous organisation (Raisch et al., 2009). Larger companies are able to have business units or departments dedicated to one of the other strategy. Based upon their review of large companies, Raisch and Birkinshaw (2008) defined different forms of organisational ambidexterity in a framework for understanding organisational ambidexterity. They identified ambidextrous alignment of employees, departments or business units as *structural*, *contextual* and *leadership based* ambidexterity.

#### Structural ambidexterity

Structural ambidexterity refers to structural separation of the organisational units to ensure each unit is configured to the specific needs of its task (as cited in Gibson & Birkinshaw, 2004, p. 210). In order to decouple conflicting activities these units are physically separated (Birkinshaw, Crilly, et al., 2016). The autonomous subunits adopt their own mechanistic or organic structure, have their own alignment of people, create their own processes and cultures, but all within the company's targeted integration to ensure the use of resources and capabilities (O'Reilly & Tushman, 2013). A range of concrete structural solutions, such as spatial separation, parallel or sequential structures have been identified, but most literature equates structural ambidexterity with spatial separation (Raisch & Birkinshaw, 2008).

#### Contextual ambidexterity

The contextual approach has been defined by Gibson and Birkinshaw (2004, p. 211) as simultaneously achieve alignment and adaptability within a single business unit. They suggest that ambidexterity is best by building a business unit that encourages individuals to make their own judgements as how to divide their attention between conflicting demands. A successful organisation balances between stretch, discipline, support, and trust in order to facilitate contextual

ambidexterity. O'Reilly and Tushman (2011) also emphasised the ability of senior management team to articulate a strategic intent and vision that justifies exploration and exploitation and more importantly to manage the inherent tensions associated with incompatible organisational structures. Since contextual ambidexterity facilitates the adaptation of an entire business unit and not to separate units or departments, this approach seems very help full in dealing with SMEs (Bouten et al., 2016).

### Leadership based ambidexterity

Leadership based ambidexterity differentiates of contextual ambidexterity and the described leadership of carefully building processes of alignments, as identified by Gibson and Birkinshaw (2004); Tushman and O'Reilly (1996). Lubatkin et al. (2006, p. 666) suggest that "TMT behavioural integration is essential to achieving an ambidextrous orientation in SMEs; they also suggest that the joint pursuit of an exploratory and exploitative orientation affects performance" of a firm. In their study Jansen, Vera, and Crossan (2009) examined how exploitative and explorative innovations are strategically managed within several organisations, their results identified transformational and transactional leaders to be critical to for innovative outcomes in dynamic environments. A CEO with the leadership ability to foster greater behavioural integration among the members of his or her TMT, improves the level of the team's collaborative behaviour, the quantity and quality of information exchange, and the emphasis on joint decision making. Mihalache et al. (2014) found empirical results that TMT shared leadership remains a significant enabler of organizational ambidexterity.

In their research Mihalache et al. (2014) explored how firms may overcome hurdles of balancing between exploratory and exploitative. Such hurdles are allocating resources, or having different strategic horizons and deciding to cannibalize current product portfolio. And Mom et al. (2015) especially focused on leadership and social interaction, and found that managers' ambidexterity contributes to individual performance in more uncertain and interdependent work contexts. In another study Jansen et al. (2016) propose TMT to share leadership within the team to enable exploration in their organizational ambidexterity strategy. And in more recent work Ahmadi et al. (2017) also emphasises the leadership role of senior executives and how it can strengthen or reduce the effectiveness of organisations top management team in order to facilitate ambidexterity at lower hierarchical levels. To be successful at ambidexterity, leaders must be able to orchestrate the allocation of resources between the routine and new business domains. How they actually do is seldom addressed in the research on ambidexterity (O'Reilly & Tushman, 2013).

### 3.4. Key concepts in theories about ambidexterity

The studies that defined ambidextrous approaches, measured ambidextrous behaviour in multiple large companies. The used questionnaires contain all kind of topics and concepts, when comparing several studies and its questionnaires, four relevant categories about ambidextrous behaviour can be found. First *Organisational ambidexterity* describes the structural or conceptual approach of how an organisational structure is coupled and how they manage their exploitative versus explorative behaviour. Second *absorptive capacity* describes the focus of a company's capacities, the knowledge inflow and adaptations to changes. Third the leadership approach and *managerial behaviour* identifies how the management balances between strategic contradictions of exploitative and explorative strategies. The fourth category *External environment* describes the dynamism and competitiveness of the company's market and the adoption of changing technologies.



## Organisational Ambidexterity

Organisational ambidexterity has been identified as an organization's capacity to simultaneously achieve alignment and adaptability within a single business unit. Gibson and Birkinshaw (2004, p. 211) argued that "it is best achieved not through structural, task, or temporal separation, but by building a business unit context that encourages individuals to make their own judgments as to how best divide their time between the conflicting demands for alignment and adaptability". This opened the discussion of contextual ambidexterity in Small and Medium-sized Enterprises and business units, since they face the kind of competitive pressure to jointly pursue exploitation and exploration. However, SMEs lack the amount of resources and the kind of hierarchical administrative systems, thus affect the attainment of structural ambidexterity (Lubatkin et al., 2006, p. 647). In SMEs central management is often involved with most of the employees due to the few managerial levels. This argues that contextual and leadership ambidexterity is most suitable for SMEs (Bouten et al., 2016, p. 350). In their study of high-tech Chinese SMEs, Gedajlovic, Cao, and Zhang (2012) found empirical evidence indicating that comprehensive decision making is associated with a dual emphasis of exploration and exploitation opportunities. One of the pitfalls of central management in balancing between exploration and exploitation is the negative correlation of centralization upon exploratory innovation, whereas formalization positively influences exploitative innovation (Jansen, Van Den Bosch, & Volberda, 2006). It's up to senior management to start building organic structures and reconfigure capabilities in order to sustain a contextual organisational structure. Or as Teece (2014, p. 23) formulated "dynamic capabilities result from superior top management orchestration skills" and enable an enterprises to develops the products, processes, and business models that efficient meet ever-changing markets.

Large firms create contextual ambidexterity in small business units that simultaneously focus on exploitation and exploration (Gibson & Birkinshaw, 2004). These structures are often associated with loosely-coupled systems and span a diversified range of business activities and opportunities. In his study, Fourné (2014) indicates that exploitation and exploration are more easily combined and simultaneously pursued in low clock speed environments. This environment increases the time and efforts that companies have to integration organisational learning, explore new technologies, which may result in new product development and services for new customers or emerging markets. And a business units exploitative innovation is able to build upon existing knowledge and extend her existing products and services for existing customers (Benner & Tushman, 2003).

## Absorptive Capacity

The absorptive capacity of a company to acquire new information, assimilate and apply it to commercial ends is vital to ambidextrous organizations and the way new information is absorbed or transferred within a company, is related to the level of the company's ambidexterity (Mihalache et al., 2014). Birkinshaw, Crilly, et al. (2016) identify information handling as one of the managerial difficulties; 'how to focus on most important stimulant among too much information of both exploitation and exploration activities'. To measure absorptive capacity and link knowledge flows to explorative and exploitative activities, Mom et al. (2007) investigated the influence of top-down, bottom-up and horizontal knowledge inflows. In their research they found a positive relation between vertical knowledge inflows versus exploitative activities and between horizontal inflows and explorative activities. The existing vertical knowledge sources are required in exploitative approaches and may need to be revisited, reinterpreted and implemented upon efficiency.

Simultaneously in exploratory approaches new value creation is facilitated by linking previously unconnected horizontal knowledge sources (as cited in Jansen, Tempelaar, et al., 2009). This increases the need for ambidextrous organizations to establish formal cross-functional interfaces in the organisation that deepen knowledge flows between exploratory and exploitative units or departments without interrupting their own internal processes.

The knowledge acquisition has also been examined in relation to technological innovation. In a study into knowledge management practices among 19 leading R&D companies, Armbrecht Jr et al. (2001) presented a model for knowledge flow in the R&D process. The R&D managers prioritised knowledge acquisition among aspects of creating a culture to optimise the company's knowledge flow, improvement of knowledge loss when employees leave and managers promoted creativity by the expansion of knowledge. These knowledge flows indicate a primary mechanism by which organization members learn from each other, such organisational learning may be either exploratory and/or exploitative (as cited in Mom et al., 2007, p. 911). Knowledge acquisition in research for product improvements in the exploitative approach, refers to a firm's ability to improve and refine key attributes of products already existing in a company's product portfolio. These activities are often focused upon short-term goals and that can properly be conducted using present knowledge (Jansen, Tempelaar, et al., 2009). The explorative approach refers to R&D search, variation, risk taking, experimentation, discovering new ideas and apply them to changing environments. March (1991) explains that the later approach is likely to suffer cost of experimentation without gaining many of its benefits (as cited in Bauer & Leker, 2013).

The knowledge flows in companies with both exploitative and explorative behaviour are considered to be more tacit and ambiguous, therefore TMT has to promote knowledge sharing and sever team member's reluctance to share their tacit knowledge. The promotion of frequent interactions at operating level and making a repository of tacit knowledge, foster the discovery of new opportunities (Lubatkin et al., 2006). Especially when firms want horizontal knowledge transfers and integration in their processes, which is required when developing radically new competences and technological innovations (Fourné, 2014). In order to embed multiple competences in the company or direct in major development project, consulting a network of experts and bringing together sources of tacit knowledge creates a stronger and more competitive product (Armbrecht Jr et al., 2001). Armbrecht emphasised the use of a database system in large companies to identify tacit and expert knowledge within large companies. More recent developments offer social network sides and online communities, such a digital ecosystem enables enterprise to provide a wealth of information about certain expertise or individual experts. It enables companies to actively interact with external actors such as public institutions and other business to acquire and absorb external knowledge and generate innovation (Scuotto, Del Giudice, & Carayannis, 2017).

### Managerial behaviour

The managerial behaviour of executives in ambidextrous organisations has been identified as crucial in balancing between exploitation and exploration. The TMT decisions of allocating resources between short-term performance and long-term adaptability are trade-offs and organisational design decisions, such decisions require teams to negotiate between the existing product improvements and innovations. Smith and Tushman (2005) describe that teams need to allow variety and local adaptation in the company, but TMT also needs to facilitate collective action and strategic coherence. As key sources of ambidexterity they identify the company's leaders ability to create a

common culture and vision, with executives who are supportive, flexible, and able to put in place systems that allow context to emerge and turn individuals behaviour in shape (Gibson & Birkinshaw, 2004; Smith & Tushman, 2005). The results of Jansen et al. (2008) confirmed the relevance of developing a strong and compelling shared vision. They emphasised that common values and aspirations are an important team attribute that facilitates senior team members to prioritize and interpret problems and reduce conflicts.

In innovation literature a centralized and formal hierarchical structure has widely been studied, a formalized decision making is supposed to negatively influence innovativeness (Jansen et al., 2006). In stable environments with technological certainty, the formalization and centralization of production may be effective, but in uncertain environments or technologically complex contexts, exploitative strategies are counterproductive (Benner & Tushman, 2003). Exploratory innovation requires nonroutine problem solving and deviation from existing knowledge, creativity and decentralization of decision making is likely to improve exploratory innovation (Jansen et al., 2006, p. 1663). Organizations can excel when top or senior management teams effectively balance strategic contradictions and resolve conflicting agendas. According to Mom et al. (2015) more research about the diverse portfolio of managerial skills and behaviours across hierarchical levels is needed uncover the extent to which managers across the hierarchy of SMEs are ambidextrous and what equips them to perform well on a variety of tasks.

One of the characteristics to identify a successful balancing TMT, is connectedness, trust and cooperation between members (Jansen et al., 2006). These members may develop densely connected social relations within their units to increase a unit's contextual ambidexterity. "Close communication between top executives enables them to incorporate different perspectives to form paradoxical frames for allocating resources to both strategic contradictions" (as cited in Li, 2013, p. 879). The personal attraction as an inherent part of social integration increases the willingness of senior team members to discuss, debate and solve conflicting activities. Such discussion forces a confrontation of competing goals and aspirations and reconciles conflicting demands (Jansen et al., 2008). The informal links between executives and trustful "relationships encourage team members to openly share information and discuss conflicting goals" tasks and improves decisions of how to allocate the scarce resources between the strategic contradictions (as cited in Li, 2013, p. 879). The key benefit of connectedness is that actors can identify and access knowledge sources within a social structure (Li, 2013).

The explorative approach not only requires new knowledge, organisational connectedness and strategic decision making, but findings also indicate the relevance of a CEOs transformational leadership behaviour (Friedman et al., 2016; O'Reilly & Tushman, 2013). Organisational literature has identified the importance of leadership and in particular transformational leaders (Jansen et al., 2008). "Transformational leaders are perceived by followers as exhibiting a style of leadership that marks idealized influence, motivational inspiration, intellectual stimulation, and individual consideration that helps them to grow and achieve higher performance" (as cited in Friedman et al., 2016, p. 998). Their findings indicate that transformational CEOs help their firms to become more adaptive to environmental changes when they create a comprehensive strategic decision making process within their management team. Therefore they have to define a clear mission and vision and a senior team that is enthusiastic about the collective goals. In their study into TMT performance in SMEs, Lubatkin et al. (2006) described that in order to achieve organizational ambidexterity SMEs

have to have a CEO with the transformation leadership ability to foster greater behavioural integration among the members of his or her TMT. On the other hand in the process innovations the specific need may require transactional leadership behaviour and leaders monitor team performance upon agreed objectives and anticipates upon mistakes (Jansen, Tempelaar, et al., 2009).

### External environment

The market dynamic in the external environment and the way companies adapt to opportunities and threats in this environment, identify their ambidextrous behaviour. Once the amount of competitors increase, especially over multiple market areas, the pressure upon efficiency and lower prices will tighten the margins and operational slack. In order to overcome increased competitiveness companies may act proactive and focus upon novel products to diversify and attract new customers. On the other hand companies may improve their effectiveness and lower their prices. Literatures argues that environmental dynamism and competitiveness are likely to moderate the impact of explorative and exploitative behaviour (Jansen et al., 2006; Levinthal & March, 1993).

One of the indicators of a company's strategic behaviour is their collaboration and suppliers selection process. In dynamic environments technologies and customer preferences change and require fluctuations in product supply and change of production materials. In such environment current products and services often change and require explorative behaviour to create new opportunities and meet the need of emerging markets. Such "dynamic environments may be characterized by variations in customer preferences, fluctuations in product demand or supply of materials, changes in technologies and new products & services make current ones obsolete" (as cited in Jansen et al., 2006, p. 1664). "Outcomes of exploratory innovations tend to rapidly become diffused over the population of competitors (Levinthal & March, 1993)" (as cited in Jansen et al., 2006, p. 1664).

On the other hand competitive environments with intensive pressures for higher efficiency and lower prices make companies increase their efficiency and "pursue exploitative innovations to better cater to existing customers and build customer loyalty without substantial costs associated with exploratory innovations" (as cited in Jansen et al., 2006, p. 1664). The one sided focus upon exploitation may enhance short-term performance, but it can result in a competency trap, especially technological change require an industry to adopt a descriptive technology (O'Reilly & Tushman, 2008; Raisch et al., 2009).

### 3.5. Ambidexterity in SMEs

In their book "*Lead and Disrupt*", O'Reilly and Tushman (2016) describe examples of entrepreneurs and their success syndrome. In these companies the successful exploitative activities got too much attention and the lack of exploration eventually killed companies. Consequently, companies balance exploitation and exploration e.g. in parallel or sequential ambidexterity, however this is rather difficult to achieve in SMEs since it is resource-intensive, requires extensive organizational arrangements and is only useful in slow moving environments. Therefore Bouten et al. (2016) identified contextual ambidexterity as most suitable for SMEs. In smaller business units contextual ambidexterity may promote the local innovation and stimulate small changes needed to continually adapt to the business environment (O'Reilly & Tushman, 2013, p. 14).

Friedman et al. (2016) theorised that the strategic decision making process is key for SMEs in order to adapt to changing environments. They interviewed TMT members of small enterprises and asked

how the company innovated and handled their slack resources. Their results indicate collaboration and information sharing may strategically be favoured over competitiveness in order to explore complex technologies (Friedman et al., 2016). The SMEs that have been studied bear resemblance to business units at large firms in terms of range and, in some cases, number of individuals employed. Lubatkin et al. (2006) discuss that SMEs may not be as distinct from large firm's business unit with respect to the knowledge process impediments and the role played by TMT members in managing the top-down and bottom-up processes.

A changing environment can be an indication for the need for explorative innovations, whereas increased competition is an incentive to focus more upon the exploitative process. The more adaptive oriented SMEs "look beyond short-term financial goals (which are often the focus of small firms) and utilize their comprehensive decision-making processes to develop a deeper, more nuanced understanding of environmental, ethical and social needs, as well as potential implications of the courses of action they pursue, by developing numerous alternatives and comparing them simultaneously" (Friedman et al., 2016, p. 1011). Such decision making process requires transformative leadership, however to attain ambidexterity SMEs rely more on the individual ability of their TMT. In a rather small management team, on average 4.4 MT members including CEO, with "fewer hierarchical levels", SMEs "top managers are more likely to play both strategic and operational roles" (Lubatkin et al., 2006, p. 647). "To be successful at ambidexterity, leaders must be able to orchestrate the allocation of resources between the routine and new business domains. How they actually do is seldom addressed in the research of ambidexterity, but is at the core of the leadership challenge" (as cited in O'Reilly & Tushman, 2013, p. 18).

### 3.6. Propositions

Out of the previous paragraphs four propositions are distracted. In the explorative research these propositions are used to assess the SME cases upon ambidexterity.

#### Contextual ambidexterity

The first key concept *Organisational ambidexterity* describes organisational structures and how organisations balance between exploitation and exploration. Paragraph 3.5 identified contextual ambidexterity as strategic alignment and relevant to pursue in smaller business units and SMEs. In order to promote local innovation and continuous adaption to the changing business environment, contextual ambidexterity is used to simultaneously achieve adaptability and alignment within the company. Managerial decisions of how to allocate resources between long-term adaptability and short-term performance are trade-offs and organisational design decisions (Tushman & O'Reilly, 1996). Such decisions require SME teams to directly participate and stay in close contact to operations and align existing competences (Lubatkin et al., 2006). A decentralised decision making process would promote to stay in close contact to the market and adapt to changes. Therefore, as described in paragraph 3.4, contextual ambidexterity is optimised when individuals make their own judgements about how to divide their attention between conflicting demands. A successful organisation balances between stretch, discipline, support, and trust in order to facilitate contextual ambidexterity. This leads to the first proposition:

**Proposition 1.** The use of *contextual ambidexterity* in SMEs is driven by a direct and informal organisational structure.

**Context:** The size of SMEs avoids them to use structural ambidextrous approaches. SMEs are not able to separate explorative and exploitative alignment between business units or departments. However contextual ambidexterity in SMEs is likely to be found on project bases or in contexts of certain operations, where individuals make their own judgments how to divide their time between conflicting demands. In a decentralised decisions making environment, individuals are able to discuss how to balance between exploitation and exploration. In informal and direct communication and individual expertise is included in the decisions and gains a wider understanding of decisions about conflicting demands.

### Knowledge inflow

In a study to absorptive capacity and knowledge inflows, relations between ambidexterity and vertical or horizontal knowledge inflows are identified. A top-down inflow is positively related to exploitation. Meanwhile horizontal and bottom-up knowledge inflows are positive related to explorative activities (Mom et al., 2007). Other research identified a positive relation between formalisation and exploitation (Jansen et al., 2006). The second proposition combines the formalisation of knowledge flows and exploration of product innovations.

When top-down information flows are formalised, it increases exploitative alignment. Besides when horizontal transfer of tacit knowledge about exploration of product innovations is formalised, it is assumed that a company's knowledge transfer improves the manufacturing process of new technologies. Therefore the second proposition assumes that SMEs with formalised knowledge flows, enables them to explore product developments and transfer this knowledge to exploit efficient manufacturing. The first can be identified with increasing complexity of products, gaining more understanding of sophisticated technologies and the later enables companies to move towards production of more radical product innovations.

**Proposition 2.** The more formalised the company's knowledge sharing is, the more radical product innovations are explored and manufactured.

**Context:** When new technologies are explored and introduced in SMEs product innovations, the operational part of the organisation requires information about how to manufacture them. Therefore its assumed that the formalisation of horizontal knowledge flows within the company can be positively related to acceptance and production of radical product innovations.

### Commonality in MT

Common values and organisational aspirations are an important team attribute. A management team that has a strong and compelling shared vision facilitates it's team members to prioritize and interpret problems and reduce conflicts (Jansen et al., 2008). In a comprehensive decision-making processes, team members are able to discuss and develop a deeper commonality among organisational objectives. This enables organisations to efficient align the company upon exploitative activities and adapt to explore market changes. A TMT with informal links between executives and trustful relationships among each other, "encourage team members to openly share information and discuss conflicting goals tasks" (as cited in Li, 2013, p. 888). This improves decisions about how to allocate the scarce resources between the strategic contradictions.

The literature review also identified a positive relation between SMEs CEO transformational leadership and integration of explorative innovations (Friedman et al., 2016), what resulted in the third proposition. SMEs exploitative and explorative activities are more diversified in organisations where the management is characterised by commonality among goals and integrative behaviour among leadership. Such SMEs are able to explore innovations while the TMT simultaneously handles the conflicting demands of exploitation and transformation of current products towards in new innovations. Therefore SMEs that got commonality among TMT and a transformative leader are characterised by more diversified activities of exploitation and exploration.

**Proposition 3.** A SME management team characterised by commonality, shared values and integrative leadership is able to pursue more extremes in ambidextrous alignment.

**Context:** A TMT with shared values is able critically debate and openly discuss the conflicting task issues, but also to agree upon the explorative direction. Jansen et al. (2008) found that social integrated management teams inspires and stimulates intellectual abilities in order to reconcile conflicting demands. And transformational leader is able to influence behavioural expectations and force social integration of conflicting demands.

## Environment

“Changing environments require adaption, nonroutine problem solving, deviation from existing knowledge, creativity and decentralization of decision making” (Jansen et al., 2006, p. 1663). Hence such dynamic environmental context and discontinuous change, introduce conflicting pressures for pursuing exploration instead of exploitation. On the other hand in slow-moving and stable environments there may be sufficient time to construct dual structures and companies are able to react upon rare events of radical change. Yet formalization and centralization of decision making may be effective, but in fast changing environments exploitative strategies are counterproductive (Benner & Tushman, 2003). Rather than suggesting one dual approach, Birkinshaw, Crilly, et al. (2016) suggests the challenge for firms is to make a choice that is appropriate to its environmental context. Firms need to decide what capabilities are needed in different settings and how they may change over time. Elaborating on this perspective introduced the fourth proposition.

**Proposition 4.** Dynamic environmental changes, trigger SMEs to change their balance from exploitation towards exploration and the other way around when competitiveness increases.

**Context:** Over time new technologies are explored, developed and new products are introduced in markets. The environmental competition will react upon these technology changes and increase competitiveness by lowering prices of existing products. Increasing the competition requires SMEs to pursue exploitation, however emerging technologies require exploration. The extent to which SMEs adapts to these environmental challenges, reveals their strategic behaviour of further exploiting their existing technological and marketing trajectories. It is assumed SMEs are triggered by new technologies to change focus towards pursuing exploration and product innovations. And SMEs decide to balance towards exploitation in increased competitiveness and market down turn. Since the environmental context change over time, it is assumed SMEs change their balance over time.

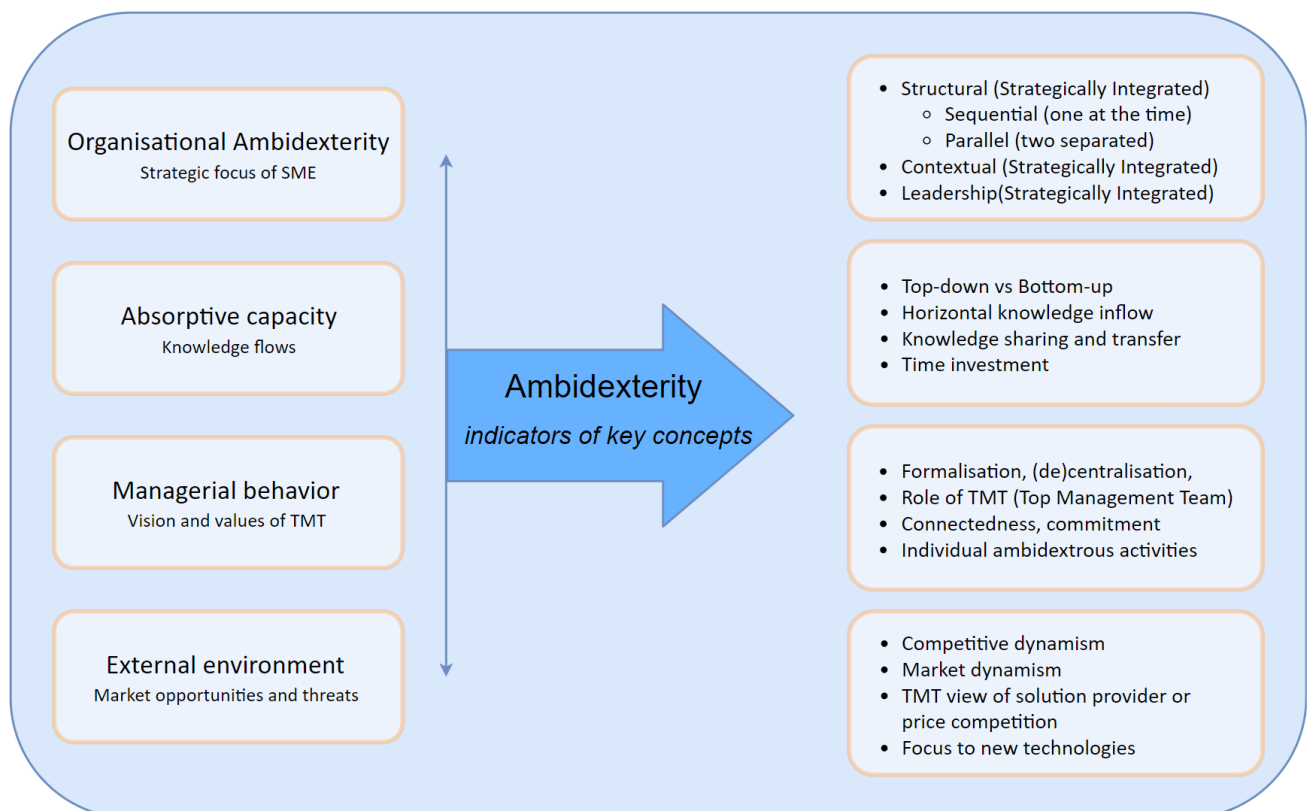
## 4. Research methodology

Starting with the conceptual framework as presented in *Figure 1*, this chapter describes the research methodology. Based upon the theory of “*Designing a Research Project*” as explained by Verschuren and Doorewaard (2010), multiple SMEs are evaluated. In *Figure 2* this evaluation is presented in the research framework. In order to measure contemporary events upon ambidextrous behaviour, a multiple case study research, as described by Yin (2009), is used. The next paragraph describes the choice for the use of a multiple. In paragraph 4.3 the case selection is argued. The last two paragraphs describe the data collection during semi-structured interviews. In these interviews contemporary events are confronted with theoretical objects out of the conceptual framework, it also explains how a Likert scale is used to measure extent of use of ambidexterity.

The literature study identified contextual ambidexterity and the transformative leadership style as important for SMEs to obtain ambidexterity. In order to balance between exploitation and exploration SMEs require to structure their organisation. Organisational structure is also part of the first key concept organisational ambidexterity. In paragraph 3.4 *Key concepts in theories about ambidexterity* three other key concepts have also been identified, therefore the literature study answers the first research sub question:

**RQ1:** *What are key concepts of ambidexterity that can be used to asses SMEs strategic behaviour?*

The four key concepts of ambidexterity are presented on the left side in *Figure 1* and are used in the case study to identify ambidexterity in SMEs. In order to use these key concepts in the evaluation of the cases, archetypes have been identified based upon the on the theory. The archetypes on the right are used to define research boundaries and are used to deduct the indicators of ambidexterity.



*Figure 1. Conceptual framework: Four key concepts and their archetypes.*



## 4.1. Research strategy

This research uses a multiple case study methodology to evaluate SMEs exploitative, explorative and hybrid approaches. The four key concepts of ambidexterity and the identified indicators are used to measure the ambidextrous behaviour in each case. In general a case study methodology is used when the investigator wants to explore a contemporary phenomenon in a real-life context, when a “How” or “Why” research question is being posed and when the investigator has little control over events (Yin, 2009, p. 10). In the evaluation of SMEs, a real-life context will be evaluated in order to gain knowledge about “How” executives handle their strategy.

### Case Study

The book “*Case Study Research Design and Methods*” of Robert K. Yin (2009) is used as guideline for this study. This method allows investigators to retain holistic and meaningful characteristics of real live events. The case study unique strength is its ability to deal with a full variety of evidence documents, artefacts, interviews, and observations. It relies on many of the same techniques as a historical method and it adds direct observation of the events being studied and interviews of the persons involved in the events. A case study goes beyond what might be available in a conventional historical study and is preferred in examining contemporary events. The evaluation of SMEs is about the contemporary events and persons involved in these events.

“How” and “Why” research questions are about prevalence of a certain effect and the exploration of such effect. These questions are more explanatory and deal with operational links needing to be traced over time, rather than frequencies or incidence. These questions are likely to lead to the use of case studies, histories and experiments as the preferred research methods (Yin, 2009, p. 9). The historical methodology is a preferred method when there is virtually no access or control over the behavioural events. A case study is distinctive in the degree to the extent of the investigator’s access to and control over actual behavioural events in contemporary events and is used when relevant behaviour cannot directly be manipulated. In this case study of SMEs was able to access executive’s and study their behaviour, also SME employees have been investigated.

A common concern about case studies is that they provide little basis for scientific generalization: “How can you generalize from a single case?” (Yin, 2009, p. 15). Therefore a multiple-case study is required to generalize theoretical propositions. In multiple cases, a study doesn’t represent a “sample” but will be expanded to a generalizable theory (analytic generalization), but not to enumerate frequencies (statistical generalization). Another issue is that case studies are often confused with teaching case studies, in such case materials may be deliberately altered to demonstrate a particular point more effectively. In research, any such step would be strictly forbidden. One disadvantage in the SMEs case study is that the companies are much smaller and how smaller the company the more dependent SMEs are to one manager or single employee. Doing a case study to a very small company with only a few employees is almost similar as to study one independent person, this makes it difficult to generalize these findings.

“The essence of a case study, the central tendency among all types of case study is that it tries to illuminate a decision or set of decisions: why they were taken, how they were implemented, and with what result” (As cited in Yin, 2009, p. 17), therefore this research uses a case study research as methodology.

## 4.2. Research framework

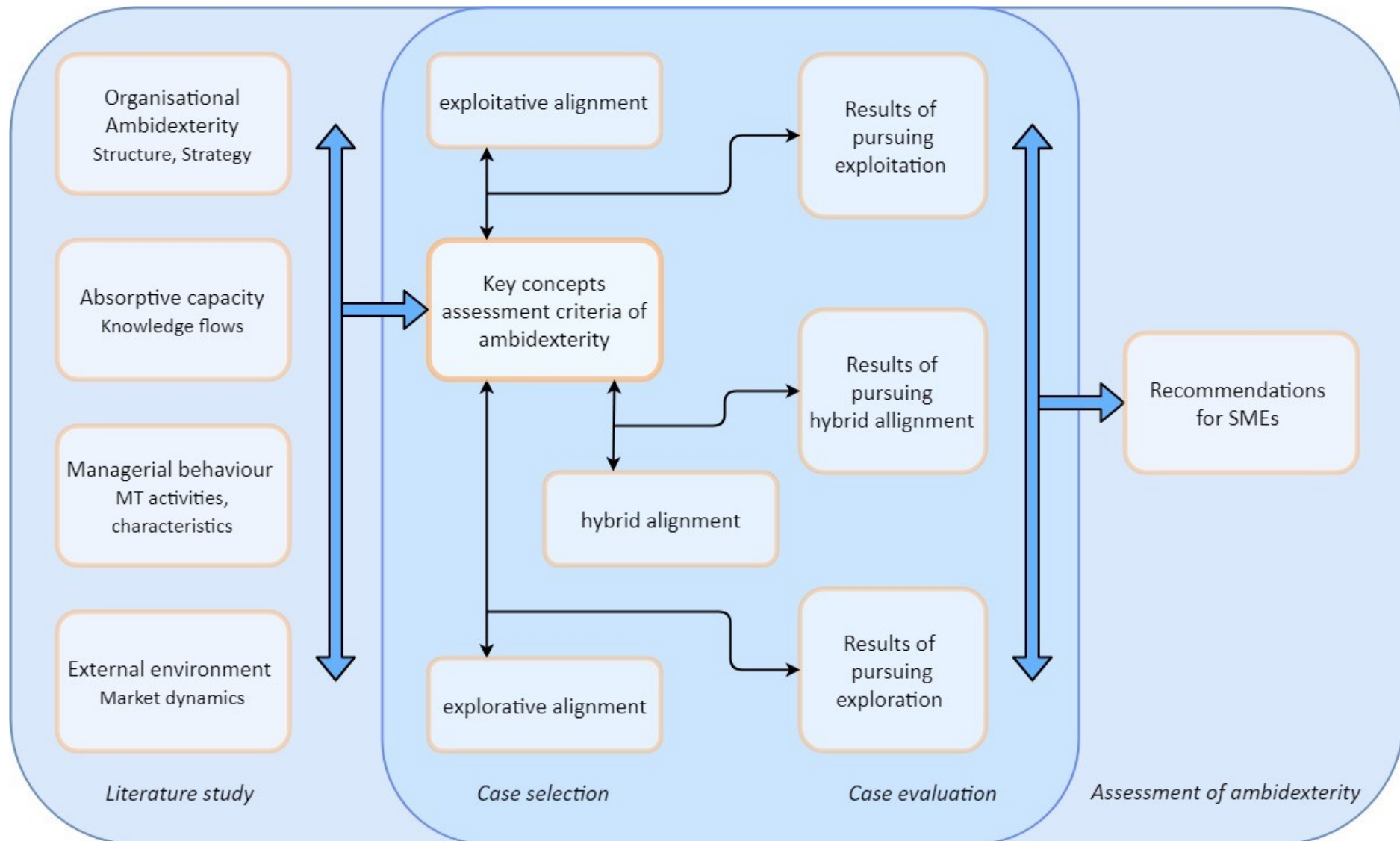


Figure 2. Research framework: four key concepts and three ambidextrous alignments for evaluation of multiple cases.

### 4.3. Case selection

The research framework sets the boundaries upon ambidextrous behaviour in SMEs and specifically upon CEO's or other executives involved in decision making between explorative and exploitative actions. The case selection criteria further demarcate this study, by controlling the environment. The selected cases are active in the same sector and are characterised upon the use of high-end technologies. These selection criteria strengthen the validity of this research. The cases are also selected upon age and are considerably older than start-ups. Subsequently cases are active in the same market, hence over time, the companies had to adapt to the same market developments and therefore the cases are characterised with similar strategic behaviour, what increases the reliability.

In this case study all the selected companies are active in the Dutch Maritime Cluster as defined in *paragraph 2.1*. In the financial year of 2016, the Maritime cluster still had to recover from the 2008/2009 economic crisis (Bossche et al., 2017). Since project investments in this sector heavily depend upon the oil price, companies have to be most efficient in this period when prices were under pressure. On the other hand the energy transition requires companies to adopt new technologies and apply it to a changing environment. Selection of cases active in the same sector and using similar technologies to control their environment, resulted in the following selection criteria:

- Small and Medium-sized Enterprises (10-250 employees and Sales < 50 million)
- Located in The Netherlands and selling products in the international Maritime market
- Internal development of own products and in control of the production process
- Incumbent SMEs with more than 25 years of experience in their business
- The company is characterised by the use of high-end technologies
- The interviewee is the responsible executive for operational and/or innervational processes

The companies in the Dutch Maritime sector can be found all over the country, but most employment is concentrated in the west, especially in the region around Rotterdam. Most people are directly working in the subsector *Ports* or are indirectly employed in relation this subsector. More than 75% of the Maritime sector employment is working in the following sub sectors: *Ports, offshore, shipbuilding, Yacht building, inland shipping and maritime supplies*. Comparing these subsectors to the case selection, increases the reliability of this study. With more than 75%, the majority of the companies in these subsectors are SMEs (Bossche et al., 2017).

One of the larger industrial organisations in the Maritime cluster is the Netherlands Maritime Technology (NMT), they are in direct contact with many companies active in this sector. In the desk research that followed upon the NMT website a contact list was made with executives active in 23 companies that seem to apply upon the selection criteria. The relevant online information of a company was studied and direct contact with executives was made by using the professional network relations. All invitations, for the participation in this research, were personally addressed and in this invitation the context of the study was briefly explained.

Of the 23 personal invitations 6 companies did not respond to the invitation. Of the other 17 companies only 11 cases full filled the selection criteria. Two foreign cases were initially selected but rejected later in order to focus upon the Dutch Maritime sector only. One company exceeded the 50 Million of Sales and therefore no longer full fills the criteria of being an SME. One contact just switched between jobs and was also rejected concerning the research validity.

Of the 11 selected cases two companies were represented by each two contacts, in one case because the role of Research and Development manager was recently swapped between the two interviewees. In the other case, the companies size simply requires divided responsibility, one of the executives got the role of Operations manager and the other one of Research and Development manager. By interviewing two persons in one company some general questions validate the company behaviour, other questions will increase the reliability since two persons are responsible for activities were smaller SMEs have only one person in control.

All the 11 selected cases full fill the selection criteria and are in a similar way spread over the country as the Dutch Maritime sector. The nine companies are located in the west part of The Netherlands. The majority is located within the region of the Rotterdam harbour and the so called Drechtsteden. This is related to the location of companies active in Maritime sector, as described in paragraph 2.2, what strengthen the research validity and reliability. One of the companies is located near the Amsterdam harbour and one company is located in the south west part of the Netherlands near the Harbour of Antwerp. Six companies are mainly active in the subsector *Offshore* and *Maritime supplies*. Three are mainly active in *Shipbuilding* and *Yacht building*, three others also supply in this subsector. Four of the companies are also active in *Ports*, three also sell their products in *Dredging* and also three in *Inland shipping*. The diversity of subsectors in this case study therefore includes a population that represents many SMEs in the Dutch Maritime Cluster and thus strengthen the reliability of this case study research.

The selected companies produce products that require a high degree of technological research, development and production skills. All cases produce products or solutions that have been developed in house. These industrial products are mainly software automated solutions with the use of electrical components and a mechanical design to withstand harsh maritime environments. Most cases are characterised by the high degree of electrical engineering and having control over the operational part of their product supply chain. In all cases the electrical design is done in house, as well as most less complex mechanical aspects. All companies are familiar with the Maritime regulations and many products in these cases comply to the applicable directives. Selecting companies upon these criteria increases the reliability of this research.

The produced products in this sector often have high installation costs. This characterises the customer demand for high quality products and long term product life cycle. Customers typically prefer proven technologies and reliable products above new products. For example a product on board of a vessel will typically be used for twenty to thirty years. New product development or technologies include comprehensive testing and official approval before it is allowed apply in a maritime environment. This indicates conservative customer behaviour upon changing products and adoption of new technologies. However in 2016 the sector is still characterised by their preliminary recovery of the economic crisis. This is mainly related to the low oil price. The preliminary recovery and the use of proven products urges companies in the sector to strategically balance exploration and exploitation. Therefore it is interesting to evaluate SMEs upon their recent strategic behaviour, besides this situation improves the internal research validity.

#### 4.4. Reliability and validity of semi-structured interview

The observation and semi-structured interview method of data collection is chosen in order to directly focus upon research topics during the interviews. This method perceives causal inferences and explanations about ambidextrous behaviour in SMEs. During the semi-structured interviews, the interviewee got the opportunity to freely associate upon their view of balancing between exploitation and exploration. Having face to face meetings help to adds expressions, understand the context of certain answers and visiting these companies, adds observations. However to assure reliability, the interview is structured by writing an interview a protocol. The same protocol is used every interview and can be found in *Appendix II*. Using an interview protocol not only improves the research reliability, but also it increases the validity since the questions do not change based upon other conducted interviews, besides the questions are based upon literature as is explained in chapter five.

The *Literature review* identifies four key concepts of ambidexterity and describes aspects of exploitative, explorative and hybrid approaches. This theoretical answer to the first sub research question (RQ1), is used to structure the interview protocol. The interview starts with four questions about *Organisational ambidexterity*, five about *Absorptive capacity*, three about *Managerial behaviour* and three questions about the External environment. Multiple studies to organisational ambidexterity, used questionnaires to measure ambidexterity in large organisations. The questionnaires used in these studies were sent to large organisations and are based upon quantitative research. These questionnaires identify relevant indicators of ambidexterity, thus using these questions as input to make the interview protocol and strengthen the research validity. The interview protocol got 15 statements about the key concepts and three open questions.

The structure of the protocol is based upon a logical description of a company, starting with an open question to introduce the company. This to give interviewee the opportunity to explain his/her role in the operational and innovation processes. Question one is followed by the statements of the four key concepts, all statements include multiple arguments based upon questions out of the questionnaires of other studies. These statements are based upon contracting variables. On the one hand they identify exploitation and on the other hand exploration. A Likert (1932) scale of 1-7 was used to score the company's approach. Regarding the Likert 7 point scale a neutral mid-point has been chosen to identify a hybrid approach and compared to a 5 point scale the additional granularity identifies the extremes with each 2 points (Garland, 1991). This way interviewees are not forced to choose a side, as is required on an even point Likert scale. With the additional two points, interviewees are also able to express the intensity of their exploitative vs explorative approach. In order to correct for false positive or negative answers, the extremes of exploitative and explorative arguments have been random swapped over different questions.

#### 4.5. Data collection

The main source of collected data is interview data, that is gathered via semi-structured interviews. All cases have been visited and during these visits observational data was also collected. Observations increase the chance upon receiving unexpected information or data about the case (Yin, 2009). The additional observational details can be found in appendix III, however this appendix is not publicly available, since it describes details about the interviewees answers and includes details that have been noticed during the interview or during the tour through the company.

In the autumn of 2017 the case study data is gathered and all companies have been visited. Eleven key persons of the cases were interviewed for about 45 minutes. And all cases are once observed during a tour through the company. Before the interview started, the interviewees were asked permission to make an audio record, under the conditions that these records will not be shared or published and are used for writing this thesis only. All interviewees gave permission and all interviews were recorded successfully. The interviews started with a brief introduction of the research study and its objective of exploring factors of ambidexterity in SMEs. The theory of balancing between short term efficiency and long term innovation was only briefly explained in the personal invitation, however only after the interview a more detailed description about ambidexterity was given, this in order to avoid any bias of the interviewee and increasing the external reliability.

During the interviews the 18 questions, see appendix II, were presented on a Laptop screen and the interviewee was given time to read the questions and study both statements before answering them. Using the same method of asking questions strengthen the internal research reliability. Question one is about introducing the company, the executive role of the interviewee and operational vs innovation processes. On average this answer took about 10 minutes and already identified aspects of ambidexterity. However in order to structure the interview the interviewee was sometimes asked to postpone further explanations since upcoming questions would handle these topics. On average the following four statements about organisational structure took the most of the time. These questions made interviewees explain their organisational structure, processes and quality improvements and the activities the company is mainly working on. The interviewees often identified one relevant innovation in their company and used this innovation as example to explain their exploration and exploitation process.

The four knowledge flow statements were either answered very quickly or resulted in extended answers about details of the company's knowledge flow processes. The topic about managerial behavioural questions were difficult, since this topic is mainly about leadership in the management team throughout the company. And although during most interviews the door was closed, not all interviewees were comfortable to talk about this topic. The last key concept of external environment was mainly used to measure the homogeneity of the cases by controlling their Maritime sector. These last three questions about the external environment also validates the characterises as described in the Dutch Maritime Cluster.

### Case Scores

The individual scores upon the fifteen statements were mainly given in rounded numbers, but sometimes an interviewee gave a score of two numbers, e.g. a score of 3-4. These scores are corrected into one of these two numbers, this number is chosen based upon the other scores of the same key concept. This strengthen the case strategy. i.e. the score 3-4 should be corrected into 4 when the case has more scores on a hybrid approach, and into 3 once the strategic approach is more to the extremes of explorative vs. exploitative. The corrections of individual scores can be found in appendix II and are argued in the interview description of appendix III.

The last question of the interview was an open question, asking the interviewee to identify factors of the company's success. This question mainly resulted in a summary about the company's strategic behaviour over the last decade and pointing out previous explained processes that proved to be successful.

## 5. Operationalisation of interview questions

This chapter justifies the questions used during the semi-structured interviews of this case study research. The questions are categorised based upon the four key concepts: *Organisational ambidexterity*, *Absorptive capacity*, *Managerial behaviour* and *External environment*. Several scientists have studied ambidextrous behaviour in large companies. These studies are often quantitative studies with large questionnaires about different fields of interest. In this explorative case study, sixteen statements are used to measure ambidexterity in SMEs. The relation between these statements and other questionnaires, strengthen the external validity of this study because those questions have already been used to measure ambidexterity.

**Questions 1 A-C:** The first introduction question **1A** is used to introduce the company, the role of the interviewee and his responsibility. **1B** describes the operational process and **1C** describes the innovation process. The aim of this question is to get a better understanding of the company's background and the position of the interviewee. A positive side effect of this first question is that the interviewee is feeling more comfortable and is able to be more open to explain his answers. However elaboration upon this question might undermine the structure of the interview.

### 5.1. Organisational structure

The first four questions are categorised in organisational ambidexterity. However in order to avoid bias of the interviewee, the definition of ambidexterity has not been explained to the respondents. Therefore the first concept is named *organisational structure* during the interview. Though this doesn't represent the whole aspect of an ambidextrous approach, this makes it easier to explain the four categories to the respondents and structure the interview.

**Question 2:** Exists of two statements about exploring radical innovations or exploiting incremental product innovations. "Units that engage in exploratory innovation pursue new knowledge and develop new products and services for new customers or emerging markets" and on the other hand "Units pursuing exploitative innovation build on existing knowledge and extend existing products and services for existing customers" (as cited in Jansen et al., 2006, p. 1661). The 'score 1' represents *Exploratory innovation*, the 'score 7' represents *Exploitative innovation*. These statements have been deducted of the questionnaire Jansen et al. (2006, p. 1672) used, this table lists a few of their questions about *exploration and exploitation*. The relation between the question and statements is represented by **Q2-1**, what means this question is used in interview question 2 at a score 1.

Exploratory innovation	Exploitative innovation (as cited in Li, 2013, p. 895)
Our unit accepts demands that go beyond existing products and services	<b>Q2-7</b> We frequently refine the provision of existing products and services
<b>Q2-1</b> We invent new products and services	We regularly implement small adaptations to existing products and services
<b>Q2-1</b> We experiment with new products and services in our local market	<b>Q2-7</b> We introduce improved, but existing products and services for our local market
<b>Q2-1</b> We commercialize products and services that are completely new to our unit	We improve our provision's efficiency of products and services
<b>Q2-1</b> We frequently utilize new opportunities in new markets	<b>Q2-7</b> We increase economies of scales in existing markets
Our unit regularly uses new distribution channels	Our unit expands services for existing clients
We regularly search for and approach new clients in new markets	Lowering costs of internal processes is an important objective

**Interview protocol: Q2** Please score what best categorises your company:

Our company invents, develops and commercializes products and services that are completely new to our company, this way we frequently utilize new opportunities in new markets (score 1).	<b>Score</b> <b>1 2 3 4 5 6 7</b> [...] Please rate a score of 1-7	Or our company frequently refines the provision of existing products and services, we introduce existing but improved products and services in our existing markets (score 7).
---	---	--

1: Clear exploitation strategy, 2: Exploitation strategy, 3: Efficient hybrid strategy, 4: Hybrid / Ambidextrous strategy, 5: Explorative hybrid strategy, 6: Explorative strategy, 7: Clear explorative strategy.

**Question 3:** The second statement is about the supply chain. On the one side “In general, exploration is associated with organic structures, loosely coupled systems, path breaking, improvisation, autonomy and chaos, and emerging markets and technologies” and on the other side “Exploitation is associated with mechanistic structures, tightly coupled systems, path dependence, routinization, control and bureaucracy, and stable markets and technologies” (as cited in He & Wong, 2004, p. 481). Ambidextrous organizations are composed of multiple tightly coupled subunits that are themselves loosely coupled from each other (Benner & Tushman, 2003).

A ‘score 1’ represents *Exploratory innovation* and ‘score 7’ represents *Exploitative innovation*. These statements have mainly been deducted of these statement above. However the questionnaire Li (2013) used also supports the supply chain topic.

<b>Environmental dynamism</b> “rate the degree to which each of these statements describes the market and competitive environment during the last three year” (as cited in Li, 2013, p. 895)
The actions of local and foreign competitors in ours major markets were changing quite rapidly
<b>Q3-1</b> Technological changes in our industry were rapid and unpredictable
The market competitive conditions were highly unpredictable
<b>Q3-1</b> Customers’ product preferences changed quite rapidly
<b>Inv.Q3-7</b> Changes in customers’ needs were quite unpredictable

**Interview protocol: Q3** Please score what best categorises the supply chain of your company:

On the one hand customers, suppliers etc. are part of loosely coupled systems, and for each product development they may change, most of the used technologies are emerging and new to the company, and customers and market characteristics are changing every time (score 1).	<b>Score</b> <b>1 2 3 4 5 6 7</b> [...] Please rate a score of 1-7	Or on the other hand the supply chain; is a tightly coupled system, is path depend and routinized, most of the used technologies are existing technologies, the product development processes are routinized and bureaucratic, customer relations are very stable and markets changes slowly (score 7).
---	---	---

1: Clear explorative strategy, 2: Explorative strategy, 3: Explorative hybrid strategy, 4: Hybrid / Ambidextrous strategy, 5: Efficient hybrid strategy, 6: Exploitation strategy, 7: Clear exploitation strategy.

**Question 4:**

In their research Jansen et al. (2006) present results that indicate that centralization negatively affects exploratory innovation, whereas formalization positively influences exploitative innovation. And “formalization is the degree to which rules, procedures, instructions, and communications are formalized or written down. Thus, formalization enhances exploitative innovations through improvement of current products, services, and processes” (as cited in Jansen et al., 2006, p. 1663).

The two statements of **Q4** represent on the one side ‘score 7’ *Exploratory innovation*, the ‘score 1’ represents *Exploitative innovation* these statements have been deducted of the questionnaire in Jansen et al. (2006, p. 1672).



<b>Formalization</b>	(as cited in Jansen et al., 2006, p. 1672)
<b>Q4-1</b> Whatever situation arises, written procedures are available for dealing with it	
<b>Q4-1</b> Rules and procedures occupy a central place in the organizational unit	
Written records are kept of everyone's performance	
Employees in our organizational unit are hardly checked for rule violations	
<b>Q4-1</b> Written job descriptions are formulated for positions at all levels in the organizational unit	

**Interview protocol: Q4** Please score what best categorises the procedures within your company:

Whatever situation arises, written procedures are available for dealing with it and; the procedures, rules, job descriptions and responsibilities occupy a central place in the organization (score 1).	<b>Score</b> <b>1 2 3 4 5 6 7</b> <b>[.....]</b> Please rate a score of 1-7	Or almost no procedures are formalised and employees are free to handle their work on their own way, the company's responsibilities are understandable and accordingly employees act upon their best abilities without any job description (score 7).
---	--	---

1: Clear exploitation strategy, 2: Exploitation strategy, 3: Efficient hybrid strategy, 4: Hybrid / Ambidextrous strategy, 5: Explorative hybrid strategy, 6: Explorative strategy, 7: Clear explorative strategy.

#### Question 5:

Mom et al. (2007) found a relation between top-down knowledge inflow and exploitation activities. They also identified how exploration activities are positively related to bottom-up and horizontal knowledge inflows. When managers focus upon increasing top-down, without enabling bottom-up or horizontal inflows in their organisation, it's likely that the exploitative activities increase and what negatively influence their exploration activities. In the questionnaire Mom et al. (2007) used, a changing environment was related to exploration and increased competition to exploitation.

This statement focuses direct upon on the managers activities and his adaption to changing environments. This statement also introduces the next category of the interview structure, namely absorptive capacity. The 'score 1' represents *Exploitative innovation*, the 'score 7' represents *Explorative innovation* these statements have been deducted of the questionnaire on page 919.

<b>Increased competition =&gt; exploitation</b>	<b>Exploration vs Exploitation activities</b>
Activities of which a lot of experience has been accumulated by yourself	Searching for new possibilities with respect to products/services, processes or markets
Activities which serve existing internal customers with existing services/products	Evaluating diverse options with respect to products/services, processes or markets
<b>Q5-1</b> Activities of which it is clear to you how to conduct them	Focussing on strong renewal of products/services, processes
<b>Q5-1</b> Activities primarily focuses on achieving short-term goals	<b>Q5-7</b> Activities requiring quite some adaptability of you
<b>Q5-1</b> Activities which you can properly conduct by using your present knowledge	<b>Q5-7</b> Activities requiring you to learn new skills or knowledge
Activities which clearly fit into existing company policy	(as cited in Mom et al., 2007, pp. 919, 920)

**Interview protocol: Q5** Please score what best categorises your work activities in the company:

It is totally clear to me how to conduct my work activities and what they will be, they can properly be conducted using my present knowledge and they are primarily focussed on achieving short-term goals (score 1).	<b>Score</b> <b>1 2 3 4 5 6 7</b> <b>[.....]</b> Please rate a score of 1-7	Or my work activities require quite some adaptability and quite often I need to learn new skills or study certain knowledge and my activities are primarily focussed on exploring long term goals (score 7).
---	--	--

1: Clear exploitation strategy, 2: Exploitation strategy, 3: Efficient hybrid strategy, 4: Hybrid / Ambidextrous strategy, 5: Explorative hybrid strategy, 6: Explorative strategy, 7: Clear explorative strategy.

## 5.2. Knowledge inflows

The acquisition of knowledge from other persons and/or units in the same organization influences their exploration and exploitation activities. In the area of technological innovation, scholars have examined the impact of knowledge acquisition by firms, in terms of the extent to which innovations tend to be incremental or radical (Mom et al., 2007). Question five already started with individual knowledge inflows. In order to measure the exploitative alignment, the top-down knowledge flow is measured in Q6. In Q7 the bottom-up inflows of knowledge is measured. Bottom-up inflow provides “managers an increased understanding of changes regarding existing technologies, products, processes, and markets and with increased understanding of new or emerging technologies, markets, customer needs, or internal initiatives” (as cited in Mom et al., 2007, p. 915). In Q8 the horizontal knowledge inflow is measured, what is used for unit learning and innovation and strengthen the strategy. Moreover horizontal interactions between employees help them developing integrative thinking skills, and resolve tensions associated with simultaneous pursuit of exploratory and exploitative activities (Fourné, 2014, p. 9).

<b>Top down vs Bottom-up and Horizontal knowledge inflows</b>	(as cited in Mom et al., 2007, pp. 919, 920)
<i>To what extent did you, last year, receive or gather knowledge from:</i>	
<b>Q6</b> Your direct supervisor	
One more hierarchical level up than your direct supervisor (if applicable)	
<b>Q7</b> Colleagues within your own organizational unit	
<b>Q7</b> Colleagues within your own department	
<b>Q8</b> Colleagues within the company	

**Interview protocol: Q6 – Q8:** *To what extent did you, last year, receive or gathered new and useful information about emerging technologies or new techniques that can be used in the developments of your company’s innovative products/processes/services.*

<b>Q6:</b> From your direct supervisor		
(score 1 = no info at all)	<b>Score 1 2 3 4 5 6 7</b> [.....] <i>Please rate a score of 1-7</i>	(score 7 = weekly)

<b>Q7:</b> Direct colleagues within your own organizational unit or department		
(score 1 = no info at all)	<b>Score 1 2 3 4 5 6 7</b> [.....] <i>Please rate a score of 1-7</i>	(score 7 = weekly)

<b>Q8:</b> From others within the company or your professional network		
(score 1 = no info at all)	<b>Score 1 2 3 4 5 6 7</b> [.....] <i>Please rate a score of 1-7</i>	(score 7 = weekly)

**Question 9:**

Armbrecht Jr et al. (2001) studied knowledge management and R&D. Among 19 leading R&D companies, management practices were identified and this study yields a model for knowledge flow in the R&D process. The managers prioritised knowledge flows had identified the following interesting aspects; How to create a culture in order to optimise the company’s knowledge flow; How to improve loss of knowledge when employees leave; How to promote creativity by the expansion knowledge. The study identified a culture where sharing and individual learning is important for the knowledge flow in the R&D process. Therefore Q9 is about the knowledge sharing. The ‘score 1’ represents *Exploratory innovation*, the ‘score 7’ represents *Exploitative innovation* these statements have been deducted of the semi-structured interviews Armbrecht Jr et al. (2001) conducted with R&D managers.

<b>Collaboration, sharing and individual learning</b>	(Armbrecht Jr et al., 2001)
<b>Q9</b> In the company a choice is made for information input stream?	
<b>Q9</b> Improving the access to knowledge; interact, extrapolate, tacit knowledge	
<b>Q9</b> Open sharing of knowledge and in line with cultural goals of the organisation	

**Interview protocol:** *Q9* In the company’s culture a choice is made how to facilitate individual learning, to stream the input of information and how to share knowledge in order to improve the access to tacit knowledge. For example there are open meetings for sharing, interacting, extrapolation of knowledge and these sessions are in line with cultural goals of the organisation.

Many investments in individual learning and the company’s knowledge. The culture is very open to share knowledge, e.g. regular (weekly) training sessions or sharing meetings (score 1).	<b>Score</b>	Only bare minimum investments in required knowledge. In culture sharing of knowledge is uncommon and exclusively need to know of internal knowledge sharing, ad hoc meetings or once a year (score 7).
	<b>1 2 3 4 5</b> <b>6 7</b> <b>[.....]</b> Please rate a score of 1-7	

*1: Clear explorative strategy, 2: Explorative strategy, 3: Explorative hybrid strategy, 4: Hybrid / Ambidextrous strategy, 5: Efficient hybrid strategy, 6: Exploitation strategy, 7: Clear exploitation strategy.*  
 Note: Q9 has been reformulated after interview A1, to express the value of knowledge sharing culture and not the open culture in general.

**Question 10:**

Pursuing exploration is related to increasing knowledge about new technologies and thus new ideas will rise. Exploration is also related to rapid changing environments and radical innovations, therefore uncertainties rise and in order to overcome failure in new product developments, managers want to reduce their risks. Also knowing that most innovative efforts tend to fail, search efforts are often intensified (Levinthal & March, 1993) and companies tend to create a better understanding about consequences of shifting their exploitation-exploration balance (Fourné, 2014).

Nevertheless when a new product development team is in close contact with others in the organisation or in their professional network, they could reduce their economic and technological risks by creating early feedback of other experts on their discoveries (Fourné, 2014). In one business unit Gibson and Birkinshaw (2004, p. 215) identified a units adaptability as “remarkable ability to turn on a dime.” “This was achieved, according to respondents, through “hiring very smart people.”” Hiring enables companies to actively interact with external actors such as individual experts or public institutions. The ability of social networks to link professionals is considered as the perfect tools to bring up innovations and hire external expert. Global enterprises use all kind of Social Network Sides (SNS) to enhance their absorptive capacity and generate innovations (Scuotto et al., 2017)

**Interview protocol: Q10** *The companies like Airbnb and Uber are extreme examples of mediation between supply and demand of a certain capacity. An organisation is able collaborate with other companies or it can hire self-employed individuals to increase the organisation efficiency. What is your experience with hiring or collaborating with external capacity in order to be more innovative.*

**“Uberisation** *is nothing but digital matching of demand and supply using a smart phone app.”* (Ganapathy, 2016)

<p>The self-employed Dutch market and hiring of R&amp;D capacity is a must have for my company in order to be innovative the required capacity must be acquired externally. Brokers such as external recruiters network events or even smart phone apps help us finding the right people (<i>score 1</i>).</p>	<p><b>Score</b>  <b>1 2 3 4 5 6 7</b>          [.....]          Please rate a score of 1-7</p>	<p>The innovation capacity of my company is more than sufficient and we seldom require external capacity. A broker circuit with recruiters and Uberisation of smart phone app’s would not help my company to be more innovative (<i>score 7</i>).</p>
--	--	---

*1: Clear exploitation strategy, 2: Exploitation strategy, 3: Efficient hybrid strategy, 4: Hybrid / Ambidextrous strategy, 5: Explorative hybrid strategy, 6: Explorative strategy, 7: Clear explorative strategy.*

### 5.3. Managerial behaviour of TMT

Organizations can excel when top or senior management teams effectively balance strategic contradictions, this internal process is largely facilitated by the senior Management Team and determine the extent of ambidextrous orientation (Tushman & O’Reilly, 1996). “Because SMEs have fewer hierarchical levels they rely more on the ability of their TMT to attain ambidexterity, their top managers are more likely to play both strategic and operational roles” (Lubatkin et al., 2006, p. 647). Their decisions regarding the organizational form, culture, resource allocation, largely determine the firms balance to both explore and exploit. Where structural differentiation permits firms to explore as well as exploit, the management team serves as the point of integration between these contrasting agendas (Smith & Tushman, 2005). The social connection of managers can be expressed in the extent to which decision making is concentrated in an organization (as cited in Jansen et al., 2006, p. 1663).

#### Question 11:

Benner and Tushman (2003) suggested that “centralized authority is beneficial to speeding up exploitative innovation. Conversely exploratory innovation requires nonroutine problem solving and deviation from existing knowledge, centralization of decision making is likely to reduce exploratory innovation.” (as cited in Jansen et al., 2006, p. 1663).

The ‘*score 1*’ represents *Exploitative innovation*, the ‘*score 7*’ represents *Explorative innovation* these statements have been deducted of the questionnaire on page 1672 (Jansen et al., 2006), they used the bullet lists below in their study. The **Q11-1** represents Question 11 statement with score 1.

<b>Centralization of decision making</b>	(as cited in Jansen et al., 2006, p. 1672)
<b>Q11-1</b> There can be little action taken here until a supervisor approves a decision	
<b>Q11-7</b> A person who wants to make his own decisions would be quickly discouraged	
<b>Q11-1</b> Even small matters have to be referred to someone higher up for a final decision	
<b>Q11-1</b> Unit members need to ask their supervisor before they do almost anything	
<b>Q11-1</b> Most decisions people make here have to have their supervisor’s approval	

**Interview protocol: Q11** Please score what best categorises the new product development process in your company:

Most development decisions have to have a supervisor's approval, only a little action can be taken by employees until a supervisor has to approve, supervisors want to be in total control and therefore are involved in all decisions before any action is taken (score 1).	<p style="text-align: center;"><b>Score</b>  <b>1 2 3 4 5 6 7</b>          [.....]          Please rate a score          of 1-7</p>	Or during the development process not even the most important design choices require someone higher up for a final decision. An engineer who wants to be creative and make his own design decisions would be encouraged (score 7).
--	---	--

1: Clear exploitation strategy, 2: Exploitation strategy, 3: Efficient hybrid strategy, 4: Hybrid / Ambidextrous strategy, 5: Explorative hybrid strategy, 6: Explorative strategy, 7: Clear explorative strategy.

**Question 12: Connectedness among MT**

In their research Jansen et al. (2006) found connectedness as important characteristic of a successful balancing MT, and since trust and cooperation are advantageous for connectedness these topics have been added to their research. As such managers may develop a densely connected and social relation within their units to increase a unit's contextual ambidexterity. "Close communication between top executives enables them to incorporate different perspectives to form paradoxical frames for allocating resources to both strategic contradictions" (as cited in Li, 2013, p. 879).

<b>Connectedness</b>	(as cited in Li, 2013, p. 895)
<b>Q12-1</b> In our organizational unit, there is ample opportunity for informal "hall talk" among employees	
<b>Q12-7</b> In this unit, TMT members from different departments feel comfortable calling each other when the need arises	
<b>Q12-1</b> Managers discourage employees discussing work-related matters with those who are not immediate superiors	
<b>Q12-7</b> People around here are quite accessible to each other	
<b>Q12-7</b> In this organizational unit, it is easy to talk with virtually anyone you need to, regardless of rank or position	

**Interview protocol: Q12** Please score what best categorises the management of your company:

In the organisation there is barely informal "hall talk" among employees and most issues are discussed during formal meetings. Managers discourage employees to discuss work-related matters with those who are not their immediate superiors or at least not without their presence (score 1).	<p style="text-align: center;"><b>Score</b>  <b>1 2 3 4 5 6 7</b>          [.....]          Please rate a score          of 1-7</p>	Or people around here are quite accessible to each other, it is easy to talk with virtually anyone you need to, regardless of rank or position. MT members from different departments feel comfortable when their employees exchange information without notifying them. And MT members call each other for advice when the need arises (score 7).
---	---	--

1: Not ambidextrous, 2: Not ambidextrous, 3: Not ambidextrous, 4: -, 5: Hybrid / Ambidextrous strategy, 6: Hybrid / Ambidextrous strategy, 7: Clear Hybrid / Ambidextrous strategy.

**Question 13:**

The results Li (2013) presents, "suggest that a greater effective balance of exploratory and exploitative innovations requires considering facilitating trust and connectedness among top managers and building their shared vision" (as cited in Li, 2013, p. 889). He argues that "a shared set of goals and values can provide a common language platform, which eliminates the misunderstandings in member communication and increases opportunities for exchanging ideas and resources freely" (as cited in Li, 2013, p. 880). Therefore "social capital among executives, including connectedness, trust and shared vision, can moderate the link between team diversity and organizational ambidexterity" (as cited in Li, 2013, p. 874).

Once the management team share their “vision by which they identify, obtain, and combine diverse perspectives on the effects of exploration and exploitation, they are willing to consider and address the challenges of allocating resources to balance strategic contradictions” (as cited in Li, 2013, p. 880).

<b>MT Vision, Commitment &amp; Trust</b>	(as cited in Li, 2013, p. 895)
<b>Q13-7</b> There is commonality of purpose in my senior team	
There is total agreement on our organizational vision	
<b>Q13-1</b> All senior team members are committed to the goals of this organization	
<b>Q13-1</b> People are enthusiastic about the collective goals and mission of the whole organization	
<b>Q13-7</b> Our senior team lacks a clearly defined collective vision (R)	

Trust refers to positive expectations regarding the quality of the relationships between TMT members, where a top executive believes that other TMT members behave beneficially and not opportunistically (as cited in Li, 2013, p. 879).

<b>Trust among TMT</b>	(as cited in Li, 2013, p. 895)
TMT members could not be counted on to fulfil their responsibilities in a reliable manner	
<b>Q13-7</b> TMT members did not approach their jobs in a professional manner	
TMT members approached their jobs carelessly	
TMT members performed their jobs less than skilfully	

**Interview protocol: Q13** Please score what best categorises the management of your company:

All MT members are enthusiastic about the collective goals and mission of the whole organization and they are totally committed to the goals of the organization (score 1).	<b>Score</b> <b>1 2 3 4 5 6 7</b> [.....] Please rate a score of 1-7	Or the management team lacks a commonality of purpose, there is no clearly defined mission and collective vision, instead managers often have their own agenda (score 7).
---	--	---

*1: Not ambidextrous, 2: Not ambidextrous, 3: Not ambidextrous, 4: -, 5: Hybrid / Ambidextrous strategy, 6: Hybrid / Ambidextrous strategy, 7: Clear Hybrid / Ambidextrous strategy.*

#### 5.4. External environment

Outcomes of exploratory innovations tend to rapidly become diffused over the population of competitors (Levinthal and March 1993). Such “dynamic environments may be characterized by variations in customer preferences, fluctuations in product demand or supply of materials, changes in technologies and new products and services make current ones obsolete” (as cited in Jansen et al., 2006, p. 1664).

On the other hand competitive environments are associated with intensive pressure for efficiency, process improvements, tighter margins and less organizational slack. Increased efficiency and pursuing exploitation requires to “better cater to existing customers and build customer loyalty without substantial costs” (as cited in Jansen et al., 2006, p. 1664).

In order to overcome market dynamics and competitiveness, company’s balance between these two as ambidextrous strategy. However literatures argues that environmental dynamism and competitiveness are likely to moderate the impact of both exploitation and exploration (Levinthal & March, 1993).

<b>Environmental competitiveness</b>	(as cited in Li, 2013, p. 895)
<b>Q14-1</b> Competition in our local market is intense	
<b>Q16-1</b> Our firm has relatively strong competitors	
<b>Q14-1</b> Competition in our local market is extremely high	
<b>Q14-1</b> Price competition is a hallmark of our local market	

**Question 14:**

The intense competition of *score 1* is associated with exploitation and *score 7* with exploration.

**Interview protocol: Q14** Please score what best categorises your industry in the last five years:

Competition in our market is intense, the firm has many competitors offering the same product and price competition is a hallmark of our market ( <i>score 1</i> ).	<b>Score</b> <b>1 2 3 4 5</b> <b>6 7</b> [.....] Please rate a score of 1-7	Or less competition in our market, more important is offering the best solution to our customer and therefore sometimes we collaborate with other suppliers. Pricing is less important compared to offering the right solution ( <i>score 7</i> ).
---	---	--

1: Clear exploitation strategy, 2: Exploitation strategy, 3: Efficient hybrid strategy, 4: Hybrid / Ambidextrous strategy, 5: Explorative hybrid strategy, 6: Explorative strategy, 7: Clear explorative strategy.

**Question 15:**

This question measures the importance of customer wishes and market dynamics that require explorative changes on the one hand and less influential conservative customer requests require exploitation. A *score of 1* is associated with exploration and *score 7* with exploitation.

<b>Environmental dynamism</b>		(as cited in Li, 2013, p. 895)
<b>Q15-1</b>	<b>Q16-1</b>	Environmental changes in our local market are intense
<b>Q15-1</b>		Our clients regularly ask for new products and services
<b>Q15-1</b>	<b>Q16-1</b>	In our local market, changes are taking place continuously
		In a year, nothing has changed in our market
		In our market, the volumes of products and services to be delivered change fast and often

**Interview protocol: Q15** Please score what best categorises your customers in the last five years:

Customers easily adopt technological changes, unpredictable and intense changes in product are rapidly adopted and customers' product preferences may change quite rapidly once competitive advantages are introduced ( <i>score 1</i> ).	<b>Score</b> <b>1 2 3 4 5</b> <b>6 7</b> [.....] Please rate a score of 1-7	Or almost no technological changes are requested by our customers, emerging technologies are only introduced when it has been proven in other markets. The selling points of our products are well known and customers rarely ask for changes in our products and services ( <i>score 7</i> ).
---	---	--

1: Clear explorative strategy, 2: Explorative strategy, 3: Explorative hybrid strategy, 4: Hybrid / Ambidextrous strategy, 5: Efficient hybrid strategy, 6: Exploitation strategy, 7: Clear exploitation strategy.

**Question 16:** Changes demanded by the market are associated with exploration and *score 1*. More conservative competitors aim for quality and efficiency are associated with exploitation and *score 7*.

**Interview protocol: Q16:** Please score what best categorises your company and its competitors in the last five years:

The actions of local and foreign competitors in our markets change quite rapidly, the products offered by our competitors change quite often and innovations are introduced on regularly bases, therefore my company is continuously exploring innovations ( <i>score 1</i> ).	<b>Score</b> <b>1 2 3 4 5</b> <b>6 7</b> [.....] Please rate a score of 1-7	Or initially our industry is focussing on efficiency of manufacturing and quality improvements, companies are not willing to invest additional cost in technological changes only changing regulations or incentives such as governmental subsidizes enable companies to start exploring emerging technologies ( <i>score 7</i> ).
--	---	--

1: Clear explorative strategy, 2: Explorative strategy, 3: Explorative hybrid strategy, 4: Hybrid / Ambidextrous strategy, 5: Efficient hybrid strategy, 6: Exploitation strategy, 7: Clear exploitation strategy.

## 6. Cross-case analysis of multiple SMEs

The individual scores, as given during the interview, are analysed in this chapter. First original scores are corrected into one rounded numbers as explained in paragraph 4.5. Secondly the numbers are corrected for false positive or negatives, therefore the numbers in the table below are reverse coded. The original scores as given during the interview can be found in appendix II. Each score is related to indicators of ambidexterity and organisational alignment. The first column identifies the questions, the top row the cases and the last column describes the topics of each question. The topics identify the extreme scores of each question. To complete this overview last row already identifies the case conclusion, however this row is explained in the next chapter.

Table 2: Reverse coded scores of exploitative, explorative and hybrid alignment in colour.

Questions	A1	B1	C1	D1	D2	E1	E2	F1	G1	H1	I1	Min / Max	Median	Topic question
<b>Org. structure</b>														
Q2	4	5	1	3	3	3	2	1	3	6	3	1 / 6	3,0	1 - <i>incremental</i> <=> 7 - <i>radical</i> innovation
Q3	2	4	3	3	3	6	3	5	5	5	4	2 / 6	3,5	1 - <i>tightly coupled</i> <=> 7 - <i>loosely coupled</i> supply chain
Q4	5	5	6	4	4	5	5	6	6	5	3	3 / 6	5,0	1 - <i>formalised</i> <=> 7 - <i>no</i> procedures
Q5	4	6	5	5	7	6	3	2	4	7	6	2 / 7	5,0	1 - <i>clear</i> work activities <=> 7 - <i>high</i> adaptability
<b>Knowledge</b>														
Q6	6	7	7	5	5	4	6	7	4	7	3	3 / 7	5,5	1 - <i>weekly</i> knowledge inflow from supervisor <=> 7 <i>None</i>
Q7	2	5	5	4	6	6	3	6	4	7	7	2 / 7	5,0	1 - <i>direct</i> colleagues no inflow <=> 7 <i>weekly</i>
Q8	5	4	3	4	4	3	4	6	2	6	5	2 / 7	4,0	1 - <i>professionals</i> in network no inflow <=> 7 <i>weekly</i>
Q9	2	7	4	4	5	6	5	6	6	6	4	2 / 7	5,0	1 - <i>ad hoc</i> knowledge sharing <=> 7 - <i>structural</i>
Q10	1	6	2	5	3	4	5	6	4	3	2	2 / 6	3,5	1 - <i>hiring</i> <i>exploitation</i> <=> 7 - <i>exploration</i> capacity
<b>MT</b>														
Q11	3	5	7	5	7	2	6	5	3	5	3	2 / 5	5,0	1 - <i>centralised</i> <=> 7 - <i>non routine</i> decision making
Q12	4	7	7	6	5	5	5	6	5	6	7	4 / 7	5,5	1 - <i>exploitative</i> <=> 7 - <i>contextual</i> connectedness
Q13	2	1	3	6	3	4	6	6	7	4	5	1 / 7	4,0	1 - <i>collective</i> goals <=> 7 - <i>no clear</i> vision
<b>Environment</b>														
Q14	3	6	6	5	3	7	4	6	2	7	6	2 / 7	5,5	1 - <i>price</i> <=> 7 - <i>solutions offered</i> in industry
Q15	4	6	3	2	3	2	5	5	6	1	4	1 / 6	3,5	1 - <i>customers</i> are <i>conservative</i> <=> 7 - <i>adapt</i> changes
Q16	2	5	4	5	4	3	3	6	2	5	4	2 / 6	4,0	1 - <i>competitors</i> <i>exploitation</i> <=> 7 - <i>exploration</i>
Min / Max	1 / 6	1 / 7	1 / 7	2 / 6	3 / 7	2 / 7	2 / 6	1 / 6	2 / 7	1 / 7	2 / 7			
Median	3,0	5,0	4,0	4,5	4,0	4,0	4,5	6,0	4,0	5,5	4,0			



## 6.1. Score description

In the table on the previous page, the first column categorises the questions or statements Q2-Q16. The top row identifies the cases including the two individual interviewees in the cases D and E. Each question correlates to the statement as used in the semi structured interviews, it identifies the different ambidextrous alignments. The colours used are yellow for **exploitation**, blue for **exploration** and hybrid is given in white. The questions were randomly corrected for false positive or negative answers, however this table contains the reverse coded scores. The original scores of Q2, Q3, Q9, Q10, Q15 and Q16 are reversed, were a score 1 is coded into 7 etc. Ten of the 15 statements got exploitation versus exploration on the extremes and hybrid in the middle. The statements of questions Q6-Q8 and Q12 are exploitative or explorative alignment and set against hybrid alignment on the other extreme. Question 13 got a red colour for being **not hybrid**, this question was found in a study into ambidexterity and measures not hybrid against hybrid or ambidextrous alignment.

## 6.2. Organisational structure

The questions Q2-Q5 exist out of statements related to ambidexterity and the alignment of the organisation towards exploitation or exploration. Q2 scores identify that 8 out of 11 cases mainly apply incremental product innovations in existing markets. SMEs in these cases rarely utilize new opportunities in new markets. Only the cases B and H balance more towards radical product innovations. These two cases invent, develop and produce new high-tech products, that are being applied into new markets. However 7 out of 11 cases balance in the middle and explained to adopt new technologies and apply these technologies to existing products. These incremental innovations also enable them to enter new markets.

How to handle the supply chain is scored in Q3. It can be seen that in 9 out of 11 cases score 3-5 what is related to a hybrid approach. In seven interviews the supply chain was described as open for change, however only during the product design phase. Once a prove of concept was accepted and the design phase ends, the production process optimises the supply of components and thereafter the supply chain rarely change. Suppliers are changed only when they fail to deliver the demanded quality or make agreed deadlines.

Once it comes to the sales side of the supply chain, 6 out of the 9 companies identified to have a stable distributors network and routinised supply chain. This enables them to offer world wide support in the international Maritime sector.

Although all companies highly value quality and all are familiar with the regulations of ISO-9001, formal procedures are not always used. The fourth statement identifies that 10 out of 11 cases use a more informal approach. One of the cases recently dropped the certificate and one other never applied for the certificate. Also, three interviewees explained the recent change of ISO-9001 procedures in and being less strict. The regulations of ISO-9001:2008 into 2015, includes a change of focus in more High-Level structure (ISO, 2015). In three other cases the lack of procedures was explained by just not having enough time to spend on writing the procedures. Regarding the one case that scores exploitative, their answer can be explained by the recent integration into a large foreign company, that already had several procedures in place. It's noticeable that the two cases with two interviewees both have a similar score on this question, this expresses that quality procedures are a company-wide matter.

The fifth statement (Q5) is about the interviewee's adaptation in work activities and individual learning, it identifies the exploitative competitive behaviour or explorative long-term prospects. Nine out of eleven interviewees scored in the middle or to the explorative side. Of the five cases with a score of 6-7, it is notable to see that three of them are considered to make the most complex and high-tech products of the case selection. The interviewees in these cases are required to study complex technical details in order to be able to adapt to long-term innovative goals. They are often the sole responsible person of introducing new technologies, they identify opportunities and initiate new developments for the company's innovative products.

One out of the eleven cases scored a clear exploitative approach and the case who scored a 3 also balances more to exploitative approach. These two interviewees also conduct engineering activities within their team and these activities are expected to pursue exploitation and achieve short-term goals. This Q5 question differentiates the role of the two interviewees who are active in the same firm. In both cases one interviewee is responsible for the more operational aspects and the other for the more explorative activities.

The overall view of the first category *Organisational structure*, identifies case H with the highest score on exploration. The cases B and E1 also have a high score on exploration. As it comes to radical innovation the cases H and B score high on innovation and development of radical new products. Regarding case E, the second interviewee identified a more exploitative approach. Actually, the two lowest scores identifying exploitative approach are in E2 and case F. Their low score at Q2 identify the company's exploitative approach and Q5 also identifies the individual achievement of short-term goal oriented activities. The Q2 score 1 at case C is related to the supplied components, rather than it can be pure related to exploitative behaviour. The company is obligated to use this old technology, since their customers highly value the reliability of these techniques. Also noticeable is the almost similar scores of the two interviewees in case D. They only differ in the individual learning and adaptation to new situations, what can be explained by the different roles of the interviewee in the company of being operational and R&D manager.

### 6.3. Knowledge sharing

In the last question individual learning and gaining new knowledge already introduced the key concept of knowledge sharing. The statements Q6 - Q8 are about how knowledge is transferred through the company. Starting with Q6 about vertical knowledge flow between supervisor and employees. The more frequent knowledge is vertically transferred, the more exploitative the aligned the company is. However, Q6 identifies 10 out of 11 cases to score in the middle or balance towards limited sharing of vertical knowledge. Only case I, with a score of 3, is exploitative oriented as it comes to vertical knowledge sharing. Since this company is part of a larger group and the interviewee is CEO of this Dutch business unit, this score represents knowledge exchanges within the group.

The Q6 statement also identifies 6 out of 11 cases with a score of 6-7, what means that interviewees received no, or almost no information at all. During the last year these cases shared limited vertical knowledge between supervisor and interviewee, at least not information about new technologies or new knowledge that could be used in the company's developments and product innovations.

Statement Q7 is about knowledge sharing with direct colleagues. These scores show an almost reversed picture compared to Q6. Nine out of eleven cases score explorative or in the middle of frequent horizontal knowledge sharing. Five out of eleven scored a 6-7 what means they periodically

organise meetings for knowledge sharing on a monthly or weekly basis. These meetings are structurally scheduled and express how companies value knowledge sharing as important for the future of the company. Again, case H scores high upon exploration, but also case I scores high upon internal knowledge sharing, which is noticeable since the case scored exploitative in Q6 and explorative in Q7. The score 2 in case A is explained by the interviewee of being a company mainly active in labour force and task oriented manufacturing, these employees require a skill set and learn on the job by doing.

Statement Q7 and Q8 both indicate a horizontal knowledge inflow what is associated with pursuing exploration. Where as Q7 was about internal sharing, is statement Q8 about external knowledge sharing. External knowledge sharing is within the interviewee's professional network or within the larger organisation. The cases F and H scored the highest with a 6. These cases regularly share valued information within their network. Therefore they use exhibitions, are contact with universities and exclusive expert groups. With a 3-5 score, 8 out of 11 cases score more in the middle and have frequently new and useful information out of their professional network.

Q9 measures the company's culture of investing in new knowledge and facilitating structural knowledge transfer meetings. The statement identifies 7 out of 11 cases to use an explorative approach with regular meetings and individual learning. Case B scores most explorative with a 7, the interviewee explained to have a so called "company academy" and highly values the monthly knowledge sharing meetings. Case A scores most exploitative upon investing in new knowledge. The interviewee again emphasised the company's task oriented approach and the required individual skill set, what is mainly leaned on the job by doing.

The Q10 statement focusses upon on hiring additional capacity in order to be more innovative. The cases B and F, with a score of 6, value hiring external expert most. Case A scores 1 and uses additional exploitative capacity to deliver a project in time, but not in order to increase their expertise. The cases C and I explained their exploitative score as not using a social network app as broker to hire R&D experts, these companies have their own network for hiring personnel.

Overall the key concept absorptive capacity and knowledge sharing within the cases mainly identifies an explorative focus. Of the Q5-Q10 statements case A and I scored two statements on exploitative approach. Five out of eleven cases have scored one or more exploitative scores. Hence the majority of case scores has an exclusive balance towards exploration among this key concept. The cases B, F and H scored most of their statements on explorative approaches.

#### 6.4. MT behaviour

The managerial behaviour within the cases is measured with the statements Q11 - Q13 and identifies how the Management Team structures the company towards exploitative or explorative alignment. The first statement is about decision making within the company, it identifies the hierarchical decision making structure and the individual design freedom engineers get to be creative. In Q11 two interviewees scored a 7 and explain to trust their experts to make design decisions based upon expertise. Seven out of the eleven cases have a balanced score of 3-5. Case E scored a 2 and identified a centralised decision making procedure, what is related to a more exploitative approach of the management. However, his colleague scored a 6, what can be explained by the difference in roles, the interviewee with a 6 is the expert of the company and the 2 is scored by the manager.

In statement Q12 the organisational decision making procedures and information stream are expressed in pursuing exploitation against ambidextrous alignment. In pursuing exploitation, the managerial behaviour is centralised and hierarchical decision making is a core value in the organisation culture. The ambidextrous approach demands individuals to make contextual decisions and balance between contradicting demand. All the eleven cases balance in the middle or on the ambidextrous approach side. The companies B, C and I have a score 7 and encourage their employees to feel comfortable to exchange information with any colleague within the company.

In Q13 commonality among a set of organisational goals within the management team is scored. A low score indicates a MT to be enthusiastic about collective goals the team trusts each other and is committed to the same organisational goals. In case B the lowest score of 1 can be found and case A scores 2, both companies have commonality among MT members about the company's objectives. On the other extreme case G has scores 7 and identified a distance between TMT and departments. The interviewee explained that their department is able to set their own agenda. In three other cases scored 6 and also identify not to have a clear vision within the MT. On the other hand, 5 out of 11 cases have a more balanced score of 3-5.

The category managerial behaviour got an overall score of, is balancing between exploitation and ambidextrous alignment. With the highest score on Q11-Q12 and lowest on Q13, case B balances most to the right between exploitative and ambidextrous alignment. With the low scores upon Q11-Q13 case A balances most to the left or exploitative alignment.

## 6.5. External environment

The case selection of SMEs active in one industry, could introduce similarity for the external environment. However the selected SMEs are active in different sub sectors and although some are active in the same sectors, their description of market dynamics differ as can be seen in their scores.

In Q14 six out of eleven cases score a 6-7 and are classified as pursuing exploration. In this industry offering the right solution is valued by these companies above being able compete in price. Case G scores the lowest because they are active in a more competitive subsector, where efficiency is more important. However, the cases A and D also experience low pricing competition in the market, but they balance more to ambidexterity with their focus upon offering the best solution to their customers.

In the former last statement, Q15 categorises the company's customers and their adaption upon changes. Eight out of eleven cases score a 3-5 and identify their customer behaviour as hybrid. Customers do not easily adopt changes, but once technologies are reliable and foster competitive advantages, they adopt changes. Case H got the most extreme score with 1, their customers are categorised as conservative and new products are not easily adopted. The interviewee even explains to have a cash cow product that is in the market for over thirty years. On the other hand, the inventions of a new sensor in this company require time to be understood by their customers. And on the explorative side the cases B and G score a six and categorises their customers as adaptive.

The last statement Q16 categorises the company and its competition. The cases A and G score a 2 and identify their competitors to have a focus upon efficiency, quality improvements and upon exploitative behaviour. On the other side case F scores a 6, what describes their competition as a

dynamic market with rapidly changing products. In their explorative approach, these competitors continuously present product innovations.

This last category of *external environment* identified the case B and F as being active in the most explorative environments. Case A has the lowest scores and is active in the most exploitative environment. Remarkable is case H and the score of 1 at Q15, their customers are categorised as conservative, however the company scores a more exploitative approach. The interviewee explained this score of having a cash cow product that is being produced for thirty years. This enables the company to conduct exploration of new products while having a steady stream of income.

## 6.6. Case conclusions

This paragraph briefly describes the identified strategies of each case. This conclusion is based upon the case descriptions as presented in the appendix and upon the scores and descriptions as presented earlier in this chapter. One of the interviewees, case B, executed a validation of his scores. After studying chapter five he scored his case and found consistency among his scores. The validation of this case identifies these case conclusions to be valid and reliable.

### Conclusion Case A

Company A is task oriented and got labour intensive activities. The score upon organisational structure and tightly coupled supply chain indicates *exploitative* alignment. Knowledge sharing can be found in the small design team where customer specific solutions are being made. Among the labour force in the factory, skills are learned and shared at the job to ensure the product quality. The case scores identify limited attention upon absorptive capacity and pursuing exploitation. The limited characteristics of ambidexterity can be related to individual behaviour in the MT and among one or two employees. However, there is a transformational leader and the company is able to adapt its designs and offer customer specific solutions. The company is also exploring new product market combinations in order to compete with new solutions. Nevertheless regarding the MT and external environment scores the company scores to pursue *exploitation*.

### Conclusion Case B

The scores in case B clearly identify this company of *explorative* alignment. The organisation is more focussed upon radical product innovations and is able to adapt technological changes. The company's absorptive capacity scores high upon horizontal knowledge sharing and hiring external experts. The company's so called 'academy' emphasises their *explorative* alignment. Commonality among company goals within the MT and their position relative to the external environment, also strengthen their *explorative* alignment.

*Note: Case B individual scores and this conclusion is validated by the interviewee. After reading chapter five the operationalisation of interview questions; the interviewee scored his case again and found a consistency among the scores. In retro perspective only Q9 changes slightly; instead of investing in new knowledge only, investments should be spread out between gaining new knowledge and knowledge sharing within the company.*

### **Conclusion Case C**

The organisational structure of company C identifies an internal *explorative* oriented organisation. Their agile engineering methodology enables them to adapt to supplier changes. However, customer base requires the company to behave *exploitative* towards the external environment. The supply chain is tightly coupled because customers demand a more conservative strategy. Therefore, company C balances between exploitation in the external environment and behaves explorative as it comes to their internal organisational structure. Balancing in between depending on the solution customers required, make the company to pursue contextual ambidexterity.

### **Conclusion Case D**

The growing company size to about 160 employees, introduced a scaling problem. The company is improving the internal processes and knowledge sharing activities. The organisational structure has been formalised and the growth crisis seems to be under control. This crisis might be related to the “control crisis” phase (Greiner, 1997). *Growing organisations move through five distinguishable phases of development. In this article Greiner (1997) advises management to anticipate their behaviour upon the next crisis.* The departments of operational and R&D have been separated and their own characteristics. However, the company’s score identifies a balance between efficiency and exploration. The physical separation of departments and their own focus points identify the company to pursue *structural ambidextrous* alignment.

### **Conclusion Case E**

The managerial actions during market down turn made the company shrink, what identifies their alignment upon efficiency. The current organisational structure is *exploitative* aligned, what is identified by the hierarchical structure and centralised decision making procedure. However, the current economic welfare initiates a more exploring strategy, as they pursued before the crisis. New energy in the MT initiates knowledge sharing and focus towards long-term innovations. The strategic change to focus more upon being a solution provider, next to the ideas of redecorating the building, is interpreted as changing balance from exploitation to a more hybrid strategy.

### **Conclusion Case F**

Due to the recent crisis company F also had to shrink in size and pursue efficiency. The company was able introduce incremental product innovations and initiatives in knowledge sharing. Concerning the new role of the interviewee and his R&D insights, explain the high explorative scores. Therefore the scores mainly represent the R&D department and their intrinsic motivation to pursue exploration. The department pursues exploration e.g. in knowledge sharing capacity and enables the company to follow the external market and adopt new technologies. However other departments are still mainly focussing upon efficiency in their current value chain.

### **Conclusion Case G**

The company’s strategy made them stop investing in the company’s growth during the economical down turn. Recently the company started growing again and with their new building they are able to expand even more. The formalised organisational layers enable the company to foster growth, however also increase the hierarchical structure and limited exploration. However, the two decentralised R&D departments enables them to explore customer requirements and adjust the products upon the external environment. So, as it comes to adoption of new technologies the R&D department pursues exploration. However overall the company’s structure, informal knowledge

sharing, centralised decision making and incremental product innovations, indicate a *ambidextrous strategy* that tends towards exploitative alignment in the other departments.

#### **Conclusion Case H**

Strategically the company explores radical product innovations. The company got one cash cow product that is being produced for about thirty years. This product enables the company to structurally invest in exploration and start long term product development projects. However, the external environment is not easy to convince, customers adopt new products once it has been proven to be reliable. The company in case H scored in every key concept second closest to explorative alignment, only customer behaviour got a more conservative score. However the interview was mainly focussed upon innovation. Regarding the large inhouse production that competes against externalized production, other departments probably pursue more exploitation.

#### **Conclusion Case I**

The Dutch business unit effectively balances between long term innovations and short term manufacturing efficiency. The knowledge processes are exploring new measurements and specific applications what enables them to explore new solutions in the industry. The larger organisation focuses upon operational efficiency and collective goals. With the decentralised business unit, the Dutch office is able to explore product innovations and collaborate with others, but simultaneously achieve efficient manufacturing and distributing the company's products.

## 7. Conclusion and Discussion

In the previous chapter the analytical findings are presented. This chapter discusses these findings based upon table 2 the *Cross-case analysis* and upon case details as described in Appendix I *Case descriptions*. The first paragraph will reflect upon the propositions, thereafter the research questions will be answered and advice for practical implications will be given. The last paragraphs describe the research limitations, suggestions for future work and ends with the conclusion and reflection to what extent the findings are generalizable.

### 7.1. Reflection upon propositions aspects

The propositions are determined in the literature study, as identified in paragraph 3.6. However, for readability they are briefly introduced again and parts of table one are presented in this paragraph.

#### First proposition

The literature study identified the use of contextual ambidexterity in SMEs and requires individuals to make their own judgements about how to divide their attention between conflicting demands.

The first proposition assumed that the use of *contextual ambidexterity* is driven by an informal and direct communication structure. Statements Q11 and Q12 are related to this proposition.

Table 3: Case scores of statement Q11 and Q12.

Questions	A1	B1	C1	D1	D2	E1	E2	F1	G1	H1	I1	Min / Max	Median	Topic question
Q11	3	5	7	5	7	2	6	5	3	5	3	2 / 7	5,0	1 - centralised <=> 7 - non routine decision making
Q12	4	7	7	6	5	5	5	6	5	6	7	4 / 7	5,5	1 - exploitative <=> 7 - contextual connectedness

Statement eleven measured the decision making structure in de cases. A low score identified a central or hierarchical decision making structure, what is counterproductive when individuals need to make their own judgements. A high score on the other hand indicates independent decision making and is in line with contextual ambidexterity. The other related statement Q12 measures the relation of informal and direct organisational communication and connectedness. Employees making independent decisions require an open atmosphere, alignment towards the same organisational goals. Open communication and accessibility between employees and executives, utilise social means throughout the firm. This enables companies to incorporate different perspectives and balance contextual ambidexterity. Therefore, a max score of 6-7 at Q11 and Q12 indicate a direct and informal organisational structure that uses contextual ambidexterity.

The results indicate that case C full fills the contextual ambidexterity scores. The case description also explains their balance between internal exploration and pursuing external exploitation by efficient solving customer problems. The cases B and D2 also have a relative high score on both statements. Case B is indicated to have a strategy more aligned upon exploration, however this company is also sole responsible for the manufacturing their products. This aspect was not addressed in the interview, more in-depth research is needed to identify if this company got a more balanced score towards contextual ambidexterity and supports the proposition. Case D does not support the proposition, since the company's growth phase and current size required them pursue structural ambidexterity. Case I seems to proof the opposite of the proposition, since this case has a centralised decision making structure, as identified with their low score upon statement eleven. However, case I scored high upon contextual connectedness. Nevertheless the cases F and G also support the proposition but with a moderating score. Consequently, only case B supports this proposition, therefore in future research a larger population is required to establish the relation between contextual ambidexterity and their direct and informal organisation structure.



## Second proposition

The second proposition assumes a relation between formalised and structural knowledge sharing and explorative activities towards more radical product innovations. The literature study identified a positive relation between top-down knowledge transfer and exploitative activities. This improves the efficiency of product manufacturing. Literature also identified explorative alignment to require new knowledge about emerging technologies. Consequently, it is assumed that SMEs who pay structural attention to foster knowledge inflows and include early feedback of other departments, are able to produce more radical in product innovations.

Table 4: Case scores of innovation, formalisation and knowledge flows.

Org. structure	A1	B1	C1	D1	D2	E1	E2	F1	G1	H1	I1	Min / Max	Median	Topic question
Q2	4	5	1	3	3	3	2	1	3	6	3	1 / 6	3,0	1 - incremental <=> 7 - radical innovation
Q4	5	5	6	4	4	5	5	6	6	5	3	3 / 6	5,0	1 - formalised <=> 7 - no procedures
Knowledge														
Q6	6	7	7	5	5	4	6	7	4	7	3	3 / 7	5,5	1 - weekly knowledge inflow from supervisor <=> 7 None
Q7	2	5	5	4	6	6	3	6	4	7	7	2 / 7	5,0	1 - direct colleagues no inflow <=> 7 weekly
Q8	5	4	3	4	4	3	4	6	2	6	5	2 / 6	4,0	1 - professionals in network no inflow <=> 7 weekly
Q9	2	7	4	4	5	6	5	6	6	6	4	2 / 7	5,0	1 - ad hoc knowledge sharing <=> 7 - structural

In the statements Q6 – Q9 the direction of *knowledge transfer* is measured, statement Q2 measures incremental versus radical innovations and statement Q4 formalisation. The radical innovation is indicated with a high score of 5-6 at Q2.

It turns out that Case H who is considered to produce the most sophisticated technologies, scored highest explorative innovations of Q2 and also at knowledge transfer. Their score upon statement four is the *median* score and identifies an ambidextrous alignment upon formalisation. Their use of increased technological complexity is supported by their explanation of being inventors of two sensors. A high score upon knowledge transfer, radical innovation and a hybrid score at formalisation, make that case H supports the second proposition.

Among other cases only case B scores relatively high upon radical innovations and knowledge sharing. In case B structural knowledge sharing even led to a so called ‘company academy’ and therefore this case also supports the proposition.

Case I scored high upon horizontal knowledge sharing and the interviewee described that their products use complex technologies. The low scores Q2 and Q4 however indicate a more incremental innovation approach, therefore case C does not support this proposition. All other cases either scored a more incremental innovation at Q2 or low on knowledge inflows.

Consequently, the two cases with a relative high score on radical product innovation, both support this proposition. However more research is needed establish this relation between formalisation of knowledge inflows and the manufacturing of radical product innovations in SMEs.

## Third proposition

The role of the MT and CEO’s leadership was identified, compared to large companies, as more relevant in SMEs. The creation of trustful relationships encourages team members to openly share information and discuss conflicting goals and tasks. In this context it is more likely to mitigate the negative emotions and conflicts within a MT and it resolves strategic contradictions. Therefore, it is assumed that SMEs with commonality among collective goals and integrative behaviour among leaders, are able to pursue more extremes in ambidextrous alignment. In statement Q13, the managerial behaviour and commonality among collective goals is measured. A low score indicates the MT got a high level of trust and commonality among organisational objectives.

Table 5: Statement thirteen commonality among company goals versus having no clear vision

MT	A1	B1	C1	D1	D2	E1	E2	F1	G1	H1	I1	Min / Max	Median	Topic question
Q13	2	1	3	6	3	4	6	6	7	4	5	1 / 7	4,0	1 - collective goals <=> 7 - no clear vision
Q2	4	5	1	3	3	3	2	1	3	6	3	1 / 6	3,0	1 - incremental <=> 7 - radical innovation
Q14	3	6	6	5	3	7	4	6	2	7	6	2 / 7	5,5	1 - price <=> 7 - solutions offered in industry

The results show four out of the eleven cases to have a score relatively low score (<4), and are identified to have commonality among company’s goals. This proposition assumes these companies pursue more extremes upon exploitation and exploration. However the cases A and B, are identified to be aligned upon only one activity of exploitation or exploration. Therefore these cases do not support the proposition. The results of case C show extremes scores upon statement fourteen, what indicates explorative alignment. This statement expresses their objective to explore a solution above offering low pricing and efficiency. Extreme score upon exploitative alignment is found in the second statement, were incremental innovation is identified. The strategy of case C is contextual ambidexterity and the extreme scores upon ambidextrous alignment make this case supports the proposition.

Case D2 also scored to have a TMT with commonality among company’s goals. The strategy of the case is identified as structural ambidexterity, because the activities are physically divided over several departments. This could make it easier to pursue extremes in each department. However, commonality among TMT was not validated by the second interviewee ‘D1’. Besides the company’s size and hierarchical layers reduces the influences of a transformative CEO and integrative behaviour among the MT. Since case D is not validated and only case C supports the proposition there is not enough support to for this proposition. Consequently, more evidence is required identify if this proposition is even plausible, therefore SMEs with more extreme indicators of ambidextrous activities have to be identified first.

#### Fourth proposition

The fourth proposition assumes that a changing environment require firms to change their balance towards exploration in dynamic environments and exploitation when competition increases. The literature study identified a slow moving environment to reduce exploration, while in dynamic environment it is heightened. Sequential alternation and context shaping capabilities allow companies to shift its activities on sensing and seizing activities over time. In the case study the external environment was demarcated by the Dutch Maritime sector. The interview results identified that this sector is still characterised by their preliminary recovery of the economic crisis. To recover companies focussed upon efficiency instead of investing in explorations. The low oil price and the transition to renewable energy, postponed offshore projects and reduced sales in this submarket.

Table 6: External environment of industry and customers

Environment	A1	B1	C1	D1	D2	E1	E2	F1	G1	H1	I1	Min / Max	Median	Topic question
Q14	3	6	6	5	3	7	4	6	2	7	6	2 / 7	5,5	1 - price <=> 7 - solutions offered in industry
Q15	4	6	3	2	3	2	5	5	6	1	4	1 / 6	3,5	1 - customers are conservative <=> 7 - adapt changes

In the case study research four out of nine companies were identified to withhold explorative investments and with the postponed project their customers are identified as conservative as can be seen in statement fifteen. However, at the time of the interview, autumn 2017, the companies identified to recover and were changing their investments upon exploration again. Statement fourteen identifies the industrial change towards exploration. With a median of 5,5, which is two points higher than the median of Q15, an industrial change towards exploration is identified.

Two cases explained their exploitative focus of the last five years and they even had to shrink during the crisis period. One other company had to put their growth on hold for several years, but recently they were able to start growing again. In five out of the nine companies the focus towards exploration was identified with recent hiring of new personnel. Two cases specifically started to invest in additional R&D personnel to focus upon exploration. These findings are in line with sensing and sizing activities and a context-shaping capabilities as identified at large cooperation's (Birkinshaw, Zimmermann, et al., 2016). Conclusively the fourth proposition of changing from exploitation towards exploration is also found in SMEs, however changing backwards from exploitation and exploration requires a longitudinal case study to measure sequential alternation.

## 7.2. Research questions

The literature review has revealed *Organisational Ambidexterity* as a strategy where executives have to balance between the strategic agendas of exploitation and exploration (Tushman & O'Reilly, 1996). Exploitation is associated with incremental innovation and exploration with discontinuous innovation. The ability to simultaneously pursue both incremental and discontinuous innovation turns out to be relevant for SMEs in the industry of the Dutch Maritime sector. This sector requires to offer innovative solutions to their customers and it has to adapt to technological changes of this industry. These two processes compete for slack SME resources, have different time horizons and may cannibalize on one another. Ambidextrous organisations are able to align such contradictory processes, structures and cultures. The objective of this study is to explore what factors are important in the alignment of the SME organisations. Meeting this objective will increase the understanding of how SMEs are able to successfully balance between exploitation and exploration.

The main research question is: "How can SMEs influence their short term exploitative and long term explorative balance?" To answer this question, three sub research questions have to be answered.

**The first sub question (RQ1):** *What are key concepts of ambidexterity that can be used to assess SMEs strategic behaviour?* Theories about organisational ambidexterity identified multiple aspects and includes "various works, ranging from *technological change* to *organizational design* and discuss the need for firms to achieve a balance between exploitation and exploration activities (Benner & Tushman, 2003; Tushman & O'Reilly, 1996)" (as cited in Raisch & Birkinshaw, 2008, p. 377). The contradictions of exploitative and explorative alignment have been debated and those researchers who view ambidexterity as attainable outcome identified several fields of interest. The field of *organisational structure* is highlighted by Benner and Tushman (2003); Tushman and O'Reilly (1996), *behavioural context* (Gibson & Birkinshaw, 2004), the Influence of *knowledge inflows* (Mom et al., 2007), *managing strategic contradictions in TMT* (Lubatkin et al., 2006; Smith & Tushman, 2005) and *environmental moderators* (Jansen et al., 2006). These studies have been highly cited in the field of *Organisational Ambidexterity*. In this explorative case study to the use of ambidexterity in SMEs is measured. This study builds upon these theories by identifying the following four key concepts: *Organisational structure, Absorptive capacity, Managerial behaviour and External environment*.

In the assessment of the cases, these key concepts were used to identify the case strategy. The description of the case strategy, as described in paragraph 6.4 'case conclusions', the following key concepts were identified. At the cases C, D and G the strategy is related to their internal *organisational structure*. The strategy of cases B, F, H and I is mainly related to their attention to *absorptive capacity*. In the cases A and E *managerial behaviour* and leading the company was

identified most relevant concept for success. However the fourth key concept, *external environment*, was only identified as having a moderating effect in the cases B, C, E and G. More details about the case strategy and relation with the key concepts is argued in Appendix I *Case descriptions*.

**The second sub question (RQ2)** states: How to indicate SMEs alignment upon *exploitation*, *exploration* or *hybrid* activities? The literature review identified several quantitative studies with indicators of exploitation and exploration, these indicators were used in questionnaires to measure ambidexterity in large organisations. Based upon these questionnaires the interview protocol was structured. Among 3 open questions this protocol has 15 statements to indicate how companies pursue exploitation, exploration or a hybrid model. Chapter five describes the operationalisation of these interview questions and the theoretical indicators.

When comparing the observation and interview results, three remarkable indicators of exploitation, exploration or hybrid alignment are found. First as part of the concept *organisational structure*, statement two indicates *incremental versus radical innovation*. The case analyses show a positive relation between the identified explorative strategy and radical innovation. The relation between strategy and exploitative alignment is less clear. Noticeable is the low median score upon statement two, what indicates a more incremental innovation strategy of this sector.

Table 7: Noticeable indicators of ambidexterity: Innovation, Connectedness, Market dynamism.

Questions	A1	B1	C1	D1	D2	E1	E2	F1	G1	H1	I1	Min / Max	Median	Topic question
Org. structure Q2	4	5	1	3	3	3	2	1	3	6	3	1 / 6	3,0	1 - incremental <=> 7 - radical innovation
MT Q12	4	7	7	6	5	5	5	6	5	6	7	4 / 7	5,5	1 - exploitative <=> 7 - contextual connectedness
Environment Q14	3	6	6	5	3	7	4	6	2	7	6	2 / 7	5,5	1 - price <=> 7 - solutions offered in industry
Q16	2	5	4	5	4	3	3	6	2	5	4	2 / 6	4,0	1 - competitors exploitation <=> 7 - exploration
Min / Max	1 / 6	1 / 7	1 / 7	2 / 6	3 / 7	2 / 7	2 / 6	1 / 7	2 / 7	1 / 7	2 / 7			
Median	3,0	5,0	4,0	4,5	4,0	4,0	4,5	6,0	4,0	5,5	4,0			
Strategy	2	6	4	4	4	3	3	5	3	6	4	2 / 6	4,0	
	Exploitative	Explorative	Contextual	Structural	Structural	Efficient hybrid	Efficient hybrid	Explorative hybrid	Efficient hybrid	Explorative	Contextual			

The second remarkable indicator is found in statement twelve, were *Connectedness* among the concept of *managerial behaviour* in the MT is measured. The use of informal communication incorporates discussions and different perspectives into the decision making process. An open communication structure encourages individuals to participate in their organisation and increase the SMEs contextual ambidextrous alignment. Comparing the former last row of table 6, the case strategy, to the score of statement twelve, identifies a strong relation between maximum score at Q12 and contextual ambidexterity. Besides all cases with any ambidextrous strategy, scored relatively high upon 'Hybrid / Ambidextrous strategy' in statement twelve. Also case A, who is identified to pursue exploitation only, has the lowest score. However the low dispersion of the score, as can be seen at min/max of 4-7, indicate that the statement representing low scores was not valued as relevant to any case. This statement need to be reviewed before other use.

The third remarkable indicator is found among external environment, as represented by statement fourteen and sixteen. The *market dynamism* and *competitiveness* in relation to the case strategy identifies the influence of the external environment upon a SMEs strategy.

The *market dynamism* of Q14 and *competitiveness* of Q16, measure a difference between the industries solutions offered and the reaction of the competition. Nine of the eleven cases score offering a solution above pursuing efficiency and a pricing strategy. The preliminary recovery of the crisis make SMEs in this sector to offer more to their existing customers and change their strategy of producing products only to being a solutions provider.

The difference between the median of these statements is explained by the cases A, D, E, G and H, of being one of the first to offer a new solution to their niche market and competitors often follow these product innovations. Yet in order to overcome increased competitiveness, the product introductions are explained to offer more to their existing customers and simultaneously widen their scope. Literature states that exploitative innovations better cater existing customers and build customer loyalty (Jansen et al., 2006). What is in line with the incremental innovative strategy of most cases, as can be seen in statement two, were innovations are valued incremental. Besides interviewees mentioned the conservative behaviour of customers in the acceptance of technological change. Therefore, most cases describe the Maritime sector as conservative and not changing rapidly.

These results are in line with studies that identified a moderating effect of environmental dynamism upon exploitative and explorative behaviour (Jansen et al., 2006; Levinthal & March, 1993). In slow moving environment, the niche markets create homogeneous products and incremental changes indicate a moderating effect upon exploration. This moderating effect of market dynamics can be seen in the low dispersion of statement sixteen, and the relation with the case strategy makes this indicator noticeable.

**The third sub research question (RQ3)** states: *How extensively is exploitation or exploration pursued in SMEs?* The results of the cross-case analyses identified a majority to pursue ambidexterity. Six out of nine companies got at strategic balance between exploitation and exploration. Besides all cases score at least three statements upon being hybrid. One striking score is found at statement twelve were with varying degrees all cases score '4' or above and therefore they all pursue ambidexterity in their MT.

When taking a closer look to the extent of ambidextrous alignment, the key concepts identify an interesting view. The extent of ambidextrous alignment is mostly balanced in the first key concept of *organisational structure*. Those cases that use structural ambidexterity or efficient/explorative hybrid, have scored the statements Q2-Q5 mainly in the middle. However the cases with contextual ambidexterity have individual scores with more outliers. This indicates their strategic focus points and pursuing ambidexterity in the context of their projects. Another difference between the use of structural ambidexterity and a hybrid one is *formalisation*. The cases D and G both got more than one hundred employees. Both companies have structurally separated their exploitative and explorative departments, however the largest company has increased their formalisation and quality procedures. This can be explained by Greiner (1997), who identified different crises among a company's growth rate. To overcome a crisis each growth phase, different managerial behaviour is required. In case G decision making is centralised, were as case D improved internal procedures and decentralised the responsibilities to make departments focus upon either exploitation or exploration.

The concept of *organisational structure* also clearly the cases that pursue exploration, the cases B and H are the only cases that scored towards radical innovation. The same statement indicate that

most cases are offering incremental product innovations. What is also found among the key concept of *external environment*, cases want to offer more to their existing customers and therefore avoid increased competition. The same effect is found in the opposite of competitiveness namely market dynamism. Most cases offer an incremental innovative solution of single products. Therefore the extent of SMEs pursuing exploitation or exploration turn out to balance in the middle of the concepts of *organisational structure* and *external environment*.

More extremes of pursuing ambidexterity can be found at statement nine, were the concept of *structural knowledge sharing* differentiates the cases with extreme outcomes. Exploitation clearly lacks knowledge sharing in the organisation of case A. Whereas exploration requires structural knowledge sharing as is found in case B and H. The other cases have a more balanced outcome in their extent to pursue ambidextrous alignment among knowledge sharing.

The concept *managerial behaviour* turns out to be relevant to identify exploitative alignment only, as can be seen in the cases A, E and G. These cases scored towards exploitation in two out of the three statements about their TMT.

### 7.3. Practical implications

In assessment of the key concepts and the indicators of ambidexterity, the SMEs strategic intent is determined. These results identify three indicators, with extensive influence upon the strategic direction between exploitation and exploration. The practical implication of these findings is related to the strategic intent SMEs pursue.

First SMEs pursuing efficiency, focus upon short term profits and activities of exploitation. They are advised to create *commonality* among the management team upon the same organisational goals. Creating commonality, improves their decisions about how to allocate the scarce resources between conflicting activities. Besides, centralisation and routinized decision making, increases a company's efficiency upon their existing business.

The second advice is for SMEs with long term perspectives and discontinuous innovation. The results show that the indicator of radical innovation is positively related to structural knowledge sharing. Since exploration requires nonroutine problem solving and deviation from existing knowledge, SMEs pursuing exploration are advised to improve their *absorptive capacity* and adopt new technologies.

Finally, the external environment and market *dynamism* tend to moderate indicators of ambidexterity. The results show several SMEs balancing in the middle without focussing upon diversification or price competition. Over time these SMEs could suffer the 'success syndrome' were the lack of exploration eventually kills companies. And since the EU identified the lack of entrepreneurial skills and of formal strategic planning, as one of the causes of insolvencies among SME during the crisis. SMEs are advised to improve their strategic decision making process and adapt to the changing external environment.

### 7.4. Research limitations

The methodology of the case study research imposes some limitations. First the methodology of a multiple case study requires to generalize theoretical propositions, however a case study doesn't represent a "sample" that will be expanded to enumerate frequencies (statistical generalization). Instead the explorative nature of this study, identifies relevant factors in relation to ambidextrous

behaviour of SMEs. It is left to others to validate these findings in enumeration of SMEs. Secondly a disadvantage of SMEs in a case study is that the companies are much smaller and how smaller the company the more dependent SMEs become to one manager or CEO. In the case study the smallest business unit had only ten employees, what is almost similar as to study the behaviour of one independent person. In addition, two cases recently introduced one of their experienced employees in a new role of responsible executives. The interviewees perspective upon their company, might be immature as it comes to their point of view as executive. Another aspect of the selected cases is the different sizes of cases, what make it difficult to generalize the findings of this study. On the other hand, based upon the Netherlands Maritime Technology data the selected cases are representative for the Dutch Maritime sector. Besides in the larger organisations a second interviewee was interviewed to validate these cases.

One of the findings is the changing balance from exploitation during the crisis to exploration today. However to the assumption of companies to change their balance over time, requires a longitudinal cases study. Whether SMEs are changing their ambidextrous alignment over time requires an incentive to pursue exploitation again. It could be interesting to find out what triggers this change.

Although the eleven cases are active in the same Dutch Maritime sector, all design and manufacture their products inhouse, and all have a similar organisational structure, the diversity between the cases make it difficult to generalise the findings. More research is needed to validate the findings and to generalise the results to other SMEs and different sectors.

## 7.5. Conclusion and future work

The purpose of this thesis is to explore and identify how SMEs executives pursue exploration of new technologies and simultaneously benefit of the exploitation of current products. It has been found that six out of nine companies balance an ambidextrous strategy. Several structures of ambidextrous alignments were identified among SMEs in the Dutch Maritime sector. One company uses structural ambidexterity, two companies are identified to use contextual ambidexterity, one balances more towards exploration and two companies balance more to exploitation. Nevertheless, with varying degrees of the use of ambidexterity has been found in all cases.

The factors of ambidexterity that turn out to be relevant depend on the strategic alignment companies pursue. The results show that to pursue explorative alignment, SMEs clearly have to focus upon *knowledge sharing*. The companies that are aligned towards exploration have structured their horizontal and vertical knowledge inflows. Their increased attention to structural knowledge sharing is related to pursuing radical innovations. Case B validated this aspect and in retro perspective the company would even increase their knowledge sharing.

On the side of exploitative alignment, company's *managerial behaviour* is the most relevant factor. Exploitation requires companies to have a centralised decision making process and hierarchical communication structure. A routinized decision making process and commonality among the management team, increases a company's efficiency upon existing business. Although in relation to large firms, it was found that the transformative leadership behaviour is more important in SMEs, to overcome market changes by influencing the relatively small MT.

The moderating effect of market dynamics as found in literature among large companies, is also found in this study as part of the key concept *external environment*. The preliminarily recovery of the

crisis in the Dutch Maritime sector, made companies to pursue exploitation. However, the SMEs avoided competitiveness by increasing their relationship with current customers and widen their range of offered solutions. In 2017 SMEs in this sector seem to adapt to the environment and change their balance from exploitation to exploration. Hence an increased focus upon horizontal knowledge inflow was identified. When SMEs want to pursue exploitation again, executive are advised to focus upon the ambidextrous indicators of *connectedness* among TMT.

Although these findings are in line with ambidexterity in one SME as identified by (Bouten et al., 2016), future research is required to be able to generalise these findings and to establish a relation between contextual ambidexterity and informal communication. Also, the Greiner growth crisis was identified in one case and this case grew to the next phase by formalising their procedures. Consequently, this case is now using structural ambidexterity, however contextual ambidexterity is still used among a few employees. The case explained their transition among the formalisation of technological changes and how to balance between long term innovations and short term design change requests. Two other cases with diminishing growth, avoid using more formalisation of procedures and handle short term questions more directly. However, these cases use contextual ambidexterity and face difficulties to overcome their growth crisis. It could be interesting for future research to identify more details about the relation between amount of employees and contextual vs. structural ambidexterity.

## 7.6. Reflection

I think, based upon the literature review and the use of existing questionnaires, I have made a reliable interview protocol to measure SMEs ambidextrous behaviour. In my opinion the statements got a high validity to measure ambidexterity in SMEs. However, I have a doubt whether all interviewees completely understood all details of each statement, like *short-term goals, tightly coupled systems, path dependency and routinization in product developments*.

A introduction could have improved their understanding. This creates more certainty about the validity of the interviewees answers. On the other hand, the executives in these cases are well experienced and therefore it is safe to assume they understand such details. Nevertheless to avoid bias of the interviewees and to assure reliability, I have chosen not to elaborate upon the questions before the last statement was answered. In hind side I could have introduced these statements by writing more details. By using this interview protocol, without interference during the structured-interview, I believe I've found reliable results.

My interest in the use of ambidexterity originated from the experience I had at my job as R&D manager and MT member in one SME. This company had to focus upon exploitation in the economic down turn of their sector. Nevertheless as R&D manager I was pushing the long-term innovation road map in order to explore product innovations. However, the results of this study identify that SMEs balance between exploitation and exploration and overtime their focus may change. Pursuing a change in strategic direction between these two requires investments and organisational alignment, takes more time and effort than I ever expected before.

I expect these findings are relevant for other SMEs, especially for SMEs who are manufacturing products. How generalizable the results are for SMEs using other business models, should be verified in more quantitative research. Yet in my future career I would use these results to create more balance in pursuing contextual ambidexterity in my company.



## Bibliography

- Abernathy, W. J., & Clark, K. B. (1985). Innovation: Mapping the winds of creative destruction. *Research policy*, 14(1), 3-22. doi: [https://doi.org/10.1016/0048-7333\(85\)90021-6](https://doi.org/10.1016/0048-7333(85)90021-6)
- Ahmadi, S., Khanagha, S., Berchicci, L., & Jansen, J. J. (2017). Are Managers Motivated to Explore in the Face of a New Technological Change? The Role of Regulatory Focus, Fit, and Complexity of Decision-Making. *Journal of Management Studies*, 54(2), 209-237. doi: <https://doi.org/10.1111/joms.12257>
- Armbrecht Jr, F. R., Chapas, R. B., Chappelow, C. C., Farris, G. F., Friga, P. N., Hartz, C. A., . . . Whitwell, G. E. (2001). Knowledge management in research and development. *Research Technology Management*, 28-48.
- Bauer, M., & Leker, J. (2013). Exploration and exploitation in product and process innovation in the chemical industry. *R&D Management*, 43(3), 196-212. doi: <https://doi.org/10.1111/radm.12012>
- Benner, M. J., & Tushman, M. L. (2003). Exploitation, exploration, and process management: The productivity dilemma revisited. *Academy of management review*, 28(2), 238-256. doi: <https://doi.org/10.5465/amr.2003.9416096>
- Birkinshaw, J., Crilly, D., Bouquet, C., & Lee, S. Y. (2016). How do firms manage strategic dualities? A process perspective. *Academy of Management Discoveries*, 2(1), 51-78. doi: <https://doi.org/10.5465/amd.2014.0123>
- Birkinshaw, J., Zimmermann, A., & Raisch, S. (2016). How Do Firms Adapt to Discontinuous Change? *California Management Review*, 58(4), 36-58. doi: <https://doi.org/10.1525/cm.2016.58.4.36>
- Bossche, M. v. d., Schijndel, M. v., Pol, G. v. d., & Sprengers, M. W. L. (2017). De Nederlandse Maritieme Cluster Monitor 2017, 249 pages. Retrieved October 27, 2017 from: <https://www.maritiemland.nl/download-digitale-versie-rapport-maritieme-monitor-2017/>
- Bouten, R., Van der Duin, P., Scholten, V., & Verburg, R. (2016). *In search of balance. Managing ambidexterity in a fast growing techno-SME*. Paper presented at the 9th International Conference for Entrepreneurship, Innovation and regional Development, June 23-24, 2016, Bucharest, Romania.
- Christensen, C. (1997). *The innovator's dilemma: when new technologies cause great firms to fail*: Harvard Business Review Press.
- Cohen, W., & Levinthal, D. (1990). Absorptive Capacity: A New Perspective on Learning and Innovation', *Administration Science Quarterly* 35. 1, 128-152. doi: <https://doi.org/10.2307/2393553>
- European Union. (2016a). *The 2016 EU Industrial R&D Investment Scoreboard*. doi:<https://doi.org/10.2791/42262>
- European Union. (2016b). *Annual Report on European SMEs 2015 / 2016 SME recovery continues*. EU. doi:<https://doi.org/10.2873/990696>
- European Union. (2016c). Insolvencies and SMEs: the role of Second Chance. *Internal Market, Industry, Entrepreneurship and SMEs*. Retrieved February 11, 2017 from: [http://ec.europa.eu/growth/smes/business-friendly-environment/performance-review-2016\\_en#annual-report](http://ec.europa.eu/growth/smes/business-friendly-environment/performance-review-2016_en#annual-report)
- European Union. (2017a). 2017 SBA Fact Sheet Netherlands. Retrieved November 11, 2017 from: <https://ec.europa.eu/docsroom/documents/26562/attachments/21/translations>
- European Union. (2017b). *Annual Report on European SMEs 2016/2017 Focus on self-employment*. EU. doi: <https://dio.org/10.2873/793361>
- European Union. (2017c). The Small Business Act for Europe. Retrieved January 14, 2018 from: [https://ec.europa.eu/growth/smes/business-friendly-environment/small-business-act\\_en](https://ec.europa.eu/growth/smes/business-friendly-environment/small-business-act_en)

- Fourné, S. (2014). *Managing organizational tensions: A multi-level perspective on exploration, exploitation and ambidexterity*. (Ph.D. thesis), Erasmus Research Institute of Management. No. EPS-2014-318-S&E, Retrieved from <http://hdl.handle.net/1765/76075>
- Friedman, Y., Carmeli, A., & Tishler, A. (2016). How CEOs and TMTs Build Adaptive Capacity in Small Entrepreneurial Firms. *Journal of Management Studies*. doi: <https://doi.org/10.1111/joms.12184>
- Ganapathy, V. (2016). Case Study: The Uberisation of Supply Chain. *SAMVAD 11*, 26-31. Retrieved April 22, 2018 from: <http://samvad.sibmpune.edu.in/index.php/samvad/article/view/98179/71318>
- Garland, R. (1991). The mid-point on a rating scale: Is it desirable. *Marketing bulletin*, 2(1), 66-70.
- Gedajlovic, E., Cao, Q., & Zhang, H. (2012). Corporate shareholdings and organizational ambidexterity in high-tech SMEs: Evidence from a transitional economy. *Journal of Business Venturing*, 27(6), 652-665. doi: <https://doi.org/10.1016/j.jbusvent.2011.06.001>
- Gerdri, N., Vatananan, R. S., & Dansamasatid, S. (2009). Dealing with the dynamics of technology roadmapping implementation: A case study. *Technological Forecasting and Social Change*, 76(1), 50-60. doi: <https://doi.org/10.1016/j.techfore.2008.03.013>
- Gibson, C. B., & Birkinshaw, J. (2004). The antecedents, consequences, and mediating role of organizational ambidexterity. *Academy of management Journal*, 47(2), 209-226. doi: <https://doi.org/10.5465/20159573>
- Government of the Netherlands. (2015). *The Dutch Maritime Strategy 2015 - 2025*. Den Haag: Ministries of Infrastructure and the Environment, Economic Affairs, Defence, Education, Culture and Science, Finance, Foreign Affairs, Security and Justice, Social Affairs and Employment Retrieved January 30, 2018 from: <https://www.government.nl/binaries/government/documents/reports/2015/07/07/the-dutch-maritime-strategy-2015-2025/150604-maritieme-strategie-uk-lr-2.pdf>.
- Greiner, L. E. (1997). Evolution and Revolution as Organizations Grow: A company's past has clues for management that are critical to future success. *Family Business Review*, 10(4), 397-409. doi: <https://doi.org/10.1111/j.1741-6248.1997.00397.x>
- He, Z.-L., & Wong, P.-K. (2004). Exploration vs. exploitation: An empirical test of the ambidexterity hypothesis. *Organization Science*, 15(4), 481-494. doi: <https://doi.org/10.1287/orsc.1040.0078>
- Ho, Y. C., Fang, H. C., & Lin, J. F. (2011). Technological and design capabilities: is ambidexterity possible? *Management Decision*, 49(2), 208-225. doi: <https://doi.org/10.1108/00251741111109124>
- Holmes, C., & Ferrill, M. (2005). The application of Operation and Technology Roadmapping to aid Singaporean SMEs identify and select emerging technologies. *Technological Forecasting and Social Change*, 72(3), 349-357. doi: <https://doi.org/10.1016/j.techfore.2004.08.010>
- ISO. (2015). International Standard Organisation: Moving from ISO 9001:2008 to ISO 9001:2015. Retrieved February 26, 2018 from: [https://www.iso.org/files/live/sites/isoorg/files/archive/pdf/en/iso\\_9001\\_-\\_moving\\_from\\_2008\\_to\\_2015.pdf](https://www.iso.org/files/live/sites/isoorg/files/archive/pdf/en/iso_9001_-_moving_from_2008_to_2015.pdf)
- Jansen, J. J., George, G., Van den Bosch, F. A., & Volberda, H. W. (2008). Senior team attributes and organizational ambidexterity: The moderating role of transformational leadership. *Journal of Management Studies*, 45(5), 982-1007. doi: <https://doi.org/10.1111/j.1467-6486.2008.00775.x>
- Jansen, J. J., Kostopoulos, K. C., Mihalache, O. R., & Papalexandris, A. (2016). A Socio-Psychological Perspective on Team Ambidexterity: The Contingency Role of Supportive Leadership Behaviours. *Journal of Management Studies*. doi: <https://doi.org/10.1111/joms.12183>
- Jansen, J. J., Tempelaar, M. P., Van den Bosch, F. A., & Volberda, H. W. (2009). Structural differentiation and ambidexterity: The mediating role of integration mechanisms. *Organization Science*, 20(4), 797-811. doi: <https://doi.org/10.1287/orsc.1080.0415>

- Jansen, J. J., Van Den Bosch, F. A., & Volberda, H. W. (2006). Exploratory Innovation, Exploitative Innovation, and Performance: Effects of Organizational Antecedents and Environmental Moderators. *Management Science*, 52(11), 1661-1674. doi: <https://doi.org/10.1287/mnsc.1060.0576>
- Jansen, J. J., Vera, D., & Crossan, M. (2009). Strategic leadership for exploration and exploitation: The moderating role of environmental dynamism. *The Leadership Quarterly*, 20(1), 5-18. doi: <https://doi.org/10.1016/j.leaqua.2008.11.008>
- Levinthal, D. A., & March, J. G. (1993). The myopia of learning. *Strategic management journal*, 14(S2), 95-112. doi: <https://doi.org/10.1002/smj.4250141009>
- Li, C.-R. (2013). How top management team diversity fosters organizational ambidexterity: The role of social capital among top executives. *Journal of Organizational Change Management*, 26(5), 874-896. doi: <https://doi.org/10.1108/JOCM-06-2012-0075>
- Likert, R. (1932). A technique for the measurement of attitudes. *Archives of Psychology*, 22 140, 55-55.
- Lubatkin, Simsek, Ling, & Veiga. (2006). Ambidexterity and performance in small- to medium-sized firms: The pivotal role of top management team behavioral integration. *Journal of Management*, 32(5), 646-672. doi: <https://doi.org/10.1177/0149206306290712>
- March, J. G. (1991). Exploration and exploitation in organizational learning. *Organization Science*, 2(1), 71-87. doi: <https://doi.org/10.1287/orsc.2.1.71>
- Mihalache, O. R., Jansen, J. J., Van den Bosch, F. A., & Volberda, H. W. (2014). Top management team shared leadership and organizational ambidexterity: A moderated mediation framework. *Strategic Entrepreneurship Journal*, 8(2), 128-148. doi: <https://doi.org/10.1002/sej.1168>
- Mom, T. J., Fourné, S. P., & Jansen, J. J. (2015). Managers' work experience, ambidexterity, and performance: The contingency role of the work context. *Human Resource Management*, 54(S1), s133-s153. doi: <https://doi.org/10.1002/hrm.21663>
- Mom, T. J., Van Den Bosch, F. A., & Volberda, H. W. (2007). Investigating managers' exploration and exploitation activities: The influence of top-down, bottom-up, and horizontal knowledge inflows. *Journal of Management Studies*, 44(6), 910-931. doi: <https://doi.org/10.1111/j.1467-6486.2007.00697.x>
- O'Reilly, C. A., & Tushman, M. L. (2011). Organizational ambidexterity in action: How managers explore and exploit. *California Management Review*, 53(4), 5-22. doi: <https://doi.org/10.1525/cmr.2011.53.4.5>
- O'Reilly, C. A., & Tushman, M. L. (2013). Organizational ambidexterity: Past, present, and future. *The Academy of Management Perspectives*, 27(4), 324-338. doi: <https://doi.org/10.5465/amp.2013.0025>
- O'Reilly, C. A., & Tushman, M. L. (2008). Ambidexterity as a dynamic capability: Resolving the innovator's dilemma. *Research in organizational behavior*, 28, 185-206. doi: <https://doi.org/10.1016/j.riob.2008.06.002>
- O'Reilly, C. A., & Tushman, M. L. (2016). *Lead and disrupt: How to solve the innovator's dilemma*: Stanford University Press.
- Ortt, J. R., & Schoormans, J. P. (2004). The pattern of development and diffusion of breakthrough communication technologies. *European Journal of Innovation Management*, 7(4), 292-302. doi: <https://doi.org/10.1108/14601060410565047>
- PwC. (2016). The Global Innovation 1000: Comparison of R&D Spending by Regions and Industries. Retrieved December 5, 2017 from: <http://www.strategyand.pwc.com/global/home/what-we-think/innovation1000/rd-intensity-vs-spend-2014>
- Raisch, S., & Birkinshaw, J. (2008). Organizational ambidexterity: Antecedents, outcomes, and moderators. *Journal of Management*, 34(3), 375-409. doi: <https://doi.org/10.1177/0149206308316058>
- Raisch, S., Birkinshaw, J., Probst, G., & Tushman, M. L. (2009). Organizational ambidexterity: Balancing exploitation and exploration for sustained performance. *Organization Science*, 20(4), 685-695. doi: <https://doi.org/10.1287/orsc.1090.0428>

- Schumpeter, J. (1942). Creative destruction. *Capitalism, socialism and democracy*, 825.
- Scuotto, V., Del Giudice, M., & Carayannis, E. G. (2017). The effect of social networking sites and absorptive capacity on SMES' innovation performance. *Journal of Technology Transfer*, 42(2), 409-424. doi: <https://doi.org/10.1007/s10961-016-9517-0>
- Smith, W. K., & Tushman, M. L. (2005). Managing strategic contradictions: A top management model for managing innovation streams. *Organization Science*, 16(5), 522-536. doi: <https://doi.org/10.1287/orsc.1050.0134>
- Teece, D. J. (2014). A dynamic capabilities-based entrepreneurial theory of the multinational enterprise. *Journal of International Business Studies*, 45(1), 8-37. doi: <https://doi.org/10.1057/jibs.2013.54>
- Tushman, M. L. (2015) *The Challenges of Ambidextrous Leadership: An Interview with Michael Tushman/Interviewer: J. Euchner*. *Research-Technology Management* 58 (Vol 3). doi: <https://doi.org/10.5437/08956308X5803003>
- Tushman, M. L., & O'Reilly, C. A. (1996). The ambidextrous organizations: Managing evolutionary and revolutionary change. *California Management Review*, 38(4), 8-30. doi: <https://doi.org/10.2307/41165852>
- Tushman, M. L., Smith, W. K., Wood, R. C., Westerman, G., & O'Reilly, C. A. (2010). Organizational designs and innovation streams. *Industrial and Corporate Change*, 19(5), 1331-1366. doi: <https://doi.org/10.1093/icc/dtq040>
- Verschuren, P., & Doorewaard, H. (2010). *Designing a Research Project*. The Hague: Eleven International Publishing House.
- Yin, R. K. (2009). *Case study research: Design and methods fourth Edition* (Vol. 5). Los Angeles: SAGE.

## Appendix I. Case descriptions

Based upon eleven semi-structured interviews, desk research and observations made during a visit to the companies, a detailed case description has been made. Of the eleven interviews two interviewees were working at the same company, these interviews are combined into one case description. The case descriptions are structured according to the four key concepts and identify how each case handles these concepts. The individual score upon the questions or statements support the company's strategy and can be found in the next chapter. The descriptions in this appendix have been summarised, a more detailed description about the interview answers and other observational notes can be found in **Fout! Verwijzingsbron niet gevonden. Fout! Verwijzingsbron niet gevonden..** The last paragraph describes the success and identifies the strategy of the company.

### Case A

The company is more than 100 years old, mainly active in the Maritime subsector of *Dredging and Ports*. The SME got about 35 employees mainly active in the construction of mechanical productions. The interviewee is executive and responsible for the operational part of constructions and explained to have a task oriented organisation.

#### **Organisational structure**

The organisation is structured upon efficiency and exploitative behaviour, however the company is able to rapidly adopt small changes requested by their customers. Innovative solutions are often initiated during meetings with customers, once proven to be feasible, most of them are easily adopted within the organisation. Innovations on the supplier side are used to improve the production process such as new machinery or the use of new materials. One exploration led to the initiative of a start-up company, located within the same building, but placed at arm's length to avoid disturbance in the organisation. The initiative of having a start-up is in line with the transformative leadership capabilities of the director, but also enables the organisation to explore new technologies. Only a limited amount of employees is involved with the exploration activities of the start-up, by far most employees are part of the exploitation process.

#### **Knowledge sharing**

The company got a high level skillset and uses experienced employees to control the output quality of new employees. Although there is no official training program, most employees learn from each other by doing at the job. Only changing safety procedures or changing regulations require training sessions for employees. Hiring additional capacity is only used to exploit the company's activities. Most new knowledge is introduced within the small design team and mainly comes from their suppliers offering new products or technologies.

#### **Managerial behaviour**

The company got a very open culture, every employee is accessible and all doors are open. Most product innovations start at a customer's problem. In a small design team, consisting of members of the MT, the options for a customer solution are being discussed. Once the team decided to develop an innovative product, all exploitative actions and design decisions are coordinated within the MT.

### **External environment**

The company is active in two niche markets. In these markets it is more important to offer a customer solution than to compete in price and increase the competition. Since the wage rate is a substantial part of their products and the Dutch wage rate is relatively high, company is required to offer diversifying products. Therefore the sales team is busy with making a Product Market Combination matrix in order to enter other markets. Although the two markets are completely different, the sales is equally spread over these markets. One of the markets easily adopts innovations and new technologies, the other tends more toward price competition.

### **The success of the company**

The solution-oriented approach attracts customers to the company, customers know where to go to get their problem solved. The transformational leadership capacities in the MT are another explanation for the company's success. The ability to transform and adapt changes in the exploitative process makes it easier to offer a customer solution.

### **Company's strategy**

The company's core business is the exploitative process, but customer requests are easily integrated in the process. The organisational structure and knowledge flows scores high on exploitative approach. However the MT got an open culture and is more hybrid structured.

## **Case B**

The engineering company is more than 35 years old and active in the development of electronics. The customers often require a complex solutions or new products. The company takes care of the whole development and manufacturing process so that the customer is able to focus upon marketing and sales of their products. The interviewee is R&D is well experienced in electronic design and since three years he is the R&D manager and responsible for about half of the employees.

### **Organisational structure**

The organisational structure is more organic since each project of new product development requires different experts. The company mainly externalises the production and assembly process, but is in total control of the produced quality.

### **Knowledge sharing**

The main process of the company's complex designs, demands a high level of technological knowhow and investment in knowledge sharing. The company got monthly knowledge sharing sessions and invests in new technologies within their so called own academy. Through the year the body of knowledge is a standard topic of interest at the three job review meetings. In specific area's where expertise is lacking, experts are being hired to assist in the design and to gain understanding about certain new technologies.

### **Managerial behaviour**

The company has got an open culture. During the design of new products all employees are valued within their expertise. Design decisions are made by experts and certainly not by executive decisions of the management. Only once customer requirements are involved the management is involved in the discussion. The MT got the same vision and trust each other without any hidden agendas.

### **External environment**

The company is expert in one technology and doesn't have many competitors in this high tech niche market. The customers sometimes even request to apply emerging technologies in order to develop innovative products. It is in both, the customer and the company's interest, to design an innovative product that sells to the end consumers.

### **The success of the company**

The success factor of the company is having the technological knowhow and ability to solve customer problems. The experts are familiar with the Maritime and Offshore market and know how to handle technological issues and understand the harsh environment. The success of their product design and controlling the manufacturing, is the future of the company.

### **Company's strategy**

The externalisation of the manufacturing process gives the company the design freedom to introduce new products. It's in their interest to design a product that solves the customers problem but also suits market demand. In the end the shared margin of the sales determines the success of a product.

## **Case C**

The SME is part of a larger group of organisations that is listed on the Dutch stock exchange. The company is an independent business unit with about 50 employees of which 35 are software engineers. The company develops software solutions for the maritime and offshore market. The interviewee is responsible for about half of the company's employees that work on software development.

### **Organisational structure**

Although the larger organisation is mechanistic structured on paper, this business units is more organic organised. A matrix organisation is used in the business unit so that the team compositions is aligned upon each project. The head of each department however coordinates the formalities like job reviews and contracts. The company exploits industrial automated software in order to solve customer problems. The customer's request reliable products and therefore the company purchases proven hardware technologies.

### **Knowledge sharing**

In projects were new technologies are selected and expertise is lacking, hardware suppliers sometimes send engineers to offer a training session on the job. This way new knowledge can be directly implemented during a project and employees are being trained at the job. Each month the company also organises meetings were about seven employees share their tacit knowledge.

### **Managerial behaviour**

The social support of the MT can be found in the shared vision; the company wants to have fun when doing business. They heavily invest in the social relation with their employees as well as with their

customers and supply chain. The company got many teambuilding events and is active in the community.

### **External environment**

The external Maritime and Offshore market is very conservative and requires the use of proven technologies. The oil price drop made price more important, but offering the right solution is most important to the customers. The cost of installation and replacement a new products is very high, therefore the provided solution has to be of the highest standard and correctly commissioned at the first time. Once new technologies are applied in this market they can be over a decade old and widely used in other markets first. Customer and supplier sides are conservative and part of tightly coupled systems that rarely adopt new technologies.

### **The success of the company**

The company's success is their understanding of the customers problem. Their ability to solve problems and deliver a solution of the highest standard. One detail of their success is their ability to involve customers in their engineering process, they use an agile process to include last minute design changes upon request.

### **Company's strategy**

The company's knowledge strategy and managerial behaviour pursue exploration, but the organisational structure and especially their external environment is exploitative aligned. In general the combination uses strengths of both exploration and exploitation alignment.

## **Case D**

With about 160 employees company D is significantly larger than all other selected cases. Consequently this company has divided the roles of manager operations and R&D manager. The case description is based upon the interview with both executives. The two scores were predominantly similar, but the individual explanations show the different roles the interviewees have.

### **Organisational structure**

The company grew in the last decade and had to move into two different buildings. The increasing amount of employees required more procedures and disciplines. Though the company used to be very informal, the current structure becomes more mechanistic and each department is developing its own culture. The operational part, especially custom projects, are more hybrid focussed. They exploit efficient manufacturing process, but a minority of this department also explores custom solutions. The R&D department tends to focus more internally to avoid distraction into daily operational business. The company's supply chain is loosely coupled at the start of a new product development and during projects of special customer requests. However once the production units increase the supply chain rarely change.

### **Knowledge sharing**

The R&D department is far more explorative oriented and shares it's technological expertise within and outside the department. The large amount of experts makes them less externally oriented, therefore each week there is a companywide meeting were tacit knowledge about product designs and technologies is shared. During these meetings other departments bring in their ideas or detailed questions about quotations are being discussed. The company is also represented on the board of one of the markets worldwide regulations.



### **Managerial behaviour**

The MT of the company is characterised by the presence of the director who is also the major shareholder. He is involved in all major decisions, but allows departments to diversify and build their own culture. As it comes to design decisions engineers are allowed to make their own decisions without a supervisors approval. This introduces an informal and less hierarchical structure, it enables agility and adaption to market changes. However it also seems to disturb the focus upon the company's core business and commonality of organisational objectives.

### **External environment**

The conservative Maritime & Offshore market is characterised by reliable products being resistant against harsh environments. The company recognises this importance and highly values qualitative products and the use of proven technologies. The market is certainly not easy in adopting new technologies and changes very slowly. However the new offshore wind market changes very rapidly and is also price driven.

### **The success of the company**

Focussing upon product quality and maintenance cost of installed base, already during early development, distinguish the company's products. Also the decreased development time of 3-18 months maximum, keeps de R&D department successful in continuously delivering new products. Part of the success is related to being board member of the niche market regulations. Being the one of the who is able to offering a product that is compliable to new regulations has been a success in the last decade.

### **Company's strategy**

The company's growth made the organisation focus upon efficiency of internal processes. The R&D department made more formalised procedures and became more internally focussed upon the long term innovations. The other departments had to formalise their internal structure as well but are also focussing upon a new market. Sharing internal knowledge is being improved during regular meetings, but the physical separation of departments make them create their own culture. By nature the R&D department is more explorative, but overall the company's applies a hybrid strategy.

## **Case E**

The SMEs got about 35 employees and is active in the development of bridges onboard of vessels. The company develops their own electronic solutions to display navigational information, but also provides system integration solutions to add other information systems.

### **Organisational structure**

The company got an open culture, doors are open and everyone is accessible. Hence there is a hierarchical structure and departments are separated in different rooms. The building is well decorated as it comes to the visitors part, but the other parts are old and a plan to change the building or to relocate these departments is currently being made.

The market down turn during of the last decade made the organisation shrink and certain quality standards become hard to met. On the other hand essential organisational structure and knowledge capabilities are still in place. Thus with the current economic welfare and the mechanistic structured organisation in place of the company seems to be ready to grow again.

### **Knowledge sharing**

Before the down turn there were more procedures to make design documents of produced systems. The engineering development phases were completed with written documents and this made engineers automatically share their tacit knowledge. Due to the down turn period some procedures have been dropped. Consequently this causes more work at the end of value chain i.e. when service is required. Recently a new technical manager took over the development and operational responsibility. He recently introduced knowledge sharing meetings. Though the topics of these technical meetings seem to be more operational oriented, there is a lot of potential to improve the culture of knowledge sharing. Especially external knowledge about emerging technologies and quality control improvements would enable the company to get back on track. The current knowledge flow is mainly limited to vertical knowledge transfers.

### **Managerial behaviour**

The strong leadership of the CEO and the hierarchical organisation emphasises the company's recent focus upon exploitative approaches. Most decisions are made top down and discussed within the MT. However experienced employees gain more design freedom and their expertise is highly valued. The managerial behaviour is focussed upon efficiency, which is in line with the market down turn period. Nevertheless the recent appointed technical manager got instruction to initiate a more explorative focus.

### **External environment**

The company's two main markets are totally different. One requires a one stop shop as solution provider and the other one competes in price. As solution provider the company is the market innovator and competitors often follow their new designs. However the largest sales is made in the Maritime inland navigational product portfolio. The company is not active in tenders or any collaborative alliances.

### **The success of the company**

The success is dedicated to the innovation strategy. Being one of the first to present innovative solutions at exhibitions is the company's success factor. The company dares to invest, which sometimes fails, but overall the technological knowhow increases and strengthens their innovative abilities. Regarding the increased amount of employees and individual technological knowhow, the company recognises a risk, but also explains this as an opportunity to speed-up the upcoming new product development processes.

### **Company's strategy**

Due to the market and economical down turn the company had to shrink, which they did by focussing upon efficiency and shrinking the organisation. However the provisional market improvements seem to be at a tipping point and the company anticipates with the new technical manager and his instruction to explore new opportunities.

## **Case F**

The company is almost 100 years old and is part of a group of SMEs. Currently the business unit got about 30 employees and mainly focussing upon the Maritime and offshore market. The interviewee got over 15 years of experience and is now responsible for the R&D department.

### **Organisational structure**

The SME is got different departments with their own responsibilities and path dependencies, hence the business unit is mechanistic structured. Nevertheless once technological complexity increases the R&D department is involved to support other departments. The recent economically down turn and reduced oil price made the company focus upon efficiency and the amount of employees decreased over the last couple of years.

The supply chain of the assembly process is changing into a more loosely coupled system. One of the reasons is spreading the supplier risks, but also new product developments required to adopt technologies. Almost all new developments are incremental product improvements. The R&D engineers are free to make all design decisions often based upon their expertise.

### **Knowledge sharing**

After finalising a development, the new products are internally introduced to other departments during training sessions. The product features being documented and internally shared. These horizontal knowledge flows are also used to inform the external sales distributors. Recently the company also started with webinars with their distributors to share product information. Design details are shared among a few within the R&D department only. Once additional knowledge or expertise is required the R&D department sometimes hires experts within their network.

### **Managerial behaviour**

There is no commonality within the company about mission and vision. The management meetings are currently represented by representatives of each department and mainly operational aspects are being discussed. The CEO is in charge of all decisions and has not defined a MT to delegate decision making. However each department often handles their own activities.

### **External environment**

There is a shift in the conservative Maritime & Offshore sector as it comes to customer demand. Offering the right solution used to be most important, but due to the crisis and low oil price customer perspective is changing and price becomes more important. Nevertheless the market highly value quality, reliability and offering the right solution because of maintenance costs of the installed base. In the market new technologies are currently introduced by competitors. Therefore R&D department is currently looking what technologies to explore and adopt in a new product development.

### **The success of the company**

The company's technological expertise is explained to be the main part the company's success. The R&D engineers have multiple disciplines and are capable to cover all disciplines of a new product development process.

### **Company's strategy**

The preliminarily recovery of the economical down turn in the Maritime sector and low oil price postponed many projects and made the company focus upon efficiency. In the few years they had to reduce their size and focus developments upon improving of existing products. Over the last decade the company was able to explore the customer wishes improved their product portfolio. The internal knowledge sharing and decision freedom are pursue exploration. However the external environment, MT decision making and organisational structure are exploitative aligned.

## Case G

The family company is 30 years old and develops mechanical and electrical products mainly used in the sub market of inland shipping. In 2007-2010 the company grew from 70-120 employees but the crisis ended the company's growth. In 2013 the company started growing again currently they got about 160 employees.

### **Organisational structure**

The R&D is divided into two disciplines and are separated of each other. Since products are often already sold, the department is mainly working on customer requests and incremental innovations. During the product development the supply chain may change, but once a product is being produced suppliers rarely change. Within the company not many procedures are formalised, however a growing organisation requires to improve this situation and initiatives are being started.

### **Knowledge sharing**

The Service department is located next to the electrical R&D and during informal meetings product issues are shared. The regular knowledge sharing meeting are scheduled every two months and internal product trainings are also highly valued. On the other hand gaining external knowledge and attending external training sessions are valued less important. Remarkable is frequency of regular hiring R&D experts in order to acquire additional knowledge about new technologies or procedures.

### **Managerial behaviour**

Four managerial layers are described and as it comes to decision making the company is hierarchical structured. On the other hand the family company is characterised by talking business around the coffee machine and having informal meetings e.g. service requests. With the four layer structure and a 'product owner' between MT and the electrical R&D, there is a certain distance between MT and R&D. This increase the departments explorative alignment and give the engineers a design freedom.

### **External environment**

The inland shipping market and the company's ability to make almost any graphical interface, make it easy to introduce changes. On the other hand the market regulations don't change that often and require thorough test procedures to pass the compliance criteria. Most competitors do not have such a wide product portfolio and use third party suppliers for components. This gives a pricing advantage and offering the whole solution, including unique features, makes the company competitive.

### **The success of the company**

The wide range of multidiscipline manufacturing and offering a total solution makes the company unique. The success of the R&D department in recent years is the introduction of their new scrum planning methodology and more working as a team, with clearly defined roles and communication to other departments.

### **Company's strategy**

The hierarchical family culture and limited internal knowledge flows characterise the company's mechanistic organisational structure. Exploitation was pursued within the labour oriented departments, during the recent market crisis. On the other hand the electrical R&D department was able to explore a new planning methodology and adopted a new technologies. With the limited resources department aims to present a new innovation next year.

## Case H

The company is about 80 years old and is active in Maritime niche markets. Currently the company got about 75 employees. The company develops and produces all the products inhouse.

### **Organisational structure**

The company got a flat organisational structure and employees offer internal support between departments when needed. The company often invents new sensors and got a development objective to invent new sensor applications. These product developments are often completely new to the market and often require long term developments. The company invests to have redundant suppliers and is able to internally produce all components when needed. Thus the supply chain is loosely coupled, however the company highly values quality in their supply chain and doesn't change supplier that often.

### **Knowledge sharing**

The internal R&D meetings are weekly scheduled to share knowledge and encourage bottom-up knowledge inflows. Relations with universities and professionals in the company's network are structural given attention. And once experts are being hired, their tacit knowledge is being integrated in the company. Regularly training sessions are being organised for Sales and distributors.

### **Managerial behaviour**

The small MT has a common goal and is socially connected in to the company. The MT decides upon the start of a new product development, but delegates detailed decision making to the experts at the R&D department. The MT balances between long term development investments and short term sales. With an R&D budgeted of 6% of the company's turnover the department is capable of starting long term development projects.

### **External environment**

The Maritime sector is seen as conservative, the customers need to be convinced about new products in a prove of concept before customers are willing to buy innovative products. The introduction of new products often takes a year before the company is able to convince customers. In the last couple of years market demand is changing and requires product integration and a one stop shop. Therefore the company changed their strategy from sensor expert to solution provider.

### **The success of the company**

The success of the company is a result of investments in developments of complex and high-tech products. The company is able to handle all aspects of these products starting at invention, design, engineering and manufacturing. The company also understands the importance of product quality and is always able to support customers around the world. The company's extraordinary products, proven quality are important enablers for their success.

### **Company's strategy**

The company has strategically chosen to align the organisation upon exploration, however recently it had to change their focus and pursue exploitation as solution provider. The decentralised R&D enables them to simultaneously develop sensor solutions and data acquisition systems. The market launce starts with a prove of concept, what enables the company to refine designed products and avoid child diseases. The structural focus upon quality and internal knowledge sharing enables the company to change the market.

## Case I

The Company started as a small engineering and consultancy firm, since 15 years it became part of a larger international company. The group got about 100 employees, however the business unit in the Netherlands got ten employees. The interviewee is founder and director of the Dutch office.

### **Organisational structure**

The small team in this business unit got decentralised responsibilities and is organic structured. In the Dutch business unit about 20% of the employees are working on R&D and new product developments. The decentralisation enables the unit to adapt its own products to market developments and changing technologies. The company aims to improve collaboration with the larger company and therefore formalises its procedures. The high-tech products and long term test & validation of new product developments, requires the business unit to study emerging technologies and adopt market changes. This business unit is characterised by balancing between exploitation of product assembly and exploration of new applications.

### **Knowledge sharing**

In the business unit knowledge is shared during weekly informal meetings of the team. The company is active in a network of industrial communities. The network causes horizontal knowledge flows into the company, what is often used in new product developments. In the larger company a new employee training program is recently introduced and a product support procedure is being made. The company frequently shares their strategic insights during group meetings.

### **Managerial behaviour**

Decision making is decentralised in the business unit and internal the two R&D engineers are making design decisions. However developing a minimum viable product, sometimes require to intervene in the design decisions in order to avoid including too much product features. The company's culture is open and within Europe every employee is able to contact colleagues. The management meetings are organised four times a year and group members have established common goals.

### **External environment**

The conservative Maritime sector can be characterised by the high installation costs and large costs of product failure. The company highly values its quality and therefore requires a long period of product development, test and validation. Some competitors offer cheaper products, but customers fear to have product failures. The company strategically collaborates with universities and use the scientific publications about their products to convince its customers. These scientist sometimes also introduce new knowledge about measurements and initiate incentives for new product developments. Because of these long term investments and collaborations, the market got high entry barriers.

### **The success of the company**

The long term success of the company is it's knowledge about and capacity of applying complex measurements in the harsh offshore environments. The Dutch business unit got specific knowledge how to measure at certain locations and its high quality products enables the small company to add

additional value to the international group it belongs to. The integration in this group also increased the distribution channels and enable the Dutch office to offer a wider product portfolio.

The most recent success of the business unit can be explained by the explorative collaboration with universities and customers and focus upon developing a minimum a viable product. This process made the business unit pursue exploitation and better understand the market needs.

### **Company's strategy**

The organisational structure of the Dutch business unit balances between exploitative production aspects and explorative development characteristics. And as it comes to knowledge sharing the company explores their network but also focus upon efficiency in making a minimum viable product. The business unit is integrated in the larger company but got a decentralised R&D and decision making structure. The business unit balances between its internal production efficiency and the exploration of new knowledge and collaboration in networks, what recently enabled them to enter two new markets.

## Appendix II.

## Interview protocol

### Case questions about: balancing the short term business operations with innovations for the long term

Thank you for your participation in our research into ambidexterity among SMEs. Our aim is to identify 'How SMEs successfully balance between short term efficiency among their operations and simultaneously be innovative on the long term'. Multiple cases of SMEs in the same sector will be selected, in order to compare their situations. These interview questions have been divided into four categories: *Organisational structure*, *Knowledge flow*, *Managerial behaviour* and *External environment*. All your answers will be treated with as confidentiality, your name, job title and company name will not be mentioned and interview results will be anonymised and only shared and published as such. This interview will take about one hour and your openness and sharing of information will be highly valued.

#### List-ID x1

1. A) Can you give a description of your company, job and team?  
B) Can you describe the organisational operation process?  
C) Can you describe the organisations innovation process?

---

#### Organisational structure

2. Please score what best categorises your company:

Our company invents, develops and commercializes products and services that are completely new to our company, this way we frequently utilize new opportunities in new markets (score 1).	<p style="text-align: center;"><b>Score</b> 1 2 3 4 5 6 7 [.....] Please rate a score of 1-7</p>	Or our company frequently refines the provision of existing products and services, we introduce existing but improved products and services in our existing markets (score 7).
---	--	--



**3. Please score what best categorises the supply chain of your company:**

<p>On the one hand customers, suppliers etc. are part of loosely coupled systems, and for each product development they may change, most of the used technologies are emerging and new to the company, and customers and market characteristics are changing every time (score 1).</p>	<p style="text-align: center;"><b>Score</b>  <b>1 2 3 4 5 6 7</b>                  [.....]                  Please rate a score of 1-7</p>	<p>Or on the other hand the supply chain; is a tightly coupled system, is path depend and routinized, most of the used technologies are existing technologies, the product development processes are routinized and bureaucratic, customer relations are very stable and markets changes slowly (score 7).</p>
--	--	--

**4. Please score what best categorises the procedures within your company:**

<p>Whatever situation arises, written procedures are available for dealing with it and; the procedures, rules, job descriptions and responsibilities occupy a central place in the organization (score 1).</p>	<p style="text-align: center;"><b>Score</b>  <b>1 2 3 4 5 6 7</b>                  [.....]                  Please rate a score of 1-7</p>	<p>Or almost no procedures are formalised and employees are free to handle their work on their own way, the company's responsibilities are understandable and accordingly employees act upon their best abilities without any job description (score 7).</p>
--	--	--

**5. Please score what best categorises your work activities in the company:**

<p>It is totally clear to me how to conduct my work activities and what they will be, they can properly be conducted using my present knowledge and they are primarily focussed on achieving short-term goals (score 1).</p>	<p style="text-align: center;"><b>Score</b>  <b>1 2 3 4 5 6 7</b>                  [.....]                  Please rate a score of 1-7</p>	<p>Or my work activities require quite some adaptability and quite often I need to learn new skills or study certain knowledge and my activities are primarily focussed on exploring long term goals (score 7).</p>
--	--	---

## Knowledge inflows

To what extent did you, last year, receive or gathered new and useful information about emerging technologies or new techniques that can be used in the developments of your company's innovative products/processes/services.

### 6. From your direct supervisor

<i>(score 1 = no info at all)</i>	<p style="text-align: center;"><b>Score</b></p> <p style="text-align: center;"><b>1 2 3 4 5 6 7</b></p> <p style="text-align: center;">[.....]</p> <p style="text-align: center;"><i>Please rate a score of 1-7</i></p>	<i>(score 7 = weekly)</i>
-----------------------------------	---	---------------------------

### 7. Direct colleagues within your own organizational unit or department

<i>(score 1 = no info at all)</i>	<p style="text-align: center;"><b>Score</b></p> <p style="text-align: center;"><b>1 2 3 4 5 6 7</b></p> <p style="text-align: center;">[.....]</p> <p style="text-align: center;"><i>Please rate a score of 1-7</i></p>	<i>(score 7 = weekly)</i>
-----------------------------------	---	---------------------------

### 8. From others within the company or your professional network

<i>(score 1 = no info at all)</i>	<p style="text-align: center;"><b>Score</b></p> <p style="text-align: center;"><b>1 2 3 4 5 6 7</b></p> <p style="text-align: center;">[.....]</p> <p style="text-align: center;"><i>Please rate a score of 1-7</i></p>	<i>(score 7 = weekly)</i>
-----------------------------------	---	---------------------------

## Knowledge sharing

9. In the company's culture a choice is made how to facilitate individual learning, to stream the input of information and how to share knowledge in order to improve the access to tacit knowledge. For example there are open meetings for sharing, interacting, extrapolation of knowledge and these sessions are in line with cultural goals of the organisation.

<p>Many investments in individual learning and the company's knowledge. The culture is very open to share knowledge, e.g. regular (weekly) training sessions or sharing meetings (score 1).</p>	<p style="text-align: center;"><b>Score</b></p> <p style="text-align: center;">1 2 3 4 5 6 7</p> <p style="text-align: center;">[.....]</p> <p style="text-align: center;"><i>Please rate a score of 1-7</i></p>	<p>Only bare minimum investments in required knowledge. In culture sharing of knowledge is uncommon and exclusively need to know of internal knowledge sharing, ad hoc meetings or once a year (score 7).</p>
---	--	---

## Uberization:

10. The companies like Airbnb and Uber are extreme examples of mediation between supply and demand of a certain capacity. An organisation is able collaborate with other companies or it can hire self-employed individuals to increase the organisation efficiency. What is your experience with hiring or collaborating with external capacity in order to be more innovative.

**“Uberisation** is nothing but digital matching of demand and supply using a smart phone app.” (Ganapathy, 2016, p. 29)

<p>The self-employed Dutch market and hiring of R&amp;D capacity is a must have for my company in order to be innovative the required capacity must be acquired externally. Brokers such as external recruiters network events or even smart phone apps help us finding the right people (score 1).</p>	<p style="text-align: center;"><b>Score</b></p> <p style="text-align: center;">1 2 3 4 5 6 7</p> <p style="text-align: center;">[.....]</p> <p style="text-align: center;"><i>Please rate a score of 1-7</i></p>	<p>The innovation capacity of my company is more than sufficient and we seldom require external capacity. A broker circuit with recruiters and Uberisation of smart phone app's would not help my company to be more innovative (score 7).</p>
---	--	--

## Managerial behaviour of management team (MT)

11. Please score what best categorises the new product development process in your company:

<p>Most development decisions have to have a supervisor's approval, only a little action can be taken by employees until a supervisor has to approve, supervisors want to be in total control and therefore are involved in all decisions before any action is taken (score 1).</p>	<p style="text-align: center;"><b>Score</b></p> <p style="text-align: center;">1 2 3 4 5 6 7</p> <p style="text-align: center;">[.....]</p> <p style="text-align: center;"><i>Please rate a score of 1-7</i></p>	<p>Or during the development process not even the most important design choices require someone higher up for a final decision. An engineer who wants to be creative and make his own design decisions would be encouraged (score 7).</p>
---	--	---

12. Please score what best categorises the management of your company:

<p>In the organisation there is barely informal "hall talk" among employees and most issues are discussed during formal meetings. Managers discourage employees to discuss work-related matters with those who are not their immediate superiors or at least not without their presence (score 1).</p>	<p style="text-align: center;"><b>Score</b></p> <p style="text-align: center;">1 2 3 4 5 6 7</p> <p style="text-align: center;">[.....]</p> <p style="text-align: center;"><i>Please rate a score of 1-7</i></p>	<p>Or people around here are quite accessible to each other, it is easy to talk with virtually anyone you need to, regardless of rank or position. MT members from different departments feel comfortable when their employees exchange information without notifying them. And MT members call each other for advice when the need arises (score 7).</p>
--	--	---

13. Please score what best categorises the management of your company:

<p>All MT members are enthusiastic about the collective goals and mission of the whole organization and they are totally committed to the goals of the organization (score 1).</p>	<p style="text-align: center;"><b>Score</b></p> <p style="text-align: center;">1 2 3 4 5 6 7</p> <p style="text-align: center;">[.....]</p> <p style="text-align: center;"><i>Please rate a score of 1-7</i></p>	<p>Or the management team lacks a commonality of purpose, there is no clearly defined mission and collective vision, instead managers often have their own agenda (score 7).</p>
--	--	--

**External environment**

**14. Please score what best categorises your industry in the last five years:**

<p>Competition in our market is intense, the firm has many competitors offering the same product and price competition is a hallmark of our market (score 1).</p>	<p style="text-align: center;"><b>Score</b></p> <p style="text-align: center;"><b>1 2 3 4 5 6 7</b></p> <p style="text-align: center;">[.....]</p> <p style="text-align: center;"><i>Please rate a score of 1-7</i></p>	<p>Or less competition in our market, more important is offering the best solution to our customer and therefore sometimes we collaborate with other suppliers. Pricing is less important compared to offering the right solution (score 7).</p>
---	---	--

**15. Please score what best categorises your customers in the last five years:**

<p>Customers easily adopt technological changes, unpredictable and intense changes in product are rapidly adopted and customers' product preferences may change quite rapidly once competitive advantages are introduced (score 1).</p>	<p style="text-align: center;"><b>Score</b></p> <p style="text-align: center;"><b>1 2 3 4 5 6 7</b></p> <p style="text-align: center;">[.....]</p> <p style="text-align: center;"><i>Please rate a score of 1-7</i></p>	<p>Or almost no technological changes are requested by our customers, emerging technologies are only introduced when it has been proven in other markets. The selling points of our products are well known and customers rarely ask for changes in our products and services (score 7).</p>
---	---	--

**16.** Please score what best categorises your company and its competitors in the last five years:

<p>The actions of local and foreign competitors in our markets change quite rapidly, the products offered by our competitors change quite often and innovations are introduced on regularly bases, therefore my company is continuously exploring innovations (score 1).</p>	<p style="text-align: center;"><b>Score</b></p> <p style="text-align: center;">1 2 3 4 5 6 7</p> <p style="text-align: center;">[.....]</p> <p style="text-align: center;"><i>Please rate a score of 1-7</i></p>	<p>Or initially our industry is focussing on efficiency of manufacturing and quality improvements, companies are not willing to invest additional cost in technological changes only changing regulations or incentives such as governmental subsidizes enable companies to start exploring emerging technologies (score 7).</p>
--	--	--

**17.** How would you describe the success of your companies innovation strategy?

*Think about development time, amount of new products, responsiveness vs creativity.*

**18.** Are there any other persons you advice to ask for participation in this case study?

*Research into how SMEs simultaneously handle exploitation and exploration of their high tech products, processes or services.*

*During the research 2/3 interviews of one hour each, will be scheduled with different employees in one SME. Of course this information will be treated as company secret and as such it will be anonymised. The information will not be shared with others in the company and only the anonymised public version will be send.*

The best practices we have learned will be shared among all participants.

Thank you again for your time.

## Appendix II. Original and reverse coded case scores

The original case scores were reverse coded, this appendix presents the original scores. Some of the interviewees gave a score of more than one number, In this chapter the original scores are presented next to the reverse corrected case score, as explained on page 28 in paragraph *Case scores*. The third column indicates the corresponding Exploitative, Explorative or Hybrid activities.

Table 8: Case A-C Original and reverse scores and *exploitative*, *explorative* and *hybrid* approaches of individual scores.

Questions	A1			B1			C1		
	Original	A1		Original	B1		Original	C1	
<b>Org. structure</b>									
Q2	4	4	Hybrid	2-3	5	Hybrid	7	1	Exploitation
Q3	6	2	Exploration	1-7	4	Hybrid	5	3	Hybrid
Q4	5	5	Hybrid	5	5	Hybrid	6	6	Exploration
Q5	4	4	Hybrid	6	6	Exploration	5	5	Hybrid
<b>Knowledge</b>									
Q6	2	6	Hybrid	1-2	7	Hybrid	1	7	Hybrid
Q7	2	2	Hybrid	5	5	Exploration	5	5	Exploration
Q8	5-6	5	Exploration	4	4	-	3	3	Hybrid
Q9	6	2	Exploitation	1-2	7	Exploration	4	4	Hybrid
Q10	7	1	Exploitation	2-3	6	Exploration	6	2	Exploitation
<b>MT</b>									
Q11	3	3	Hybrid	5	5	Hybrid	7	7	Exploration
Q12	4	4	-	7	7	Hybrid	7	7	Hybrid
Q13	2	2	Hybrid	1	1	Hybrid	3	3	Hybrid
<b>Environment</b>									
Q14	3	3	Hybrid	6	6	Exploration	6	6	Exploration
Q15	6-1	4	Hybrid	2	6	Exploration	5	3	Hybrid
Q16	6	2	Exploitation	3-4 TU	5	Hybrid	4	4	Hybrid

Table 9: Case D-E Original and reverse case scores and *exploitative*, *explorative* and hybrid approaches of individual scores.

Questions	D1			D2			E1			E2		
	Original	D1		Original	D2		Original	E1		Original	E2	
<b>Org. structure</b>												
Q2	5	3	Hybrid	5-6	3	Hybrid	5	3	Hybrid	6	2	Exploitation
Q3	5-6	3	Hybrid	5-6	3	Hybrid	2	6	Exploration	5	3	Hybrid
Q4	4	4	Hybrid	4	4	Hybrid	5	5	Hybrid	5	5	Hybrid
Q5	5	5	Hybrid	7	7	Exploration	6	6	Exploration	3	3	Hybrid
<b>Knowledge</b>												
Q6	3	5	Hybrid	2-3	5	Hybrid	4	4	-	2	6	Hybrid
Q7	4	4	-	6	6	Exploration	6	6	Exploration	3	3	Hybrid
Q8	4	4	-	4	4	-	2-3	3	Hybrid	4	4	-
Q9	4	4	Hybrid	3	5	Hybrid	2	6	Exploration	3	5	Hybrid
Q10	2-3	5	Hybrid	5-6	3	Hybrid	4	4	Hybrid	3	5	Hybrid
<b>MT</b>												
Q11	5	5	Hybrid	7	7	Exploration	2	2	Exploitation	6	6	Exploration
Q12	1	6	Hybrid	5	5	Hybrid	5	5	Hybrid	5	5	Hybrid
Q13	6	6	not ambidextrous	3	3	Hybrid	4	4	-	5-6	6	not ambidextrous
<b>Environment</b>												
Q14	5	5	Hybrid	3	3	Hybrid	7	7	Exploration	2 6-7	4	Hybrid
Q15	6	2	Exploitation	5	3	Hybrid	7 5	2	Exploitation	4 1-2	5	Hybrid
Q16	2-3	5	Hybrid	4	4	Hybrid	5	3	Hybrid	5	3	Hybrid



Table 10: Case F-I Original and reverse case scores and *exploitative*, *explorative* and hybrid approaches of individual scores.

Questions	F1			G1			H1			I1		
	Original	F1		Original	G1		Original	H1		Original	I1	
<b>Org. structure</b>												
Q2	7	1	Exploitation	5	3	Hybrid	2	6	Exploration	5	3	Hybrid
Q3	3	5	Hybrid	3	5	Hybrid	3	5	Hybrid	4	4	Hybrid
Q4	6	6	Exploration	6	6	Exploration	5	5	Hybrid	3	3	Hybrid
Q5	2	2	Exploitation	4	4	Hybrid	6-7	7	Exploration	5-6	6	Exploration
<b>Knowledge</b>												
Q6	1	7	Hybrid	4	4	-	1	7	Hybrid	5	3	Exploitation
Q7	6	6	Exploration	4	4	-	7	7	Exploration	7	7	Exploration
Q8	6	6	Exploration	2	2	Hybrid	5-6	6	Exploration	5	5	Exploration
Q9	1-2	6	Exploration	2	6	Exploration	2-3	6	Exploration	3-4	4	Hybrid
Q10	2	6	Exploration	4	4	Hybrid	5	3	Hybrid	6	2	Exploitation
<b>MT</b>												
Q11	5	5	Hybrid	3	3	Hybrid	5	5	Hybrid	3	3	Hybrid
Q12	6	6	Hybrid	5	5	Hybrid	6	6	Hybrid	7	7	Hybrid
Q13	6	6	not ambidextrous	7	7	not ambidextrous	4	4	-	5	5	-
<b>Environment</b>												
Q14	5-6	6	Exploration	2	2	Exploitation	7	7	Exploration	6	6	Exploration
Q15	3	5	Hybrid	2	6	Exploration	7	1	Exploitation	4	4	Hybrid
Q16	2	6	Exploration	5-6	2	Exploitation	3	5	Hybrid	4	4	Hybrid

[ End of this document ]