

**Organising for Value Creation, Strategising for Value Capture:
Knowledge, Capabilities, and Business Models**

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Abstract

The root of firms' ability to generate profits lies in their resources and capabilities, which allow them to capture revenue larger than their cost of creating the value. Nowadays, the resource of *knowledge* has become the most important strategic resource of the firm to create and capture value. To ensure sustainable value creation and value capture, firms' capabilities need to be of dynamic nature. These so-called *dynamic capabilities* enable firms to constantly adapt to their rapidly changing environment. Integrally tied to firms' strategic resources and dynamic capabilities is their *business model*, which describes how firms create value for themselves and for third parties as well as how they capture a share of the value they create.

This thesis addresses four sub-aspects of the fundamental question of *how firms create and capture value*, stemming from the fields of knowledge, dynamic capabilities, and business models. Aside from a general introduction and an overall conclusion, it consists of four research papers which address individual sub-aspects and form the main body of this cumulative thesis.

Following the general introduction, the first two papers address creating and capturing value from knowledge, by examining two important aspects in the context of the internationalisation of firms from and to emerging markets: First, creating value based on knowledge transfers in global R&D networks of emerging market multinational enterprises, and second, enabling value capture by protecting knowledge in emerging market R&D subsidiaries of advanced market multinational enterprises. The third paper studies firms' dynamic alliance capabilities, which enable them to create value based on alliances in rapidly changing environments. The fourth paper examines the role of business model design and correlated aspects, such as product market strategies, for capturing value from razor and blade business models. The final chapter summarises this thesis and draws conclusions.

Taken as a whole, this thesis provides novel, in-depth insights into knowledge, dynamic capabilities, and business models, which are highly relevant aspects for value creation and value capture. The research papers contribute important theoretical insights to their respective fields and develop managerial implications of high practical relevance.

Kurzdarstellung

Die Ressourcen und Fähigkeiten eines Unternehmens bilden die Grundlage der Sicherung von Erträgen, die höher als die Kosten der Wertschaffung sind, sodass Gewinne erzielt werden. *Wissen* ist heutzutage das wichtigste strategische Gut zur Wertschaffung und -sicherung. Für eine nachhaltige Wertschaffung und -sicherung muss ein Unternehmen *dynamische Fähigkeiten* besitzen. Diese ermöglichen es Unternehmen, sich fortwährend ihrer sich rasch wandelnden Umwelt anzupassen. Eng verzahnt mit den strategischen Ressourcen und dynamischen Fähigkeiten eines Unternehmens ist dessen *Geschäftsmodell*, das beschreibt, wie ein Unternehmen Wert für sich und Dritte schafft, und wie es einen Teil des Wertes für sich sichert.

Die vorliegende Dissertation adressiert vier Teilaspekte der grundlegenden Frage, *wie Unternehmen Werte schaffen und sichern*, aus den Bereichen *Wissen*, *dynamische Fähigkeiten*, und *Geschäftsmodelle*. Neben einer allgemeinen Einleitung und Schlussfolgerung besteht diese kumulative Dissertation aus vier Forschungsartikeln, die individuelle Teilaspekte aufgreifen und den Hauptteil dieser Arbeit bilden.

Folgend auf eine allgemeine Einleitung adressieren die ersten beiden Artikel mit der Untersuchung zweier Aspekte aus dem Kontext der Internationalisierung die Wertschaffung und –sicherung auf Basis von Wissen: Erstens, der Wertschaffung basierend auf Wissenstransfers in globalen Forschungs- und Entwicklungs- (F&E) Netzwerken multinationaler Unternehmen aus Schwellenländern, und zweitens, der Ermöglichung der Wertsicherung durch Wissensschutz in F&E-Standorten multinationaler Unternehmen aus Industrieländern in Schwellenländern. Der dritte Artikel untersucht die dynamischen Fähigkeiten von Unternehmen, auf Basis von Allianzen in einem sich rasch wandelndem Umfeld Werte zu schaffen. Der vierte Artikel untersucht die Rolle der Gestaltung von Geschäftsmodellen sowie verbundener Aspekte wie Produkt-Markt-Strategien, für die Wertsicherung auf Basis von ‚Rasierer-und-Klingen‘ Geschäftsmodellen. Das letzte Kapitel fasst zusammen und zieht ein Fazit.

In ihrer Gesamtheit liefert diese Dissertation neue, detaillierte Einblicke in die für die Wertschaffung und –sicherung zentralen Aspekte Wissen, dynamische Fähigkeiten, und Geschäftsmodelle. Die Forschungsartikel tragen wichtige, theoretische Erkenntnisse zu ihren jeweiligen Forschungsgebieten bei und entwickeln Handlungsempfehlungen von hoher Praxisrelevanz.

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List of abbreviations

AM	Advanced market
AMNE	Advanced market multinational enterprise
B2B	Business-to-business
B2C	Business-to-consumer
BM	Business model
BRIC	Brazil, Russia, India, China
cf.	Compare (confer)
CEO	Chief executive officer
CIO	Chief information officer
e.g.	For example (exempli gratia)
E-Business	Electronic business
EU	European Union
EM	Emerging market
EMNE	Emerging market multinational enterprise
et al.	And others (et alii / et aliae / et alia)
FDI	Foreign direct investment
FF	Private family-owned firm
GE	General Electric Company
HBA	Home-base-augmenting
HBE	Home-base-exploiting
HQ	Headquarters
IP	Intellectual property
IPR	Intellectual property rights
IT	Information technology
JV	Joint venture
MNE	Multinational enterprise
NF	Privately-owned nonfamily firm
R&D	Research and development
SF	State-owned firm
US/ USA	United States of America

1 Introduction

1.1 Motivation and relevance

1.1.1 Value creation and value capture

Value creation based on investments in research and development (R&D) and innovation has been an important topic of management research for many years (Lepak, Smith, & Taylor, 2007). Yet, the examples of Fraunhofer Institute's mp3 technology and Twitter's social networking service show that even the best innovators often assume their innovations will automatically yield rewards and, as a consequence, underperform in capturing value (Michel, 2014). Thus, how firms capture value from innovation has become an equally important and complementary question to research on value creation (James, Leiblein, & Lu, 2013), making the overall question of *how firms can create and capture value* one of the most frequently addressed questions in contemporary management research (Lepak et al., 2007; Nickerson, Silverman, & Zenger, 2007).

Whenever firms generate profit, it is because they have accumulated resources and developed capabilities that enable them to capture more revenue than their cost of value creation. Nowadays, firms' resources increasingly consist of knowledge and intellectual property (IP), which have become the strategic resources of the firm (Gambardella & McGahan, 2010). To create a sustainable competitive advantage based on their strategic resources, firms need to develop a certain set of dynamic capabilities (Teece, Pisano, & Shuen, 1997). Moreover, they need to search for new business models (BMs) (McGrath, 2010), which are integrally tied to their strategic resources (Gambardella & McGahan, 2010) and whose design is one of the key microfoundations of their dynamic capabilities (Teece, 2010).

This dissertation addresses *organising for value creation* and *strategising for value capture* with regard to the three key aspects of *knowledge*, *dynamic capabilities*, and *business models*. The following section illustrates the relevance of these aspects and points out the main research directions.

1.1.2 Knowledge, dynamic capabilities, and business models

In the information age, managing *knowledge* is a central challenge in order to create and capture value from innovation (Teece, 1998). Firms need to transfer knowledge across the organisation, to enable its commercialisation (Meyer & Thaijongrak, 2013) and need to protect knowledge, to ensure the uniqueness of their innovations (Perri & Andersson, 2014; Pisano & Teece, 2007). The first two papers of this dissertation address the aspect of knowledge. They examine, how multinational enterprises from emerging markets enable the transfer of knowledge within their R&D networks and how advanced market multinational enterprises protect knowledge when performing R&D in markets with weak appropriability regimes.

Dynamic capabilities are an important research stream in strategic management and are closely related to value creation and value capture (Lepak et al., 2007). Of particular importance for firms' value creation is the sub-class of *dynamic alliance capabilities*, which allow firms to innovate based on alliances in dynamic environments (Donada, Nogatchewsky, & Pezet, 2016; Schilke, 2014). The third paper of this dissertation explores what constitutes firms dynamic alliance capabilities and contributes to the yet limited understanding of how firms build and exploit them, to create value based on alliances in rapidly changing environments (Wang & Rajagopalan, 2015).

The business model describes the architecture of firms' value creation and capture mechanisms (Teece, 2010). It can serve as a unit of analysis to gain further understanding of value creation and value capture (Zott, Amit, & Massa, 2011). The fourth paper of this dissertation contributes to the relevant, albeit underexamined role of the business model for capturing value (Desyllas & Sako, 2013). It analyses how firms design business models and correlated aspects to enable capturing value.

The remainder of this introductory chapter is organised as follows: The following section 1.2 offers an overview of the related literature streams. It briefly reviews the state of the art in research around the three main aspects of knowledge, dynamic capabilities, and business models. It explicates individual aspects in greater detail and points out research gaps. Section 1.3 gives an overview of the four papers constituting this thesis and describes their respective research questions. Section 1.4 presents the structure of this thesis and outlines each paper individually and in the overall context.

1.2 State of the art in research

1.2.1 Knowledge transfers and knowledge protection in global R&D networks

Over the last decades, advanced market multinational enterprises (AMNEs) internationalised more and more to emerging markets (EMs) (Dunning & Lundan, 2009). Domestic firms benefited vastly from these inward investments in R&D and the accompanying spillovers (Meyer, 2004), which led to the rise of emerging market multinational enterprises (EMNEs) since the 1990s (Hobdari, Gammeltoft, Li, & Meyer, 2017; Luo & Tung, 2007; Luo & Zhang, 2016). Today, EMNEs have become the greatest new competitors for AMNEs (Deng, 2013).

EMNEs' advanced market (AM) subsidiaries likely have higher knowledge levels than their headquarters. Thus, EMNEs' net knowledge flows are from subsidiaries to headquarters (Awate, Larsen, & Mudambi, 2015). In order to benefit from the absorbed knowledge, it is of key importance for EMNEs to develop capabilities for knowledge transfer and exploitation, (Ghoshal & Bartlett, 1990; Gupta & Govindarajan, 2000), especially when internationalising to foreign markets (Awate, Larsen, & Mudambi, 2012; Cuervo-Cazurra, 2012; Luo & Wang, 2012). Additionally, when EMNEs compete with AMNEs in EMNEs' home markets, they increase their absorptive capacity and develop capabilities enabling them to successfully compete with AMNEs on the global stage (Luo & Tung, 2007).

The relatively young stream of literature on EMNEs offers several interesting research avenues: Future studies need to develop new insights into knowledge creation, acquisition, and transfer in EMNEs' global R&D networks (Andersson, Dasi, Mudambi, & Pedersen, 2016; X. Liu & Giroud, 2016; Meyer & Thaijongrak, 2013) and how EMNEs transfer and exploit knowledge within their organisation (Deng, 2012). Further, insights on how far EMNEs differ from AMNEs with regard to their organisational models are scarce (Kostova, Marano, & Tallman, 2016). Research needs to examine, how EMNEs use global resources to upgrade their headquarters and subsequently use the upgraded headquarters to improve their global competitiveness (Luo & Zhang, 2016).

Due to the strong growth of foreign direct investments (FDI), the topic of knowledge spillovers takes a prominent role in research today (Sofka, Shehu, & de Faria, 2014).

Knowledge spillovers are defined as the transfer of knowledge between organisations without a contractual relationship (Chang & Xu, 2008; Meyer, 2004) and can have both positive and negative effects on multinational enterprises (MNEs) (Alcácer & Chung, 2007; Feinberg & Gupta, 2004). They take place via several spillover effects and channels (Blomström & Kokko, 1998; X. Liu & Buck, 2007; Spencer, 2008) and cause MNEs to increase knowledge protection (de Faria & Sofka, 2010). Especially in EM subsidiaries, AMNEs face a trade-off between knowledge creation and knowledge protection (Perri & Andersson, 2014). To protect knowledge, they make use of formal protection strategies based on host countries' legal systems (de Faria & Sofka, 2010). However, EMs often feature weak appropriability regimes (Lamin & Ramos, 2015), which leads firms to develop and apply informal protection strategies (Perri & Peruffo, 2016).

Only few studies go beyond the separation of knowledge protection strategies into formal protection strategies and secrecy as an informal protection strategy, necessitating more fine-grained research (Gallié & Legros, 2012). Furthermore, firms' ownership structure as an important firm characteristic likely also affects knowledge protection, since it affects firms' innovative activities (Hoskisson, Hitt, Johnson, & Grossman, 2002; Keupp, Palmié, & Gassmann, 2012; Kochhar & David, 1996), the time horizon of their investment decisions (de Massis, Frattini, Pizzurno, & Cassia, 2015; Dyer, 2003), as well as their risk behaviour and conservativeness (Dunn, 1996; Thomsen & Pedersen, 2000). So far, this aspect remains largely neglected by research (Keupp, Beckenbauer, & Gassmann, 2010).

1.2.2 Dynamic alliance capabilities for partnership-based value creation

Capabilities are the set activities firms perform to create and deliver products or services and to generate profit from them. They can be separated into the sub-classes of *ordinary capabilities* and *dynamic capabilities* (Teece & Leih, 2016). Dynamic capabilities form an important body of literature in the field of strategic management and are closely related to both value creation and value capture (Lepak et al., 2007). Dynamic capabilities encompass higher-level activities that enable firms to redirect their lower-level, operational activities towards seminal endeavours, in environments of rapid technological change (Teece, 2014; Teece et al., 1997). They constitute firms'

abilities to sense and seize new opportunities and their ability to reconfigure, to adapt to their rapidly changing environment (Teece, 1998, 2007).

Alliance capabilities as another sub-class of capabilities are those capabilities that are related to firms' alliance activities. They enable firms to create and capture value from alliances (Anand & Khanna, 2000; Wang & Rajagopalan, 2015) and to create a competitive advantage based on alliance management (Ireland, Hitt, & Vaidyanath, 2002). Dynamic alliance capabilities are the set of higher-level alliance capabilities that enable firms to redirect their operational, alliance-related activities towards seminal future alliances. They encompass firms' capabilities to sense and seize opportunities and challenges related with alliances and their capabilities to reconfigure to address the variations of their external environment and thereby remain capable of sensing and seizing alliance opportunities (Donada et al., 2016; Schilke, 2014; Wang & Rajagopalan, 2015).

Because digitisation is transforming more and more industries, the role of building alliances to identify and to grasp opportunities arising from the rapidly changing environment becomes more and more important (Coreynen, Matthyssens, & Van Bockhaven, 2017). However, little is known about how firms develop and exploit dynamic alliance capabilities (Wang & Rajagopalan, 2015) and about the capabilities required to succeed in developing new services based on alliances in the dynamic, digital environment (Donada et al., 2016; Lerch & Gotsch, 2015; Mina, Bascavusoglu-Moreau, & Hughes, 2014; Randhawa, Wilden, & Hohberger, 2016).

1.2.3 Business model design and capturing value from business models

The business model describes how a firm creates value for itself and for third parties and how it captures and monetises a share of the total value (Amit & Zott, 2001; Baden-Fuller & Mangematin, 2013; Chesbrough, 2007; Teece, 2010; Zott & Amit, 2007). It delineates the activity systems of a firm and its partners by disclosing links and underlying mechanisms (Zott & Amit, 2013). If a firm's activities and resources render it more efficient in value creation and value capture than its competitors, its business model will generate profitable revenue (Gambardella & McGahan, 2010).

Business models are strongly interconnected with many other aspects, such as the firm's products, which makes business model design a very complex and challenging task (Zott & Amit, 2013). Further, to capture value, business models must be

imitable (Al-Aali & Teece, 2013). Formal IP can provide innovators with the temporally limited freedom to achieve sustainability in capturing value, by developing superior capabilities, a strong position in specialised complementary assets, and market entry barriers (Desyllas & Sako, 2013; Teece, 1986). Moreover, due to the many facets of business models, the combination of different formal and informal protection mechanisms can be favourable (Desyllas & Sako, 2013). Next to protection mechanisms, the revenue model is another highly relevant aspect related to capturing value from business models, because it directly determines the share of the created value that the firm can eventually capture (Chesbrough & Rosenbloom, 2002; Wirtz, Pistoia, Ullrich, & Göttel, 2016; Zott & Amit, 2010).

How firms capture value from business models is an important, yet underrepresented topic in the literature (Desyllas & Sako, 2013). To fully understand business model design, it is important to analyse both value creation and value capture (Amit & Zott, 2015). In this regard, the interplay between business models and product market strategies is an important aspect (Zott & Amit, 2013), which, with the exception of Zott & Amit (2008), has so far attracted only little consideration in the literature. Further, the interdependency between business models and technological innovation is an important, yet underrepresented aspect of technology strategy research (Baden-Fuller & Haefliger, 2013).

1.3 Main research questions

The main body of this dissertation consists of four research papers, each of which aims to contribute to certain of the research gaps pointed out above. Two papers analyse, how firms organise to create value, first regarding knowledge transfers within their global R&D organisation (paper A) and second by employing their dynamic alliance capabilities to innovate based on alliances (paper C). The other two papers analyse firms' strategies for capturing value, first by protecting their knowledge with informal knowledge protection strategies (paper B) and second based on business model design (paper D). The following text describes the specific research gaps and research questions, each of the papers addresses.¹

¹ For the purpose of this introductory chapter, the research gaps and questions have been summarised and reduced to the core aspects. The research gaps and questions elaborated in the research papers may deviate from those stated in this section, in the sense of being more detailed and specific.

Paper A contributes to research on knowledge creation, transfer, and exploitation in EMNEs' global R&D networks and examines a sub-aspect of value creation from knowledge. By developing an evolutionary model of EMNEs' global R&D networks along their catch-up process, paper A answers the following research question:

Question A: How do R&D networks of EMNEs develop along their catch-up process and what roles do networks and individual units play?

Paper B addresses research gaps regarding AMNEs' strategies to protect R&D knowledge in their emerging market subsidiaries and therefore examines a sub-aspect of capturing value from knowledge. It considers different types of firm ownership in its examination, to examine its likely, but so far neglected influence on informal knowledge protection strategies. Paper B answers the following research question:

Question B: Which informal knowledge protection strategies do AMNEs use when they perform R&D in emerging markets and how does firms' ownership type influence their choice?

Paper C focuses on firms' dynamic capabilities for the creation of value through innovation based on alliances in rapidly changing, digital environments. By identifying the microfoundations of firms' dynamic alliance capabilities, it contributes to the understanding of how firms develop and exploit these capabilities. Paper C answers the following research question:

Question C: What are the microfoundations of firms' dynamic alliance capabilities?

Paper D contributes to the literature on capturing value from business models. It examines the interplay between business model design, product market strategies, technological innovation, and IP, and answers the following research question:

Question D: How do firms capture value from razor and blade business models and what influences business model design?

1.4 Thesis structure and outline of the thesis

1.4.1 Thesis structure

Given its nature, this paper-based dissertation answers the research questions stated above in four individual research papers, each of which constitutes one of the subsequent chapters of this thesis. Hence, this thesis is structured into six chapters: This introductory chapter, followed by the four research papers and an overall conclusion. Figure 1-1 summarises the structure of this thesis. The following Table 1-1 provides an overview of the four research papers along with authorships, research design, data sources and the main findings.

Thesis Structure		
Chapter 1	<i>Introduction</i>	Motivation and relevance, state of the art in research, main research questions, thesis structure and outline
Chapter 2	<i>Paper A</i>	Organisational concepts in international R&D revisited: An evolutionary model of EMNEs' global R&D networks
Chapter 3	<i>Paper B</i>	Protecting R&D knowledge in emerging market subsidiaries: Does ownership type matter?
Chapter 4	<i>Paper C</i>	Dynamic alliance capabilities and the microfoundations of partnerships for digital innovation: A multiple-case study analysis
Chapter 5	<i>Paper D</i>	Capturing value from razor and blade business models: Archetypes of business model configurations
Chapter 6	<i>Conclusion</i>	Summary, implications for research and management practice

Figure 1-1: Overall structure of this thesis

Table 1-1: Overview of papers

Paper	Title	Authors	Method and data	Findings
A	Organisational concepts in international R&D revisited: An evolutionary model of EMNEs' global R&D networks	Homann, F.; von Zedtwitz, M.	Conceptual	<ul style="list-style-type: none"> Evolutionary model of EMNEs' catch-up process First to apply the ambidexterity perspective to EMNEs' global R&D networks Pointing out of headquarters' key role in EMNEs' catch-up as a knowledge hub that accesses, processes and sources knowledge
B	Protecting R&D knowledge in emerging market subsidiaries: Does ownership type matter?	Homann, F.	Qualitative (6 case studies of AMNEs with R&D subsidiaries in the BRIC states)	<ul style="list-style-type: none"> Identification of two classes of protection strategies: preventive and remedial Ownership type is an antecedent to the applicability of individual protection strategies Family and state-owned firms focus more on preventive knowledge protection; private nonfamily firms focus more on remedial knowledge protection
C	Dynamic alliance capabilities and the microfoundations of partnerships for digital innovation: A multiple-case study analysis	Homann, F.; Gassmann, O.	Qualitative (5 case studies of alliance-based digital innovation initiatives)	<ul style="list-style-type: none"> Breakdown and description of firms' dynamic alliance capabilities Identification of the microfoundations of firms sensing, seizing and reconfiguring activities
D	Capturing value from razor and blade business models: Archetypes of business model configurations	Homann, F.; Winterhalter, S.; Gassmann, O.	Qualitative (7 case studies of razor and blade type consumer products)	<ul style="list-style-type: none"> Conceptualisation of four archetypes of razor and blade BMs Five propositions on razor and blade business model design Identification of firms' ability to capture value using formal protection strategies as the key driver of razor and blade business model design

1.4.2 Thesis outline

This section outlines each of the four papers that constitute this thesis. Papers A and B focus on the aspect of *knowledge*, with regard to *organising for value creation* and *strategising for value capture* respectively. Paper C examines *dynamic alliance capabilities* in the context of *organising for value creation* and paper D analyses business models against the background of *strategising for value capture*. Figure 1-2 illustrates the four research papers in the overall context and illustrates their relation to one another.

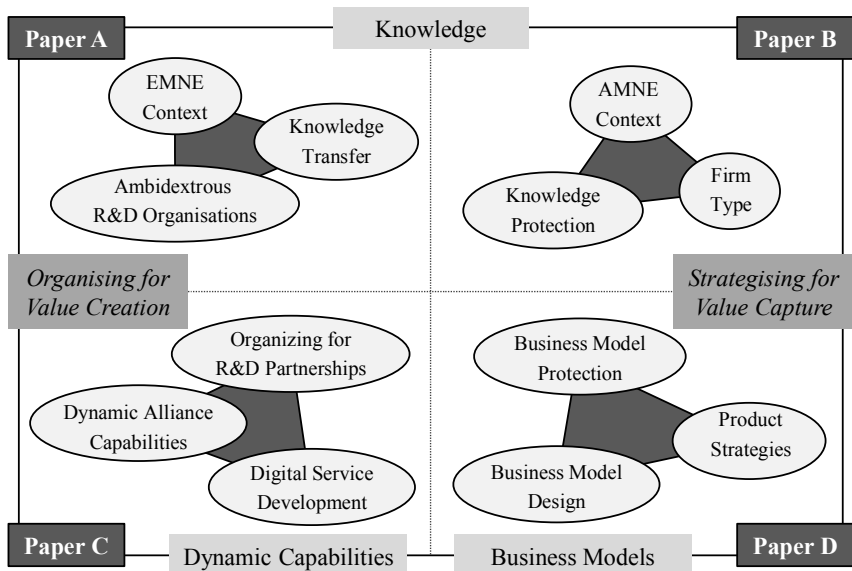


Figure 1-2: Research papers in the overall context

Paper A of chapter 2, '*Organisational concepts in international R&D revisited: An evolutionary model of EMNEs' global R&D networks*', addresses research question A and the aspect of creating value from knowledge. Building upon the literature on MNE internationalisation, organisational ambidexterity, and knowledge transfers in R&D networks, it combines theory of these fields into one model and develops a conceptual, evolutionary model of EMNEs' global R&D networks along their catch-up process. The paper contributes to theory by being the first to apply the ambidexterity perspective to EMNEs' R&D networks. It introduces the notion of organisationally

separate exploration and exploitation networks, into both of which the headquarters are embedded. The paper proposes that headquarters take the role of a knowledge hub with the triple function of accessing, processing, and sourcing knowledge. It concludes that EMNEs' catch-up process is of an 'uneven' nature, with headquarters' evolution preceding subsidiary evolution.

In chapter 3, paper B, *'Protecting R&D knowledge in emerging market subsidiaries: Does ownership type matter?'*, addresses research question B and the aspect of capturing value from knowledge. It analyses the knowledge protection strategies, AMNEs employ in their emerging market R&D subsidiaries. Based on a review of the literature on knowledge protection and ownership type as an influencing factor on firm behaviour, it examines the effect of different types of firm ownership on the use of certain informal knowledge protection strategies. It differentiates between family, private nonfamily, and state ownership. In a multiple-case study of six AMNEs, the paper identifies two sub-classes of informal knowledge protection strategies – preventive and remedial protection strategies. It further identifies ownership type as an antecedent to the application of certain informal knowledge protection strategies. Lastly, it develops case studies of how firms employ and use individual strategies, which can inform managers about the successful application of those.

Paper C, *'Dynamic alliance capabilities and the microfoundations of partnerships for digital innovation: A multiple-case study analysis'*, constitutes chapter 4 of this thesis. It examines research question C and the aspect of creating value by utilising dynamic capabilities. This paper studies, how firms, whose traditional core business is based in the offline world, make use of alliances to develop innovative digital services and thereby develop new business areas. It builds upon the literature on dynamic capabilities, alliance capabilities, and the recently emerging conception of the combination of both as dynamic alliance capabilities. In a cross-industry multiple-case study of five traditionally offline firms, with recent and successful developments of innovative digital services based on alliances, it explores the microfoundations underlying firms' dynamic alliance capabilities. It describes the microfoundations of firms' capabilities to sense and seize alliance opportunities and their capabilities to reconfigure, to adapt to the quickly changing digital environment. Based on the research results, the paper develops managerial implications, which assist managers of offline firms in their endeavours to explore new, digital market opportunities.

Paper D of chapter 5, '*Capturing value from razor and blade business models: Archetypes of business model configurations*', examines how firms capture value from business models and answers research question D. It begins with a review of the literature on first, business model design and product market strategies as elements of firms' value creation activities and second, revenue models for two-part tariffs and business model protection strategies as elements of firms' activities to capture value. Building upon the literature, the paper develops a theoretical framework that differentiates between four distinct revenue models of razor and blade business models. In a multiple-case study analysis of seven consumer products that follow a razor and blade type business model, it identifies four archetypes based on the revenue model types. The paper then explicates each archetype with regard to business model design themes, product market strategies, revenue mechanisms, and protection mechanisms. It develops five distinctive propositions for the design of razor and blade business models, which provide researchers with a basis for further analyses and can help managers in designing their own firms' business models.

2 Organisational concepts in international R&D revisited: An evolutionary model of EMNEs' global R&D networks

Co-authored by Maximilian von Zedtwitz

Abstract

The process of emerging market multinational enterprises (EMNEs) catching up with advanced market multinational enterprises (AMNEs) has become a new focus of international business research. Typically, researchers view EMNEs' catch-up in the context of headquarter-subsidiary relationships and reverse knowledge transfers. We acknowledge this view, but propose three new arguments: First, we argue that catch-up and learning not only take place on the unit level but also on the network level; second, headquarters take the role of an ambidextrous knowledge hub; and third, headquarters use their intermediary role first for their own catch-up and subsequently for the catch-up of emerging market subsidiaries.

Building upon and combining constructs and insights from the literature on the internationalisation of multinational enterprises (MNEs), organisational ambidexterity, and knowledge transfers, we develop an evolutionary model of the catch-up process of EMNEs' global R&D networks. By combining these strands of research into one model, our research makes several contributions: We are the first to apply the ambidexterity perspective to EMNEs' R&D networks and attribute headquarters a dual embeddedness in both the exploration and exploitation network. We propose that headquarters take the role of a knowledge hub and perform the triple function of accessing, processing, and sourcing knowledge. Based on this, we reason that EMNEs' evolution process is of an 'uneven' nature, with headquarters catching up first and emerging market subsidiaries following. Finally, we explicate the limitations of our model and identify future research directions.

Keywords: Emerging market multinational enterprises; internationalization; R&D; knowledge transfers; headquarter-subsidiary relationships; ambidexterity perspective

2.1 Introduction

The evolution of emerging market (EM) firms benefits greatly from knowledge spillovers that result from foreign direct investment of advanced market multinational enterprises (AMNEs) in emerging markets (Meyer, 2004). Capitalising on this new knowledge, emerging market firms expand their geographic reach and become emerging market multinational enterprises (EMNEs), defined as international companies with an origin in emerging markets that engage in outward foreign direct investment, effectively control their international activities, and internationalise mainly value-adding activities (Luo & Tung, 2007).

The differences between AMNEs' and EMNEs' internationalisation processes appear to be not just phenomenological, but also theoretical (Kostova et al., 2016). Traditional theories on the internationalisation of multinational enterprises are likely relevant to EMNE research, but yet unable to adequately explain their internationalisation (Luo & Zhang, 2016). EMNEs internationalise as part of their catch-up strategy (Mathews, 2002). They not only benefit from the presence of AMNEs in their home markets and from the learnings of AMNEs' internationalisation, but also directly leverage the organisational and technical knowledge present in advanced markets (AMs). EMNEs establish research and development (R&D) networks in AMs and transfer locally acquired technologies back to their EM-based headquarters (HQ) (Luo & Tung, 2007). We argue that their EM-based HQ serve as a knowledge hub, relaying AM-developed technology to subsidiaries in both domestic and foreign EMs, reconfigured for application in EMs utilising headquarters' EM-indigenous capabilities. This suggests two asymmetries in the theory on AMNEs' and EMNEs' internationalisation processes: First, EMNEs benefit from competing with AMNEs in both their own home market and in advanced markets in a way that advanced market firms cannot, and second, the role of EMNEs' HQ is different from the role of AMNEs' HQ.

Researchers typically view this phenomenon in the context of headquarter-subsidiary relationships and reverse knowledge transfers. While we acknowledge the power of these strands of literature, we argue that:

- 1) Catch-up and learning take place not only at the unit level, but also at the network level;

2) The role of EMNEs' HQ is not to either interact with home-base-augmenting (HBA) or home-base-exploiting (HBE) subsidiaries (Kuemmerle, 1997), but an ambidextrous role of interacting with both HBA and HBE subsidiaries. In essence, the HQ becomes a knowledge hub;

3) The HQ uses its intermediary function at first to upgrade its own organisational capabilities, and successively to elevate the innovation capability of its exploitation network. Due to this sequential approach, it is a form of organisational evolution.

In a departure from predominantly quantitative research on knowledge flows in MNEs, which misses out on providing an in-depth understanding of this phenomenon due to an under-representation of conceptual or qualitative studies (Michailova & Mustaffa, 2012), we develop a conceptual model of EMNEs' global R&D network organisation. We base our model on heterogeneity-focused EMNE research, differentiating along various dimensions such as organisational form, destination, and internationalisation motives and stage (Luo & Zhang, 2016). We draw from research on MNE internationalisation, organisational ambidexterity, and knowledge transfer in mapping out our narrative style evolutionary model of EMNEs' catch-up process (Cheng, Birkinshaw, Lessard, & Thomas, 2014; Cornelissen, 2017; Oswick, Fleming, & Hanlon, 2011). We place our focus on R&D networks, because the internationalisation of R&D is a key enabler for MNEs, to access and leverage global knowledge (Awate et al., 2015; Doz, Santos, & Williamson, 2001).

By combining these strands of international business research and associated theoretical constructs, we make several contributions to the literature. First, we apply the ambidexterity perspective to EMNEs, and are – to our knowledge – the first to apply it to EMNEs' R&D networks. Based on this, we elevate the former perception of exploration and exploitation subsidiary mandates from the unit level to the network level. Second, we ascribe a sequential nature to EMNEs' knowledge transfer process: From the explorative R&D network to the headquarters, which process and reconfigure the knowledge using their EM-indigenous knowledge and capabilities, and subsequently from the headquarters to the exploitative R&D network. Third, we attribute the central role within EMNEs' catch-up process to the headquarters, which are dually embedded in the exploration and exploitation network and manage both of them on the network level, instead of managing based on unit-to-unit interactions.

Fourth, we expand the traditional perception of headquarters being the *control hub* to headquarters also being the *knowledge hub* of the EMNE. We argue that headquarters embody the *triple function of accessing, processing, and sourcing knowledge*. Fifth, we refine EMNEs' evolution process to an 'uneven' process, with headquarters' evolution preceding subsidiary evolution. Finally, we argue that headquarters optimise psychic distance between themselves and their exploration and exploitation network, to maximise their own catch-up and to fulfil their role as the knowledge hub.

The rest of this paper is organised as follows. First, we review the literature on MNE internationalisation, followed by reviews of the literature on ambidexterity in an R&D network context and on knowledge diffusion in EMNEs' R&D networks. Second, based on the combination of these literature streams, we build our theoretical model of EMNEs' R&D network evolution. Third, we point out and discuss the main contributions of our model to extant theory. Fourth and last, we draw conclusions and derive implications for future research.

2.2 Global R&D network organisation and knowledge transfers

2.2.1 Viewing EMNEs' R&D networks from three perspectives

The internal organisation of the firm is an important topic to the strategic management of innovation (Keupp et al., 2012). By exploring the internationalisation of EMNEs' R&D networks, this paper follows the promising avenue of research on EMNEs' dominant organisational design and structures (Deng, 2012; Kostova et al., 2016). Especially in the context of orchestrating and integrating geographically dispersed operations in a dynamic manner, EMNE research is still in its infancy (Luo & Zhang, 2016). Their ability to simultaneously explore and exploit competencies and resources in an integrated manner within their global R&D network provides the basis for establishing and retaining a competitive advantage (Luo and Tung 2007). Earlier research on (A)MNEs' subsidiary roles differentiates between home-base-augmenting vs home-base-exploiting R&D sites (Kuemmerle, 1997), technology- vs market-seeking R&D units (von Zedtwitz & Gassmann, 2002) or competence-creating vs competence-exploiting subsidiary mandates (Cantwell & Mudambi, 2005). Our research follows this notion, but at the same time elevates it from the unit to the network level. By arguing for the existence of separate exploration and exploitation

R&D networks, we take an ambidexterity perspective on EMNEs' global R&D networks.

Closely connected to MNE organisation is the topic of intra-MNE knowledge flows, which are central to international business theory as well as the very existence and competitiveness of MNEs (Michailova & Mustaffa, 2012). But little is known about how EMNEs create, acquire, transfer, and exploit knowledge within their global R&D networks (Andersson et al., 2016; X. Liu & Giroud, 2016). Because subsidiaries often become sources of knowledge for headquarters, which then become sources of knowledge for other subsidiaries (Awate et al., 2015; Michailova & Mustaffa, 2012), the headquarter-subsidiary relationship is a key aspect of intra-EMNE knowledge transfers. However, how EMNEs upgrade the home base and then leverage the upgraded home base remains mostly unexplored (Luo & Zhang, 2016), and the understanding of how MNEs evolve through interactions between individual units within their R&D networks is incomplete (Sarkar, 2011). By combining theory on knowledge flows in R&D networks with earlier research on MNEs' headquarters' role as *R&D hubs* in their global R&D networks (Gassmann & von Zedtwitz, 1999), we bring forward the argument that EMNEs' headquarters act as *control* and *knowledge hub* within and between their exploration and exploitation network.

2.2.2 MNE unit mandates and networks

MNE literature distinguishes between the unit mandates of *exploration* and *exploitation* (Almeida & Phene, 2004; Yang, Mudambi, & Meyer, 2008). The mandate of *exploration* refers to learning and innovation, in the sense of developing or acquiring new knowledge (Gupta, Smith, & Shalley, 2006; Kuemmerle, 1997; Yang et al., 2008). The mandate of *exploitation* refers to the use and adaption of existing knowledge and possibly, but not necessarily, the development and acquisition of incrementally new knowledge (Gupta et al., 2006; March, 1991). It also includes the transfer of knowledge to exploitative units or networks, since these units require a continuous inward knowledge flow (Cantwell & Mudambi, 2005; Kuemmerle, 1997; Yang et al., 2008).

In the traditional view, MNEs' headquarters are responsible for defining the firm's overall strategy and assign subsidiary mandates to implement it (Birkinshaw & Hood, 1998; Song, 2014). More recent research finds contemporary MNEs' headquarters'

role to also encompass the development and dispersal of knowledge within the R&D network (Awate et al., 2015). Since the transfer of knowledge is an exploitative activity and the sourcing and integration of knowledge are explorative activities (Andersson et al., 2016), MNEs' headquarters combine explorative and exploitative unit mandates. This ambidextrous nature of the headquarters' mandate is an important aspect of the headquarters-subsidiary relationship in EMNEs, which requires further research, to gain deeper insights on individual units' roles (Jormanainen & Koveshnikov, 2012).

Network-based structures have helped MNEs to prosper, by easing the coordination of international activities (Mathews, 2006). In the context of EMNEs, one of the critical questions yet to be examined is how they leverage their competitive advantages in their globally differentiated network of units (Luo & Zhang, 2016). Literature on traditional MNEs suggests that a central position in R&D networks provides headquarters with better and broader access to other units' knowledge. It creates opportunities for the HQ to access knowledge and improve their innovative capabilities (Phelps, Heidl, & Wadhwa, 2012; Tsai, 2001).

2.2.3 An ambidexterity perspective on EMNE internationalisation

EMNEs' ability to simultaneously exploit core competencies at home and in foreign EMs and to explore new opportunities in foreign AMs in an integrated fashion is the foundation of EMNEs' long-term competitive advantage (Luo & Tung, 2007). EMNEs have stronger motives and capabilities than other firms to establish and leverage organisational ambidexterity, to overcome their latecomer disadvantages on the global stage (Luo & Rui, 2009). On unit level, ambidexterity refers to the simultaneous exploration and exploitation via loosely connected and differentiated subunits (Gupta et al., 2006; O'Reilly & Tushman, 2004). Viewing the R&D network from this perspective, we postulate the *simultaneous existence of an exploration-focused and an exploitation-focused R&D network within the EMNE, which are organisationally separate from one another*.

In early phases of their internationalisation, EMNEs are prone to have an explorative orientation, since they need to catch-up on their lack of capabilities and knowledge (Awate et al., 2012; Kedia, Gaffney, & Clampit, 2012; Luo & Rui, 2009; Luo & Tung, 2007; Mathews, 2002). When EMNEs invest in AMs, they often acquire foreign

companies with the goal of accessing advanced knowledge and technology (Luo & Tung, 2007). The exploration network likely has a decentral organisation structure with loose processes and open cultures (Bandeira-de-Mello, Fleury, Aveline, & Gama, 2016). Unit mandates of EMNEs' explorative R&D networks can further be separated into two sub-mandates: First, a purely *technology-seeking* mandate in firms with a technologically weak home-base, and second, a *home-base-augmenting* mandate in firms with a technologically advanced home base (Di Minin, Zhang, & Gammeltoft, 2012; Le Bas & Sierra, 2002). As a consequence of operating with technology-seeking subsidiaries in AMs, EMNEs' HQ are able to increase their technological capabilities (Chen, Li, & Shapiro, 2012). Consequently, *their explorative subsidiaries' mandates change from technology-seeking to home-base-augmenting* along the catch-up process.

In addition to explorative activities in AMs, EMNEs enter foreign emerging markets with exploitative subsidiaries to grow in size and to tap new markets. They operate more efficiently than AMNEs, because the cost of foreign market activities increase with institutional distance (Meyer & Peng, 2016). Further, EMNEs hold ownership advantages regarding the operation in institutionally weak conditions similar to their home countries and are thus also able to operate more effectively in EMs than AMNEs (Buckley, Cross, Tan, Xin, & Voss, 2008). Likely, EMNEs' exploitation network features larger units and a more central organisation structure, with well-defined processes and a tightly established organisational culture (Bandeira-de-Mello et al., 2016). Analogous to explorative subsidiary mandates, unit mandates of EMNEs' exploitative R&D networks can also be separated into two sub-mandates: First, a *market-seeking* mandate in firms with a relatively weak technological home-base and second, a *home-base-exploiting* subsidiary mandate in firms with a relatively strong technological home base (Di Minin et al., 2012; Le Bas & Sierra, 2002). Thus, analogous to EMNEs' exploration network, the *exploitative subsidiaries' mandates change from market-seeking to home-base-augmenting* along the catch-up process.

Based on these insights on exploration and exploitation in EMNEs, we conclude the following for EMNEs' R&D networks: First, *EMNEs establish a decentrally organised exploration-focused R&D network in AMs, whose units' mandates evolve from purely technology-seeking to home-base-augmenting*; and second, *EMNEs establish a more centrally organised exploitation focused R&D network in EMs, whose units' mandates evolve from purely market-seeking to home-base-exploiting*.

2.2.4 Intra-firm knowledge transfers

Knowledge is one of the most important strategic assets of the firm to establish and to maintain a competitive advantage (Grant, 1996; March, 1991). MNEs exist because of their capability to transfer and exploit knowledge internally more efficiently and effectively than through external market mechanisms (Gupta & Govindarajan, 2000; Minbaeva, Pedersen, Björkman, Fey, & Park, 2003) and because they are able to develop particular knowledge transfer capabilities superior to those of other firms (Dasí, Pedersen, Gooderham, Elter, & Hildrum, 2017). Knowledge gets transferred, if units have interdependencies with one another (Cano-Kollmann, Cantwell, Hannigan, Mudambi, & Song, 2016). This knowledge transfer, specifically the net balance of a unit's in- and outflows of knowledge, determine its role in the R&D network (Cano-Kollmann et al., 2016; Cantwell & Mudambi, 2005). Since knowledge transfers always involve two parties, they are dyadic and significantly depend upon the relationship between the sender and the receiver (Andersson, Gaur, Mudambi, & Persson, 2015).

Due to different knowledge levels of AMNEs' and EMNEs' headquarters, knowledge flows differ between AMNEs and EMNEs. Most likely, EMNEs' AM subsidiaries have a higher knowledge level than their headquarters (Awate et al., 2015), thus the extent of knowledge flows to the subsidiary is greater for EM subsidiaries than for AM subsidiaries. This *reverse* knowledge flow from subsidiaries to headquarters is of high importance for EMNEs (Luo & Tung, 2007; Nair, Demirbag, & Mellahi, 2016). In comparison to AMNEs, whose R&D networks rely more on *knowledge sourcing* – a knowledge push from the headquarters to subsidiaries, EMNEs' R&D networks rely more on *knowledge accessing* – a knowledge pull of the headquarters from AM subsidiaries (Awate et al., 2015). This corresponds to the exploration/ exploitation view of subsidiary mandates in the way that R&D strategies of explorative subsidiaries are supply-driven (sourcing), whereas the R&D strategies of exploitative subsidiaries are demand-driven (accessing; Cantwell & Mudambi, 2005). We conclude for EMNEs' R&D networks that *EMNEs' HQ access knowledge from AM subsidiaries to increase the HQ's knowledge level (knowledge pull), and that EMNEs source knowledge from their HQ to EM subsidiaries (knowledge push)*.

Through the processing of knowledge in the sending unit and the obtaining of new knowledge in the receiving unit, both parties involved in knowledge transfers develop new capabilities. However, the knowledge gap between sender and recipient and the potentially lacking absorptive capacity of the recipient may act as barriers for knowledge exploitation (Cohen & Levinthal, 1990). Thus, only when EMNEs' headquarters have reached a certain minimum knowledge level, their foreign investments in AMs lead to productivity increases at home, and only when headquarters reach a more advanced level, productivity increases substantially (M. Li, Li, Lyles, & Liu, 2016). This implies for EMNEs' R&D networks that *their HQ enable accessing knowledge from AM subsidiaries, by increasing their absorptive capacity through technology-related exploitative activities in their domestic market and in foreign EMs, which involve a processing and transfer of the current knowledge.*

AMNEs' headquarters' primary concern is to maintain control of the R&D network, in order to align the firm's strategy across units and to ensure efficiency (Ambos, Asakawa, & Ambos, 2011). For this, AMNEs' headquarters often take the role of the R&D network orchestrator or R&D hub. They control intra-firm knowledge flows and thereby facilitate the development of innovation capabilities (Awate et al., 2015; Gassmann & von Zedtwitz, 1999; Mudambi & Navarra, 2004).

Based on these findings, we propose that, in addition to the traditional, *control* role, EMNEs' headquarters take the second role of the *knowledge hub* and perform the *triple function of accessing, processing, and sourcing knowledge* within their R&D networks. Because of the dyadic nature of knowledge transfers (Andersson et al., 2015) and because the knowledge levels and psychic distance between HQ and EM subsidiaries are closer in EMNEs than in AMNEs (Awate et al., 2015; Johanson & Vahlne, 1977), EMNEs' headquarters are supposedly better at reconfiguring advanced knowledge (Rui, Zhang, & Shipman, 2016) and thus better at fulfilling the role of the hub for knowledge transfers to EM subsidiaries.

We draw two major conclusions from the literature on knowledge transfers: First, *EMNEs improve knowledge transfers via the HQ by reconfiguring existing knowledge for relevance to the new context;* and second, *along EMNEs' internationalisation process, HQ develop from a knowledge source (within the exploitation network) and a knowledge recipient (within the exploration network), to a unidirectional knowledge*

hub (connecting the exploration and exploitation network), to multidirectional knowledge hub (within both the exploration and exploitation network).

Summarising our review of the literature, we assert that existing international business theory adequately describes many aspects of EMNEs' catch-up process. However, it does so in a scattered and static manner, leading to shortcomings in the understanding of the dynamic catch-up process as a whole. In the following, we present a conceptual model of EMNEs' global R&D networks along their catch-up process, which builds upon and combines the above literature.

2.3 EMNEs' R&D network evolution

2.3.1 Knowledge level as the key driver for EMNEs' catch-up process

We present an evolutionary model of EMNEs' global R&D network evolution (see Table 2-4 at the end of this section for an overview of the model) as a theoretical variant to the recently proposed 'virtuous cycle' of EMNEs – that is “*using global resources to upgrade the home base and then use the upgraded home base to further capitalise on global opportunities*” (Luo & Zhang, 2016, p. 348). In our model, we view EMNEs' R&D networks from an ambidexterity perspective and describe knowledge transfer as a sequential process. Headquarters, as the *knowledge hub* with a *triple function of accessing, processing, and sourcing knowledge*, play the central role in the catch-up process. The process itself is of an 'uneven' nature, in which headquarters evolve at first, before EM subsidiaries follow. Figure 2-1 illustrates the changing knowledge levels of different parts of the R&D network, which is the key driver for network evolution and provides the basis for our model.

In the beginning, the distance in knowledge levels between headquarters and the exploitation network is small, which is beneficial for the headquarters' sourcing of knowledge to the exploitation network. However, both the psychic distance and the knowledge gap between headquarters and the exploration network are large, which has a limiting effect on headquarters' ability to access knowledge. EMNEs are able to overcome this limitation by being aware of their headquarters' learning role, and because their home markets are often large and important growth markets for their AM subsidiaries. In middle phases, the distance between the exploration network and headquarters decreases. Headquarters take an intermediary role within and between

both networks. Due to the headquarters deep knowledge of EMs as target markets for exploitation and the small institutional distance to EMs, they are well able to source relevant and processed advanced-level knowledge to the exploitation network. In late phases, the distance between headquarters and both networks is small, which facilitates knowledge transfers across all units. The need for headquarters' coordinative and knowledge processing activities reduces, which leads to more lateral and direct knowledge transfers between subsidiaries and may eventually lead to all units integrating into one R&D network.

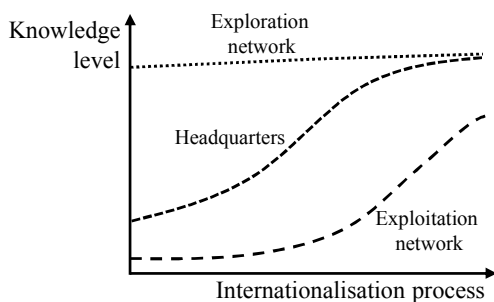


Figure 2-1: Knowledge level as the key driver for network evolution

2.3.2 Four-phase model of EMNEs' R&D network evolution

2.3.2.1 Phase 1: Building up the headquarters' knowledge base

Extant research on early phases of EMNEs' internationalisation is divided into three camps: First, some researchers argue that EMNEs' internationalisation path complies with existing international business theory, with an initial exploitation of ownership advantages in foreign emerging markets (e.g. Dunning, Kim, & Park, 2008; Narula, 2006). Second, other researchers argue that EMNEs differ, because they put a stronger emphasis on explorative internationalisation in advanced markets to become internationally competitive (e.g. Awate et al., 2015; Luo & Tung, 2007; Mathews, 2006). Third and in between these two camps, researchers argue that EMNEs follow a simultaneous exploration and exploitation in both advanced and emerging markets (e.g. Bandeira-de-Mello et al., 2016; Di Minin et al., 2012; Guillén & García-Canal, 2009) or that their behaviour differs between individual firms for firm-specific reasons (e.g. Buckley, Elia, & Kafourous, 2014; Ramamurti, 2012). Our model follows the third

and most recent line of research of simultaneous exploration and exploitation. Notwithstanding these diverging rationales, the quintessence of our model remains valid for any one of the internationalisation paths.

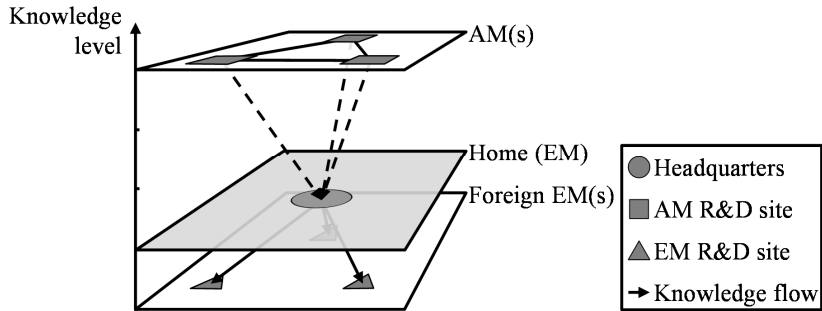


Figure 2-2: Market-seeking (EMs) and technology-seeking (AMs) R&D internationalisation

Figure 2-2 depicts the R&D network of EMNEs' during their first phase of internationalisation. Initially, EMNEs feature a technologically low knowledge level at their headquarters (Awate et al., 2012, 2015). The more global their aspiration level becomes, the more they expand their explorative R&D activities by establishing technology-seeking subsidiaries in advanced markets (Kedia et al., 2012; Luo & Tung, 2007). By accessing AM subsidiaries' knowledge and capabilities, headquarters gradually build up their knowledge base and increase their absorptive capacity (Chen et al., 2012). In this phase, EMNEs' headquarters exert little control on the exploration network (Awate et al., 2015) and the network features a decentral organisation with loose processes and open cultures (Bandeira-de-Mello et al., 2016). Nevertheless, EMNEs try to establish the HQ as the central R&D site, to improve future access to subsidiary-knowledge (Phelps et al., 2012; Tsai, 2001).

EMNEs internationalise their formerly domestic exploitative R&D activities, despite their headquarters' low knowledge level. They establish subsidiaries with market-seeking motives, to gain market-specific knowledge of foreign EMs (Kedia et al., 2012). Their capabilities to operate in institutionally weak environments, their abilities to operate at lower costs, and their understanding of customers in emerging and lesser developed markets enable them to tap new markets and thereby to gain a competitive advantage over AMNEs (Luo & Tung, 2007; Luo & Zhang, 2016; M. W. Peng, 2012;

Ramamurti, 2012; von Zedtwitz, Corsi, Søberg, & Frega, 2015). In this phase, a central R&D network organisation with well-defined processes and an established organisational culture is favourable for EMNEs (Bandeira-de-Mello et al., 2016). Due to headquarters' low knowledge level, their explorative R&D network does not have an immediate effect on the exploitation networks' performance (M. Li et al., 2016).

The main goals of the headquarters in this phase are to increase their absorptive capacity, to transfer existing knowledge to foreign EMs, and to exploit existing knowledge at home and in foreign EMs. The headquarters thereby acquire market-specific knowledge from foreign EMs and build the foundation for taking a more central role in the future. Table 2-1 summarises the developments and changes that lead to a transition from phase 1 to phase 2.

Table 2-1: Developments and changes that lead to the transition from phase 1 to 2

<i>Transition mechanism</i>	<ul style="list-style-type: none"> • HQ's accessing of knowledge from AM subsidiaries drives their knowledge absorption and learning
<i>Changes in the exploration network</i>	<ul style="list-style-type: none"> • Decreasing knowledge gap between HQ and AM subsidiaries • Exploration mandates change from purely technology-seeking to HBA • Network becomes increasingly central around HQ
<i>Changes in the exploitation network</i>	<ul style="list-style-type: none"> • EM subsidiaries receive more advanced knowledge from HQ • Exploitation mandates change from purely market-seeking to HBA
<i>Changes in the headquarters' role</i>	<ul style="list-style-type: none"> • HQ process advanced knowledge to increase its relevance for foreign EMs • HQ develop from a recipient of knowledge to a hub for knowledge transfer

2.3.2.2 Phase 2: Catching up with headquarters as the central unit

Due to learning processes and knowledge absorption in phase 1, EMNEs are able to increase headquarters' technological capabilities and knowledge level (Chen et al., 2012), which decreases their knowledge gap to AM subsidiaries, but increases their gap to foreign EM subsidiaries (see Figure 2-3). It consequently affects the mandates of both their exploration and exploitation R&D network.

Once EMNEs have established a stronger technological home-base and have increased their headquarters' R&D activities, the exploration network's mandate changes: The purely technology-seeking motives of AM subsidiaries transform to home-base-augmenting subsidiary mandates (Chen et al., 2012; Di Minin et al., 2012), and the

increased knowledge level of the home base leads to positive productivity effects (M. Li et al., 2016). The locus of EMNEs’ exploration activities still lies mostly in its AM subsidiaries, but headquarters are gradually moving towards a dual embeddedness in both the exploration and exploitation network. Due to headquarters’ increased absorptive capacity and better ability to recognise valuable knowledge, while still exhibiting a significant knowledge gap to AM subsidiaries, the net flow towards HQ peaks in this phase. They increase their central control over AM subsidiaries to intensify knowledge accessing (Z. Peng, Qin, Chen, Cannice, & Yang, 2016).

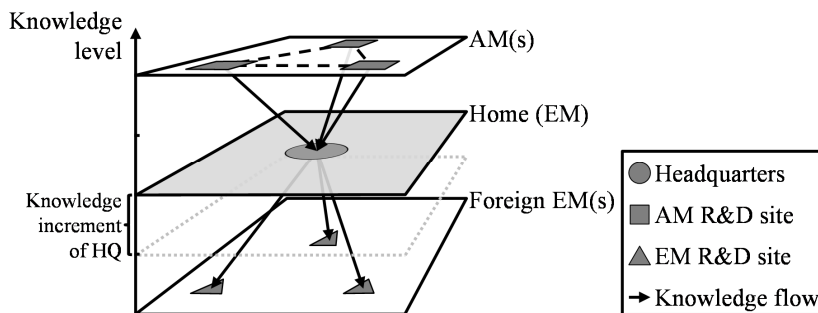


Figure 2-3: Transition to HBA (AMs) and HBE R&D (EMs)

In their exploitation R&D network, EMNEs start to use their HQ as a springboard for the commercialisation of technologies and knowledge, the HQ acquired from AM subsidiaries, in foreign emerging markets and lesser developed markets in the cultural and geographic sphere of the headquarters. Headquarters combine their newly acquired knowledge with their EM indigenous knowledge and capabilities, to develop cost innovations. Along with this, their foreign EM subsidiaries’ motives develop from market-seeking to home-base-exploiting (Di Minin et al., 2012; Le Bas & Sierra, 2002).

Headquarters now take a central position in the EMNEs as a *control hub* and unidirectional *knowledge hub* between the exploration and the exploitation R&D networks. The main enabler of the headquarters’ innovation catch-up are knowledge flows from AM subsidiaries to the HQ (Awate et al., 2015), which lead to increasing R&D spending of the HQ (Chen et al., 2012). Headquarters *access* knowledge from AM subsidiaries, *process* this knowledge by utilising their EM indigenous capabilities, to make it applicable to EMs, and source knowledge to EM subsidiaries for

exploitation. Table 2-2 summarises the developments and changes that lead to a transition from phase 2 to phase 3.

Table 2-2: Characteristics of the transition from phase 2 to 3

<i>Transition mechanism</i>	<ul style="list-style-type: none"> • Learning progress of HQ and foreign EM subsidiaries • HQ's accessing of knowledge from AM subsidiaries and sourcing of knowledge to EM subsidiaries drives the learning progress
<i>Changes in the exploration network</i>	<ul style="list-style-type: none"> • Decreasing knowledge gap between HQ and exploration network increases explorative activities of HQ • Network centralises around HQ
<i>Changes in the exploitation network</i>	<ul style="list-style-type: none"> • EM subsidiary knowledge level rises • Increasing 'upstream' knowledge flows from EM subsidiaries to HQ and from HQ to AM subsidiaries extend the exploitation network to AMs
<i>Changes in the headquarters' role</i>	<ul style="list-style-type: none"> • HQ increasingly create competence and become fully embedded into the exploration network • HQ develop from a unidirectional to a multidirectional knowledge hub

2.3.2.3 Phase 3: Competing with headquarters as the knowledge hub

With performing home-base-augmenting R&D in AMs and home-base-exploiting R&D in EMs during phase 2, EMNEs are able to further increase headquarters' and EM subsidiaries' knowledge levels through accessing knowledge from AM subsidiaries, processing it in the HQ, and sourcing it to their EM subsidiaries. This enables them to also advance the HQ role, to increase 'upstream' knowledge flows and thereby to broaden exploitation in advanced markets (see Figure 2-4).

In phase 3, the distinction between EMNEs' exploration and exploitation network becomes less obvious, since the allocation of these roles on the base of geographic location has become obsolete. The headquarters now play a central role in the exploration network. They access and process global knowledge and create competence that is new to the firm. The foundation of the headquarters' success with processing knowledge for application in EMs lies in the extent of commonality in specialised knowledge with EM subsidiaries: At the core of this is that if two units have identical knowledge, integrating this knowledge has no benefit, and if two units have entirely separate knowledge, integration can only take place on the very basic level (Grant, 1996). Since headquarters still possess basic, EM specific knowledge, but

now also possess more advanced knowledge, a combination of their own knowledge with exploitative subsidiaries' knowledge is very fruitful.

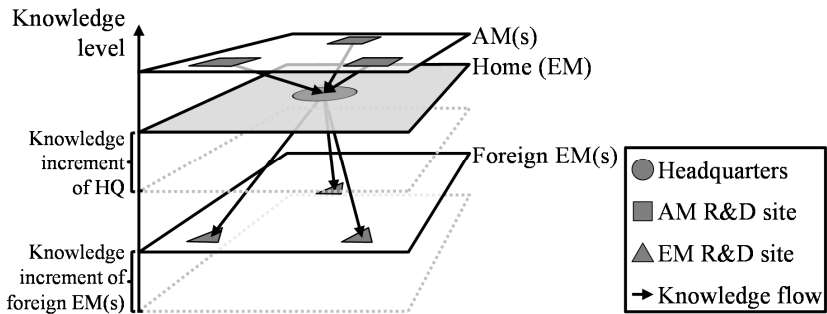


Figure 2-4: EMNE R&D network: Dispersed HBA and HBE R&D with knowledge hub

Similar to the exploration network, the exploitation network organises around HQ. In its embedded position in both networks, HQ can orchestrate globally dispersed resources and capabilities for an optimal utilisation of the firms' strengths (Luo & Zhang, 2016). They now have advanced knowledge of local customer requirements in foreign EMs, which allows for advanced, EM specific innovations (frugal innovations). At the same time, EMNEs can fortify their first-mover advantages, to beat increasing competition in foreign EMs (Kedia et al., 2012). Along with headquarters' catch-up process, EMNEs will start to compete with local firms in advanced markets. AM subsidiaries' mandates broaden to home-base-exploiting R&D. However, chances are that the EMNE still needs technological assistance from local partners (Di Minin et al., 2012).

The headquarters' role is that of an orchestrator and control hub in both the exploration and exploitation network. In addition, HQ now access knowledge from both networks, process the knowledge for application in both AMs and EMs, and source it to both networks. Headquarters' role is that of a *multidirectional knowledge hub*. By accessing and processing the exploration network's knowledge, and sourcing it to the exploitation network, HQ continue their catch-up process. Table 2-3 summarises the developments and changes that lead to a transition from phase 2 to phase 3.

Table 2-3: Characteristics of the transition from phase 3 to 4

<i>Transition mechanism</i>	<ul style="list-style-type: none"> • HQ approximate AM subsidiaries' knowledge level
<i>Changes in the exploration and exploitation network</i>	<ul style="list-style-type: none"> • Vanishing of knowledge gap between HQ and AM subsidiaries • Exploration and exploitation network approximate one another and may, in some cases, integrate into one network
<i>Changes in the headquarters' role</i>	<ul style="list-style-type: none"> • Need for HQ to centrally manage decreases • HQ become an integrated knowledge hub

2.3.2.4 Phase 4: Organising like 'traditional' MNEs

Due to headquarters' integration into global operations, their role as the control hub, and their role as a knowledge hub, HQ are able to further increase their knowledge level, to eventually catch-up with AM subsidiaries. At this point, EMNEs' R&D organisation becomes similar to that of the global R&D networks of AMNEs. Figure 2-5 depicts EMNEs' R&D networks in this phase.

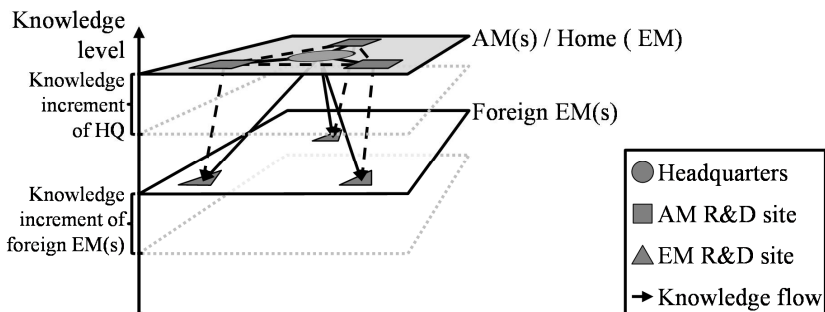
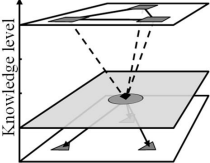
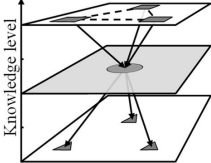
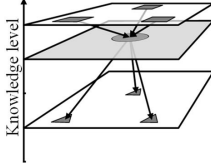
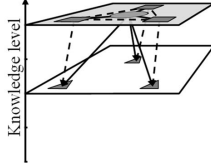


Figure 2-5: MNE-like global R&D organisation

The differences in knowledge levels between the exploration and exploitation network become smaller. They may take different forms, depending on various industry- or firm-specific aspects (Boutellier, Gassmann, & von Zedtwitz, 2008). Intra-firm knowledge flows, especially between explorative and exploitative units, take place in a more decentral manner. Because of the approximation of the exploration and exploitation network, it is less necessary for the HQ to centrally manage the EMNEs' activities. The HQ now take the role an integrative knowledge hub that integrates knowledge from the exploration and exploitation network, and distributes it within the global R&D network.

Table 2-4: Overview of EMNEs' R&D network evolution

Characteristic	Building up the headquarters' knowledge base	Catching up to AMNEs with headquarters as the central unit	Competing with AMNEs with headquarters as the knowledge hub	Organising like 'traditional' MNEs
R&D network				
Exploration network	<ul style="list-style-type: none"> • Regional • Technology-seeking R&D in AMs • Decentral organisation between HQ & AM subsidiaries 	<ul style="list-style-type: none"> • Regional • HBA R&D in AMs • Rising explorative R&D in HQ • Increasingly central organisation between HQ & AM subsidiaries 	<ul style="list-style-type: none"> • Multinational • Dispersed HBA R&D • Centralised R&D hub organisation around HQ 	<ul style="list-style-type: none"> • Global network comprising both exploration & exploitation • Firm- & industry-specific organisation (e.g. R&D hub organisation, integrated network organisation)
Exploitation network	<ul style="list-style-type: none"> • National • Market-seeking R&D in EMs • Exploitative R&D in HQ • Centralised around HQ 	<ul style="list-style-type: none"> • Regional • HBE R&D in foreign EMs • Exploitative R&D in HQ • Centralised around HQ 	<ul style="list-style-type: none"> • Multinational • Dispersed HBE R&D • Centralised in EMs & home • HQ as R&D hub for AMs 	
Headquarters' role	<ul style="list-style-type: none"> • Knowledge creation & sourcing to EMs • Absorption of AM knowledge 	<ul style="list-style-type: none"> • Unidirectional knowledge hub that accesses knowledge from AMs, processes it & sources it to EMs 	<ul style="list-style-type: none"> • Multidirectional knowledge hub that accesses, processes & sources knowledge within the two networks 	<ul style="list-style-type: none"> • Titular centre, decentral management • Integrative knowledge hub, integrated in both networks
Illustrative example of Haier's global R&D network*	<ul style="list-style-type: none"> • Internationalisation to exploit geographically close markets in Southeast Asia in 1997 • Internationalisation to US & Europe in 1999-2001 to explore technologies 	<ul style="list-style-type: none"> • 2009: 15 AM design centres develop products for AMs & EMs • 2012: 5 foreign R&D centres, acquisition of Fisher & Paykel for further expansion in AMs 	<ul style="list-style-type: none"> • 2016: Acquisition of GE's appliance business • World's largest & most innovative home appliances manufacturer 	<ul style="list-style-type: none"> • Prospective

* Based on Bonaglia et al. (2007); Duysters et al. (2009); Ge et al. (2016); Kirkpatrick (2017); H. Liu and Li (2002)

2.4 Implications for research

By combining constructs from the literature on MNE internationalisation, knowledge transfers, and organisational ambidexterity, we not only drew a dynamic picture of EMNEs' catch-up process, we also proposed that their global R&D organisation likely consists of two differently-purposed networks for exploration and exploitation, connected via the R&D headquarters, assuming the role of a knowledge/technology hub. Over the course of time, both the hub and the exploitation network upgrade their knowledge and organisational capabilities, catching up with the exploration network. This model contributes to the international business literature in multiple ways.

We contribute to the literature by elevating the formerly unit level perception of exploration and exploitation subsidiary mandates to the network level. We argue that EMNEs establish ambidexterity mainly via organisational separation, which, due to the large psychic distance between advanced and emerging markets, they can easily achieve, especially in early phases of their internationalisation process. With this notion, we are among the first to apply the ambidexterity perspective to EMNEs' R&D networks, thereby enhancing the reach of ambidexterity theory. We further argue that the focus of the exploration and exploitation networks develops along the internationalisation process from national, to regional, to multinational and eventually to the global stage, which adds to the understanding of the dominant organisational models in EMNEs.

We further contribute to the literature on headquarters-subsidiary relationships in the EMNE context. Due to headquarters' dual embeddedness into both the exploration and exploitation network, we attribute the central, coordinative role in the catch-up process to them. Anecdotal evidence suggests that at least some EMNEs opportunistically expand their international R&D organisations unit-by-unit, corresponding to drivers established by international business theory. However, they realize ambidexterity-leverage effects only subsequently through the networks thus created. We argue that successful EMNEs manage both networks at the network level, by setting guidelines and strategies, instead of managing based on unit-to-unit interactions.

With our notion of separate exploration and exploitation networks and headquarters' dual embeddedness in both networks, we also contribute to the literature on knowledge flows in EMNEs. We propose a sequential knowledge transfer process from the

explorative R&D network to the headquarters, which process the knowledge, and a subsequent transfer from the headquarters to the exploitation network. Thus, while AMNEs' headquarters' primary concern is to maintain control, we suggest that the EMNEs headquarters' scope extends to that of an intra-MNE *knowledge hub*. This originates from EMNEs' headquarters' dual embeddedness in both the exploration and exploitation network and assigns headquarters the *triple function of accessing, processing, and sourcing knowledge*. By being embedded in both networks, headquarters assume a dual interface role towards either network. With this, they create redundancy in expertise, which they can use to create cross-function absorptive capacity (Cohen & Levinthal, 1990). In contrast, AMNEs are less able to make use of this effect, as their HQ's psychic distance to EM subsidiaries is greater, which means that they are less capable of transferring knowledge from AMs to EMs (Johanson & Vahlne (1977), see Figure 2-6). The EMNE R&D HQ thus acts as an interpreter between the exploration and the exploitation network, utilising its short psychic distances between either network and elevating the technological capabilities of the exploitation-based network in EMs over time, as it raises its own knowledge level and innovation capabilities. The AM-based exploration network not only serves as a good example to follow, but is deliberately tapped as a source of knowledge to be adapted for use in the exploitation network – via the EMNE R&D hub.

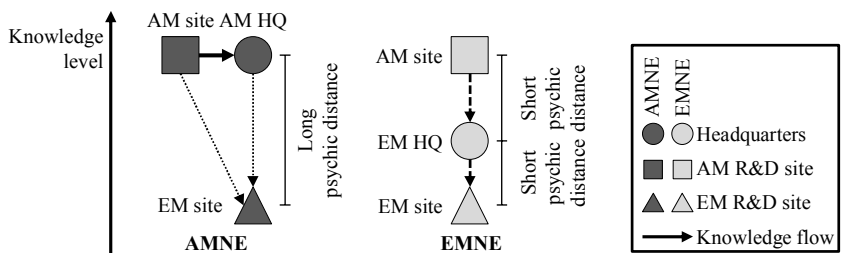


Figure 2-6: Distance advantage of EMNEs facilitates knowledge transfer to foreign EMs

Our exposition of headquarters' central role as a knowledge hub also contributes to literature on subsidiary evolution and to the emerging discussion on the upgrading of headquarters during the catch-up process. We refine the evolution of EMNEs to be of an 'uneven' nature, with headquarters' evolution preceding subsidiary evolution. Focussing initial learning and catch-up on the HQ enables EMNEs to quickly access

and absorb AM knowledge. Headquarters utilise their EMNE specific ownership advantages to boost their domestic R&D activities, thereby increasing their absorptive capacity and improving their capabilities of serving as the knowledge hub. EMNE R&D headquarters are (almost by definition) also based in EMs. Though, given the relatively short international history of EMNEs and R&D headquarters' central role in controlling and coordinating all domestic innovation activities, these R&D headquarters are most likely the aggregators and conveyors of global knowledge for foreign subsidiaries, despite the substantial initial psychic distance between the R&D HQ and AM-based exploration-oriented R&D units.

To fulfil the *role of the knowledge hub* and to maximise learning along the catch-up process, we argue that EMNEs' headquarters optimise psychic distance between themselves and their R&D networks. In early phases of the catch-up process, EMNEs' headquarters benefit from the low cultural and geographic distance to foreign EMs and exploit existing knowledge in these markets. By exposing themselves to AMs (e.g., through serving as original equipment manufacturers to AM-based customers, through technology joint ventures with AMNEs, or through outright acquisitions of AM-based R&D units), EMNEs reduce the psychic distance to AMs and enable the exploration of new knowledge. In the intermediate phases of our evolutionary model, EMNEs' headquarters have an elevated knowledge level and are able to serve as a first *unidirectional* and later *multidirectional knowledge hub* between AM and EM subsidiaries. Their reduced psychic distance to AMs enables them to access knowledge, process it in the headquarters by utilising their EM specific knowledge, and to source it to lesser developed foreign EMs for exploitation. With this notion, we contribute to the theoretical groundwork of how EMNEs create, acquire, transfer, and exploit knowledge within their global R&D networks.

2.5 Future research directions and conclusions

Conceptual insights are often the starting point for subsequent empirical and quantitative research (Doz, 2011), an observation that certainly holds true for our evolutionary model of EMNEs' global R&D networks. As our model is based on the combination of different theoretical concepts, researchers should initially make use of qualitative research for further analysis from a variety of theoretical lenses (Doz,

2011). Another interesting path for future research could be to test our model based on a historical comparison to AMNEs, which could help to identify potential similarities and differences in the behaviour of EMNEs and AMNEs. This could also increase the level of detail in the last phases of our model, which so far few – if any – EMNEs have reached.

With regard to the theories upon which we build our model, future research should specify how EMNEs complete each transition from phase to phase. For example, research could examine the details of how EMNEs achieve ambidexterity and whether their approach is subject to change along the catch-up process, especially in late phases. Furthermore, future studies should increase the level of detail on knowledge flows, since our as well as other studies (e.g. Awate et al., 2015) focus on intra-firm net flows of knowledge and neglect reverse external knowledge flows and learning from the external environment.

In conclusion, we made several contributions to international business theory and clarified the picture of EMNEs' global R&D networks, by combining different theoretical concepts and narrating EMNEs' evolutionary catch-up process. Our model offers researchers a new, dynamic perspective on EMNE internationalisation and provides several promising starting points for future empirical research.

3 Protecting R&D knowledge in emerging market subsidiaries: Does ownership type matter?

Single authored

Abstract

Knowledge leakages from emerging market subsidiaries of multinational enterprises are a perpetual threat to firm performance, especially due to the often weak intellectual property rights legislation of host countries. Nevertheless, advanced market multinational enterprises perform research and development activities in emerging markets to capture the attractive growth opportunities, these markets offer. They mitigate the risks of knowledge leakages by adopting informal knowledge protection strategies.

In a multiple-case study of six European multinational enterprises, this study examines the influence of different types of firm ownership – family, private nonfamily, and state ownership – on informal knowledge protection strategies. It makes three main contributions: First, it extends theory on knowledge protection by distinguishing between two classes of informal protection strategies – preventive and remedial protection strategies. Second, it establishes a connection between knowledge protection and organisational characteristics, by identifying ownership type as an antecedent to the applicability of certain informal protection strategies. Third, it informs managers about informal protection strategies and provides examples of the successful application of those.

Keywords: Informal knowledge protection, ownership type, multinational enterprises, multiple-case study

3.1 Introduction

Emerging markets (EMs) offer attractive growth opportunities to multinational enterprises from advanced markets (AMNEs), but also entail risks. Practitioners tend to identify knowledge leakages from EM subsidiaries to competitors as a perpetual threat to sustainable firm performance. This risk is particularly relevant in the context of large EMs, such as the BRIC states (Brazil, Russia, India, and China). These countries frequently require technology transfers in exchange for market access and employ forced research and development (R&D) localisation policies, while at the same time offering weak intellectual property rights (IPR) protection (Ezell, Atkinson, & Wein, 2013).

Earlier studies have examined knowledge spillovers between firms in general (Blomström & Kokko, 1998; Ritala, Olander, Michailova, & Husted, 2015) and between firms in EMs (Chang & Xu, 2008; X. Liu, Lu, Filatotchev, Buck, & Wright, 2010; Meyer, 2004; Spencer, 2008; Zhang, Li, Li, & Zhou, 2010). Further, recent studies have described knowledge protection strategies of firms in China (Keupp, Beckenbauer, & Gassmann, 2009; Keupp et al., 2010), country-level differences in knowledge protection (de Faria & Sofka, 2010), the effect of mandates and clusters on knowledge protection (Sofka et al., 2014), and knowledge protection with regard to the trade-off between knowledge inflows and knowledge outflows (Perri & Andersson, 2014; Perri, Andersson, Nell, & Santangelo, 2013).

Researchers have identified ownership type as an important antecedent to the understanding of how and why firms choose and implement particular innovation-related initiatives (Keupp et al., 2012). For example, research has examined the effect of family ownership on different business processes (Dyer, 2003), product innovation (de Massis et al., 2015), or R&D investments (Chrisman & Patel, 2012; Duran, Kammerlander, van Essen, & Zellweger, 2016), and the influence of state ownership on performance (Goldeng, Grünfeld, & Benito, 2008), foreign direct investment (FDI) (Ramasamy, Yeung, & Laforet, 2012), or the selection of joint venture (JV) partners (Ramachandran, Clark, McIver, & Miller, 2011). Since ownership type has an influence over firms' investment horizons and risk aversion (Thomsen & Pedersen, 2000), it is likely to affect firms' innovative activities and development outcomes (de Massis, Frattini, & Lichtenthaler, 2013; Hoskisson et al., 2002), as well as firms'

knowledge and IPR protection strategies. This is especially so between family and private nonfamily firms (de Massis et al., 2015).

So far, insights on the influence of firm-level characteristics on knowledge protection strategies remain scarce (Gallié & Legros, 2012; Keupp et al., 2010). Research that goes beyond the separation of protection strategies into patents and secrecy is lacking, and further studies analysing different IPR protection strategies are required (Gallié & Legros, 2012). In addition, researchers have called for studies on mechanisms aside from formal IPR that allow family firms to safeguard their particularistic goals (Kotlar, de Massis, Frattini, Bianchi, & Fang, 2013).

By addressing these gaps in a multiple-case study of six AMNEs, this paper provides answers to the following research question: *Which informal knowledge protection strategies do advanced market multinational enterprises use when they perform R&D in emerging markets and how does their ownership type influence their choice?*

This paper contributes to the emerging stream of research on knowledge protection in AMNEs' EM subsidiaries (Sofka et al., 2014) by making three main contributions: First, it extends the theory on knowledge protection by identifying two main classes of informal protection strategies: preventive and remedial strategies. Second, it connects the literature on knowledge protection with the literature on organisational characteristics by identifying ownership types and corresponding firm characteristics as antecedents to the applicability of the two classes of protection strategies. Third, it informs managers about the two classes of informal knowledge protection strategies and provides examples of how firms with certain characteristics successfully apply individual strategies.

3.2 Theoretical background

3.2.1 Knowledge protection strategies

Formal protection strategies are strategies for protecting knowledge with legal mechanisms, such as patents, copyrights, and trademarks. These protection strategies are based on the respective countries' legal systems (de Faria & Sofka, 2010). In EMs, formal protection strategies are often severely hindered due to several specialties of their legal systems, because of which AMNEs face many challenges when employing

formal protection strategies in EMs (Cao, 2014; The Economist Intelligence Unit, 2013a, 2013b). Thus, AMNEs cannot solely rely on formal protection strategies to protect their R&D activities in these business environments (Zhao, 2006). As a result, the use of informal knowledge protection strategies is of vital importance when operating in EMs. The following paragraphs review the literature on informal protection strategies (see Table 3-1 for an overview).

Table 3-1: Overview of informal knowledge protection strategies

#	Informal Protection Strategy	Literature
1	Secrecy	de Faria & Sofka (2010); Gallié & Legros (2012); Keupp et al. (2009); Liebeskind (1997); Tian (2010)
2	Complex design	de Faria & Sofka (2010); Gallié & Legros (2012); Keupp et al. (2009)
3	Loyalty of employees	Cao (2014); Keupp et al. (2009); Liebeskind (1996)
4	Governance structures of alliances	Kale, Singh, & Perlmutter (2000); Li, Eden, Hitt, Ireland, & Garrett (2012)
5	Relationship to government officials	Cao (2014); Keupp et al. (2009)
6	Preparing for employee departures	Moore, Hanley, & Mundie (2011)
7	Monitoring of departed employees	Agarwal, Ganco, & Ziedonis (2009)

Secrecy. Firms employ mechanisms governing knowledge transfers between their employees and outsiders, as well as among their employees, to ensure secrecy. They establish rules and restrictions on the knowledge transfer of specific issues, to specific recipients, or even to certain subsidiaries as a whole (de Faria & Sofka, 2010; Liebeskind, 1997). Especially in EM-subsidaries, AMNEs make the explicit knowledge reliable on additional tacit knowledge, or even go so far as to not document any important information in written form (Keupp et al., 2009; Tian, 2010).

Complex design. Firms use complex design or technological specialisation to make the imitation of their products too costly, too time-consuming or even impossible to achieve for competitors. Foreign firms use this strategy especially in EMs, to prevent

less developed domestic firms from making use of potential knowledge spillovers (de Faria & Sofka, 2010; Keupp et al., 2009).

Loyalty of employees. Increasing the loyalty of employees is a protection strategy specifically aimed at reducing knowledge leakages through employee turnover. Firms increase the futurity of incentives to employees (Liebeskind, 1996) and build trust with their employees by making them feel that the firm appreciates their relationship (Keupp et al., 2009). Particularly in China, the loyalty of employees can be boosted by making use of the Chinese *guanxi* culture, in which personal relationships play an important role (Cao, 2014; Keupp et al., 2009).

Governance structures of alliances. Due to restrictions on market access or to create a linkage to host country firms, AMNEs often enter into joint ventures or form strategic alliances with domestic firms in EMs (D. Li et al., 2012). One of the main reasons why domestic firms enter into these alliances is to learn knowledge and capabilities from their partners (Kale et al., 2000). Thus, the balance between knowledge sharing and knowledge leakages is a core competence when engaging in alliances with domestic firms, since knowledge sharing, which is intended to support the alliance's development goals, often leads to unintended and potentially damaging knowledge leakages (D. Li et al., 2012). To prevent unintended knowledge outflows, firms carefully select the right governance structures before entering into alliances. For this balance between inward and outward knowledge spillovers, mutual trust and interaction on the individual level between the alliance partners is favourable (Kale et al., 2000; D. Li et al., 2012). Further, equity-based governance structures, even though typically more costly, help to encourage knowledge exchange between partners and to reduce the partners' concerns about knowledge spillovers (D. Li et al., 2012). Establishing wholly owned subsidiaries instead of forming joint ventures is most advantageous for knowledge protection (Tian, 2010).

Relationship to government officials. Maintaining a good relationship to government officials is an important protection strategy in some EMs. In China, firms can establish an external *guanxi* network with government officials, to gain the status of a trusted friend. This relationship to administrative authorities can be used to quickly react to IPR infringements, without relying on the slow judicial arm of IPR enforcement (Cao, 2014; Keupp et al., 2009).

Preparing for employee departures. To reduce knowledge leakages through leaving employees, firms can prepare for employee departures. For this, agreements with employees about IPR ownership and nondisclosure agreements need to be in place. In case of a departing employee, knowledge and information that are accessible for the employee have to be determined, affected departments have to be informed, and the employee's actions need to be reviewed (Moore et al., 2011).

Monitoring of departed employees. To prevent damages from knowledge leakages through employee departures, firms monitor the activities of their departed employees and new employers. If any IPR violation is detected, firms aggressively enforce their patents, as a reputation for being tough on IPR violations helps to reduce damages through knowledge leakages by employee mobility. This strategy is especially useful in markets with weak laws on employment contracts (Agarwal et al., 2009).

3.2.2 Ownership type as an influence on firm behaviour

Firms' ownership type is likely to affect their innovatory activities (Hoskisson et al., 2002; Keupp et al., 2012; Kochhar & David, 1996) and thus also likely to influence the informal knowledge protection strategies they apply in EM subsidiaries. A recent review on the ownership of corporations separates firm ownership into six (nonexclusive) types: institutional investor ownership, insider ownership, blockholder ownership, family ownership, business group ownership, and state ownership (Boyd & Solarino, 2016). On the basis of this typology, this research categorises ownership into three exclusive types: family ownership, private nonfamily ownership, and state ownership. For the term *family firm*, this research follows the definition of (Westhead, Cowling, & Howorth, 2001, p. 370): "*a firm is regarded as a family firm if it meets the following conditions: more than 50% of ordinary voting shares are owned by members of the largest single family group related by blood or marriage and the firm is perceived by the chief executive/ managing director/ chairman to be a family business.*" Accordingly, this paper regards a firm as a state-owned firm, if more than 50% of the ordinary voting shares are owned by the state. The following paragraphs examine the influence of ownership type on firm behaviour, with regard to goal setting, risk behaviour, time horizon, and social capital.

Goal setting. Ownership types affect the goals set by firms. Family firms develop additional capabilities and tacit knowledge, due to the existence of non-financial goals

next to financial goals (Duran et al., 2016). Similarly, compared to other firm types, state-owned firms have more numerous and intangible goals, may be constrained due to certain civil service rules (Perry & Rainey, 1988; Rainey & Bozeman, 2000), and often follow non-economic goals (Goldeng et al., 2008; Tönurist & Karo, 2016). They are likely to pay attention to political goals and consider social consequences such as jobs and social welfare in their decisions (Thomsen & Pedersen, 2000). However, in foreign locations, the premise of the state helping their local operations may not be given (Cuervo-Cazurra, Inkpen, Musacchio, & Ramaswamy, 2014). Nevertheless, state-owned firms may invest more in corporate social responsibility, to reduce scepticism of the host government regarding the investments of a foreign state in their own country (Cuervo-Cazurra et al., 2014).

Risk behaviour. Different types of ownership also have an influence on firms' risk behaviour (Dunn, 1996; Thomsen & Pedersen, 2000). Family firms make strategic decisions with the family's personal wealth and thus feature a predominantly risk averse organisational climate, which influences their product innovation activities towards higher prudence (de Massis et al., 2015). In addition, families often have their wealth concentrated in a single firm and would be severely affected if risky decisions turn out badly. Hence, they are less eager to follow high-risk/high-return strategies (Gómez-Mejía, Cruz, Berrone, & De Castro, 2011). Family firms are strongly concerned about a potential loss of control (Donnelly, 1964; Thomsen & Pedersen, 2000), which, in comparison with nonfamily firms, may lead to differences in their alliance-based innovation activities, especially because the family firm would have to give autonomy to highly knowledgeable managers (de Massis et al., 2015). State-owned firms' managers' risk aversion is often assumed, but seldom shown to be higher than in private firms. However, risk culture, which is managers' perception of risk taking of co-workers and superiors, has been shown to not differ from private nonfamily firms (Bozeman & Kingsley, 1998).

Time horizon. Research has shown that different types of ownership affects firms' time horizon (de Massis et al., 2015; Dyer, 2003; Thomsen & Pedersen, 2000). Scholars recently argued that state-owned firms may provide a unique institutional setting for innovation, by combining a risk-seeking behaviour with a long time horizon of investment decisions and innovatory activities (Boyd & Solarino, 2016; Tönurist & Karo, 2016). Family-ownership also results in a long-term perspective, rather than

short-term financial goals, because families strive to pass wealth on to future generations (de Massis et al., 2015; Dunn, 1996; Dyer, 2003) Family firms tend to implement more long-term employee development programs, rather than short-term trainings, which may help to increase the long-term identification with the firm through shared goals, norms, and values (de Massis et al., 2015; Gómez-Mejía et al., 2011). They also have a tendency to establish long-term relationships with key external stakeholders, to improve the family's reputation among the community (Dunn, 1996). These relationships may provide an insurance-like protection for their relationship-based intangible assets (de Massis et al., 2015; Godfrey, 2005). Similar ties to officials and a strive for positive public reputation have been shown for state-owned firms (M. W. Peng, Bruton, Stan, & Huang, 2016). However, this likely only holds true in their home markets and it can be expected that the ties to foreign host country officials are much less developed.

Social capital. Family firms have been shown to be more likely to avoid socially irresponsible actions that would create unfavourable publicity, which could damage the family's reputation (Dyer & Whetten, 2006). Due to the internal and external social capital that family firms build up through external relationships, in the case of damage, both internal and external stakeholders are more likely to act in favour of the firm (de Massis et al., 2015; Gómez-Mejía et al., 2011). Compared to nonfamily firms, family firms are more able to make use of the community (Miller, Lee, Chang, & Le Breton-Miller, 2009). In addition, family firms' external social capital improves their alliance building and partnership success (Ireland et al., 2002). To gain local legitimacy, foreign state-owned firms may form alliances with both private and state-owned domestic firms in host countries (Cuervo-Cazurra et al., 2014).

In sum, the review of the literature on the influence of ownership type on firm behaviour points to the existence of several theoretical reasons, why firms with different ownership type may differ in their use of different informal knowledge protection strategies. The following chapters elaborate on this based on a multiple-case study research design.

3.3 Research methodology

3.3.1 Case study approach

This research elaborates on and establishes a link between the theory on informal knowledge protection and the influence of ownership type on innovative activities. Given the limited knowledge about the influence of ownership type on firms' knowledge protection strategies, this research employs an inductive multiple case-study design (Yin, 2013). This design allows a detailed examination of each case, to examine the link between ownership type and informal knowledge protection strategies in the individual firms. In addition, it enables the identification of differences between different types of ownership in a cross-case analysis. Because AMNEs rely most on informal knowledge protection strategies in countries that exhibit weak appropriability regimes (Keupp et al., 2010), this research chooses AMNEs' EM subsidiaries as its empirical setting. Thus, to comply with the theoretical setting and goal of this study, potential case firms must originate from AMs, perform R&D activities in EMs, and must employ informal knowledge protection strategies.

3.3.2 Data source and sampling

Data from six technology-intensive AMNEs with R&D activities in at least one of the BRIC states provides the basis for this research (see Table 3-2 for an overview and firm demographics). All six case studies are based on semi-structured interviews that were conducted in 2014 and 2015. The sampling and data collection was performed in three steps: The first step was desk research, to find AMNEs with R&D activities in EMs and to identify potentially relevant contact persons within these firms. An introductory email was sent to these personnel, to describe the scope of this research project. Following, the research project and the compatibility of the firms as potential case study participants were discussed in short telephone calls with the contact persons. From there, the potential case study participants were narrowed down to 18 firms. The second step was conducting semi-structured interviews with the 18 firms, lasting 30 to 60 minutes each. The main topics of these interviews were general information about the firm, potential channels of knowledge leakages, informal protection strategies employed by the firms, as well as the link between protection strategies and firm characteristics such as ownership type, industry, and corporate culture (see appendix for the interview questionnaire). The interviewees received the

questionnaire in advance so that they could prepare. The third step was to identify the firms most suitable as case studies for the purpose of this research project, based on the information gathered during step two. The selection was made based on the ownership type of these firms, with a maximum variation in their characteristics, namely goal setting, risk behaviour, time-horizon, and social capital. Thus, these cases can be viewed as polar type cases (Eisenhardt, 1989; Eisenhardt & Graebner, 2007). Thereafter, a second and, if necessary, a third round of interview was scheduled with managers of the six selected firms. In total, 15 interviews, lasting a combined 9.5 hours (see section 3.7: Table 3-4 for a complete list of interviews) were conducted with the six case firms. The interviewees were heads of IPR departments, R&D managers, or heads of business units.

3.3.3 Data analysis

All interviews were recorded and transcribed in verbatim. For triangulation purposes, if possible, interviews with different interviewees were performed. In addition, internal corporate documentation and publicly available information on the firms was analysed (Yin, 2013). Based on the interview transcripts and all additional information, case studies for each of the six firms were written. Specific details were clarified in an iterative manner, with a rotation between the initial case studies, original data, and the literature, to reach a consistent representation in the case studies. In preparation for the cross-case analysis and to gain an overview of the protection strategies used in the individual cases, the protection strategies were rated and displayed in a table, with regard to the reliance on and the success of the case firms with the individual strategies (see Table 3-3 at the end of section 3.4). This rating was performed based on self-assessment of the interviewees. Distinctions were made between heavy use, medium use and no application of the strategy within the firms. Further, a distinction for the non-application was made between ‘no specific reason for the non-application’, ‘intentional non-application’ and ‘influenced by legal requirements of host countries or requirements of partners’. The following chapter describes the individual case studies and the findings thereof.

Table 3-2: Demographics of case study firms

Cases	Firm type	Industry*	Firm size (employees)	Ownership type	Management board/ supervisory board	R&D presence in the BRIC states			
						Brazil	Russia	India	China
NF-1	Private nonfamily	Electronic & Electrical Equipment	>100,000	Stock listed firm, no shareholder holds more than 10% shares	All members of the management board and supervisory board are private managers.	Yes	Yes	Yes	Yes
NF-2	Private nonfamily	Food Producers	>100,000	Stock listed firm, no shareholder holds more than 5% shares	All members of the management board and supervisory board are private managers.	No	No	Yes	Yes
NF-3	Private nonfamily	General Industrials	>100,000	Stock listed firm, no shareholder holds more than 5% shares	All members of the management board and supervisory board are private managers.	Yes	Yes	Yes	Yes
FF-1	Family	Industrial Engineering	25,000- 50,000	100% family ownership	All members of the management board and supervisory board are family members.	Yes	Yes	No	Yes
FF-2	Family	General Industrials	5,000-10,000	100% family ownership	60% of the management board (incl. CEO) are family members. One member of the supervisory board is a family member.	Yes	Yes	No	Yes
SF-1	State- owned	Automobiles & Parts	>100,000	>90% owned by a state-controlled foundation	All members of the management board are private managers. One member of the supervisory board is a government member.	No	No	No	Yes

* The industry classification follows the 2014 EU Industrial R&D Investment Scoreboard (Hernández et al., 2014)

3.4 Findings

3.4.1 Case NF-1

Firm NF-1 is a private nonfamily firm from the ‘electronic and electrical equipment’ industry that is listed on the stock exchange. None of its shareholders hold more than 10% of shares. The interviewees described the firm as driven by numbers and stated that it follows both long-term goals and strives for short-term success. With regard to knowledge leakages, the firm is less risk averse than other firms: It sees leakages only partially as a problem, but rather as part of the competition with other firms. Market seeking foreign direct investment (FDI) motives play the major role for R&D investments in EMs. The firm develops and adapts products locally, to better meet local customer and market requirements. Due to forced localisation policies, Firm NF-1 is increasingly required to enhance the value-add and expand the complexity of R&D activities in EMs. In certain areas, especially in software development, efficiency seeking motives and the availability of resources also play a role for R&D-related FDI. The degree of R&D centralisation ranges from R&D units located in China, India, and Russia, which are fully integrated into the global R&D network, to decentral, less connected R&D sites in all BRIC states, which act as internal contractors to other firm units. Firm NF-1 preferably performs basic research, system engineering, and architecture and system integration activities in its advanced market (AM) R&D sites. It undertakes component development and the adaptation of products to local requirements in EM subsidiaries.

Firm NF-1 manages formal protection strategies centrally from its corporate IPR department, which is part of its central R&D division. It manages informal knowledge protection strategies in a decentral manner, without any clearly defined top management responsibilities. It uses several informal protection strategies in EMs, as described in the following. (1) For Firm NF-1, it is difficult to maintain *secrecy*, because it is active in highly regulated business sectors such as healthcare. In the product certification process, Firm NF-1 is often required to disassemble the system and to hand over technical documentation to government officials. It does not know, to which extent this knowledge is kept confidential by EMs’ government officials. Firm NF-1 is very unrestrictive about the transfer of knowledge to EM subsidiaries, as it perceives this would decrease the productivity of local R&D sites. (2) It uses *complex*

design only to a very limited extent, for reasons of economy. *“The problem is that you do not see a direct value of complex design, you only see the higher costs. And it is hard to convince your principal of the higher costs”* (Lead IP Counsel, Firm NF-1). (3) It is difficult for Firm NF-1 to find *loyal employees* in EMs. It tries to improve employee loyalty with incentives or deferred compensation, but cost is an important consideration. *“In the end, I can keep my employees, if I pay more than my competitors. But then, I am also more expensive than my competitors”* (Lead IP Counsel, Firm NF-1). (4) Firm NF-1 preferably uses wholly owned subsidiaries for activities in the BRIC states. Due to government restrictions in China in the past, minority-owned joint ventures were also used to gain market access. (7) Firm NF-1 *monitors the activities of departed employees* only to a limited extent as it is difficult to prove knowledge outflows given the limited legal means in the BRIC states, especially in China. *“Legal means are mostly good for deterrence, because potential punishments are high”* (Lead IP Counsel, Firm NF-1).

3.4.2 Case NF-2

Firm NF-2 is a private nonfamily firm in the ‘food production’ industry and is listed on the stock exchange. None of its shareholders hold more than 5% of shares. Both market seeking motives as well as technology sourcing motives play a role for the firm. With regard to market seeking FDI, the firm has application groups in many EMs that adapt products to local customer and market requirements. *“The task of our local sites is it to act as if they were a domestic company, to make consumers think that the brand they buy is a domestic brand”* (Head of IPR Management, Firm NF-2). Regarding technology sourcing FDI, Firm NF-2 operates a research centre in China, whose mission is to tap on local knowledge on food and nutrition. Further, with any of its activities in EMs, it seeks to learn and advance in terms of time-to-market. *“Domestic competitors are challenging us very well, because in some areas, they can implement much faster than we can. Also, the Asian ‘can do’ mentality helps us”* (Head of IPR Management, Firm NF-2). Firm NF-2 performs basic scientific research centrally in Europe, its globally dispersed R&D centres perform region-specific R&D. Application groups in all markets adapt the products to local customer and market requirements. It integrates EM R&D units into its global network of R&D centres, to

enable developing for the global market. Its application groups cooperate with R&D centres and are also integrated into the R&D network.

Firm NF-2 applies several informal protection strategies. (1) It is critical for Firm NF-2 to ensure *secrecy*, since a large share of the firm's knowledge is process-related and not protected by patents. (2) The strategy of increasing product *complexity* to hinder imitation is not suitable for the firm, since it is mainly active in the food and nutrition sector. Its products are too low-tech and not suitable for this strategy. (3) *Employee loyalty*, especially in R&D functions, is crucial to Firm NF-2. It tries to improve loyalty by giving R&D employees a clear perspective within the firm and by transferring them to R&D centres in other regions, to make them aware of opportunities within the firm. Firm NF-2 tries to offer competitive salaries and has special bonus and incentive models for senior employees. However, it perceives wage competition in EMs as tough. Firm NF-2 also sets up noncompete agreements with employees, even though these are costly and difficult to enforce in EMs. In the case of departing employees, Firm NF-2 sometimes makes use of 'symbolic firing', to improve the loyalty of other employees. (4) With regard to core R&D, Firm NF-2 does not enter into *alliances*. All of the global R&D centres of Firm NF-2 are wholly owned. Still, Firm NF-2 has several joint ventures in Asia, including two JVs in China, of which it holds majority shares. (5) To efficiently enforce patents in China, Firm NF-2 pays close attention to the local embeddedness and to *relationships to government officials*. "On paper, IPR enforcement is better in China than in Brazil or India. However, when it comes to the crunch, you have to be very well locally embedded to enforce your rights in the local market" (Head of IPR Management, Firm NF-2). (6) Firm NF-2 *prepares for employee departures* by immediately withdrawing access to any information from departing employees. In critical cases, the employee may be released from work. (7) It does not follow the strategy of *monitoring activities of departed employees*, mainly because it would be problematic for the firm to prove that a former employee illicitly used confidential firm knowledge.

3.4.3 Case NF-3

Firm NF-3 is a nonfamily firm in the 'general industrials' industry and is listed on the stock exchange. None of its shareholders hold more than 5% of the firm. Its FDI in the BRIC states follow mostly market seeking motives. Firm NF-3 often experiences

forced localisation policies for both R&D and production in the BRIC states. It performs basic R&D centrally at R&D sites in Europe and the USA and preserves all knowledge regarding basic R&D in AM sites. R&D sites in the BRIC states develop mostly for local markets. To be able to better cooperate with local patent offices, Firm NF-3 has local IPR departments in large EMs.

Firm NF-3 uses strong formal protection for its products and knowledge and is tough on IPR infringements. In addition, it employs several informal protection strategies: (1) *Secrecy* is of key importance for Firm NF-3. It educates its employees to create awareness of secrets and it monitors the IT activities of its employees to detect any potential theft of knowledge. Further, Firm NF-3 constantly monitors competitors for the use of any confidential knowledge in their products, to detect and to react to knowledge leakages early. Firm NF-3 also uses governing mechanisms for the transfer of knowledge to EMs; R&D sites in BRIC states do not get access to knowledge on basic R&D that was performed in Europe and the USA. (2) *Complex design* is also a key strategy of Firm NF-3. *“There is a lot that you can inherently see in a product, that you can glean just from being exposed to it and try to reverse engineer and somehow steal that knowledge or the IPR that is associated with that. So making things more complex obviously is one way to do it”* (Chief IPR Officer, Firm NF-3). (3) *Employee loyalty* is an issue for Firm NF-3 in China, but less so in Brazil, Russia, and India. To counter this, Firm NF-3 brings in expatriates on the management as well as on the research staff level, to increase the loyalty of employees by strengthening its corporate culture. Further, Firm NF-3 uses non-compete clauses in the employees' contracts. Despite this, employee turnover has significantly increased in China in the last five years, mainly due to an increase in competition. (4) Firm NF-3 has many R&D *alliances* in the BRIC states. In each alliance, it carefully crafts agreements and monitors the activities of partner firms. (6) It also monitors its employees to be *prepared for possible departures*. *“We have a retention mechanism in place when we determine that someone is thinking about leaving the company. We evaluate that person and decide whether or not it is somebody who we truly want to keep. If we are concerned that they have a lot of information and that we would not want them to go to a competitor, we may be proactive in offering them something different, so that they would want to stay”* (Chief IPR Officer, Firm NF-3). In cases of leaving employees, Firm NF-3 restricts access to IT systems and withdraws access to sensitive knowledge

immediately upon the employees' resignation. (7) *Monitoring activities of departed employees* is also important for Firm NF-3. "We try to monitor employee departures very closely. We are always taking extra precaution to brief, to have an exit interview with that person before they leave, putting them on notice that anything that they have developed, including what is in their head, is owned by our company and that we are going to monitor where that person goes and what products come out of that group" (Chief IPR Officer, Firm NF-3). Its reputation for being tough on IPR violation helps Firm NF-3 to prevent knowledge leakages through departed employees.

3.4.4 Case FF-1

Firm FF-1 is active in the 'industrial engineering' industry and wholly owned by members of the founding family. All top management positions are staffed with family members of the second and third generation. The firm, as a whole, has a clear long-term orientation. In EMs, it follows a medium to long-term strategy. Traditions play an important role in the firm. Of the six case firms, Firm FF-1 is one of the most risk averse and conservative firms. In Brazil, Russia, and China, FDI investments follow a market seeking/ ownership advantage strategy. In China, Firm FF-1 follows also an efficiency seeking strategy. Its sites in China are both oriented towards the domestic, as well as to export markets, especially towards Asia and Africa. Firm FF-1 uses a central R&D organisation; European R&D sites are responsible for all R&D activities. R&D sites in Brazil, Russia, and China perform engineering design activities and adapt products to market conditions. Local product managers work closely with global product managers in European sites, who integrate the requirements of all locations and ensure that new developments meet all markets' requirements.

To protect its IPR, Firm FF-1 relies heavily on formal protection strategies, especially on patents. It files patents regionally, with a focus on its sales markets. In addition, Firm FF-1 uses several informal protection strategies in EMs. (1) *Secrecy* is highly important. Governing mechanisms on internal knowledge transfer to EM subsidiaries exist. Firm FF-1 uses clear processes and tools to delegate roles, distribute information and trace access to information. Engineers in EMs can only access knowledge necessary for engineering-design tasks. Only its European R&D centres have access to R&D-related knowledge. (2) Firm FF-1's products are of high *complexity* and thus, it can easily make use of this protection strategy. (3) *Employee loyalty* is of key

importance for Firm FF-1. By transferring its European corporate culture of sustainability and continuity to EM subsidiaries, while respecting local cultures, it is able to keep employee turnover low. The top managers in EMs are Europeans with a good understanding of the local culture and who are able to speak the local language. Firm FF-1 pays its employees in EMs comparatively well. (5) It has own operations in all BRIC states, as well as joint ventures in Russia, India, and China, in which it holds either equal or majority stakes. Firm FF-1 selects partners carefully; trust plays a major role in all of its partnerships. The Managing Director of a business unit of Firm FF-1 summarised the general difficulties of EMs as follows: *“The worst that happens is that firms enter EMs without any models for cooperation or tools to control the activities. If then any economic pressure and problems come up, companies let everything go and transfer too much knowledge to sites in EMs to quickly encounter upcoming problems.”*

3.4.5 Case FF-2

Firm FF-2 is active in the ‘general industrials’ industry and is wholly owned by members of the founding family. Family members make up majority of the management board, including the CEO. Firm FF-2 is risk averse, conservative, and has a long-term orientation in its investments. It follows market seeking/ ownership advantage motives with its FDI investments in China. Both its own operations, as well as its JV in China, target the domestic market. Technology sourcing and efficiency seeking do not play significant roles today, but are getting more important. Firm FF-2 performs all R&D activities and product developments in Europe. In China, it performs only engineering design activities. It seeks geographic proximity to customers, while acknowledging the value of strong headquarters. Firm FF-2’s operations in China are integrated into its R&D network and cooperate with European sites. It strictly separates its JV from the rest of the firm.

Firm FF-2 uses both formal and informal protection strategies. (1) It pays careful attention to the *secrecy* of corporate knowledge. Its JV has strictly no access to the IT system or other knowledge to ensure secrecy towards its JV partners. (3) Firm FF-2 places heavy emphasis on the *loyalty of its employees*. *“Next to formal protection strategies, binding employees to the company, as far as possible in the Chinese, local conditions, is a key success factor for us”* (Team Leader Patents and Licences, Firm

FF-2). Firm FF-2 has identified the problem of employee turnover years ago and has developed specific measures to counter this problem, thereby achieving its long-term goal to reduce employee turnover. *“Reasons for our low employee turnover are our corporate culture, in combination with our good name”* (Team Leader Patents and Licences, Firm FF-2). Part of Firm FF-2’s motivational program is that Chinese employees get access to more information. They are integrated into the R&D network and travel to Europe to attend trainings, which increases their commitment to the firm. (4) For its joint venture, Firm FF-2 selected a leading domestic firm as a partner, mainly because of its structure and its employees. The main reason to enter into the JV was to show more presence in China and to be able to better meet the Chinese market requirements. A minor reason was access to the patent portfolio of the JV partner. Firm FF-2 has a majority-ownership in the JV to ensure control of the cooperation. Still, the JV remains organisationally separated from the rest of the firm.

3.4.6 Case SF-1

Firm SF-1 is active in the ‘automotive and parts’ industry and jointly owned by two foundations, with a majority/minority split. The majority holding foundation holds >90% is managed by the local city government and the minority-holding foundation is privately managed. The mission of both foundations is charitable. Neither of the foundations is involved in the management board of the firm; the chairman of the majority-holding foundation is a member of the advisory board. Historically, the firm was conservative and long-term oriented. In recent years, the orientation shifted more and more towards short-term goals, but the notion of being a foundation-owned firm is still apparent. Firm SF-1 follows a market seeking/ ownership advantage strategy in EMs; products are mostly downgrades of products for advanced markets. It organises its R&D activities centrally and performs 60% of R&D activities its home country. It performs only 30% of R&D activities outside of Europe. In the BRIC states, Firm SF-1 has engineering centres that perform engineering design activities, to adapt products to local market requirements.

Firm SF-1 uses both formal and informal protection strategies to protect its knowledge. (1) *Secrecy* is very important. Firm SF-1 addresses general secrecy and information protection by educating its employees, to create awareness for the value of confidential knowledge. Further, the firm uses a central user management system to

manage the access rights to critical information and encourages supervisors to regularly reassess access rights of employees. It uses governing mechanisms for the transfer of knowledge to EMs: “*We only transfer knowledge from Europe to EMs, when it is already used in mass production or is at least patented*” (Team Member Information Protection, Firm SF-1). (3) In EMs, Firm SF-1 has a good reputation amongst its employees, who more and more see it as a reliable employer. It plans to increase the *loyalty of key employees* by establishing pre-employment screenings and by assessing employee satisfaction regularly. Further, Firm SF-1 tries to decrease insecurities among employees by informing them early about management decisions. (4) In China, Firm SF-1 is legally required to form JVs to gain market access. In these JVs, the Chinese partner holds, due to legal requirements, at least 51% of shares, but usually contributes little knowledge. Firm SF-1 expects to have lost a significant amount of knowledge to joint venture partners in the past. In other EMs with less governmental restrictions on market access, it operates with wholly owned subsidiaries. (6) Firm SF-1 plans to *prepare for employee departures* in the future by assessing the knowledge of departing employees and by establishing exit talks, to find out, why and where to the employee leaves.

Table 3-3 summarises the findings of all case studies and displays, which firms employ which protection strategies. The following section discusses the findings with regard to potential influences of ownership types on informal knowledge protection strategies.

Table 3-3: Overview of case study findings

Protection strategy	Protection strategy type	Private nonfamily ownership			Family ownership		State ownership
		NF-1	NF-2	NF-3	FF-1	FF-2	SF-1
<i>Secrecy</i>	Preventive	(-)	●	●	●	●	●
<i>Complex design</i>	Preventive	-	○	●	●	○	○
<i>Loyalty of employees</i>	Preventive	-	◐	-	●	●	◐
<i>Governance structures of alliances</i>	Preventive	(-)	◐	◐	◐	●	(-)
<i>Relationship to government officials</i>	Remedial	○	●	○	○	○	○
<i>Preparation of employee departures</i>	Remedial	○	●	●	○	○	○
<i>Monitoring of departed employees</i>	Remedial	◐	-	●	○	○	○

- frequent use of and high success with strategy
- ◐ use of and success with strategy
- non-application of strategy for no specific reason
- intentional non-application of strategy
- (-) influenced by legal requirements of host countries or requirements of partners

3.5 Discussion

3.5.1 Influence of ownership types on informal protection strategies

The case study findings suggest that ownership types have an impact on the employment and embodiment of different protection strategies. This section discusses the findings and illustrates the link between firms' ownership types and the protection strategies they employ.

Secrecy. Regarding the strategy of (1) *secrecy*, the findings show only limited differences between firms with different ownership types. In all cases but Case NF-1, restrictions on the transfer of R&D related knowledge to subsidiaries in EMs exist. Firm NF-1 restrains from restrictions on the transfer of knowledge due to reasons of productivity, because as the Vice President R&D of NF-1 put it: *"All this keeping things secret from employees in EMs is nonsense, you either perform R&D in EMs or not. In today's world, you cannot hide everything."* This perception may be founded in the often lower long-term orientation of nonfamily firms (Thomsen & Pedersen, 2000), which can lead to a higher cost sensitivity regarding decisions that show little short-term value. Opposing this interpretation however are the findings from Firm NF-2 and NF-3. For example, Firm NF-3 has an extensive employee education process about secrecy and makes use of IT-surveillance systems to detect knowledge leakages.

Complex design. The strategy of (2) *complex design* is both used by private no-family firms (case NF-3) and family firms (case FF-1). In contrast, Firm NF-1 objects to the extensive application of this protection strategy due to cost reasons. As the Lead IP Counsel of Firm NF-1 put it: *"We do not use this strategy to the fullest extent, because in the end [...] you do not see a direct value [...], you only see the higher costs."* For the strategy of *complex design*, next the goal setting, the risk behaviour or the time horizon of the firm, the nature of firms' products plays an important role. E.g. for Firm FF-1, applying this strategy is clearly favourable, due to the complexity of their products. For similar reasons, this strategy is useful for Firm NF-3. Firm NF-2's products on the other hand are too low tech to purposely increase their complexity.

Loyalty of employees. In contrast to secrecy and complex design, the cases show clear differences between family, private nonfamily, and state controlled firms with regard to (3) the *loyalty of employees*. Although all case firms assign key importance to

employee loyalty, the private nonfamily firms seem to be much less successful in its realisation. They name competition, especially regarding salary, as a major problem for employee loyalty. A key reason for this may be nonfamily firms' tendency to have a stronger focus on financial goals than other firms (Duran et al., 2016; Goldeng et al., 2008; Tönurist & Karo, 2016). Thus, they tend to be more cost sensitive regarding decisions with little short-term value, such as higher salaries, which likely increase employee loyalty. To recite Vice President R&D of Firm NF-1: *"In the end, I can keep my employees if I pay more than my competitors. But then, I am also more expensive than my competitors."* The family and state controlled firms show a higher success in making their employees identify themselves with the corporate culture and the firm, thereby reducing employee turnover. *"Reasons for our low employee turnover are our corporate culture in combination with our good name. Employees are proud to work in our company"* (Team Leader Patents and Licences, Firm FF-2). These findings are consistent with the findings of Miller *et al.* (2009), who find that community as measured by organisational commitment to employees correlates with performance in emerging market environments and appears to be more helpful to family than to nonfamily firms. Also, the long-term orientation of family and state-owned firms seems to have a positive effect on the long-term loyalty of the employee: *"We have a good reputation and employees start to notice that we do not generate variations by hiring, firing, hiring and firing"* (Team Member Information Protection, Firm SF-1).

Governance structures of alliances. Regarding the strategy (4) *governance structures of alliances*, the cases show no evidence for differences contingent on ownership type. Both family and nonfamily firms prefer to operate with own subsidiaries, or at least in majority-owned JVs in EMs. This is consistent with the understanding of the literature, which states that majority ownership can help to reduce local-partner-related appropriation risks (Zhang, Li, Hitt, & Cui, 2007). However, contextual factors such as industry restrictions are very important in this regard, as the legal requirements of host country governments differ significantly between both countries and industry sectors (Estrin & Prevezer, 2011; Ezell et al., 2013).

Relationship to government officials. Only firm NF-2 applies the strategy of (5) *relationship to government officials* to protect knowledge in EM subsidiaries, which opposes the literature's descriptions of family firms tending to establish long-term relationships with key external stakeholders (Dunn, 1996) as an insurance-like

protection (de Massis et al., 2015; Godfrey, 2005; Gómez-Mejía et al., 2011). Likely, the reason for this discrepancy lies in the geographic limitations of this strategy and the geographic and institutional distance between firms' home and home markets.

Preparing for employee departures. Two of the case firms, both private nonfamily firms, use the strategy (6) of *preparing for employee departures* by using retention mechanisms, to receive early warnings for possible employee departures (Firm NF-3), or to immediately withdraw access to information after the resignation of employees (Firm NF-2). This strategy may have its origin in the lower loyalty of employees in the nonfamily firms, which creates a larger need for the application of this strategy.

Monitoring of departed employees. The strategy (7) of *monitoring the activities of departed employees* is employed by two private nonfamily firms, Firm NF-1 and NF-3. Especially Firm NF-3 makes strong use of this strategy and uses its reputation for being tough on IPR violations to prevent employees from leaking knowledge to competitors.

3.5.2 Two different types of informal protection strategies

Two different types of informal knowledge protection strategies become apparent when taking a closer look at the case findings. First, *preventive protection strategies*, aimed at eliminating the deeper cause of knowledge leakages, and second, *remedial protection strategies*, aimed at avoiding damage from knowledge leakages. This is consistent with a site-note of (Sofka et al., 2014, p. 1322), who state that informal knowledge protection strategies “*rely upon processes within a company aimed at preventing knowledge flows or limiting their negative effects.*”

The first group of preventive protection strategies consists of the strategies *secrecy*, *complex design*, *loyalty of employees*, and *governance structures of alliances*. Recapitulating all case studies, the findings suggest that firms with a longer time-horizon within their goals, a tendency for risk aversion, and a stronger emphasis on building up social capital, namely the family and the state-owned firms (Gómez-Mejía et al., 2011; Thomsen & Pedersen, 2000; Tönurist & Karo, 2016), are more likely to implement preventive protection strategies. In contrast to the private nonfamily firms, they spare no efforts to protect themselves from possible future knowledge leakages, even if a direct financial benefit may not be calculable or foreseeable. Further, for the implementation of preventive knowledge protection strategies such as secrecy or the

loyalty of employees, minding local employees and the local culture is crucial. This is a prevailing behaviour in family and state-owned firms, compared to an absence in nonfamily firms (Gómez-Mejía et al., 2011; Thomsen & Pedersen, 2000). The findings underline the importance of firm-internal community when it comes to preventive knowledge protection, of which family firms can make better use (Miller et al., 2009).

The second group of remedial protection strategies consists of the strategies *relationship to government officials, preparation of employee departures, and monitoring of departed employees*. The case findings suggest that this type of knowledge protection strategies is more common among private nonfamily firms, which may be a result of nonfamily firms' generally lower risk aversion (de Massis et al., 2015; Dunn, 1996) in combination with their shorter time horizon and stronger focus on financial goals (Thomsen & Pedersen, 2000). Due to this, they are more eager to follow a high-risk strategy with regard to preventive protection and are thus, much more often than family or state-owned firms, forced to take remedial, damage-limiting action, after knowledge outflows have occurred.

3.6 Conclusion

In summary, the findings suggest that family and state-owned firms, who generally have a longer time horizon than private nonfamily firms, place more emphasis on building social capital and non-financial goals and tend to make use of preventive knowledge protection strategies. Family and state-owned firms focus more on eliminating the deeper cause of knowledge leakages. Private nonfamily firms, with generally lower risk aversion, a shorter time-horizon, and a stronger focus on financial goals, on the other hand place a stronger emphasis on remedial strategies that aim at managing damage from knowledge leakages.

This paper makes three main contributions. First, it contributes to the academic discussion on knowledge protection strategies of AMNEs' EM subsidiaries by introducing the two classes of informal knowledge protection strategies: preventive and remedial protection strategies. Second, it connects the fields of knowledge protection and organisational characteristics by identifying ownership type and corresponding firm characteristics as antecedents to firms' decisions for or against the application of different informal protection strategies. Third, it provides managers with

insights about the two types of protection strategies, how firms apply them in different contexts, and in how far they may be applicable in their own firm's EM subsidiaries.

The goal of this study was to explore informal knowledge protection strategies, different types of firms employ when performing R&D in emerging markets. Its main limitation lies in its exploratory setting: Due to the case study-based research methodology, findings of this study should not be generalised, but should encourage researchers to test the findings in a quantitative study. Further, future research could include other firm-level characteristics such as FDI motives, the scope of subsidiaries' R&D activities, the degree of R&D centralisation, or the degree of subsidiaries' local embeddedness into the examination.

3.7 Appendix paper B

3.7.1 Interview data

Table 3-4: Overview of interview data

Case	Interviewee	Duration	Means
NF-1	Vice President R&D	25 min	Via phone
	Lead IP Counsel/ Expert for Chinese IPR Law	30 min	Via phone
NF-2	Head of IPR Management	30 min	Via phone
	Head of IPR Management	50 min	In person
NF-3	Chief IPR Officer	30 min	Via phone
	Chief IPR Officer	35 min	Via phone
FF-1	Managing Director of Business Unit	10 min	Via phone
	Managing Director of Business Unit	40 min	Via phone
	Patent Engineer	60 min	Via phone
FF-2	Head of Innovation Management	15 min	Via phone
	Team Leader Patents and Licences	30 min	Via phone
	Team Leader Patents and Licences	40 min	Via phone
SF-1	Head of Information Protection	20 min	Via phone
	Team Member Information Protection	60 min	In person
	Team Member Information Protection	90 min	In person
Total	15 interviews with 10 interviewees	9h 25 min	

4 Dynamic alliance capabilities and the microfoundations of partnerships for digital innovation: A multiple-case study analysis

Co-authored by Oliver Gassmann

Abstract

The digital transformation poses many unfamiliar challenges for offline, product-focused firms. At the same time, it entails many opportunities for them to enhance their product offering by developing innovative digital services. Because offline firms frequently lack the internal capabilities to develop innovative digital services and to keep up with innovation in the digital space, entering alliances with online firms is indispensable for many of them. By entering these alliances, offline firms obtain the resources, knowledge, and capabilities required for the development of new digital services.

For entering alliances in the rapidly changing digital environment, firms need to develop a certain set of dynamic alliance capabilities. These capabilities allow them to sense and seize opportunities for digital alliances and to reconfigure themselves to adapt to the perpetually changing digital environment. In a multiple-case study of offline firms and their alliance-based digital service developments, this paper explores firms' dynamic alliance capabilities and the underlying microfoundations of their sensing, seizing, and reconfiguring activities.

Keywords: Dynamic alliance capabilities, microfoundations, digital service development, multiple-case study

4.1 Introduction

The digital transformation entails an abundance of opportunities for manufacturing firms to increase their service offerings (Coreynen et al., 2017; Lerch & Gotsch, 2015). Competition in firms' traditional product sectors, together with decreased sales margins due to commoditisation, are driving them to extend their businesses with new offerings that include a relatively high degree of service content (Kindström, 2010). For this, leading in the digital transformation is a task that will challenge every firm as a whole. However, many firms lack the capabilities to develop innovative digital services and to keep up with innovation in the digital space.

Alliances are an important mechanism to address the challenges of the digital transformation: offline firms in traditional industries are trying to build up the resources and capabilities required for the development of digital businesses, while online firms try to learn about offline products and services from offline firms, to turn their rapid growth into mature and sustainable business models (Mina et al., 2014; The Economist Intelligence Unit, 2015). In this regard, open service innovation is a topic that calls for more focus (Mina et al., 2014; Randhawa et al., 2016), especially against the background of co-development and alliances in the form of inter-firm collaborations, as well as collaborations with customers (Biemans, Griffin, & Moenaert, 2016). So far, little is known about the capabilities required by offline firms to succeed in alliance-based service developments in the dynamic environment of the digital transformation (Donada et al., 2016; Lerch & Gotsch, 2015). Our multiple-case study addresses these gaps and offers managers as well as management scholars an insight into firms' alliance-based digital service development capabilities.

4.2 Theoretical background

Due to the ongoing expansion of the digital transformation, firms in all industries face rapidly changing business environments. To turn these changes into opportunities, they can enhance their product offerings with new, digital service offerings (Coreynen et al., 2017). For this, they must identify their own digital service potential, which emanates from both internal capabilities and customer and market requirements (Lerch & Gotsch, 2015). Firms must assess their own capabilities, examine potential

partnerships, and define, which capabilities are best to obtain from external partners (Chesbrough & Schwartz, 2007; Hogenhuis, van den Hende, & Hultink, 2016).

4.2.1 Dynamic capabilities

The theoretical perspective of dynamic capabilities is highly suitable for explaining how firms effectively adapt to discontinuous changes in their external environment (Birkinshaw, Zimmermann, & Raisch, 2015). Capabilities are a set of a firm’s current or potential activities that make use of the firm’s resources, to enable the delivery of products and/or services (Teece, 2014; Teece & Leih, 2016). Dynamic capabilities theory separates capabilities into two classes: *Ordinary capabilities* and *dynamic capabilities* (Teece & Leih, 2016). Ordinary capabilities relate to administrative, operational or governance-related activities that are necessary to complete tasks. They derive from a combination of skilled personnel, facilities and equipment, processes, and administrative coordination and are about *doing the things right* (Teece, 2014). Dynamic capabilities encompass activities that enable a firm to redirect its ordinary capabilities towards prospective areas, which are especially important in rapidly changing environments. They are about “[...] *doing the right things, at the right time, based on new product (and process) development, unique managerial orchestration processes, a strong and change-oriented organisational culture, and a prescient assessment of the business environment and technological opportunities*” (Teece, 2014, p. 331). Depending on the strength of its dynamic capabilities, a firm is able to align its resources with both its strategy and environmental changes at a certain speed. Dynamic capabilities can be separated into three distinct activities: Sensing, seizing, and reconfiguring (see Table 4-1, Teece, 2007).

Table 4-1: Types of dynamic capabilities (Teece, 2014)

Dynamic capability	Description
<i>Sensing</i>	Identification, development, and assessment of technological opportunities in relationship to customer needs and market requirements
<i>Seizing</i>	Decision-making and mobilisation of resources, to address opportunities with new products or services and to capture value from this
<i>Reconfiguring/ transforming</i>	Continued renewal of the organisation through the reconfiguration of resources, structures, processes, people, and culture

Sensing activities are about identifying opportunities and threats out of the changing business environment. Sensing requires resources and routines for scanning, searching, and exploration of technological change, and channels to share and discuss new ideas and opportunities. Sensing activities require a balanced level of centralisation, to encourage communication between market-facing and innovating units, an open culture with freedom for discussions, and a senior management that encourages long-term thinking (O'Reilly & Tushman, 2008).

Seizing activities are about making decisions and executing tasks, to address opportunities and threats with new products, processes, or services. Seizing requires a management that is able to create a vision and a strategy, that sets up suitable organisational alignments, and that provides the necessary complementary resources and assets at the right time (O'Reilly & Tushman, 2008; Teece, 2007).

Reconfiguring activities are about reallocating resources within the organisation, away from the mature business towards new opportunities that emerge from changing markets and technologies. It encompasses the recombination and reconfiguration of structures, processes, people, and culture (O'Reilly & Tushman, 2008; Teece, 2014).

Underlying firms' dynamic capabilities are the *microfoundations* of dynamic capabilities, which are their "*distinct skills, processes, procedures, organisational structures, decision rules, and disciplines*" (Teece, 2007, p. 1319).

4.2.2 Dynamic alliance capabilities

Alliances are mutual working relationships between two or more parties (such as the focal firm and suppliers, customers, distributors, or young ventures) that can be used by one firm to obtain the capabilities and organisational resources required to create a new product, technology, or service (Chesbrough & Schwartz, 2007; Hogenhuis et al., 2016; Perks, Gruber, & Edvardsson, 2012).

Dynamic alliance capabilities, sometimes also referred to as relational dynamic capabilities, are a firm's "*ability to integrate, build, and reconfigure a set of skills, assets, and routines that provide the basis for a firm's relational rent to address changing environments*" (Donada et al., 2016, p. 94). They enable the firm to extend and adapt its existing alliance capabilities to new opportunities and challenges, which constantly arise from variations in the external environment (Wang & Rajagopalan,

2015). Same as dynamic capabilities, dynamic alliance capabilities can be distinguished into sensing and seizing activities (alliance management) and reconfiguring activities (alliance learning routines, Schilke, 2014).

4.3 Methods

The goal of this study is to explore the microfoundations of dynamic alliance capabilities in alliance-based digital service development projects of offline firms. By employing a multiple-case study approach, which allows us to gain an in-depth understanding of this issue (Eisenhardt & Graebner, 2007; Yin, 2013), we follow a recent call of Biemans et al. (2016) for more fine-grained qualitative research on new service development, to complement the prevalent large-scale quantitative surveys.

In order to investigate how firms set up and make use of alliances for digital service innovation, we first reviewed the literature on partnerships and dynamic capabilities. Our aim was to understand how firms react to changes in their business environment and how they can extend their knowledge, resources, and capabilities through alliances. We then performed desk research, to identify firms with a non-digital core business that recently developed leading-edge digital services. We specifically searched for firms whose digital developments received awards or that are known as a leader of the digital transformation in their industry. In the multiple-case study itself, we explored five digital service development initiatives by means of semi-structured interviews with representatives from the individual firms, each of which lasted about one hour. Our interviewees were managers in strategy, digital innovation, digital services, and digital business models (see Table 4-2). We used dynamic capabilities theory as an analytical framework to structure our interviews and analyses (Teece, 2007, 2014). We triangulated our data by analysing internal corporate information as well as publicly available material.

Table 4-2: Overview of case studies

Case	Digital service development project(s)	Interviewee role
<i>Automotive Firm</i>	Development of a 'connected car' service platform in a partnership with a large IT firm	Head of Strategy & Business Development Digital Services & Business Models
<i>Banking and Finance Firm</i>	Development of a digital service platform for private banking in a partnership with a large digital design agency and a large front-end development firm	Senior Project Manager
<i>Healthcare Distribution Firm</i>	Development of a B2B e-commerce platform in collaboration with a recently acquired healthcare distribution firm	Head of Strategy & Solutions
<i>Retail and Healthcare Firm</i>	Integration of a new digital service into own B2C app based on a technology-partnership with a start-up firm	Director Digital Innovation
<i>Wholesale Firm</i>	Development of a sales support app for use by internal sales representatives in a partnership with a technology consulting firm and an app-development agency	Sales Director E-Business / Head of International E-Business Integration

4.4 Findings

Building upon the works of Kindström, Kowalkowski, & Sandberg (2013) and Teece (2007, 2014), in the following we identify the nature of the three distinct activities that constitute firms' dynamic alliance capabilities and carve out their microfoundations. We have to remark that our elaborations must necessarily be incomplete, opaque, and difficult to implement for other firms. Otherwise, with the effective communication their dynamic capabilities and microfoundations, firms' competitive advantage would lose its sustainable character (Teece, 2007).

4.4.1 Sensing: approaches to discovering alliance opportunities

We find that firms' sensing activities for opportunities for alliances in the field of innovative digital services are based on four microfoundations, which we explicate in the following (see Table 4-3).

Table 4-3: Microfoundations of sensing capabilities

Microfoundation	Description of the microfoundation
<i>Active partner search</i>	Active search for partners in adjacent digital sectors and exploration of opportunities (e.g. technologies) based on the partner search
<i>Passive partner search</i>	Building up a reputation for being a favourable partner and exhibiting digital activities to enable being sensed as an opportunity by potential partners
<i>Customer integration</i>	Involvement of customers into the development of new digital services to build up customer knowledge and to continuously reassess the customer demands
<i>Visionary executives</i>	Establishing digital responsibilities in management boards to ensure management attention and support for digital partnership

4.4.1.1 *Active partner search*

Given that digital technology generates complex innovation challenges, finding the right partners is a key success factor for developing innovative digital services (Chesbrough, 2011; Mina et al., 2014). Our case studies show that to sense opportunities for innovative digital services, firms actively search for potential alliance partners. For example, *the Automotive Firm* established a digital strategy department that performs a permanent active search for potential partners in adjacent sectors. It is staffed with both externally hired digital experts and with automotive experts, to ensure a thorough understanding of all requirements, potential partners need to fulfil. In addition, the firm runs a venture capital company that searches for innovative start-ups in both its traditional and in the digital business and runs a start-up incubator. Similar to this, *the Retail and Healthcare Firm's* digital partnership team performs an active search for innovative start-ups at fairs and in important start-up clusters. It partners with start-up incubators to improve deal flow. During the first years of being active in the digital space, the active search was the firm's key sensing activity. *The Healthcare Distribution Firm* hired external experts with a digital background, who perform a search for innovative start-ups in the digital healthcare sector in three internally defined core areas. Through the in-house development of digital solutions, it deepens its knowledge and understanding of the digital sector and its capabilities to find and assess potential partners.

4.4.1.2 *Passive partner search*

In addition to the active search, the *Retail and Healthcare Firm* uses a passive partner search. Frequently, innovative online firms identify it as an application partner for their new digital solutions. Within the first 1.5 years of being active in the digital health sector, it built up a reputation for being a digital innovator and gradually switched from an active search towards a passive exhibition of its digital activities. Today, the firm sees this as one of its key microfoundations of its sensing activities. Similarly, the *Automotive Firm's* start-up incubation activities and its frequent presence at fairs and congresses on digital topics promote its reputation as a digital innovator.

4.4.1.3 *Customer integration*

Co-creation, the joint creation of value with the customer, is a frequently discussed concept in innovation research (Biemans et al., 2016; Perks et al., 2012). The *Banking and Finance Firm* closely integrated its customer relationship managers into the digital service development team and performs customer integration workshops that help to better understand customer needs. Similarly, the *Wholesale Firm* integrated its sales representatives, who use the newly developed digital service solution in the sales process, into the development team. Further, its digital service development team accompanies sales representatives to sales meetings with end-customers throughout the development process, to gain a thorough understanding of the sales process and both the sales representatives' and the end-customers' needs. The *Healthcare Distribution Firm* invested in several retail pharmacies to better integrate its customers into the development process. It uses them as a platform for testing and piloting new digital services and now has direct access to the end-customer.

4.4.1.4 *Visionary executives*

For two of our case firms, establishing digital responsibilities and having visionaries on the management board is the key foundation for the creation of innovative digital services. In the *Banking and Finance Firm*, the initial starting point for the development of an innovative digital service was an executive's vision. He was in the right position to convince the management board of making significant investments with the creation of a digital innovation team, of the need to partner with leading

digital design and development agencies, and of the necessity of closely integrate those partners with the firm’s project team. A similar situation was the starting point of the digital service development in the *Wholesale Firm*, whose CIO sensed an opportunity for the development of a digital solution in an alliance with external partners and who convinced the management board of making significant financial investments into the concept development.

4.4.2 Seizing: addressing alliance opportunities

Seizing alliance opportunities by setting up the partnerships is a key step of creating and capturing value with the development of new digital services. Table 4-4 summarises the four microfoundations we identified as the core of firms’ seizing activities, which we describe in the following.

Table 4-4: Microfoundations of seizing capabilities

Microfoundation	Description of the microfoundation
<i>Creating a digital service innovation space</i>	Separating the digital service business from the traditional business and creating an agile organisation with new processes, roles, and structures that is more similar to agile partners
<i>Managing the digital service development process</i>	Establishing a new digital service development process and remaining flexible along the development process and the evolution of partnerships
<i>Integrating the partners</i>	Establishing skills as well as clearly defined roles and responsibilities to manage cross-functional teams, to enable co-development with customers and partners in integrated and/or collocated project teams
<i>Tapping partners’ capabilities</i>	The ability to understand and apply partners’ capabilities, knowledge, experience, and existing infrastructure

4.4.2.1 Creating a digital service innovation space

Four of our case firms created a separate space for their alliance-based digital innovation activities. For example, the *Automotive Firm* separated its digital service development from its traditional business by creating a new business unit, to adapt to its partners’ much faster innovation cycles. Similarly, the *Healthcare Distribution Firm* and the *Retail and Healthcare Firm* created agile innovation centres, which allow them to closely collaborate with start-ups on digital innovation. The *Banking*

and Finance Firm relocated its temporary digital service development team into a separate location, to create an independence of existing processes, structures, and the existing corporate culture.

4.4.2.2 *Managing the digital service development process*

The redesign of development processes is an important microfoundation in three of our case firms. For example, the *Automotive Firm* and the *Retail and Healthcare Firm* have developed new service development processes that are more suitable for fast-paced digital innovation in collaboration with agile partners. A little less determined, the *Banking and Finance Firm* adapted its decision-making process by establishing fixed daily meetings of the team leaders and the project leader, to enable quick decision making. In addition, it established semi-weekly meetings with senior managers, to quickly resolve any upcoming major issues.

4.4.2.3 *Integrating the partners*

The ability to seize new opportunities through the orchestration and integration of existing and new assets is at the core of dynamic capabilities (O'Reilly & Tushman, 2008). The *Banking and Finance Firm* achieved this by collocating its two partners with the internal development team in its digital innovation space. This allows all parties to thoroughly understand each other's development activities and the end-customers' needs. Further, the close integration contributes to sensing by disclosing new business opportunities during the development process.

4.4.2.4 *Tapping partners' capabilities*

The main competitive advantage of strategic alliances results from the integration of a partners' complementary resources to create new value (Ireland et al., 2002). For the *Automotive Firm*, the core question was how to create a scalable digital service platform. By establishing a partnership with a large IT firm and by becoming the IT firm's lead partner in the automotive industry, it was able to create an intrinsic motivation among its partner and thereby ensure that its partner contributes all relevant capabilities and knowledge. Similarly, the *Retail and Healthcare Firm* became the strategic partner in the healthcare sector of a digital start-up firm and thereby created an intrinsic motivation of its partner, to contribute the best of its capabilities.

4.4.3 Reconfiguring: transforming and renewing the organisation

Sensing and seizing opportunities for innovation is often enough to gain a short-term competitive advantage. However, to create a sustainable competitive advantage and to adapt to changing technologies, customers, partners, and competitors, the recombination and modification of the organisation is required (Kindström et al., 2013). Table 4-5 summarises the four microfoundations we identified as the core of firms' reconfiguration activities, which we explicate in the following.

Table 4-5: Microfoundations of reconfiguring capabilities

Microfoundations	Description of the microfoundation
<i>Orchestrating the partner network</i>	Managing partners and customers with regard to their relationship to the firm and among each other
<i>Creating a partnership-oriented thinking</i>	Inciting own employees to access external partners' and customers' knowledge
<i>Securing resources for digital service developments</i>	Securing external resources to extend the resource base into new areas and markets and internal resources to enable co-specialisation with partners
<i>Transferring partners' innovativeness</i>	Creating a digital mind set within the company, to transfer partners' digital innovation capabilities into the company

4.4.3.1 *Orchestrating the partner network*

Setting up and orchestrating the network of partners requires organisational processes to integrate activities, strategies, and knowledge across partners (Frankenberger, Weiblen, & Gassmann, 2013; Wang & Rajagopalan, 2015). The *Automotive Firm* and the *Retail and Healthcare Firm* established specific functions for the management of digital partnerships, who align individual and shared goals between partners. The *Banking and Finance Firm* manages its network of partners by integrating both partners and customers closely into the digital service development team, to be able to exert a direct influence on the partners' activities.

4.4.3.2 *Creating partnership-oriented thinking*

One of the most difficult elements of reconfiguring for partnerships for digital service innovation is the creation of a partnership-oriented thinking. This is founded in the 'not invented here' syndrome, which presents one of the core challenges for 'outside-

in' open innovation (Chesbrough, 2011). The *Retail and Healthcare Firm* created a partnership-oriented thinking by establishing a digital innovation team with an open and agile culture as a mediator between external partners and its traditional business units. The mediation team helps to increase the acceptance of external solutions in the traditional business. The *Wholesale Firm* makes use of its success-focused culture to create acceptance of externally developed solutions. By developing and rolling out new solutions in the biggest and most relevant markets, it proves their advantage in challenging environments and thereby reduces scepticism towards them. The *Banking and Finance Firm* created a partnership-oriented thinking by integrating both its partners and its customer relationship managers into the development team. With the active inclusion of its relationship managers into the partnership-based development, it was able to change the relationship managers' mind-sets and achieved an acceptance of the newly developed digital solutions.

4.4.3.3 *Securing resources for digital service developments*

Reconfiguring activities entail the recombination and modification of existing resources (Teece, 2014). Securing resources for digital service developments provides a foundation for this, by extending the resource base. For example, the *Healthcare Distribution Firm* secured external resources by making strategic acquisitions, to build up core competencies with regard to the development of digital services and to gain access to and understanding of the end-customer. These acquisitions enable the company to develop own services and provide the basic digital competencies required to set up future alliances. The *Automotive Firm* and the *Retail and Healthcare Firm* secured internal resources for digital service development by reconfiguring roles, resources, and the organisation with the creation of new digital innovation organisations, which enable them to sense and seize additional external resources.

4.4.3.4 *Transferring partners' innovativeness*

Creating a digital mind-set within the company to transfer partners' digital innovation capabilities is one of the main challenges of reconfiguring for digital partnerships. The *Automotive Firm* has integrated digitalisation into its overall strategy and has recruited IT experts on different levels of the organisation to establish a digital mind-set. Through close collaboration, the *Banking and Finance Firm's* internal employees improved their knowledge about digital innovation and got accustomed to the fast pace

in digital innovation. The *Retail and Healthcare Firm* established a ‘test-and-learn’ culture within its digital organisation through frequent collaborations with start-ups.

4.4.4 Summary of findings

The findings of our case studies show that firms base their dynamic alliance capabilities mainly on four microfoundations for each activity. Table 4-6 summarises the findings and provides an overview with regard to the prevalence of individual microfoundations across the cases. The following section discusses our case findings.

Table 4-6: Microfoundations of dynamic alliance capabilities and prevalence in our case studies

		Automotive Firm	Banking and Finance Firm	Healthcare Distribution Firm	Retail and Healthcare Firm	Wholesale Firm
<i>Sensing</i>	Active partner search	●	○	●	◐	○
	Passive partner search	◐	○	○	●	○
	Customer integration	○	●	◐	○	●
	Visionary executives	◐	●	○	◐	●
<i>Seizing</i>	Creating an innovation space	●	●	●	●	○
	Managing the development process	●	●	○	●	◐
	Integrating the partners	○	●	○	○	○
	Tapping partners’ capabilities	●	●	◐	●	◐
<i>Reconfiguring</i>	Orchestrating the network	●	◐	○	●	○
	Partnership-oriented thinking	●	◐	○	●	●
	Securing resources	●	◐	●	●	○
	Transferring innovativeness	◐	◐	○	◐	○

●: high, ◐: medium, ○: low

4.5 Discussion

Dynamic capabilities consist of sensing, seizing, and reconfiguring activities. This section discusses our case findings and elaborates on how firms create dynamic alliance capabilities with regard to each of the three activities.

The core purpose of sensing as a dynamic alliance capability is to identify opportunities for alliances and to anticipate the benefits entailed by entering these alliances. This may be in the form of access to new technologies and knowledge, or in order to gain beneficial external influence on the corporate culture. We were able to identify several differences between firms' sensing activities, depending on the maturity of their digital activities: Firms with mature digital activities are more formalised in sensing alliance partners, have better-defined resources and responsibilities for this and rely more on a search for opportunities outside of their organisation. Further, firms with mature digital initiatives are, due to their higher visibility in the digital space, able to benefit more from other firms' sensing activities. In the less mature firms, sensing of alliance opportunities is much more people- and project-driven. It relies more on internal employees' visions and initiatives and on the attention of individual management board members.

Seizing activities aim at mobilising resources to address alliance opportunities by integrating the own and the partners' development teams, processes, and resources, and eventually at developing new products or services. Our case firms achieve this either through the creation of permanent, alliance-focused organisational units (Automotive Firm, Healthcare Distribution Firm, Retail and Healthcare Firm) or through the creation of temporary project organisations (Banking and Finance Firm, Wholesale Firm). For all firms, a crucial success factor is the uncoupling of alliance-based developments from regular innovation activities, in order to enable the adaption of internal processes to the processes and activities of innovative and agile partners. Firms support this uncoupling with the separation of the alliance-based development teams in a different organisational unit. This finding suggests the transferability of findings from ambidexterity and business model research about the separation of the development of disruptive technologies or business models (e.g. Chesbrough & Rosenbloom, 2002; O'Reilly & Tushman, 2008; Winterhalter, Zeschky, & Gassmann, 2016) to research on partnerships in dynamic environments.

Firms constantly need to reconfigure themselves, to enable adequate reactions to environmental changes. Three of our case firms actively manage their partner network with regard to their involvement in the firms' innovation activities and with regard to the interaction among partners and customers. A key concern in every firm's reconfiguring activities is to transfer a part of their partners' corporate culture and innovativeness into their own firm and to create openness within their organisation. However, this is challenging for any firm. To recite the Sales Director E-Business of the Wholesale Firm in this regard: *"A new employee hired from an alliance partner loses a lot of his innovative potential, as soon as you hire him as an internal employee."*

4.6 Managerial implications

Dynamic alliance capabilities provide important building blocks to the success of alliances. Thus, the applicability of the findings is easily recognisable (Donada et al., 2016). Due to the digital transformation expanding into all industries, a firm's ability to profit from alliances with partners that differ significantly from the firm itself can pose a significant competitive advantage.

The microfoundations of dynamic alliance capabilities we identified in this study are fundamental strategic aspects, firms need to consider when attempting to develop new services based on alliances in fast-changing external environments. They offer several starting points for managers to improve their firm's capability to profit from alliances.

Our case studies suggest that to sense alliance opportunities, managers should establish clear responsibilities for alliances and customer integration, pay close attention to aligning internal and alliance requirements, and increase their firm's visibility, to enable being found by potential partners. Seizing alliance opportunities requires managers to define the organisational arrangement of the traditional and the new, alliance-based business and to enable the access and use of alliance partners' capabilities for the benefit of the alliance and the own firm. To enable future sensing and seizing of alliance opportunities, managers need reconfigure their firms by establishing responsibilities for the management of the alliance network and must permanently adapt their own firm's role within this network. Further, managers need to adapt their own firm's corporate culture to changing environments and to different

alliance partners and need to identify the right partners to ensure the availability of potentially necessary resources and capabilities in the future. Table 4-7 summarises the main goals of each phase and provides critical questions managers need to ask themselves, when building or reassessing their own firm's dynamic alliance capabilities.

Table 4-7: Main goals of dynamic alliance capabilities & managerial questions to ask

Dynamic alliance capability	Main goals	Managerial questions to ask
<i>Sensing</i>	<ul style="list-style-type: none"> • Identification and assessment of appliance opportunities • Linking alliance opportunities to the traditional business • Aligning alliance opportunities with customer needs 	<ul style="list-style-type: none"> • Who is responsible for the search for partners and the sensing of opportunities? Do we need specific alliance roles and/or teams? • Who ensures that the customer is at the core of the alliance-based new service development? • Who sponsors development projects and respective partnerships on management board level? • How do we align internal and alliance requirements? • How can we attract more attention outside of our core business, so that potential partners will find us?
<i>Seizing</i>	<ul style="list-style-type: none"> • Adapting organisational structures to alliance partners • Utilising partners' resources and capabilities for new developments 	<ul style="list-style-type: none"> • How can we separate the new business from our traditional business, but still maintain the necessary connections between both? • How can we adapt our organisation to the organisations of our current and future partners? • How can we understand, access and make use of our partners' capabilities?
<i>Reconfiguring</i>	<ul style="list-style-type: none"> • Utilising the partner network • Enhancing employees' alliance capabilities through an open culture • Securing external and reconfiguring internal resources 	<ul style="list-style-type: none"> • What is our role in the innovation network? • What roles, responsibilities, and structures do we implement to manage our network of partners? • How do we create acceptance for externally/openly developed digital solutions among the internal, traditional development teams? • How do we identify the right resources and how do we secure partners' resources for us?

4.7 Conclusion

The objective of this research was to deepen our understanding of dynamic alliance capabilities and underpinning microfoundations. By analysing case studies of firms with successful digital innovation activities, our analysis has identified the underlying microfoundations of firms' sensing, seizing, and reconfiguring activities for alliances.

Due to the digital transformation spreading across all industries, firms are facing many new challenges and opportunities. The digital transformation allows previously product-focused, offline firms to enhance their products with new digital services. However, developing digital services requires an abundance of additional capabilities and resources that are costly and difficult to develop and to maintain. Entering alliances is an effective way of obtaining these resources and capabilities, to succeed in developing innovative solutions for unfamiliar challenges.

Firms that are eager to enter alliances and to succeed in alliance-based innovation projects need to develop a certain set of dynamic alliance capabilities. These capabilities allow them to sense and seize new alliance opportunities, and to reconfigure themselves to adapt to the ever changing environment. Our research provides managers and management researchers with an understanding of the microfoundations underlying firms' dynamic alliance capabilities. This can help firms to determine, develop, and enhance their own dynamic alliance capabilities, to enable successful alliance-based innovation projects in the future.

In this study, we took the perspective of traditional, offline firms. Vice versa, online firms require certain dynamic alliance capabilities as well, and their microfoundations may differ from those identified in our study. In addition, dynamic alliance capabilities may change over the process of entering, operating, and exiting an alliance, which is an aspect that should be explored in future longitudinal research.

5 Capturing value from razor and blade business models: Archetypes of business model configurations

Co-authored by Stephan Winterhalter and Oliver Gassmann

Abstract:

A common approach in extant literature on business models is to analyse individual aspects of business models in general. In contrast to this approach, this study provides a detailed analysis of several different aspects of one particular type of business model, the razor and blade type. The use of the razor and blade type business model is prevalent in today's consumer industry. To deepen the understanding of how firms create and capture value from it, this study examines this business model type based on a theoretical framework of four different revenue model configurations. In a multiple-case study of seven razor and blade business models, it explicates four archetypes of this business model type, describes each of them with regard to business model design themes, product market strategies, revenue model configurations, and protection mechanisms and derives propositions for razor and blade business model design. This study contributes to the literature on business models, especially regarding the sub-topics of business model protection and the interrelation between technology and business models. It further provides managers with an overview of different design configurations of razor and blade business models.

Keywords: Razor and blade business model; business model design; product market strategy; revenue model; protection strategy; multiple-case study

5.1 Introduction

Amongst the multitude of business models that gained popularity in recent years, the razor and blade business model is arguably one of the most prominent ones (Teece, 2010). Despite its practical relevance and wide presence in business model literature (e.g. Chesbrough & Rosenbloom, 2002; Matzler, Bailom, Eichen, & Kohler, 2013; Teece, 2010), to our knowledge, no structured analysis of razor and blade business models has yet been conducted. When discussed, researchers mostly focus on an abstract description of the revenue model of razor and blade business models, which, on the general business model level, has been named as an aspect that requires further research (Wirtz et al., 2016). Moreover, the interplay between product and business model is a key aspect for value creation and value capture (Zott & Amit, 2013). With the exception of Zott and Amit (2008), existing business model literature neglects the complex interaction of product aspects (such as the product market strategy and technical intellectual property (IP)) and business aspects (such as the business model and non-technical IP). In addition, the protection of value capturing mechanisms, which are of key importance for razor and blade business models, remains relatively underexplored (Desyllas & Sako, 2013). It is important to include both value creation and value capture, to fully understand business model design (Amit & Zott, 2015). Existing research on razor and blade business models thus lacks a certain depth, leaving us with only a vague understanding of the underlying mechanisms.

Instead of focusing on the analysis of business model elements across different business model types, we aim to perform an in-depth analysis of the aspects most relevant to a single type of business model – the razor and blade business model. We focus on this business model for three reasons. First, this business model is increasingly popular among companies offering consumer products, even though it has been around for more than a century and is one of the classics in business model literature (Teece, 2010). Second, by analysing the interplay between base and complementary product across different aspects related to the business model, we are able to better understand the relationship between product and business model design. Third, to capture value from razor and blade business models, functioning lock-in mechanisms to future complementary sales are an important aspect, as a large share of the value is captured with those. Thus, analysing lock-in and protection mechanisms of this business model type can lead to valuable contributions to the general discussion

on business models and on value capturing mechanisms. The main research question of our study is: *How do firms capture value from razor and blade business models and what influences business model design?*

We begin our paper with a review of the literature on business models, including aspects related to value creation and value capture such as business model design themes, product market strategies, revenue models, and protection mechanisms. We identify four possible revenue model configurations of two-part product arrangements. In the following sections, we explain our multiple-case study research method, describe our case studies, and analyse our empirical evidence, explicating four different archetypes of razor and blade business models based on different revenue models. Thereafter, we reflect on our findings, establish a connection of our findings with earlier research, and conclude five propositions for the design of razor and blade business models. To conclude, we summarise our research, derive implications for theory and practice, and highlight potential limitations of our study.

5.2 Theoretical background

5.2.1 Business models, value creation, and value capture

We base our research on the conceptual and theoretical frameworks of Amit and Zott (Amit & Zott, 2001; Zott & Amit, 2010) and Teece (2010). A business model describes the activity system performed by firms and its partners and describes the links and underlying mechanisms existing in this system of activities (Zott & Amit, 2013). We define business models as an explanation of how firms (1) create value for themselves and for third parties (partners, suppliers, customers) and (2) how they capture and monetise a share of the total value (Amit & Zott, 2001; Baden-Fuller & Mangematin, 2013; Chesbrough, 2007; Teece, 2010; Zott & Amit, 2007, 2010, 2013). It is important to view value creation and value capture as distinct processes, since the creator value may not be able to capture the value after successful creation (Lepak et al., 2007).

5.2.2 Value creation

Value creation refers to the series of activities across the value chain that contribute to a new product or service in a way that there is net value subjectively realised by the

final customer (Chesbrough, 2007; Lepak et al., 2007). Two aspects significantly influencing firms' value creation are the business model and product market strategies (Zott & Amit, 2008).

5.2.2.1 Business model design themes

The drivers of value creation of a firm's activity system include novelty, lock-in, complementarities, and efficiency (Amit & Zott, 2001). Novelty-centred business model design contains new activities or link and/or governs activities in new ways. Business model designs that focus on lock-in aim at attracting and keeping business model participants (in razor and blade business models the customers) engaged. Complementary-based business models create value through the bundling of activities or goods that provide more value when bundled in a system than the combined value of all activities or goods separately. Efficiency-centred business model design aims at increasing efficiency by reducing transaction costs (Amit & Zott, 2001; Zott & Amit, 2010). Efficiency-centred value creation is often the main value driver for imitation-based business models (Zott, 2003; Zott & Amit, 2007). Often, the bundled provision of complementary products is necessary not just to capture value subsequently, but also to create value in the first place (Teece, 2010). This holds true particularly for the razor and blade type business model, in which complementarities are necessary to create customer value. From the firm perspective, a main value driver of razor and blade business models is the lock-in to future purchases of complementarities by customers.

5.2.2.2 Product market strategies

A firm's strategy is much more than just its business model – in our case the razor and blade business model. It is a contingent plan about the business model configuration and depends on contingencies that might occur (Casadesus-Masanell & Ricart, 2010). Next to business models, product market strategies are an important aspect that firms need to select and design (Zott & Amit, 2008). The product market strategy defines how a firm positions its products against competitors' products (Porter, 1985). Firms choose certain product market strategies in order to increase value creation and capture (Zott & Amit, 2008). It is complementary to business models (Zott & Amit, 2008) and is usually defined before a business model is finally designed (Casadesus-Masanell & Ricart, 2010; DaSilva & Trkman, 2014).

Earlier research identifies two main categories (with two or three sub-categories) of product market strategies that can lead to competitive advantage: The first, *differentiation*, aims at creating products with higher quality or new features, at improving deliverability or at decreasing switching costs towards the own product (Porter, 1985). The differentiation strategy can be further separated into *innovative differentiation/timing of product introduction*, which emphasises on innovations, and *marketing differentiation*, which emphasises on *advertisement, product quality* and/or *service* (Lieberman & Montgomery, 1988; Miller, 1986; Porter, 1985). The second category is *cost leadership*. Cost leaders often perform little product innovation but imitate products that have proven to be successful (Miller, 1986). *Cost leadership* can be further divided into *price leadership* (low cost, low value added), *reduced price with an emphasis on quality*, and *competitive price with better quality* (G. Johnson, Whittington, Regnér, Scholes, & Angwin, 2017; Lawton, 1999). The latter is a combination of both *differentiation* and *cost leadership*.

5.2.3 Value capture

Capturing value is an activity that, on the organisational level, goes simultaneously with value creation. Firms can capture a share of the total value by making use of their resources, to make their value creation inimitable or difficult to imitate (Lepak et al., 2007). For razor and blade business models, two aspects play a key role in capturing value: First, the revenue model, the pricing of the razor and blade, plays a key role in determining the profits the firm can generate over the life cycle of the product system (Dhebar, 2016; Schmalensee, 2015). Second, firms can protect their competitive advantage from imitation by selecting from a large set of protective mechanisms available to them (e.g. patents, secrecy, complementary assets or lead time; James et al. (2013)) to capture value from innovation. These protection mechanisms may also be applicable to protect business models (Desyllas & Sako, 2013).

5.2.3.1 The revenue model: Pricing the razor and blade

The revenue model is a major determinant of the total value that a firm can capture after the value is created (Zott & Amit, 2010) and is the key characteristic of razor and blade business models. In its traditional notion, the base product is priced inexpensively with low margins and the complementary products are priced expensively with a high margin (Chesbrough & Rosenbloom, 2002; Teece, 2010).

Pricing the razor and blade (also known as two-part tariffs) has been a topic in economic research for a long time, and researchers have shown that different optimal revenue models exist, depending on the parameter space of assumptions about consumer demand curves, (Oi, 1971; Schmalensee, 1981, 2015). But also in the management literature, researchers have discussed revenue models differing from the usual model of cheap razors and expensive blades, e.g. around the example of Apple’s iPod with expensive digital music players and cheap complementaries via the connected digital music store (M. W. Johnson, Christensen, & Kagermann, 2008).

While firms’ particular pricing decisions and the implementation of a revenue model is tactical, determining the revenue model is a strategic decision. With strategic choices, the firm sets up its business model, which is then constrained in the available tactical choices (Casadesus-Masanell & Ricart, 2010). Four different configurations can be distinguished for the revenue model of razor and blade business models, based on the margins on individual components of the product-system (see Figure 5-1): (1) products with a low margin on the base product and high margins on the complementary product (the ‘traditional’ razor and blade model, ‘L - H’), (2) products with low margins on both base and complementary product (‘L - L’), (3) products with high margins on both base and complementary product (‘H - H’), and (4) products with high margins on the base product and low margins on the complementary products (‘H - L’).

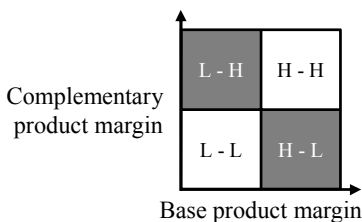


Figure 5-1: Possible revenue models in razor and blade business models

Another possibility to classify the strategic choices is based on what we refer to as the *profit split* – the distribution profits between base and complementary product over the lifecycle of the product system, which is based on the margin of basic and complementary products. In this sense, the ‘L - L’ and the ‘H - H’ strategies exhibit a low profit split and the groups ‘L - H’ and ‘H - L’ exhibit a high profit split.

5.2.3.2 *Protecting business models to capture value*

Traditionally, innovators have always captured value from technological innovation based on consumers buying products protected by intellectual property rights. This works effectively if strong IP protection is set up, the product or service offering is inimitable for other reasons, or the offer contains an attractive bundled solution (Teece, 2010), the latter of which is the case for razor and blade business models. Due to its revenue model configuration, an important success factor for the traditional razor and blade business models is the firm's ability to retain a monopoly on the high-margin product for as long as possible. If a third party controls other required complementary assets or elements, capturing value from innovation becomes more difficult for the firm (Pisano & Teece, 2007). Because of the possibility to protect razor and blade products with IP rights, designing the business model requires both skills related to designing the business model and setting up IP protection (Teece, 2010).

Protective barriers around innovations can be created with formal IP rights (legal protection, e.g. patents or copyrights) and with investments in strategic protection methods (complementary assets, e.g. brand image, distribution or services) (Pisano & Teece, 2007). Recently, the Profiting from Innovation framework (Teece, 1986) was transferred to the domain of business models, to describe how firms capture value from business model innovation (Desyllas & Sako, 2013). Because of the multifaceted nature of business models and the rather weak appropriability regime in which business model innovation typically takes place, the combination of different formal and strategic forms of IP protection can be advantageous to protect business models. Protective barriers can provide the innovator with the freedom required to develop superior capabilities, a strong position in specialised complementary assets, and market entry barriers, to ensure long-term competitiveness (Desyllas & Sako, 2013; Teece, 1986). For the special case of razor and blade business models, firms likely make strong use of both formal and informal protection strategies (Bonakdar, Frankenberger, Bader, & Gassmann, 2017).

5.2.4 **Research gap**

Our research addresses two important research gaps around the literature on business model innovation. First, the integration of the literature on business model design and

product market strategies is still at an early stage and has, aside from the important contribution of Zott and Amit (2008), rarely been addressed by researchers (Zott & Amit, 2008). As razor and blade business models' product market strategy and business model design are inherently interdependent, gaining a detailed picture of value creation with regard to both aspects is an important task. Additionally, an important avenue for technology strategy research is to analyse the interdependencies between business models and technological innovation (Baden-Fuller & Haefliger, 2013). This is particularly crucial for the aspect of value capture, since under the legislation of many countries, technological innovations are patentable, whereas methods of doing business are not (Gassmann & Bader, 2017). Second, how firms capture value from business model innovation and how they protect certain value capturing mechanisms is an area that remains relatively underexplored (Desyllas & Sako, 2013). In razor and blade business models, it is essential to integrate business model related value capturing strategies such as the revenue model with product related protection mechanisms, since only their interplay will enable firms to create a sustainable competitive advantage.

5.3 Case studies

5.3.1 Methodology

5.3.1.1 Case study approach

Due to the early stage of business model research, a large share of existing knowledge is of conceptual nature, leaving much space for case study and interview-based explorative empirical research (Eisenhardt, 1989; Wirtz et al., 2016). To explore the design of razor and blade business models, we employ a comparative multiple-case study design. Especially with regard to the complex activity systems around business models, case studies are an adequate approach (Casadesus-Masanell & Feng, 2013). Our research question – “How do firms capture value from razor and blade business models and what influences business model design?” – is of explanatory nature, which makes case study research a suitable approach. The multiple-case study research design allows us to analyse each individual case in sufficient detail, including the design of its business model and the corresponding product characteristics as well as

allowing us to perform a cross-case analysis to draw generalisable conclusions that could apply to many other razor and blade type business models (Yin, 2013).

5.3.1.2 Data source and sampling

The study analyses seven consumer products that follow a razor and blade logic. Our sampling of firms chosen for analysis in this study was theoretical and followed the goal of choosing cases that are likely to contribute to emergent theory (Eisenhardt, 1989). We performed our sampling and data collection in two steps. First, we performed desk research and created a database of cases of products that follow a razor and blade business model logic. Our database now includes 39 examples of razor and blade business models collected in 2014 and 2015, based on the analysis of secondary data. Second, we performed in-depth analyses of 21 of these examples based on data collected in personal interviews with company or industry experts and extensive analysis of secondary data. We classified those cases based on our framework of revenue model configurations and identified seven case studies that correspond to the four different revenue model configurations. Because of the tremendous complexity of business models that make use of two-sided markets (e.g. gaming consoles and platforms, e-readers and connected platforms, music players and connected music stores; Rochet & Tirole (2006)), we excluded this special type of razor and blade business models from our analysis and focus on business models, in which both the base and the complementary products are developed and manufactured by the same firm and sold under the firm brand. We selected the seven final cases in a way that they are distinct from one another in the sense of the revenue model, while at the same time similar in the sense of the specific industry (e.g. CapsuleTea vs. CapsuleCoffee, Printer1 vs. Printer2, Toothbrush1 vs. Toothbrush2; see Table 5-1). Since most of the products making use of a revenue model with a high margin on the base product and a low margin on the complementary product ('H - L' pricing) use two sided-markets (e.g. Apple iPod & iTunes music store, Amazon e-readers and eBook store), we were limited to the analysis of one case only.

For the final sample of the seven cases, we performed nine semi-structured interviews with eleven different interview partners (see Appendix paper D: Table 5-3), either in person or via telephone. Our interview partners held the roles of heads of R&D, marketing directors, project managers, product managers, or brand managers. Our

interview guideline comprised the following objectives: (1) background information on the company and the interviewee, (2) information on the design of the business model (e.g. target customers, mechanisms of value creation), and (3) information on protective mechanisms (e.g. patents, trademarks, existence of trade secrets). We sent the interview questionnaires to interviewees in advance, so that our interview partners could prepare and, if necessary, refer us to another firm representative.

Table 5-1: Sampling of case studies based on revenue model

Revenue model	Base product margin	Complementary product margin	Profit split	Case studies
<i>L - H</i>	Low	High	High	<ul style="list-style-type: none"> • CapsuleTea • Printer1
<i>H - L</i>	High	Low	High	<ul style="list-style-type: none"> • Printer2
<i>H - H</i>	High	High	Low	<ul style="list-style-type: none"> • FootFile • Toothbrush2
<i>L - L</i>	Low	Low	Low	<ul style="list-style-type: none"> • CapsuleCoffee • Toothbrush1

5.3.1.3 Data analysis

We gathered and examined secondary data, archival materials, and additional background information, both to deepen and to triangulate our interview findings (Yin, 2013). Based on interview notes, transcripts, and all additional information, we developed case studies for all seven firms. To reach a consistent description of the individual business models and product characteristics, we elaborated upon the details in an iterative manner, switching between the case studies, our original data, and the literature. After completing the individual case studies, we performed a cross-case analysis, first within the four revenue models of our theoretical framework, to check for similarity within these groups and therefore to ensure the validity of our framework, and second across the four revenue models, to uncover, describe, and analyse the differences between these strategies and to provide evidence for the existence of different archetypes of razor and blade business models, based on the revenue model configurations.

5.3.2 Case descriptions

5.3.2.1 *Low base, high complementary revenue model*

CapsuleTea is a capsule-based single serve tea maker. It is positioned as a premium product that offers a high product quality and convenience. The product was one of the first to apply a razor and blade business model to the tea market. The *profit split* is high, with expensive, high-margin complementary products and cheap, low-margin base products. Over the lifespan of the base product, complementaries account for roughly 85% of total sales. Base and complementary product and the interface between them are patent protected, to ensure *lock-in* and complementary sales. Investments in complementary protection assets, mostly in the form of building a brand image, are high, both to improve sales and to strengthen the *lock-in* after the expiration of patent protection.

Printer1 is one of the market leaders in inkjet printers for private use. It follows both a *quality* and *innovative differentiation* strategy by offering base products with innovative features and marketing them as high quality products. The *profit split* is high; high-end printers have a low margin, low-end printers may even sell with a loss. Cartridges for both types are expensive and sell with high margins. The main business model value driver is customer *lock-in*. In addition, Printer1 recently launched a *complementary service*, a subscription of printed pages per month with an automated and free delivery of new cartridges. Printer1 makes use of both legal and complementary protection assets: Base and complementary product as well as their interface are protected with strong patents. The protection of the interface is achieved with patents on a chip that is integrated in the cartridges, whose function is it to show the filling level of the cartridge. Despite of offering inkjet printers since the 1980s, through recurring inventions, the firm is able to upkeep patent protection until today. For current generation printers, third parties are only able to circumvent legal protection by refilling cartridges. The firm invests strongly in its brand image to strengthen *lock-in*.

5.3.2.2 *High base, high complementary revenue model*

Toothbrush2 is an electric toothbrush with exchangeable toothbrush heads. It follows a strategy of *quality* and focuses on product performance and customer service. It

underlines its high quality standards by distributing exclusively through pharmacies, dentists and own flagship stores. The *profit split* is low, prices and margins on both base and complementary product are high. Business model *lock-in* is the main value driver of Toothbrush2's business model. Both base and complementary product are protected by trademarks, only complementary products are protected by patents. The interface is not patent protected, leaving third parties with the – so far unused – possibility to produce complementaries. To ensure value capturing through the sales of complementaries, Toothbrush2 uses its brand image, the exclusive distribution channels, and its customer service.

FootFile is a new type of pedicure product launched in 2013 and is the first to apply a razor and blade business model in its market segment. It follows a *timing* product market strategy. The *profit split* is low, both base and complementary product generate profits, with a slightly higher margin on complementaries. The target of FootFile is to reach a conversion rate of 50%, meaning that 50% of customers, who bought the base product, buy complementary products in the future. Thus, customer *lock-in* can be seen as a major value driver of the firms' business model. Both base and complementary product are protected with design rights, but third party complementary products are widely available. The product's brand is strong and established in its market segment.

5.3.2.3 *Low base, low complementary revenue model*

CapsuleCoffee is a single serve coffee maker that was launched into an established, but growing market. It follows the product market strategies of *reduced price with an emphasis on quality* with a quality-line of moderately priced capsules that are about 20% cheaper than the market leader and *price leadership* with a budget-line of cheaply priced capsules that are about 60% cheaper than the market leader. Both capsule types can be used in the same base product. The base product has a moderate margin, thus the *profit split* is medium to low, depending on the complementary product line. The main value driver is *lock-in*, which is mainly achieved through strategic protection mechanisms such as the brand image and the distribution through large retailers. Legal protection is weak, since competitors have succeeded in circumventing the patents that cover the capsules and the interface, thus no monopoly on complementaries exists.

Toothbrush1 is an electric toothbrush with exchangeable toothbrush heads. Toothbrush1 entered a market in which two major players exist as market leaders. It seeks to increase market penetration, following a strategy of a *reduced price with an emphasis on quality*. Both base and complementary product are priced rather cheap with moderate margins and generate profit. Thus, the *profit split* is low. The main business model value driver is *lock-in*. Products are protected with patents and design rights on base and complementary product. The interface remains unprotected, making third party complementary products theoretically possible. However, so far no third party offers complementaries. Certain patents on the base product protect the cost leading position of Toothbrush1. Toothbrush1 uses its brand and its reputation for quality, which originates from its reputation as a producer of manual toothbrushes.

5.3.2.4 High base, low complementary revenue model

Printer2 was launched in 2010 by one of the market leaders in inkjet printers for private use. Unlike traditional printers, it does not use cartridges, but integrated tanks that can be refilled. At first, the product was introduced only to markets with low average incomes (South East Asia and South America) that traditionally show a high quota of third party cartridge refills. In 2014, the product was introduced to Western European markets. The product was the first of its kind for private use (cf. Section 5.7: Table 5-4 for an overview of the competitive situation). It follows a strategy of a *reduced price with an emphasis on quality* in combination with *timing* as being the first of its kind. The *profit split* is high; the margin on base products is high, while complementaries' margin is low. From the firm perspective, the main business model value driver is the increased *efficiency*, since it does not have to ensure the monopoly on the sale of complementaries to capture value. As a first mover, *novelty*, in the sense of focusing the firms' activities solely on the sale of printers and excluding the cartridge sales (content novelty; Zott & Amit (2010)), is also an important value driver for Printer2. Printer2 makes use of legal and complementary protection assets on its base product, which is protected by patents and trademarks. From the consumer side, this innovation means an incremental change in how they supply their printers with ink. For printer manufacturers however, this change represents a fundamental and radical shift in their business model for the whole personal printer industry. Six years after market introduction, all major printer manufacturers offer similar products.

Table 5-2: Overview of case studies

Profit split	Revenue model [base – compl.]	Case	Product market strategy		Business model value driver(s) [firm perspective]	Components protected by formal protection mechanisms	Strategic protection mechanisms
			Main strategies	Specific strategies			
High	L – H	<i>CapsuleTea</i>	• Differentiation	• Innovative diff.: Timing • Marketing diff.: Quality	• Lock-in (strong)	• Base product • Complementary products • Interface	• Brand image
		<i>Printer1</i>	• Differentiation	• Innovative diff.: Innovative features • Marketing diff.: Quality	• Lock-in (strong) • Complementaries	• Base product • Complementary products • Interface	• Brand image • Distribution channels
	H – L	<i>Printer2</i>	• Differentiation • Cost leadership	• Innovative diff.: Timing • Reduced price with an emphasis on quality	• Efficiency • Novelty	• Base product	• Brand image
Low	L – L	<i>CapsuleCoffee</i>	• Cost leadership	• Reduced price with an emphasis on quality • Price leadership	• Lock-in (weak)	• Base product	• Brand image • Distribution channels
		<i>Toothbrush1</i>	• Cost leadership	• Reduced price with an emphasis on quality	• Lock-in (weak)	• Base product • Complementary products	• Brand image
	H – H	<i>Toothbrush2</i>	• Differentiation	• Marketing diff.: Quality, Service	• Lock-in (medium)	• Complementary products	• Distribution channels • Customer service
		<i>FootFile</i>	• Differentiation	• Innovative diff.: Timing • Marketing diff.: Quality	• Lock-in (weak)	• Base product	• Brand image

5.4 Findings: Archetypes of razor and blade business models

Based on the four different revenue model configurations that constitute the theoretical framework of our case studies, in the following we explicate four different archetypes of razor and blade business models (see Figure 5-2): *classic*, *differentiated*, *low-price*, and *reverse* razor and blade business models. Using our case study data, we analyse the key characteristics between those archetypes with regard to value creation – business model design and product market strategies, and value capture – revenue model and protection mechanisms.

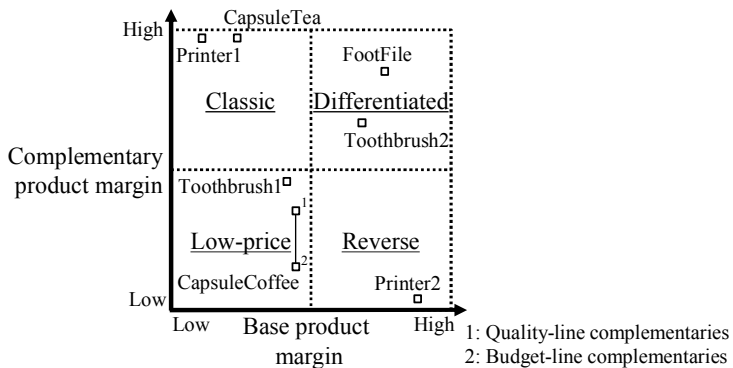


Figure 5-2: Archetypes of razor and blade business models

5.4.1 Classic razor and blade business models

Classic razor and blade business models have a high *profit split* with low-margin base products and high-margin complementary products. Its main driver of firm value creation is the lock-in of the customer to future purchases of complementary products.

“The long term plan is that the revenue mainly comes from the capsules and if it doesn’t, then you’re dead, it’s not going to work. From a quality point of view [the lifespan of the machine is] between 8 to 12 years. [However, real consumer cycles are shorter.] I would expect it’s about 4 years. [...] We expect about one capsule per day per machine.” – Marketing Director CapsuleTea

To create a broad base of potential customers for the complementaries, firms price their base products with very low margins, thereby minimising the barrier for customers to participate in their business model.

“Towards the machine, the consumers’ price sensitivity is pretty high. The cheaper you sell it, the more you sell. Towards the capsules, it is not very high.”

– Marketing Director CapsuleTea

Firms may also generate additional value by offering complementary services around their razor and blade products, which supplements their premium product market strategy. We find that firms employing a classic razor and blade business model may likely use a product market strategy of *differentiation*, based on innovation and quality. Regarding innovation, our two case studies showed different strategies, due to the different stage in the product life cycle. CapsuleTea follows a clear strategy of *timing* by offering the first of its kind in the tea market.

“Nobody has been expecting, nobody has been demanding a tea machine. So we have to explain this proposition and the only thing you can do is marketing.”

– Marketing Director CapsuleTea

Printer1 on the other hand focuses on incrementally improving its product, since the inkjet printer industry is in a very mature stage. It continuously adds innovative features to its printers, e.g. recently, printing from mobile devices, to promote base product sales and thereby to broaden the customer base for its consumables. Regarding its consumables, it focusses on a high quality and marketing.

“What we do, is that we offer better quality with our original cartridges and we let the customer know this.” – Product Manager Printer1

The key driver of capturing value is the firms’ ability to establish a monopoly on the provision of consumable or expendable products as complementary products to consumers, since they price the base products with low margins (CapsuleTea) or may even use the base products as loss leaders (Printer1).

“With the cheap printers, we are making slight losses, with the most expensive ones, we are making slight profits. [...] Our biggest revenue source is the cartridges.” – Product Manager Printer1

The most relevant aspect for creating customer lock-in seems to be the firms’ ability to achieve formal IP protection on the interface between base and complementary product, mostly via patents and three-dimensional trademarks. Both CapsuleTea and

Printer1 achieve this interface protection by including an interface chip into the complementaries, which is protected by patents.

“I don’t know the exact number of patents, but it’s quite a number. [...] We do have patents on the capsule and on the way the machine is reading the capsule. If you open the capsule, the capsule has a certain shape. This shape is protected and then there is a reading chip in it, which the machine reads. [...] The main thing is certainly the interaction between the machine and the capsule.”

– Marketing Director CapsuleTea

“We have chips in our cartridges that show the fill-level and are protected by patents, which third-party cartridges would violate. What we do have, is a problem with refilled cartridges. We cannot do much about that, as long as they don’t violate our trademarks.” – Product Manager Printer1

For the time after the expiry of patent protection, two different strategies for classic razor and blade business models seem to exist. First, firms can develop new technological inventions for their products to gain new patents, like in the case of Printer1. Based on our analysis, this strategy seems to be very useful for industries with short technology cycles, e.g. the IT industry, or for product systems with extreme profit splits towards the complementaries. Second, firms can focus on strategic protection mechanisms with a strong brand identity to ensure future complementary sales, like in the case of CapsuleTea.

“For instance Gillette is using speed; I think they are launching a new razor every 2 years. You need to adapt the total system around it. [We] cannot do that, because the investment in a machine is a bit higher and from a technological point of view, that would be unacceptable. [For the time after the expiry of our patents,] we are trying to build a strong brand.”

– Marketing Director CapsuleTea

5.4.2 Differentiated razor and blade business models

Differentiated razor and blade business models have a low *profit split* with both high-margin base and complementary product. Our case studies indicate that the key factor driving firms to select this *profit split* is their rather weak capability to create a *lock-in*.

“Our goal is to first create a turnover base with the base product. We aim for a refill-conversion-rate of 50%, meaning that 50% of the base product customers buy refills. This may take a while to reach, since our consumable lasts up to one year and it is less obvious, when to buy the refill.” – Brand Manager FootFile

Differentiated razor and blade products are positioned with a clear differentiation strategy of *quality* and/or *timing*, to achieve high margin sales. The case study of FootFile shows, that innovation can play a large role, but only in combination with a simultaneous marketing differentiation based on the brand image.

“We aim for creating innovations and make the largest share of our sales with innovations. [...] It is important to discover unmet customer needs. [...] With all our consumer products, we aim for creating a high variety of complementary products, e.g. for different skin types.” – Brand Manager FootFile

In addition, Differentiation strategies may also differ between base and complementary product: Toothbrush2 strongly differentiates its complementary products by offering the highest quality in the market, whereas its base product is qualitatively inferior to those of other market players.

“Our differentiation to competitor products is mainly via the toothbrush heads. Our heads are the best on the market. E.g. Philips, one of our main competitors, has its background in electronics; their base-product design is better than ours. Our quality differentiation takes place via the heads and via the customer service of our distribution partners and of us.”

– Project Manager Toothbrush2

The revenue model of differentiated razor and blade business model likely differs from the classic type mostly because of the rather weak lock-in capability. Because of the weak lock-in in combination with a product market strategy of differentiation, firms cannot afford to have low margins on complementaries or to even use them as loss leaders. Our cases indicate that this holds especially true for innovative products in new markets and for products with multiple-use consumables.

“At the beginning, we make most profit with our electric toothbrushes. We do not subsidise our toothbrushes with the toothbrush heads. Over time, toothbrush head sales become increasingly important.” – Product Manager Toothbrush2

“Right now, our highest profits come from the base product sales. Our complementary product sales still have to develop.” – Brand Manager FootFile

Strategic protection mechanisms like brand protection or distribution channels seem to be most important for differentiated razor and blade business models.

“Having a well-known brand name is definitely important to reach consumers and to create the image of an innovative product. This is a form of protection to our business.” – Brand Manager FootFile

Both the interviews and our analysis of secondary data sources show that both case products are only partially protected by patents; in the case of FootFile the base product, in the case of Toothbrush2 the complementary products. For Toothbrush2, third party complementaries were not available, whereas for FootFile, third party complementaries are widely available for roughly 30% of the original product’s price. The interviews suggest that Toothbrush2’s success factors are the distribution channel and their strong brand in combination with their product portfolio.

“Distributing our products only through dentists and pharmacies helps us to educate the customer on how to use the product. We do not just provide the products, but a service as well. We educate the dentists, who then pass the knowledge on to the end customer.” – Project Manager Toothbrush2

Compared to FootFile, Toothbrush2 also targets only very specific customer segments and not the broad mass markets, which likely also is one of the reasons why, in oppose to FootFile, no third party complementaries exist.

“Part of our protection strategy is to target specific customer segments, different from our competitors. We reach those customers via our distribution channels.”

– Product Manager Toothbrush2

5.4.3 Low-price razor and blade business models

Low-price razor and blade business models have a low *profit split* with both low-margin base and complementary product. We find that the key factor that drives firms to choose a low profit split is their inability to establish a monopoly on the complementaries and a strong customer *lock-in*. Products with low-price razor and

blade business models aim at price sensitive customers and may use both product market strategies of *price leadership* or *reduced price with an emphasis on quality*.

“Our customer is a down-to-earth person, who is focused on the product and does not have to boast about which coffee he consumes. But he is confident about consuming our brand and demands quality.” – Brand Manager CapsuleCoffee

“Our highest goal is not to have many functions or innovations. Our product is the price leader for sonic toothbrushes.” – Marketing Director Toothbrush1

Particularly interesting is, that firms that offer low-price razor and blade business models may use both of the above mentioned strategies at the same time, with the same system, as both the cases *CapsuleCoffee* and *Toothbrush1* have shown.

“We have established budget capsules for our system, which allow less wealthy customers to also use it. [...] We are considering introducing even cheaper discount capsules to address those price levels, in which competitors could attack us.” – Brand Manager CapsuleCoffee

In comparison to *classic* and *differentiated* business models, low-price razor and blade business models offer reduced prices on their complementaries. Complementary product sales play a key role in capturing value, but much less than in the *classic* type.

“Our revenue generation is based on both the base product and the complementary products. [...] We expect to sell roughly 15 toothbrush heads per toothbrush over its product life, which cost about the same as regular toothbrushes.” – Marketing Director Toothbrush1

None of the two firms protect their value capture with protection of the interface between base and complementary product, but rely only on patent protection of the base and/or the complementary products. Especially for *Toothbrush1*, patent protection is an important part of its price leadership strategy.

“We have very important patents protecting the price leadership of our base products. [...] Theoretically, it would be possible that someone produces a toothbrush head.” – IP Manager Toothbrush1

Strategic protection strategies like specific distribution channels or strong brands seem to play a much smaller role for the *low-price* type than for the *classic* and *differentiated* type, since in both cases, the firms did not emphasise on this.

5.4.4 Reverse razor and blade business models

Reverse razor and blade business models turn the revenue model of *classic* razor and blade business models on its head and sell high-margin blades with low-margin complementaries (M. W. Johnson et al., 2008). They are very different from the three other archetypes. In reverse razor and blade business models, the *lock-in* of consumers to future complementary sales plays a highly insignificant role. The main business model value driver for reverse razor and blade business models, especially in industries in which classic razor and blade business models are prevalent, is likely to be the increased *efficiency*, by superseding the need to upkeep a monopoly on complementaries, like the following two statements of Printer2 before and after product introduction show. For industries in which no reverse razor and blade business models are yet apparent, *content novelty* may also be an important value driver for first movers.

“There are third parties who supply ink cartridges [...] at prices cheaper than Epson’s brand products [...] for Epson to remain competitive, it might have to lower its prices of such consumables” (Seiko Epson Corporation, 2007, p.46).

“To counteract the loss in market share of genuine ink cartridges, Epson will pursue a policy of realising customer value by emphasising the quality [...] as well as by boosting user-friendliness with inkjet printers suitably adapted to customer needs in each market, such as models equipped with high-capacity ink tanks” (Seiko Epson Corporation, 2012, p.15).

The main product market strategy of Printer2 is to offer a *reduced price with an emphasis on quality*, with regard to the overall system cost, to the customer. A minor strategy for Printer2 is *innovative differentiation* with a first to the market product type, to enable the lower price. These strategies also mirror in the revenue model with high-margin base products and low margin complementary products, as our case study of Printer2 shows: At the time of market introduction, the base product price was almost four times as high as that of comparable, regular cartridge-based printers of the same manufacturer, while the price of complementary ink on the other hand is with about 1/12th of the price of regular ink cartridges much lower. Value capturing is therefore taking place mostly through base product sales.

Protecting value capture in reverse razor and blade business models is reduced to achieving a competitive advantage based solely on product market strategies. In mature product markets, like the stagnating printer market, securing ongoing sales of base products may become a very difficult task, especially if competitors are able to offer similar products quickly.

5.5 Discussion

The revenue model is an important strategic lever for razor and blade business models. It is very similar to two-sided platform markets, in which pricing is likewise used in a strategic manner to win platform battles (Gawer & Cusumano, 2008). However, no simple formula exists for the question of how much to subsidise one side of the market over the other in two-sided platform markets (Gawer & Cusumano, 2008), which seems to also hold true for razor and blade business models. Despite this complexity, our analysis still contributes to the clarification of this question.

Business models following a design-theme of lock-in “*build in elements to retain business model stakeholders, e.g. customers*” (Zott & Amit, 2010, p. 222). We find that for the design of razor and blade business models, firms’ capability to create this lock-in has a significant effect on their revenue model and therefore on the choice of a specific archetype of razor and blade business models (see Figure 5-3).

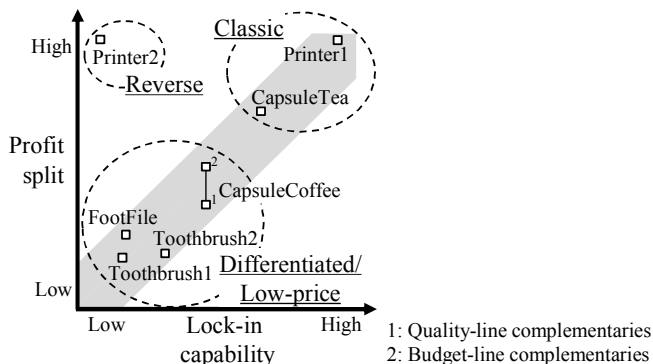


Figure 5-3: Profit split and lock-in capability of different razor and blade business model archetypes

Earlier research argues that in razor and blade business models, several possibilities exist for creating a customer lock-in: First, firms may use consumer emotions in the sense of creating a strong brand, second, firms may rely on consumer convenience, e.g. with an automatic consumable replacement plan, third, firms may try to bind consumers contractually, and fourth, firms may use a proprietary interface that is protected by patents and design rights (Dhebar, 2016). Based on the analysis of the four archetypes, we find that formal interface protection between the base and complementary product is the most important driver for firms to determine the design of their razor and blade model.

Our case studies suggest that if firms are able to achieve interface protection, they likely follow a classic razor and blade business model design (cf. Figure 5-3). Further, we find evidence that firms continually develop their product systems to upkeep formal protection of the interface, which confirms the findings of an earlier single case-study on Gillette razor and blade systems (Bonakdar et al., 2017; Sternitzke, 2012). Based on this, we conclude proposition 1 and 2 as follows:

Proposition 1: Firms that are able to effectively protect the interface between base and complementary product are likely to follow a classic razor and blade business model.

Proposition 2: Firms that follow a classic razor and blade business model continually develop their product systems to obtain new patents that upkeep the formal interface protection.

To increase lock-in, especially in the long term, earlier research finds that firms who follow a classic razor and blade model build up strategic protection mechanisms with an indefinite life over the period of formal protection (Conley, Bican, & Ernst, 2013; Desyllas & Sako, 2013). Our case studies support and extend this view. We find that firms make use of especially marketing differentiation based on product quality to build strong brand protection, leading us to conclude proposition 3 as follows:

Proposition 3: Firms that follow a classic razor and blade business model use the period of formal interface protection to build up strategic protection via marketing differentiation.

If on the other hand firms are unable to achieve and formal protection of their product system's interface, their product systems do not fulfil the basic prerequisite for two-

part tariffs of having a monopoly on complementaries (Schmalensee, 1981) and thus, firms have to price base and complementary product differently. In this case, firms' lock-in capabilities depend on soft factors such as consumer behaviour or consumer convenience. Due to existing competition, firms seem to price their product systems based on the competitive advantages they achieve through certain product market strategies, namely differentiation or cost leadership. This leads us to conclude:

Proposition 4: Firms with low lock-in capabilities in competitive markets choose a low profit split and emphasise on differentiation or low-price product market strategies.

Trying to achieve or enforce formal protection may pose a Sisyphean task, especially in markets with weak appropriability regimes, like in the case of the printing industry in emerging markets (Tsujiimoto, Mori, Tiwari, & Herstatt, 2016). Next to competing based on prices or differentiation in both base and complementary product, in industries with value creation that is predominantly based on lock-in, firms may be able to revolutionise their industry by creating value based on efficiency by entering competition with a reverse razor and blade business model. This leads us to conclude:

Proposition 5: Firms in competitive markets, in which razor and blade type business models are the dominant form of business model design, may use reverse razor and blade business models to achieve a competitive advantage.

5.6 Conclusion

5.6.1 Summary

In this article, we explored the design of razor and blade business models. Using a theoretical framework based on different revenue models, we identify four archetypes of razor and blade business models. In seven case studies of products from different consumer industries, we describe and analyse all four archetypes with regard to relevant aspects such as value creation design (Zott & Amit, 2010), product market strategies (Zott & Amit, 2008), and protection mechanisms (Teece, 2010). Based on this analysis, we develop five propositions on the design of razor and blade business models. In summary, our findings show that firms' ability to capture value using formal protection strategies is the key driver of razor and blade business model design.

5.6.2 Implications for theory and practice

Our findings contribute to the extant literature on business models in general and the aspect of capturing value in particular. First, by discussing alternative revenue models, we extend the current understanding of razor and blade business models that assumes cheap razors and high-margin blades (Teece, 2010). Second, with our multiple-case study analysis, we extend the so far mostly anecdotal evidence on razor and blade business models with in-depth analyses of their design. Third, we advance a recently emerging discussion on the protection of business models (Bonakdar et al., 2017; Desyllas & Sako, 2013) by providing empirical evidence on how firms combine different formal and strategic forms of IP protection for their advantage in the family of razor and blade business models. Fourth and last, our study, especially case Printer2, adds to the literature on the interrelationship between technology (shifts) and business models (Chesbrough, 2010; Tongur & Engwall, 2014).

Our findings also have valuable practical implications, especially for business development managers. First, the description of different archetypes of razor and blade business models provides managers with a good picture of possible design configurations of razor and blade business models and may help them to determine the type most suitable for their firm. Second, our findings may increase managers' awareness of the importance of suitable protection mechanisms, to achieve success with certain business model configurations. Third and last, managers may use our case studies as a reference for the redesign of their own firms' business model, especially regarding capturing value.

5.6.3 Limitations and future research

Its qualitative nature with its multiple-case study approach is one of the main limitations of our study. Due to the separation of our seven case studies into four archetypes, only two or one, respectively, case studies per archetype constitute the empirical base of the individual archetypes. Larger studies including more business models of the individual archetypes would enhance the validity and explanatory power of those. Another promising path for future research with regard to capturing value from business models is the question, in how far technology drives business model design. This aspect may be especially relevant in countries, in which business methods are not patentable, since firms may use technological developments in a certain way to

de facto ensure a monopoly in their business model by patenting technology. A particularly useful approach to this question could be a longitudinal study of specific development projects.

5.7 Appendix paper D

5.7.1 Interviews

Table 5-3: Overview of original data for case studies

Case	Original data	Interview partners
CapsuleTea	3 interviews	Marketing Director, Business Unit Commercial Leader Europe, Business Unit Head of Intellectual Asset Department, Group
Printer1	1 interview	Product Manager, Business Unit
Printer2	-	-
CapsuleCoffee	1 interview	Head of Brand Management, Business Unit
Toothbrush1	2 interviews	IP Manager Marketing Director Head of R&D
Toothbrush2	1 interview	Project Manager Product Manager
FootFile	1 interview	Senior Brand & Trade Marketing Manager, Business Unit

5.7.2 Competitive situation of reverse-razor and blade printer market

Table 5-4: Overview of dates of market introduction of ‘reverse razor and blade’ printers of the four largest printer manufacturers

	Emerging markets	Advanced markets
Epson	<ul style="list-style-type: none"> • Q4/2010: Southeast Asia • 06/2011: India 	<ul style="list-style-type: none"> • 10/2014: Western Europe • 09/2015: USA
Brother	<ul style="list-style-type: none"> • Q2/2015: Southeast Asia & Africa 	<ul style="list-style-type: none"> • 03/ 2016: Western Europe
Canon	<ul style="list-style-type: none"> • 11/2015: India & Southeast Asia 	<ul style="list-style-type: none"> • 03/2016: Western Europe • 12/2016: USA
HP	<ul style="list-style-type: none"> • 02/2016: India & Southeast Asia 	-

6 Conclusion

6.1 Overall summary

This thesis analysed how firms organize to create value and strategise to capture value, with a focus on knowledge, dynamic capabilities, and business models. Drawing upon the literature of these fields and rich original data, this thesis provided both theoretical concepts as well as empirical evidence for so far unresolved issues.

The first paper elaborated on creating value from knowledge. It developed a conceptual model of the evolution of EMNEs' global R&D networks along their catch-up process, based on the combination of theoretical concepts from the fields of MNE internationalisation, ambidexterity theory, and knowledge transfers. The model describes how EMNEs transfer knowledge within their R&D networks, how they organise their R&D network to facilitate knowledge transfers, and which roles individual units and parts of the R&D network take. The second paper contributed to capturing value from knowledge. In an empirical analysis, it analysed informal knowledge protection strategies AMNEs employ in their emerging market R&D subsidiaries. Based on a multiple-case study, it elaborated on firms' protection strategies, pointed out the existence of two different types of informal protection strategies and established a connection between ownership type as an important firm characteristic and the use of certain protection strategies. The third paper explicated the aspect of creating value by utilising dynamic capabilities. Employing a multiple-case study research design, it analysed the microfoundations of firms' capabilities to innovate based on alliances in rapidly changing environments – their so-called dynamic alliance capabilities. The fourth and last paper addressed the aspect of capturing value from business models. It developed a theoretical framework for different types of revenue models of razor and blade business models. Building upon this, it elaborated archetypes of razor and blade business models in a multiple-case study.

The following sections summarise the implications of this thesis for theory and for management practice and give an overview of opportunities for future research.

6.2 Implications for research and future research opportunities

The emergence of EMNEs, which are inherently different from ‘traditional’ AMNEs, presents many intriguing research opportunities on intra-firm knowledge flows. The development of a conceptual model of EMNEs’ global R&D networks in paper A significantly contributes to existing theory. Most importantly, it provides a new, dynamic perspective on EMNEs’ R&D networks and is among the first to apply the ambidexterity perspective to this unit of analysis. It brings the central role of EMNEs’ headquarters for their catch-up process to the point, by describing them as EMNEs’ knowledge hubs and by ascribing them the triple role of accessing, processing, and sourcing knowledge. This paper contributes to several research streams of the international business literature. Due to its nature, the empirical testing and refinement of the conceptual model are promising avenues for future research. Further, the paper opens up discussions on headquarter-subsidiary relationships in EMNEs and ambidextrous R&D networks.

Paper B makes several detailed contributions to the literature on knowledge protection and to the general aspect of capturing value from knowledge. First, its results point out the existence of two classes of informal protection strategies and thereby refine existing theory. Moreover, this study is the first to examine the influence of ownership type on informal knowledge protection strategies and provides empirical evidence in this regard. To deepen the understanding of informal protection strategies, future studies could emphasise on this aspect and examine other firm-level characteristics, such as FDI in connection with subsidiary motives, or the degree of subsidiaries openness.

Paper C contributes to dynamic capabilities theory by specifically addressing the important, yet underexamined sub-topic of dynamic alliance capabilities. It deepens the understanding of the underlying logic of dynamic alliance capabilities, by identifying the microfoundations of firms’ activities for developing new digital service business models based on alliances. Moreover, the paper provides novel empirical evidence of dynamic alliance capabilities and thereby adds to existing conceptual work on dynamic capabilities and especially to the sub-topic of dynamic alliance capabilities. Since any alliance between firms has to go through the stages of entering, operating, and exiting the alliance, future research should consider firms’ timing for

the development of dynamic alliance capabilities. Assuming that firms' dynamic alliance capabilities may depend upon the stage of the alliance, an analysis of this aspect could provide valuable insights for both research and management practice. An appropriate research design for this could be a longitudinal, qualitative analysis, since it allows for examining both the process over time as well as individual stages along the process in adequate detail.

This dissertation also provides in-depth insights into the underexamined aspect of capturing value from business models. By performing an in-depth analysis of razor and blade business models, paper D adds to the predominantly anecdotal evidence presented in existing research and refines the understanding of this type of business model. In addition, this study adds to the sparsely addressed interaction of the business model with product related aspects, such as product market strategies, technological innovations, and intellectual property. Particularly because business methods are not patentable under some of the major IP legislations, the understanding of the role of technological innovation and IP is of significant importance for value capture. Future studies should emphasise on these aspects and address, in how far technological innovations drive the design of firms' business models, against the background of capturing value.

On the general level, future research could address the limitations of this dissertation arising from its reliance on conceptual and qualitative research designs. In quantitative, large scale studies, researchers could test the validity of the model, strategies, microfoundations, and archetypes developed and analysed in this thesis and thereby attempt to generalise its research results.

6.3 Implications for management practice

Aside from its theoretical implications, this thesis also brings forward several implications for management practice. In particular, the case studies developed in paper B, C, and D provide managers with real world examples for their respective units of analysis.

More precisely, paper B offers managers with both an overview and in-depth examples of strategies, advanced market firms employ to protect their knowledge when performing R&D in emerging markets. In combination with the analysis of firms'

ownership types, the results can advise managers on the usefulness and applicability of certain strategies for their own firms' foreign subsidiaries.

Similarly, paper C provides an overview and examples of firms' dynamic alliance capabilities, which, in today's rapidly changing environments and more and more interconnected industries, are of high practical relevance. The identified microfoundations that constitute firms' dynamic alliance capabilities are well suitable as guidelines for managers to uncover improvement potential in their own firms. The formulation of the goals of certain activities, in connection with precise questions, managers need to ask themselves when trying to reach those goals, round off the research results and ensure their practical applicability.

Lastly, paper D offers insights into the design of razor and blade business models and closely connected aspects such as product market strategies, technological innovation, and intellectual property. It provides managers with exhaustive archetypes of this type of business model and thereby can guide them in the design of their own firm's business models and the correlated aspects.

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Curriculum Vitae

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