UNIVERSITY OF TWENTE.

Technische Universität Berlin

MASTER THESIS

The Business Model Innovation Process and its Importance to Micro-foundations: A Dynamic Capabilities Perspective

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March, 2019

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Title:	The Business Model Innovation Process and its Importance to Micro-foundations: A Dynamic Capability Perspective
Date:	March 2019
Keywords:	Business model, business model innovation, business model innovation process, incumbent firms, waste management industry, dynamic capability, micro-foundation

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ABSTRACT

While much has been written about Business model innovation (BMI), two important aspects have been under-emphasized. The first is the process through which BMI occurs in incumbent firms from mature industries and the second is its relationship with micro-foundations.
To address this deficiency, this present paper draws on two case studies from the waste management industry in Germany to investigate the process through which BMI occurs in these operations and to explore the notion of micro-foundations and their role towards this process.
Drawing on the dynamic capabilities perspective, the paper studies the process of BMI in terms of sensing, seizing and reconfiguring; and further examines the underlying micro-foundations that the operations apply within the process of BMI.
The findings reveal that incumbent firms can manage to innovate their business model by using a systematic innovation process, consisting of three phases. But moreover, this study found that the effectiveness of the BMI process to provide competitive outcomes depends on the extent to which incumbents possess specific micro-foundations. Sensing and learning are important for creating the prospective value of the BMI process, while coordinating and integrating are required for the realization the value creation of the BMI process.
This paper, thus, not only fills important gaps in the academic literature but also provides practical insights for managers pursuing a BMI process within their organization.

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List of Abbreviations

BM	Business Model
BMC	Business Model Canvas
BMI	Business Model Innovation
CBDO	Chief Business Development Officer
CEO	Chief Executive Officer
CFO	Chief Financial Officer
CIS	Community Innovation Surveys
CO_2	Carbon Dioxide
CTO	Chief Technology Officer
DC	Dynamic Capability
DCV	Dynamic Capability View
e.g.	for example
e-business	Electronic Business
EEG	German Renewable Energy Sources Act (German: Erneuerbare-Energien-Gesetz)
et al.	et alia (and others)
etc.	et cetera (and so on)
FORM	First-order realizing micro-foundation
FOCM	First-order creating micro-foundation
HR	Human Resources
i.e.	in other words
OC	Ordinary Capability
R&D	Research and Development
RBV	Resource-Based-View
VRIN	Valuable, rare, inimitable and non-substitutable
XDR	X-ray Dry Recovery

1. INTRODUCTON

The importance of business model innovation (BMI) has been growing, both in practice (e.g., Magretta, 2002; Pohle & Chapman, 2006) and in academia (e.g., Massa & Tucci, 2013; Schneider & Spieth, 2013; Schneider & Spieth, 2014). BMI is widely recognized as an essential competitive enabler for both new and established firms that want to remain competitive and survive in rapidly changing business environments (Johnson, Christensen & Kagermann, 2008; Zott & Amit, 2007).

The majority of research, however, shows that although the importance of BMI is fully realized by most firms, and new firms (often high tech, start-up, and e-businesses) reach concrete results, many incumbents do not generate satisfactory profits or competitive advantages from BMI endeavours (Foss & Saebi, 2017; Mezger, 2014).

Incumbents, in contrast to new firms, face not only the problem to generate innovative new business models (BMs), but also, face the problem to manage their existing BM and repertoire of capabilities (McGrath, 2010; Mezger, 2014). The balancing of these activities is a risky endeavour and explains why many incumbents struggle with innovating their BM (Mezger, 2014).

In order to systematically tackle the management of the BMI process and compete with new firms, incumbents are in much need to understand how a BMI process unfolds and what is needed to achieve such a change (Bock, Opsahl, George & Gann, 2012; Wirtz, Schilke & Ullrich, 2010).

Even though of crucial importance for incumbents, only limited research exists about the process and the capabilities that constitute the core of the BMI process, especially in the context of incumbents (e.g., Bucherer, Eisert & Gassmann, 2012; Foss & Saebi, 2017; Kim & Min, 2015).

In fact, past work has especially focused on BMI in the context of new firms (often high tech, start-up, and e-businesses) (Arend, 2013; Demil, Lecocq, Ricart & Zott, 2015; Foss & Saebi, 2017). This extensive focus on new firms left an important gap outside of the e-business sector, in particularly on mature firms in traditional industry settings such as manufacturing and energy (Bucherer et al., 2012; Kim & Min, 2015).

In addition, past work has also focused almost entirely on the conceptualization phase of new BMs without providing sufficient clarity and guidance about the remaining BMI process phases (De Reuver, Bouwman & Haaker, 2013). There is hardly any research generating an understanding of the end-to-end phases of the BMI process, from early conceptualization to implementation (e.g., Chatterjee, 2013; De Reuver et al., 2013; Koen, Bertels & Elsum, 2011).

And lastly, past work has also looked at organizational capabilities that might facilitate the process of BMI (e.g., Demil & Lecocq, 2010; Doz & Kosonen, 2010). One characteristic in particular, the concept of dynamic capabilities (DCs), has been posited as being a critical enabler in attaining competitive performance gains in rapidly changing environments (Desyllas & Sako, 2012). Teece (2007) defines DC as a set of capabilities to sense opportunities, seize opportunities and sustain competitive advantage through resource reconfigurations. These capabilities are closely interwoven with the capabilities needed in the process of BMI (DeTienne & Chandler, 2004; Leih, Linden & Teece, 2015; Shane & Venkataraman, 2003). Yet, despite this suggestion, there is scarce empirical evidence to support this claim and even more, a lack of understanding of the origins (micro-foundations) of such dynamic capabilities (e.g., Bucherer et al., 2012; De Reuver et al., 2013; Kim & Min, 2015; Koen et al., 2011).

The present study is aimed to fill up this gap and aims to identify the process through which BMI occurs in incumbents from mature industries and to explore its relationship with the micro-foundations, the distinct processes which underpin and enable the deployment of DCs.

Focusing on waste management firms as incumbents from mature industries as the level of analysis, the following research question has been formulated:

How does the process of BMI unfold and what role do the micro-foundations of dynamic capabilities play within this process?

The research agenda is derived from the following sub questions:

(1) How can the traditional and new business model be described and categorised?
(2) How can the process of BMI be described and categorized?
(3) What phases does a BMI process undergo and what are the underlying managerial and organizational activities?
(4) What are micro-foundations and what role do they play in facilitating the process of BMI?

To investigate these research questions, the dynamic capabilities perspective has emerged in the strategic management literature. This perspective has been highlighted as being useful for investigating innovation at the organizational level and in particular to better understands the origins of DCs which make up innovation in practice (Felin & Foss, 2005; 2009).
Through company interviews, data is gained on the BMI process of two operations in the German waste management industry. The approach of this paper is thus qualitative and the purpose is consequently exploratory.
The aim of this research paper is to achieve a deeper understanding of the process of BMI in the context of incumbents from mature industries and to explore the micro-foundation of DCs and their role in enabling the BMI process.
This study, thus, has the objective to develop a conceptual framework of the BMI process within incumbent firms from mature industries, by (a) identifying and conceptualizing a set of phases relevant for the process of BMI, (b) describing the underlying managerial and organizational activities of the identified phases, and (c) specifying the nature and role of the micro foundations (sensing, learning, integration, cooperation) in facilitating the identified activities and process phases.
In addressing the above mentioned objectives, this paper contributes to the literature in several ways: First, the scope of BMI literature is expanded from high-tech firms to incumbent firms, especially in mature industries. Second, the study contributes to a better understanding of the BMI process by providing an integrative framework, which systematically outlines how a BMI unfolds in incumbent organizations. Third, this study contributes to the literature by relating micro-foundations to the BMI process in the context of BMI in incumbent organizations which has not been developed with the same focus elsewhere and has been called for in previous research (Schneider & Spieth, 2013; Zott & Amit, 2007).
Apart from the theoretical contributions, the findings are also of high relevance from a managerial point of view. The proposed framework provides a concrete, step-by-step process that helps practitioners to structure and assess their BMI process.
The paper is divided into eight chapters: following this introduction, Chapter 2 defines the key concepts of this present study. In Chapter 3 relevant academic research streams are reviewed, discussed and the literature gap is illustrated. Chapter 4 lays the theoretical foundation for this paper by introducing the dynamic capability perspective into the field of BMI. Chapter 5 outlines the methodological approach for this paper and focuses on the research strategy and design, sampling, data collection and data analysis techniques. In Chapter 6, the empirical data is presented and discussed. Chapter 7 is dedicated to the discussion of the most important findings of both case studies relative to the thesis research focus. The study ends with Chapter 8, where the main conclusions of the thesis are derived and the limitations and implications, both theoretical and managerial, are discussed.

2. CONCEPT DEFINTIONS

2.1 Introduction

This chapter serves as the foundation of this thesis and aims to explain the three key concepts of the present research. In doing so, the chapter starts out with (1) an evaluation of the business model concept, and its specific components and dimensions; (2) it then goes on in assessing the concept of business model innovation; and (3) ends with the description of the dynamic capability concept.

2.2 The Business Model Concept: Definitions, Frameworks, and Contemporary Perspectives

2.2.1 *Business Model Definitions*

The notion of the ´Business Model' (BM) concept in itself, though, widely used in management research as well as by practitioners, suffers from lack of clarity and has so far remained a fuzzy construct (DaSilva, Trkman, Desouza & Lindič, 2013; Wirtz, Pistoia, Ullrich & Göttel, 2016; Zott, Amit & Massa, 2011). The following terms are used in the literature as synonyms for the term BM: *statement* (Stewart & Zhao, 2000), *presentation* (Morris, Schindehutte & Allen, 2005; Shafer, Smith & Linder, 2005), *architecture* (Dubosson-Torbay, Osterwalder, & Pigneur, 2002), *method* (Afuah & Tucci, 2001), *pattern* (Brousseau & Pénard, 2007), *set* (Seelos & Mair, 2007), and *conceptual tool* or *model* (George & Bock, 2011; Osterwalder, 2004; Osterwalder, Pigneur, & Tucci, 2005). There is a divergence of views among scholars and practitioners as to its meaning and so far, no congruence on a precise definition has occurred (George & Bock, 2011; Zott et al., 2011). Thus it is not surprising; that the BM concept is often studied without an explicit definition. Zott et al. (2011) reviewed 103 BM publications and found that only 44% of these publications defined the term BM, 37% did not define the term at all, and the remaining 19% cited a source.

Nevertheless, several attempts have been made. Building on a value creation perspective, Chesbrough and Rosenbloom (2002) refer to a BM as the "logic that connects technical potential with the realization of economic values" (p. 536) or Magretta (2002) conceptualises BMs as "stories that explain how enterprises work" (p. 87), both perspectives linking the BM to a description of how a firm does business. In other publications, it is linked to capturing value. Eisenmann (2002), for example, views the BM as "a hypothesis about how a company will make money over the long term: what the company will sell, and to whom; how the company will collect revenue" (p.12). Other researchers have combined perspectives or proposed definitions that only fit the nature of their study (Bucherer et al., 2012). To conclude, the BM concept is still lacking consensus on its definition and compositional elements, and is "developing largely in silos" (Zott et al., 2011, p.1019).

Despite, the heterogeneity in terms of definition and conceptualization, it is, however, possible to identify common themes among scholars. The vast majority of scholars understand and describe the BM as a concept (e.g., Baden-Fuller & Morgan, 2010; Teece, 2010; Zott & Amit, 2008). In detail, a concept that can describe and explain "the logic of a firm" (Casadesus-Masanell & Ricart, 2010, p.2), in terms of the way it operates, and how it creates and captures value (Brea-Solís, Casadesus-Masanell & Grifell-Tatjé, 2015). Or simply put: the BM describes what customers want, how they want it, and how an firm can best meet these needs and get paid for doing so (Gambardella & McGahan, 2010; Teece, 2010). In more detail and from an aggregated point of view, a BM has three core integrative parts the "architecture of the value creation, delivery, and capture mechanism" of a firm (Teece, 2010, p.172). In line with this argument, this study follows the ontology of Osterwalder and Pigneur (2010), who define a BM as "the rationale of how an organization creates, delivers and captures value" (Osterwalder & Pigneur, 2010, p. 14). As a result the following definition is used in the present study:

Definition #1:
A BM represents the logic of how an organization
creates, delivers and captures value.

2.2.2 *Components of a Business Model*

Considering the considerable differences in the definition and conceptualization of a BM, it is not surprising that BM literature also considers different standards as to what constitutes a BM.
While some BMs define three components (Demil & Lecocq, 2010; Koen et al., 2011; Zott & Amit, 2010), others prescribe four to six components (Johnson et al., 2008; Morris et al., 2005) and the most complex ones comprise between 17 and 20 components (Johnson et al., 2008; Shafer et al., 2005). This indicates that the number of BM components in itself has been highly debated in BM literature, as Shafer et al. (2005) confirmed who compared 12 BM definitions and identified 42 different components. Following this view, Gassmann, Frankenberger and Csik (2013) explicate that the BM literature "has not yet reached a common opinion as to which components exactly make up a business model" (p.1).
The same applies for BM frameworks. Several model frameworks have been proposed (e.g., Morris et al., 2005; Osterwalder & Pigneur, 2010; Shi & Manning, 2009; Wirtz et al., 2010). The framework proposed by Cantrell (2000) suggests a framework, which classifies a BM into four basic types: realisation model, renewal model, extension model, and journey model. Each model highlights various BM choices. A more recent framework by Wirtz et al. (2010) divides a BM framework into content, commerce, context and connecting BMs, and Zott and Amit (2007) emphasise the efficiency and novelty of BMs. In addition, an alternative research stream has emphasised the size of a BM rather than its consequences.
Probably the most popular example is the "Business Model Canvas (BMC)" (Schneider & Spieth, 2014). The BM ontology consisting of nine building blocks can be grouped into three categories (see Table 1). The product segment (I), explains the offering of a firm, and as such encompasses the promise of value to be delivered, communicated, and acknowledged. The infra-structure segment (II) explains a firm´s architecture through which the value is created or produced, and thus covers the whole value chain of activities, resources, core competencies and value partners and customer. The financial aspects (III) explain a firm´s earnings but also its cost structure. These three segments together can be broken down into nine building blocks: value proposition, key partners, key activities, key resources, customer relations, channels, customers, costs and revenues.

Segment	BM Building Blocks		Explanation of the Building Blocks
I Product	1	Value Proposition	"The Value Proposition Building Block describes the bundle of products and services that create value for a specific Customer Segment"
II Infra-structure	2	Customer Segments	"The Customer Segments Building Block defines the different groups of people or organizations an enterprise aims to reach and serve"
	3	Channels	"The Channels Building Block describes how a company communicates with and reaches its Customer Segments to deliver a Value Proposition"
	4	Customer Relationships	"The Customer Relationships Building Block describes the types of relationships a company establishes with specific Customer Segments"
	5	Key Resources	"The Key Resources Building Block describes the most important assets required to make a business model work"
	6	Key Activities	"The Key Activities Building Block describes the most important things a company must do to make its business model work"
	7	Key Partners	"The Key Partnerships Building Block describes the network of suppliers and partners that make the business model work"
III Financial Aspects	8	Cost Structure	"The Cost Structure Building Block describes all costs incurred to operate a business model"
	9	Revenue Streams	"The Revenue Streams Building Block represents the cash a company generates from each Customer Segment"

Table 1 *The Nine Building Blocks of the Business Model Canvas (*Adapted from Osterwalder & Pigneur, 2010, p.22-42)

The nine building blocks can be mapped visually into a canvas; the Business Model Canvas (BMC) The visual framework comes blank with nine boxes and a set of questions that can help to fill out every column in the canvas (see Figure 1). It can be used to visualize and analyse a current BM, but also to map changes and future scenarios. Due to its simplicity, it "has been widely recognised as a useful tool to describe and design business models" (Markopoulos, Martens, Malins, Coninx & Liapis, 2016, p.102). Research studies also found that working visually with BMs can enhance creativity, facilitate team knowledge work (Eppler, Hoffmann & Bresciani, 2011) and even mitigate cognitive challenges (Täuscher & Abdelkafi, 2017).

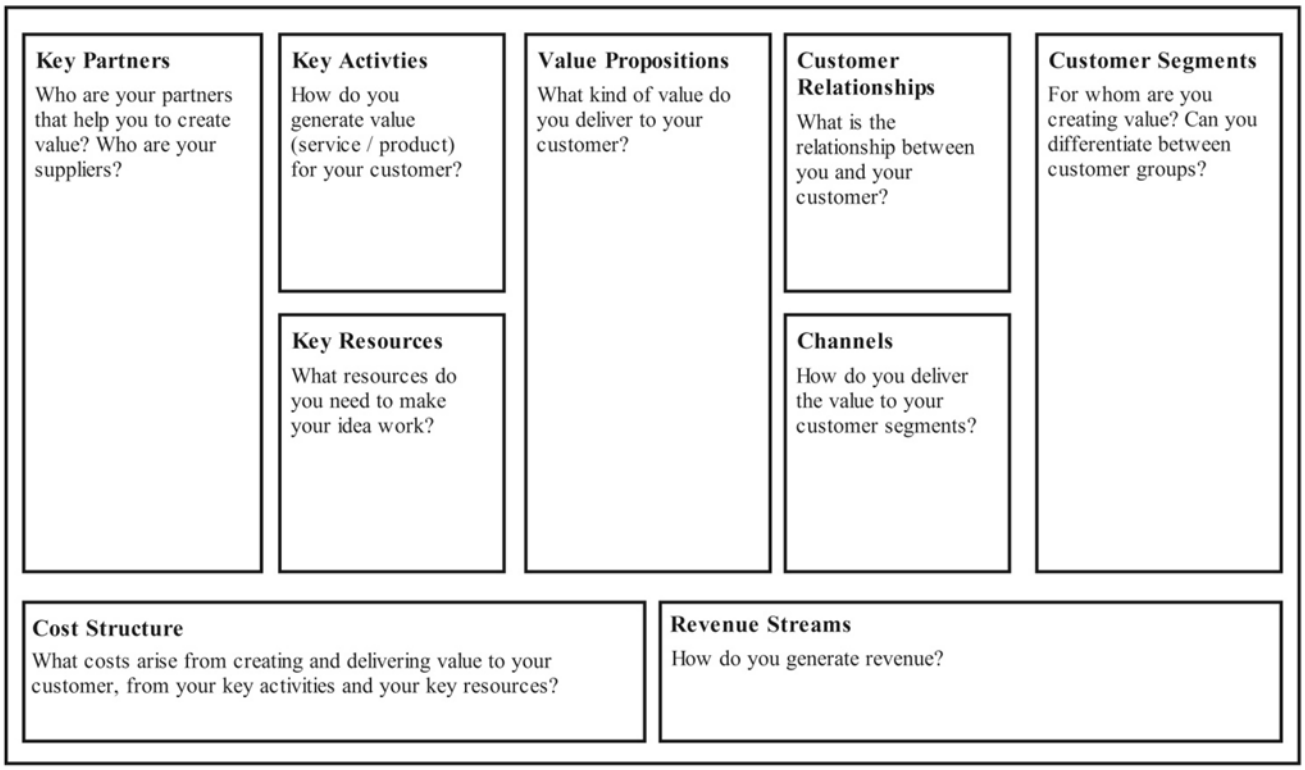

Figure 1 *Business Model Canvas (*Source: Own illustration, based on Osterwalder & Pigneur, 2010, pp.18-19)

Despite the substantial differences in BM literature as to what constitutes a BM, it is, however, possible to identify consistent pattern. Most scholars seem to converge on the notion that a BM compromise three dimensions: (1) a firm's value offering (value offering), (2) a firm's value creation architecture (value delivery), and (3) a firm's financial viability (value capture) (see Figure 2) (Demil & Lecocq, 2010; Osterwalder & Pigneur, 2010; Saebi, Lien, & Foss, 2017; Schneider & Spieth, 2014; Teece, 2010). Whereas *value offering* classifies the value that is created for the customer, *value delivery* classifies the whole chain of activities and resources which enable a firm to create and provide the value offering, and *value capture* refers to the activities through which value is retained.

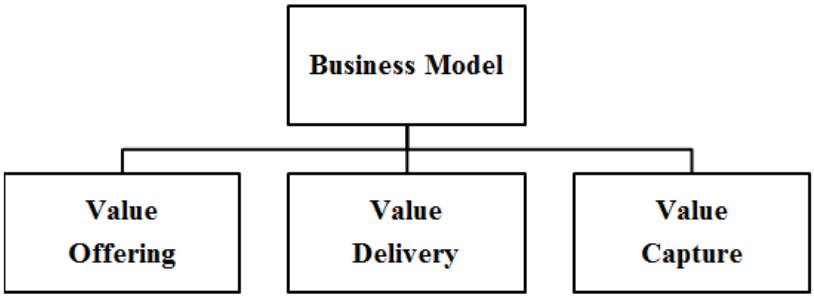

Figure 2 *Three Key Dimensions of a Business Model: Value Offering, Value Delivery and Value Capture (*Source: Own illustration)

2.3 The Business Model Innovation Concept: Definition, Typology and Categorization

2.3.1 *Business Model Innovation Definition*

It has been argued that BMs have become the new basis of competition and probably a new type of innovation in itself, the Business Model Innovation (BMI) (Johnson et al., 2008; Zott & Amit, 2007). Given the heterogeneous structure of the BM knowledge, there is also a divergence of views among scholars and practitioners as to the definition (George & Bock, 2011; Zott et al., 2011) and meaning of the BMI concept (Schneider & Spieth, 2013; Teece, 2010). A BMI is often referred to as a *change*, *reconfiguration* or a *process* (e.g., Bucherer et al., 2012; Sosna, Trevinyo-Rodríguez & Velamuri, 2010) of redefining a firm´s extant system (Teece, 2010). It implies "the search for new business logics of the firm and new ways to create and capture value for its stakeholders" (Casadesus-Masanell & Zhu, 2013, p.464). Building on these perspectives the following can be defined:

Definition #2:

A BMI introduces a new logic of how a company creates, delivers, and captures value with respect to its extant logic.

This change can be achieved by modifying or introducing a new set of components or resources that enable a business to create value (Massa & Tucci, 2013). In addition to the perspective in changing components and resources, the majority of literature draws heavily on changing activities of a BMI (Santos, Spector & Van der Heyden, 2009; Zott & Amit, 2010). Accordingly, a reconfiguration doesn't occur through changes in elements but through changes in some kind of activity. For instance Santos et al. (2009) define a BMI as "a reconfiguration of activities in the existing business model of a firm that is new to the product/service market in which the firm competes" (p.14), similar Amit and Zott (2010) coin the process of it "designing a new, or modifying the firm's extant activity system" (p.2). Amit and Zott (2012), who follow the activity-based perspective of a BM, have proposed that managers can renew their BM in three ways: (1) by adding new activities, (2) linking activities in novel ways, or (3) changing who performs an activity (Amit & Zott, 2012).
The governance concerning the BM plays another essential role within firms pursuing BMI (Casadesus-Masanell & Ricart, 2010). Recent studies have shown that the success of a new BM depends not only on its activities and elements but rather on its implementation; how a BM is controlled and regulated (Brea-Solís et al., 2015). As such, it is, necessary in regards to BMI, to consider also the firm governance and its specific regulation mechanism.

In aggregate, a BMI can occur in a number of ways by changing the content (i.e. the nature of the components/activities), the structure (i.e. linkages and sequencing of components/activities) and/or the governance (the control/responsibility over a component/activity) of an extant system (Zott & Amit, 2010).

2.3.2 *Business Model Innovation Typology*

It is necessary at this point to stress out, that not all changes in the content, structure or governance will necessarily lead to a BMI (Voelpel, Leibold & Tekie, 2004). It is, thus, important to examine how much change is necessary before BMI comes into play. Three approaches have been proposed to classify this view (Taran, Boer & Lindgren, 2015).
The first approach defines a BMI in terms of its *degree of radicalism*, the extent to which the new BM departs from the extant BM. As such BMIs can range from incremental innovations, referring to minor changes such as improvements or extensions (McDermott & O'Connor, 2002), right through to developments or applications of something significantly new (Khanagha, Volberda & Oshri, 2014). An addition, a new distribution channel, such as selling online, is, thus, referred to as mere an

incremental BMI (Mitchell & Coles, 2003). A radical BMI, in contrast, provides a clearly differentiated value proposition and creates entirely new fields of competition (Hamel & Ruben, 2000; Johnson, 2010) which can be then considered to be disruptive (Markides, 2006).
The second approach positions a BMI in terms of what might be called the *scope of the innovation* (e.g., Garcia & Calantone, 2002; Johannessen, Olsen & Lumpkin, 2001). As such, this approach measures the degree of newness of the innovation outcome with respect to an appropriate referent (Crossan & Apaydin, 2010). In fact, a new (innovative) BM thus can be new to the firm, new to the market and industry, and new to the world (Bucherer et al., 2012). One scholar makes a precise distinction and implies that a new BM should only be new to the firm (Osterwalder, 2004); other scholars argue that a BMI inhales fundamental changes and thus should be positioned into the new industry/world category (Cavalcante, Kesting & Ulhøi, 2011; George & Bock, 2011; Yunus, Moingeon & Lehmann-Ortega, 2010). So far, the BMI literature has not yet reached a common understanding as to which category exactly makes up a BMI (Schneider & Spieth, 2014).
Related to the notion of architectural innovation, the third approach defines a BMI in terms of its *complexity*. Based on the core elements that constitute a BM, literature proposes that a BMI compromises either innovating one, several (Wirtz et al., 2010), or even all of the elements (Johnson et al., 2008). As a consequence, any change in any of the elements could be considered as a form of BMI (Barjak, Niedermann & Perret, 2013; Osterwalder et al., 2005), or more precisely as Taran et al. (2015) point out "a change in one of the building blocks would constitute a simple innovation, while simultaneous changes in all of the building blocks would be the most complex form of business model innovation" (p. 306).
Accordingly, combining these three approaches, a BMI outcome should be characterized by some degree of *radicalism*, *scope*, and *complexity*. Whereas radicalism refers to the newness (incremental vs. radical) of each building block; scope describes the question whether the innovation is new to the company/market/world; and complexity defines the number of components in a BM that have changed. Building on these findings, this study uses the following extended definition.

Definition #2 (extended):

A BMI introduces a new logic of how a company creates, delivers, and captures value by changing at least two components of the initial BM in a way that is new to the market in which the firm competes.

Such a classification seems appropriate for this present study for two reasons. First, this study focuses on incumbent firms in mature industries. Incremental innovations that are solely new to the firm or market may be more common than radical changes in this empirical setting. In addition, this paper argues that BMI occurs when at least two emblements of the initial BM change. A change in only one element might not incorporate sufficient changes to label it as a BMI.

2.3.3 *Business Model Innovation Categorization*

There are two main possibilities for incumbent firms to pursue BMI. This study categorizes them into: *unique* and *derivative* BMI. A firm pursues a unique BMI, when it creates a new BM derived from its own technological breakthrough or reconfiguration of its extant products, systems and processes (Amit & Zott, 2012; Johnson et al., 2008; Sorescu, Frambach, Singh, Rangaswamy & Bridges, 2011). As such it can be referred to as an "invention". In contrast, derivative BMI refers to the imitation of an existing BM (Enkel & Mezger, 2013) or the acquisition of start-ups with innovative BMs (Johnson, 2010, p. 150). As such a firm strengthens their existing BM with an adoption of a BM that has already been invented by another firm (Gilbert, Eyring & Foster, 2012; Markides & Charitou, 2004; Markides & Oyon, 2010).

While sharing the potential for the same outcome (BMI), adaptive and additive BMI are two distinct approaches that imply important differences. In this study, a focus is placed on unique BMIs of incumbent firms. These innovations are fewer and less investigated in the literature (Amit & Zott, 2012; Johnson et al., 2008; Sorescu et al., 2011).

For unique BMI, two conceptual approaches are outlined in the literature: adoption and addition (Kim & Min, 2015). An adoption refers to a firm replacing its extant BM with the novel one. In contrast, an addition refers to a firm adding a new BM to their existing BM while managing them simultaneously (Mezger, 2014).

2.4 The Dynamic Capability Concept: Origin, Definition and Dimensions

Previous studies of (strategic) management have acknowledged that in order to pursue a BMI and to achieve superior competitive positions in rapidly changing business environments, firms must possess dynamic capabilities (Teece, 2007; 2014).

2.4.1 *The Dynamic Capability Perspective as a Consequence of the Resource-Based View*

The origin of the concept of DCs can be traced back to the evolution of the resource-based view (RBV). The premise of the RBV is that resources are the genesis of competitive advantage (Barney, 1991; Peteraf, 1993). Fundamentally, a firm can achieve competitive advantage when it possesses resources that are valuable, rare, inimitable and non-substitutable (VRIN criteria) (Barney, 1991; Conner & Prahalad, 1996; Priem & Butler, 2001; Wernerfelt, 1984; 1995). One shortcoming of this view is that resource advantage is not sufficient in dynamic market environments (Wu, 2010). "VRIN resources do not persist over time and hence cannot be a source of sustainable competitive advantage" (Wang & Ahmed, 2007, p.36). This shortcoming underscores the need to formulate new perspectives to explain how long-term competitive advantage is created in dynamic markets.
One new approach is the DC perspective. The concept of DC has emerged as an attempt to overcome the static criticism levelled at the RBV (Eisenhardt & Martin, 2000; Priem & Butler, 2001). Whereas the RBV emphasizes resources collection, the DC perspective highlights resource renewal (Eisenhardt & Martin, 2000; Teece et al., 1997). In other words, the potential for long-term competitive advantage lies not only in the possession of VRIN resources but also in creating new resource configurations in response to market changes (Teece et al., 1997).

2.4.2 *The Classification of Resources, Ordinary Capabilities and Dynamic Capabilities*

When discussing the role of resources and capabilities in value creation and in achieving competitive advantage, it is worth referring to the hierarchical order of DCs and their strategic notion (Wang & Ahmed, 2007).

At the base level are *resources*. "Resources are the foundation of a firm and the basis for firm capabilities" (Whang & Ahmed, 2007, p.35). Fundamentally, resources consist of all tangible and intangible assets which are owned and/or controlled by a firm (Barney, 1991). They are also called zero-level element of the hierarchy (Zollo & Winter, 2002). Resources are necessary for a firm´s existence and can also be a source of temporary competitive advantage if they meet the VRIN criteria (Wójcik, 2015).

Above these are a layer of *ordinary capabilities* (OCs) which are standard operating, administration and governance routines or abilities that are (technically) needed for the survival of a firm (Winter, 2003). They can be thought of as best practices that can be learned and imitated, such as the Toyota Production System (Teece, 2007). OCs are (i) directed towards producing outputs, (ii) cannot change on their own or change other firm capabilities, and (iii) produce outputs that can be estimated (Tiantian & Yezhuan, 2015). "A firm's ordinary capabilities, if well honed, enable it [firm] to perform efficiently its current activities" (Teece, 2012, p. 1396), thus they are necessary for a firm to create and capture value.

Above these are a layer of *dynamic capabilities* (DCs), which are, unlike ordinary capabilities, strategic and distinctive, unique to each firm (see Table 2) (Teece, 2012). Like OCs, DCs are also a set of routines or abilities, but these are not directed toward producing outputs but rather directed towards adjusting firm´s existing OCs into new ones as needed to innovate and respond to changes in the environment (Pavlou & El Sawy, 2011). DCs are (i) directed towards changing the way outputs are produced, thus, they (ii) can change on their own or change other firm capabilities, and (iii) their

output cannot be estimated (Tiantian & Yezhuan, 2015). For instance, a firm´s resource coordination process is considered dynamic, because (i) it changes how outputs are created, (ii) it can be used to change or renew firm´s existing OCs, (iii) and the outcome of this process cannot be estimated (Tiantian & Yezhuang, 2015). OCs are abilities to produce tangible and intangible outputs, in contrast DCs are abilities to change the way outputs are produced (Winter, 2003; Zahra, Sapienza & Davidsson, 2006).“Strong dynamic capabilities are critical to success” (Teece, 2012, p. 1396). Reviewing literature reveals that most of DCs research state a direct relationship (e.g., Teece et al., 1997; Zollo & Winter, 2002), or an indirect link between firms’ DC and firm performance or competitive advantage (e.g., Zott, 2003), and only the minority of research papers proposes that DC do not necessarily lead to higher performance gains or competitive advantage (e.g., Eisenhardt & Martin, 2000; Helfat et al., 2007).

This complementary classification of resources and capabilities provides the basis for the conclusion that DCs are the highest form of capability that exists in a firm (Whang & Ahmed, 2007). Thereby lower-order elements such as OCs and resources build the foundation of DCs. It is, thus, impossible to evaluate a firm´s DCs without assessing the resources and lower-order capabilities as well. DCs are, thus, a source of competitive advantage, but not a competitive advantage on their own. They are required items (Eisenhardt & Martin, 2000) that “can be used to develop resource configurations that lead to long-term competitive advantage” (Cavusgil, Seggie & Talay, 2007, p.163). Following this view, a firm need to possess lower-order elements and DCs to create competitive returns, without DCs, the firm is, however, unlikely to sustain a competitive advantage in changing environments (Harreld, O'Reilly & Tushman, 2007).

Principles	Ordinary Capabilities (OCs)	Dynamic capabilities (DCs)
Purpose	Technical efficiency in business functions	Achieving congruence with customer needs and with technological and business opportunities
Mode of attainability	Buy or build (learning)	Build (learning)
Operating Model	Operate, administrate, and govern	Sense, seize, and transform
Key routines	Best practices	Difficult-to-imitate processes
Managerial Emphasis	Cost control	Entrepreneurial asset orchestration and leadership
Significance	Doing things right	Doing the right things
Imitability	Relatively imitable	Inimitable
Predictability of Outcomes	Predicted outcomes	Unpredicted outcomes
Result	Technical fitness (efficiency)	Evolutionary fitness (innovation)

Table 2 *Differences between Ordinary and Dynamic Capabilities* (Adapted from Teece, 2014, p. 332)

2.4.3 *The Dynamic Capability Concept and its Elements*

The literature has provided a variety of definitions on the concept of a DC (e.g., Eisenhardt & Martin, 2000; Helfat, Finkelstein, Mitchell, Peteraf, Singh, Teece & Winter, 2007; Teece, 2007;

Teece, Pisano & Shuen, 1997; Zahra et al., 2006; Zollo & Winter, 2002). Regarding its nature, DCs have been defined as *processes* or *routines* (Augier & Teece, 2009; Eisenhardt & Martin, 2000; Eriksson, 2014; Galunic & Eisenhardt, 2001), as *skills* (Helfat & Peteraf, 2015; Teece et al., 1997; Teece, 2007), but also as *abilities* or *capabilities* (e.g., Helfat et al., 2007; Teece, 2007; Winter, 2003; Zahra et al., 2006).
Despite this fragmentation, three prominent definitions have been found (Di Stefano, Peteraf & Verona, 2010).
First, Helfat et al. (2007) define DC as "the capacity of an organization to purposefully create, extend, and modify its resource base" (p.4). The ´resource base´ refers here to "tangible, intangible, and human assets (or resources) as well as capabilities which the organization owns, controls, or has access to on a preferential basis" (Helfat et al., 2007, p. 4).
Second, Eisenhardt and Martin (2000) define DCs as "processes to integrate, reconfigure, gain and release resources – to match or even create market change. Dynamic capabilities thus are the organizational and strategic routines by which firms achieve new resources configurations as market emerge, collide, split, evolve and die" (Eisenhard & Martin, 2000, p.1107).
And lastly, Teece et al. (1997) define DC as "the firm´s ability to integrate, build, and reconfigure internal and external competences to address rapidly changing environments" (p. 510).
However, due to the fact that much of the definitions published (Barret, 2010; Di Stefano et al., 2010; Zahra, Sapienza & Davidsson, 2006) can be traced back to the original definition by Teece and Pisano (1994) and Teece et al. (1997), this study builds also on their thoughts and uses the following definition:

Definition #3:

A dynamic capability is the process or skill of a firm to sense, seize and transform its resources and competences as needed to address rapidly changing environments.

DCs can be disaggregated according to Teece (2007) into high-order and lower-level capabilities. The DCs are higher-order capabilities which reconfigure and alter the lower-level capabilities, so called micro-foundations (e.g., Ambrosini & Bowman, 2009; Helfat & Winter, 2011; Pavlou & El Sawy, 2011; Winter, 2003; Zollo & Winter; 2002).

2.4.3.1 The Key Clusters of Dynamic Capabilities: Sensing, Seizing, Reconfiguring

Teece (2007) disaggregates three fundamental high-order capacities: "(1) to sense and shape opportunities and threats, (2) to seize opportunities, and (3) to maintain competitiveness through enhancing, combining, protecting, and, when necessary, reconfiguring the business enterprise´s intangible and tangible assets" (p.1319). All three capacities are linked to each other, in which the sensing capability comes first followed by the seizing and reconfiguring capacity (Helfat & Peteraf, 2009; Teece, 2007).

Sensing Capacity

The sensing capacity refers to the firm´s ability to identify and assess opportunities in the environment (such as new technologies, regulations or shifting customer needs), or as Mezger (2014) describe it as "the ability to recognize change and consequently identify commercial opportunities and threats" (p.438). The sensing capacity inherently encompasses "all processes that help an organization collect and analyze market information to learn about customers, competitors and channel members" (Wagner, Wenzel, Wagner & Koch, 2017, p.28). That it, sensing refers to three routines: market orientation (Kohli & Jaworski, 1990; Morgan, Vorhies & Mason, 2009), customer orientation (Jaworski & Kohli, 1993), and competitor orientation (Narver & Slater, 1990).

Seizing Capacity

The seizing capacity refers to the capability to mobilize resources internally and externally to address the sensed opportunities and to capture value from doing so (Teece, 2007). The seizing capacity is mostly underpinned by R&D activities (Wagner et al., 2017) and activities such as "making organisational innovations, selecting business models and product architectures, and investing in appropriate technologies"(Maijanen & Jantunen, 2016, p.139).

Reconfiguring (Transforming) Capacity

The reconfiguring capacity refers to managing change and maintaining competitiveness through reconfiguring and recombining a firm´s core and complementary resources (Teece, 2007). This capacity is "about learning new skills, developing and adopting new processes and organisational structures, and effectively applying knowledge management activities (e.g., knowledge sharing within the organisation)" (Maijanen & Jantunen, 2016, p.139)

Altogether, these three capacities are suggested to build a firm's overall DCs and all of them are according to Teece (2007) necessary for firm success, "the enterprise will need sensing, seizing, and transformational/reconfiguring capabilities to be simultaneously developed and applied for it to build and maintain competitive advantage" (p.1341). Another important point to mention is "that top management's entrepreneurial and leadership skills around sensing, seizing, and transforming are required to sustain dynamic capabilities" (Teece, 2012, p. 1398).

2.4.3.2 The Micro-foundations of Dynamic Capabilities: Sensing, Learning, Integration and Coordinating

The three clusters, sensing, seizing and reconfiguring, are undergirded by so called micro-foundations. They are lower order routine activities; firms engage in to fulfil the tasks of the higher-order capabilities (Eisenhardt & Martin, 2000). Four micro-foundations commonly described are *(1) sensing* (2) *learning, (3) integration and (4) coordinating routines* (Pavlou & El Sawy, 2001). These micro-foundations can play an essential role in developing DCs (Zahra et al., 2006).

A *sensing capability* is defined by Pavlou and El Sawy (2011) as "the ability to spot, interpret, and pursue opportunities in the environment"(p.243-244).
The three basic routines that underlie this capability are according to Pavlou and El Sawy (2011): (1) generating market intelligence (Galunic & Rodan, 1998), (2) disseminating market intelligence (Kogut & Zander, 1996), and (3) responding to market intelligence (Teece, 2007). Generating market intelligence relates to identifying customer needs (Teece, 2007), being responsive to market trends (Amit & Schoemaker, 1993), identifying market opportunities (Day, 1994), and detecting resource combinations (Galunic & Rodan, 1998). The second routine disseminating market intelligence relays to interpreting market intelligence (Kogut & Zander, 1996) and making sense of events and developments, and exploring new opportunities (Teece, 2007). And lastly, responding to market intelligence are refers to initiating plans to exploit market intelligence (D'Aveni & Gunther, 1994), and pursuing specific market segments with plans to seize the new opportunities (Teece, 2007).

A *learning capability* is the firm´s "ability to revamp existing operational capabilities with new knowledge" (Pavlou & El Sawy, 2011, p. 244). It refers fundamentally to knowledge exploration, retention, and exploitation inside and outside a firm's boundaries (Eisenhardt & Martin, 2000; Lawson & Samson, 2001; Lichtenthaler & Lichtenthaler, 2009).
The four underlying routines of the learning capability are: (1) acquiring, (2) assimilating, (3) transforming, and (4) exploiting knowledge (Zahra & George, 2002). Acquiring knowledge relates to attaining and integrating new resources from external sources (Zahra & George, 2002). Assimilating

knowledge refers to the understanding and interpretation of the new acquired knowledge (Eisenhardt & Martin, 2000; Zahra & George, 2002). Transforming knowledge regards the incorporation of the new knowledge into the firm's knowledge base (Lane, Koka & Pathak, 2006). And last, exploiting knowledge refers to the organizational processes of managing and retaining knowledge within the firm over time (Dierickx & Cool, 1989; Garud & Nayyar, 1994).

"Integrating capability is defined as the ability to combine individual knowledge into the unit's new operational capabilities by creating a shared understanding and collective sense-making" (Pavlou & El Sawy, 2011, p.245). It thus refers to the transfer of knowledge and information in a firm (Felin & Powell, 2016; Grant, 1996; Okhuysen & Eisenhardt, 2002). It does encompass both the knowledge transfer within the firm (between departments) and between the firm and its external partners.
The three underlying routines of the integrating capability are: (1) sharing individual input within the business unit (Okhuysen & Eisenhardt, 2002), (2) illustrating individual and group knowledge (Crowston & Kammerer, 1998), and (3) integrating inputs within a business unit to execute a collective activity and improve operational capabilities (Grant, 1996; Helfat & Peteraf, 2003). Open communication and close relationships within and across firm divisions is crucial for this capability, as they facilitate the understanding and integration of different and complex knowledge (Mors, 2010).

"*Coordinating capability* is defined as the ability to orchestrate and deploy tasks, resources, and activities in the new operational capabilities" (Pavlou & El Sawy, 2001, p.246). It refers to official and informal collaboration between and within different business units (Frost & Zhou, 2005; Mudambi, Mudambi & Navarra, 2007; Schulze & Hoegl, 2008) and the management between activities and departments (Malone & Crowston, 1994), in particular between the R&D and marketing department (Verona & Ravasi, 2003).
The four underlying routines of the coordinating capability are: (1) assigning resources to tasks (Helfat & Peteraf, 2003), (2) appointing right person to right task (Eisenhardt & Brown, 1999), (3) identifying vertical and horizontal relatedness among tasks and resources (Galunic & Eisenhardt, 2001), and (4) orchestrating activities (Henderson, 1994).

2.5 Summary

This chapter shows that the BM concept is still lacking consensus on its definition and compositional elements and the literature in this domain is, thus, developing independently. Given the heterogeneous structure of the BM knowledge, there are also considerable differences in the conceptualization of the BMI construct. So far, the present paper has, however, reached an understanding as to which components exactly make up a BM and how to define a BMI in the context of this paper. Moreover, this chapter clarifies the concept of DCs as a process or skill to integrate, combine, build, reconfigure and transform organizational resources to generate changes and innovative forms of competitive advantage; and the concept of micro-foundations as distinct processes which underpin and enable the deployment of DCs.

3. CURRENT RESEARCH ON BMI WITHIN INCUMBENTS

3.1 Introduction

This chapter introduces the research area and outlines the background and rationale for the present study. In doing so, this chapter reviews the contemporary literature on BMI, identifies key research streams and subsequently outlines the main research gaps related to pursing BMI in the context of incumbents.

3.2 Business Model Innovation in the Context of Incumbents

Firms in mature industries such as pharmaceutical, construction, infrastructure or energy have been affected lately by abrupt market shifts, new technologies, or disruptive start-ups (Gilbert et al., 2012; Sabatier, Craig-Kennard & Mangematin, 2012). These developments force incumbent firms, especially in mature industries, to find new answers to increase or at least maintain profitability (Chesbrough, 2010; Sandström & Björk, 2010).
BMI has been identified to be the answer for incumbents trying to seize opportunities outside their core operating space (e.g., Johnson, 2010; Pohle & Chapman, 2006). BMI offers a way to differentiate a firm from their competitors in particular when there is no change anymore to compete based on products or services (Chesbrough, 2010; Johnson, 2010; Matzler, Bailom, Friedrich von den Eichen & Kohler, 2013). In fact, it is the novelty presented by a new innovative BM that can shake whole industries (Demil & Lecocq, 2010; Steenkamp & Arnoldi-Van der Walt, 2004) and result in superior value creation (Amit & Zott, 2001; Morris et al., 2005).
Even though of crucial importance for incumbents only a few studies per se address BMI in the specific context of incumbents firms (e.g., Arend, 2013; Ghezzi et al., 2015; Mezger, 2014; Sanchez & Ricart, 2010). This stream of literature examined incumbent firms pursuing BMI in the airline (Casadesus-Masanell & Ricart, 2011), manufacturing (Chesbrough & Rosenbloom, 2002), retailing (e.g., Sorescu et al., 2011; Sosna et al., 2010), newspaper (Gilbert et al., 2012), telecommunication (Ghezzi et al., 2015); and insurance industry (Desyllas & Sako, 2013).
Analysis of these studies reveals four important research streams relevant for the present study: (1) the first stream studies the organizational performance consequences of BMI (Giesen, Berman, Bell & Blitz, 2007; Kim & Min, 2015; Visnjic, Wiengarten & Neely, 2016), the (2) second strand of research clarifies the nature of the BMI process (e.g., Hienerth, Keinz & Lettl, 2011; Sorescu et al., 2011; Sosna et al., 2010), the (3) third strand of research examines the challenges related to managing BMI (Moingeon & Lehmann-Ortega, 2010); and the (4) fourth strand of research explores specific capabilities supporting managers in pursuing BMI (e.g., Casadesus-Masanell & Ricart, 2011; Desyllas & Sako, 2013; Gilbert et al., 2012; Johnson et al., 2008; Markides & Charitou, 2004; Markides & Oyon, 2010). Each literature stream has, however, also limitations that are examined as follows.

3.2.1 *Research Stream 1: Impact of BMI on Organizational Success*

The first research stream studies the organizational performance consequences of BMI. While the majority of research indicates that BMI is vital for organizational success (Bucherer et al., 2012; Lambert & Davidson, 2013; Taran et al., 2015) and creates competitive advantage (Johnson et al., 2008; Zott & Amit, 2007), research does not actually grasp this effect (Aspara, Hietanen & Tikkanen, 2010; Chesbrough & Rosenbloom, 2002). In fact, this line of research is still at an infant stage. Empirical research studies "focusing on the effects of business model innovation are still rare" (Schneider & Spieth, 2013, p. 14) and have fundamentally lagged behind. Nevertheless, the few

studies that have investigated this relationship in the context of incumbents have found positive performance effects. For instance, Visnjic et al. (2016) examined the impact of service BMIs on the performance of incumbent firms in the manufacturing industry. The study shows that service BMI efforts can generate long-term performance benefits with short-term performance losses. As such, this "study suggests that firms need to look beyond the evidence on short-term effects in order to achieve superior performance in the long run" (Visnjic et al., 2016, p.7). Moreover, Kim and Min (2015) found that 56 incumbent retailers can enhance their performance by adding a new BM when complementary assets are exploited and conflicting assets are managed by autonomous business units.

3.2.2 *Research Stream 2: The Nature of the BMI Process*

The second strand of research examines the nature of the BMI process (Foss & Saebi, 2017; Schneider & Spieth, 2013; Wirtz et al., 2016). This research stream is widely-dispersed and varies on a range of dimensions.

First, the research studies differ according to the structure of the identified BMI processes. Whereas earlier work has followed a static and linear structure of the BMI process (Johnson, Christensen & Kagermann, 2008; Zott & Amit, 2007, 2008, 2010), more recent studies view the process as dynamic and recursive (e.g., Chesbrough, 2010; Bourreau et al., 2012; Bucherer et al., 2012). The literature following the later view points out that firms are permanently influenced by internal and external forces, and consequently need to adopt frequently (Demil & Lecocq, 2010; Visnjic & Neely, 2011). As such, this process is described as an evolutionary process, as an ongoing learning cycle through double-lop (Moingeon & Lehmann-Ortega, 2010) and trial-and-error learning (Chesbrough, 2010; Dmitriev, Simmons, Truong, Palmer & Schneckenberg, 2014; McGrath, 2010; Sosna et al., 2010).

Second, the number of process phases differs between studies. The number fluctuates between three and ten. Sosna et al. (2010) divide the process according to three phases (experimentation, evaluation and adaptation). Lindgardt, Reeves, Stalk & Deimler (2009) also uses three process phases, namely uncover opportunities, implement new business model, and build platform and skills. In contrast, the process of Amit and Zott (2012) proposes seven process phases, and the BMI process of Pramataris, Papakyriakopoulos, Lekakos and Mylonopoulos (2001) consists of even ten process phases.

Third, research studies differ according to which process phase they focus on, with the majority concentrating on the design phase of a new BM, and the minority on the remaining BMI process phases. There is a lack of scientific evidence and guidance concerning the end-to-end phases of the BMI process, from early conceptualization to implementation (e.g., Chatterjee, 2013; Koen et al., 2011; Osterwalder & Pigneur, 2010). Particularly the shift between the exploration and exploitation stage is still poorly mapped out (De Reuver et al., 2013).

Fourth, studies differ according to the underlying organizational and managerial activities. Sosna et al. (2010) and Enkel and Mezger´s (2013) argue that the BMI process is an initial experiment followed by constant fine-tuning based on trial-and-error planning. In a similar vein, Chesbrough (2010) argues that firms have to develop three processes: experimentation, effectuation, and organizational leadership in order to discover a new BM. In contrast, some other authors do not view such an approach as necessary for the success of BMI (Bourreau, Gensollen & Moreau, 2012). Drawing back to the processes of Sosna et al. (2010) and Enkel and Mezger (2013), both approaches require significant external support, in terms of partnering and customer involvement, in order to tackle the challenges appearing when conducting BMI. Bock et al. (2012), however, advise firms to restrain their partnering.

It is, thus, increasingly noticeable that the publications in literature are subject to arbitrariness. Despite, the heterogeneity, it is, however, possible to identify one common theme among scholars. The vast majority of scholars describe the BMI process with two broad phases: On the one hand, there is the *development phase* of a new BM and on the other hand, there is the *modification phase* of the existing BM. The first phase refers to the procedure of how a new BM is created, and the modification phase describes the procedure of how the viable BM is integrated into the existing firm. Overall, incumbents need to be concerned with both phases (Bucherer et al., 2012, Gilbert et al, 2012).

3.2.3 *Research Stream 3: Challenges Related to Managing BMI*

The third research stream clarifies the substantial challenges and barriers that incumbent firms face while pursuing BMI (Pauwels & Weiss, 2008). Incumbents have to develop a new BM parallel to an existing one (Mezger, 2014) or replace an existing BM with a new one. As such incumbent firms face not only the challenge to develop new assets, but also, face the challenge to leverage and renew their existing capabilities and resources in a new changing environment (McGrath, 2010). Transferring and adjusting resources between BMs, can lead to serious trade-offs in the firm (Chesbrough, 2010).

Previous academic research has identified two main challenges related to the management of the BMI process in the context of incumbents: (1) the restraining effect of the prevailing BM (Bucherer et al., 2012; Chesbrough & Rosenbloom, 2002; Gilbert et al., 2012; Tripsas & Gavetti, 2000), and (2) the inability of the firm to realign the resources that support the prevailing model (Kim & Min, 2015; Markides & Charitou, 2004). These two challenges are also labelled as the dominant logic trap (Prahalad & Bettis, 1986) and the identity trap (Bouchikhi & Kimberly, 2003).

Besides these two main challenges, managers from incumbent firms can face a range of other challenges. Most commonly, managers lack an understanding of the concept itself and are easily intimidated by the idea to identify radical new BMs (Chesbrough, 2010). In fact, it has been frequently argued that the lack of appropriate management concepts supporting managers in pursing BMI (Bock et al., 2012; Gassmann et al., 2013; Kim & Min, 2015), and the absence of creativity, experimentation and iteration (Eppler et al., 2011) are some factors which suppress incumbent firms´ capacity to pursue BMI.

3.2.4 *Research Stream 4: Prerequisites of Conducting BMI*

The fourth research stream emphasizes specific firm capabilities, processes and tactics required to overcome the previous mentioned barriers and to enable a firm to conduct BMI (e.g., Desyllas & Sako, 2013; Kim & Min, 2015; Plé, Lecocq & Angot, 2010)

Six strategies are suggested that could help to overcome the barriers. In fact, scholars suggest, that incumbents need to: (1) emphasis on separation or integration of individual activities instead of the overall BM (Markides & Oyon, 2010); (2) use intellectual property rights in the short term and develop specific complementary assets in the long term to sustain competitive advantage (Desyllas & Sako, 2013; Hienerth et al., 2011); (3) allow external collaboration and partnerships within the BM development phase (Giesen et al., 2007; Hienerth et al., 2011; Plé et al., 2010); (4) trigger virtuous cycles that expand both value creation and value capture (Casadesus-Masanell & Ricart, 2011); (5) emphasize on BMI as well as on replication (Aspara et al., 2010); and (6) manage conflicting assets by setting up autonomous business units for the new BM (Kim & Min, 2015).

3.3 Concluding Research Gaps

The innovation of BMs – ostensibly, a new source of future competitive advantage that is found to positively influence the performance and competitive advantage of incumbent firms in mature markets (e.g., Kim & Min, 2015; Visnjic et al., 2016) – is less well understood (Demil et al., 2015). After several years of demanding BMI research, there are still more questions than answers regarding the overall BMI concept (Bucherer et al., 2012; Foss & Saebi, 2017), especially in the context of incumbents in mature industries (Ghezzi et al., 2015; Kim & Min, 2015; Sanchez & Ricart, 2010).
While there has been definite progress in research on BMI by incumbents, this literature review reveals a set of deficiencies that need to be addressed.
Empirical research on BMI is rare. The extensive focus on start-ups and e-businesses left an important gap regarding incumbent firms from mature industries outside of the e-business sector (Bucherer et al., 2012; Kim & Min, 2015).
Existing research studies focus almost entirely on the design phase of a new BM without providing sufficient clarity about the remaining BMI process phases. There is hardly any research generating an understanding of the end-to-end phases of the BMI process, from early design to implementation (e.g., Chatterjee, 2013; Koen et al., 2011; Osterwalder & Pigneur, 2010).
In addition, to this knowledge gap on the BMI process phases and the industry sector; uncertainty exists about the role that the micro-foundations of DCs play in the process of BMI. The extant research on firm capabilities fails to clarify the micro-foundations of DCs that enable its evolution (e.g., Bucherer et al., 2012; De Reuver et al., 2013; Kim & Min, 2015; Koen et al., 2011).
Consequently, there is a lack of understanding how a BMI process unfolds in incumbents and what is needed to achieve such a change (Bock et al., 2012; Wirtz et al., 2010). Underlying guiding frameworks and solid concepts about how the BMI process can be organized in order to remain competitive and survive in changing environments are, thus, highly requested and needed (Bock et al., 2012; Bucherer et al., 2012; Dmitriev et al., 2014; Kim & Min, 2015; Lüttgens & Montemari, 2016; Martins, Rindova & Greenbaum, 2015; Schneider & Spieth, 2014; Zott et al., 2011).

3.4 Summary

The analysis of literature that was presented in this chapter shows that research on BMI in particular in the context of incumbent firms is still at an infant stage. Despite the various attempts there are several research gaps, but also possibilities for future research. Further research on the process of BMI in particular, how a BMI process unfolds and what contributes to or inhibits its success, could shed more light on this controversy, and contribute to clarifying the specific trade-offs and challenges for incumbents in conducting BMI.

4. THEORETICAL BACKGROUND

4.1 Introduction

The following chapter describes the theoretical foundation of this study by integrated the DC perspective into the field of BMI. By investigating the relation between DCs and the process of BMI, this chapter contributes to establish a better understanding of these interrelations, leading to the development of a conceptual model to be tested, refined, and validated in the following research step.

4.2 The Strong Link between Business Model Innovation and Dynamic Capabilities

The DC perspective attempts to explain the processes through which a firm develops in changing environments and maintains a competitive advantage (Priem & Butler, 2001). A DC can be defined as "the firm's ability to integrate, build and reconfigure internal and external competences to address rapidly changing environments" (Teece et al., 1997, p.516). They further can be disaggregated into three groups of activities or processes: 1) identification and assessment of an opportunity (sensing), 2) mobilization of resources to address an opportunity and to capture value from doing so (seizing), and 3) continued renewal (managing threats and transformation) (Teece, 2012).
This definition and conceptualization is built around many of the underpinning strategic conditions, which form the basis of BMI (Heaton, Linden & Teece, 2014).

First, the definition of DCs claims that the possession of the sensing, seizing and reconfiguring clusters will lead to competitive advantage. The majority of BMI research, in comparison, also links BMI with organizational success (Bucherer et al., 2012; Lambert & Davidson, 2013; Taran et al., 2015) and with competitive advantage (Johnson et al., 2008; Zott & Amit, 2007).

Second, the DC conceptualization claims that the end goal is the reconfiguration of internal and external competences (Teece, 2012). According to Zott and Amit (2010), a BMI can occur by changing the content (i.e. the nature of the components/activities), the structure (i.e. linkages and sequencing of components/activities) and/or the governance (the control/responsibility over a component/activity) of an extant BM. And thus, its end result is also referred to as a reconfiguration (e.g., Bucherer et al., 2012; Sosna, Trevinyo-Rodríguez & Velamuri, 2010).

Third, the sensing, seizing, and reconfiguring ability clusters that constitute the DC concept are similar to entrepreneurial activities within the BMI process (e.g., DeTienne & Chandler, 2004; Heaton et al., 2014; Leih et al., 2015; Shane & Venkataraman, 2003). In fact, each "of the three clusters is tied to business model innovation, development, and implementation" (Heaton et al., 2014, p. 8). For instance, Mezger (2014) defines the process of BMI as follows: "(1) identification of opportunities for new business models, (2) design of a new business model to address such an opportunity, and (3) implementation of the new business model" (p.438). These three process steps are similar with the sensing, seizing and reconfiguring capabilities. Mezger (2014) further explains referring to the sensing and sizing capability "moving back and forth between sensing and seizing servers a means for learning and systematically aligning new business model with underlying opportunities, needs and requirements" (p.441). This explains that the two concepts of DCs and BMI are not only fundamentally intertwined but are identical. Even further, several researcher view the BMI itself as a key output of the three activity cluster sensing, seizing, and reconfiguring (Agarwal & Helfat, 2009; Andries & Debackere, 2006; Augier & Teece, 2009; Chesbrough, 2010; Harreld et al., 2007; Subramanian, Chai & Mu, 2011; Teece, 2007, 2009, 2010).

4.3 Operationalization of Dynamic Capabilities and its Underlying Micro-foundations

Following the view of the preceding subsection, a BMI process can be conceived as a DC. This allows for insights from the DC literature, in particular its operationalization, to be applied to the study of the process of BMI (Heaton et al., 2014). Several publications have, however, pointed towards problems regarding its operationalization due to the definition of the term and its key unit of analysis (e.g., Abell, Felin & Foss, 2008; Eriksson, 2014; Felin & Foss, 2005; Priem & Butler, 2001; Wang & Ahmed, 2007).

The first challenge facing the operationalization of DC addresses the elusive nature of DCs. In spite of the significant contributions and improvements of the DC construct, a unique definition of this concept has not been reached yet (Ambrosini & Bowman, 2009; Barreto, 2010). This may be due to the fact that the definition and key concepts defined by Teece et al. (1997) appear elusive and thus allows further refinement and reinterpretation. For instance, Teece et al. (1997) define DCs as "the firm's ability to integrate, build, and reconfigure internal and external competences to address rapidly changing environments" (p. 516). Eisenhardt and Martin (2000) in contrast define DCs as a process to address or initiate a market change. Further, Zahra and George (2002) define DC neither as a firm's ability nor as processes but as a capability. As such, the applications of DCs differ. DCs can be understood as specific routines (Winter, 2003; Zollo & Winter, 2002), processes (Eisenhardt & Martin, 2000) or rules (Eisenhardt & Sull, 2001) and, in addition, vary significantly in terms of their main structural elements (e.g., content, role, creation and context) (Barreto, 2010).

Another challenge facing the operationalization of DCs may be grounded in the level of analysis. DCs have been predominantly considered in abstractions at macro level (Barreto, 2010; Helfat & Peteraf, 2009; Priem & Butler, 2001). That is, much of the DC literature neglects to analyse the micro aspects of DCs, and thus neglects to define in detail what DCs are, what they consist of and how they can be developed (Felin & Foss, 2005, 2009; Gavetti & Levinthal, 2000). Barney and Felin (2013) recently concluded that "further understanding of organizational capability and heterogeneity ought to rest on questions of micro-foundations: how capabilities are built" (p.149). Some researchers have attempted to address the issue of micro-foundations, although with limited success because they propose only a general description of the micro-foundations rather than specific clarifications and descriptions on the origins of DC (Eisenhardt, Furr & Bingham, 2010; Teece, 2007; Wallin, 2009).

And lastly following the preceding line of argument, many authors consider only the individual or firm level as appropriate when investigating DCs. However, there is a growing body of literature that rejects this narrow representation of DCs, and suggests addressing individual and firm phenomena alike (Abell et al., 2008; Barney & Felin, 2013; Felin & Foss, 2005; Hodgson, 2012; Pavlou & El Sawy, 2011). For instance, a key statement of these authors is that firms are made up of individuals and there is no firm without individuals (Felin & Foss, 2005).

According to these considerations, it becomes obvious that there are still numerous unsettled perplexities faced by researcher in dealing with the concept of DCs and micro-foundations (Barreto, 2010; Zahra et al., 2006).

There are, however, some studies that offer an operational solution. These studies "are based on managers' views and evaluations concerning how well their firm performs particular tasks or how good their firm's ability in given tasks is, either relative to competitors or in an absolute sense" (Laaksonen & Peltoniemi, 2018, p.190). For instance Laaksonen and Peltoniemi (2018) give the example that "Bhattacharya et al. (2005) studied the dynamic capabilities of 'employee skill flexibility' and 'employee behaviour flexibility' through asking managers for their views on the extent to which their firm's employees can be utilized in many types of jobs" (p.193).

Furthermore, referring to micro-foundations, the majority of studies reviewed measured micro-foundations by their quantity (Arthurs & Busenitz, 2006; Bernroider, Wong & Lai, 2014; King & Tucci, 2002). These studies look at whether a firm possesses a particular micro-foundation (Laaksonen & Peltoniemi, 2018). Other studies go even further and look not only at whether a firm deploys a particular micro-foundation ((1) determine its existence) (Doving & Gooderham; 2008), but also asked questions that aim to tap into the ´quality´ and ´role´ of these micro-foundations ((2) determine its role and quality) (Arend, 2014). Most of the variables used in the studies are in line with the definitions of Teece et al. (1997) and Teece (2007) as outlined in Chapter 2.4.3.2.

4.4 Dynamic Capabilities - A Theoretical Framework for Business Model Innovation

Although the conceptualization of DCs and its underlying micro-foundation may seem abstract, a few research studies describe them as a set of identifiable and specific routines (Eisenhardt & Martin, 2000). In fact, to isolate the main routines that underpin DCs and empirically measure them, past empirical studies have relied on the definitions of Teece et al. (1997) (sensing, learning, integrating, and coordinating), and Teece (2007) (sensing the environment to seize opportunities and reconfigure assets). Following the approach described above, existing literature suggests that DCs can be disregarded into higher-order and second-order DCs.

*High-order Description of DCs**:***

At the base level are three assets orchestration processes *sensing*, *seizing* and *reconfiguring* (Teece, 2007). Whereas *sensing* refers to the identification and assessment of opportunities or threats; *seizing* to the mobilization of resources internally and externally to address opportunities and to capture value from doing so; and *transforming* to the continued reconfiguration of the firm (Teece, 2007; Teece, 2014). This disaggregation of DCs can also be used to characterize the BMI process - its sensing, seizing, and reconfiguring steps are geared towards the three phases: (1) identification of opportunities for new BMs (sensing), (2) designing a new BM to address such an opportunity (seizing), and (3) implementing the new BM (reconfiguring) (Mezger, 2014).
Following this view, the operationalization of the high-order DCs are based on the interview participants views and evaluations concerning how (well) their firm perform the sensing, seizing and reconfiguring.

Second-order Description of DCs:

Under the capacities sensing, seizing and reconfiguring, there is layer of micro-foundations, which enable the development of the high-order categories (Dosi, Nelson & Winter, 2000; Eisenhardt & Martin, 2000). In this present paper, micro-foundations are presented as a set of four micro-foundations routines: *sensing*, *learning*, *integrating*, and *coordinating capability* (Teece et al., 1997; Teece, 2007; Pavlou & El Sawy, 2011). These four micro-foundations have been subject of research in their own by Pavlou and El Sawy (2011).
Following this view, the present paper determines first whether the case firm has the particular micro-foundation identified by Pavlou and El Sawy (2001), and then taps into the ‘quality’ and ´role´ assessment of these micro-foundations (see Chapter 5.3.3).

This disaggregation of high-order and second-order DCs will be applied in this thesis due to its valuable practical implications and due to the fact that it is consistent with other research (e.g. Marsh & Stock, 2006; Verona & Ravasi, 2003).

Figure 3 presents both the high order DCs and their corresponding second-order micro-foundations.

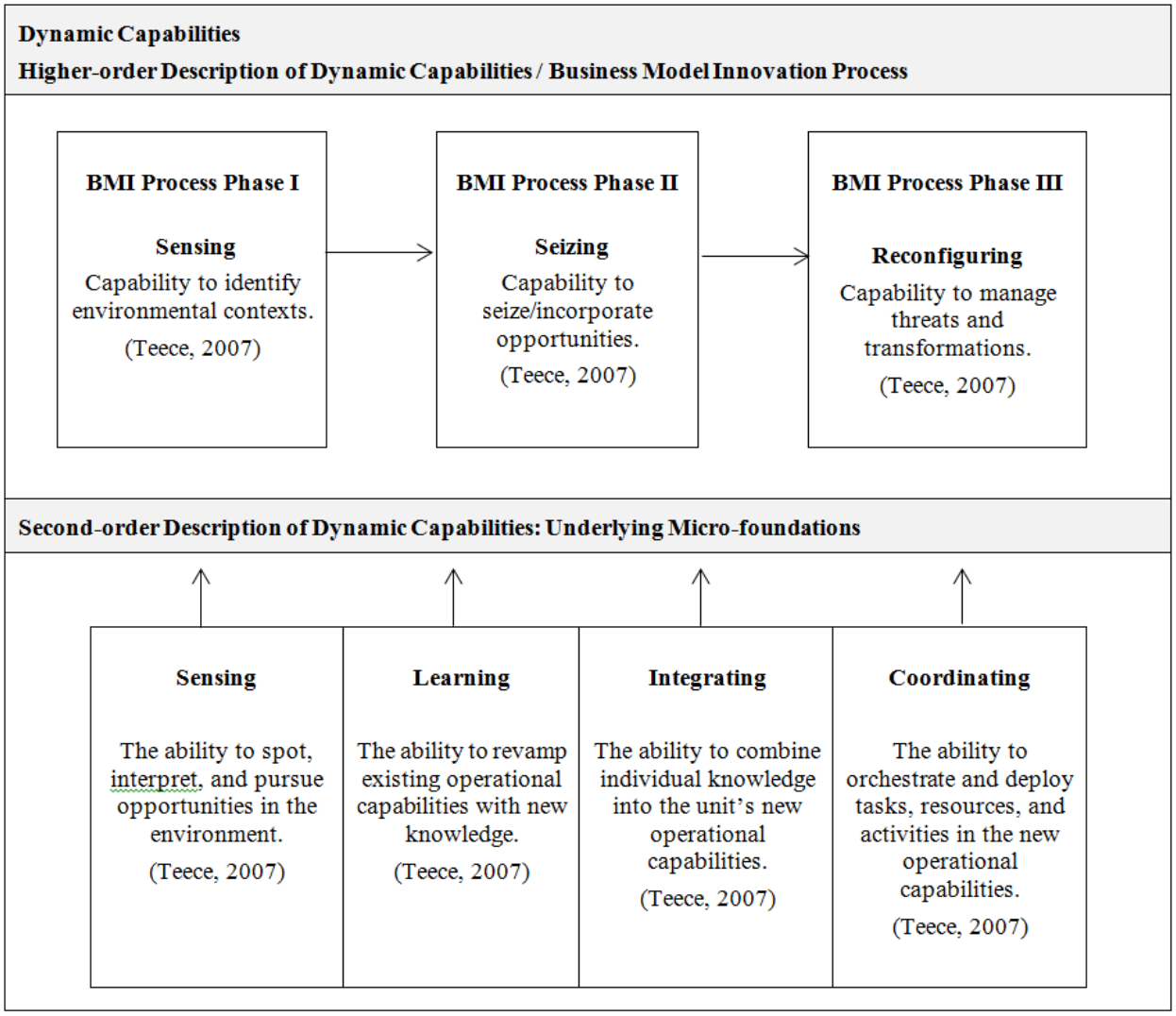

Figure 3 *Dynamic Capabilities / Business Model Innovation Process and its Underlying Micro-foundations* (Adapted from Teece, 2014 and Pavlou & El Sawy, 2011)

4.5 Summary

This chapter integrated the DC construct into the field of BMI and proposed a conceptual model consists of two-order propositions that helps executives as well as researchers gain new insights into the realm of the BMI process.

5. METHODOLOGY

5.1 Introduction

This chapter gives an outline of research methods used in this paper. The research design that was chosen for the purpose of this study is first clarified before the subsection discusses the methods used to collect and analyse the data and how the credibility, transferability, dependability, and confirmability of the data is ensured.

5.2 Research Strategy, Design & Course of Research

The emergent BMI literature has generally focused on the mechanism through which high-tech and newly founded firms profit from radical new BMs, leaving incumbent firms outside of the high-tech realm widely unexplored (Bucherer et al., 2012; Kim & Min, 2015). There is a lack of understanding how a BMI process unfolds in incumbents and what capabilities are needed to achieve such a change (Bock et al., 2012; Wirtz et al., 2010). Underlying guiding frameworks and solid concepts about how the BMI process unfolds and what contributes to its success are highly requested and needed (Bock et al., 2012; Dmitriev et al., 2014; Kim & Min, 2015; Lüttgens & Montemari, 2016).
It is against this backdrop that this study aims to develop a methodological approach of BMI which serves academic researcher and business practitioners alike. Bridging the gap between academia and practitioners, and developing a method, seems to be best approached qualitatively following the realism principle. The qualitative research allows addressing the complexity of BMs and BMI in its context (Eriksson & Kovalainen, 2008). It is also suitable if a holistic in-depth investigation is needed (Feagin, Orum & Sjoberg, 1991) and if new relationships, abstract concepts and operational definitions need to be examined (Bettis, 1991).This suits well with the aim of this research paper to achieve a deeper understanding of the process of BMI in the context of incumbents from mature industries and to explore the micro-foundations and their role in facilitating this process. Following this view, the methodological orientation of this study is inductive and explorative in nature.
The inductive case study approach allows developing theory even in case of former lack of understanding and theorization about a phenomenon (Eisenhardt, 1989). Due to the fact that the current knowledge on the BMI process within incumbents is quite limited and there is no consensus on the conceptualization of micro-foundations, this seems to be an appropriate choice of methodology for this study. Moreover case study research can have among others exploratory and explanatory applications (Voss, Tsikriktsis & Frohlich, 2002; Yin, 1994). This approach thus fits with the aim of this study: first exploring how the process of BMI unfold in in incumbent firms from mature industries, and second explaining what role the micro-foundations of dynamic capabilities play within this process.
Consistent with the exploratory nature of this study and with the inductive case study approach, multiple case studies have been conducted. A multiple case study approach helps to gain a comprehensive view on the research phenomenon and to assess inter-and intra-case comparison. This approach allows studying complex social phenomena such as BMI is one (Eisenhardt, 1989).
The case studies were retrospectives, rather than real-time longitudinal.
As Bryman and Bell (2007) suggest, the interview is the most employed method in qualitative research and therefore was chosen to accomplish the goal of collecting empirical data in this research study. In fact, semi-structured interviews were chosen as they are considered to be the most appropriate technique in accomplishing the particular research goals. This approach provides the inquirer also with a degree of structure, as they outline the main topics to be covered, but at the same time allows a degree of flexibility in adjusting the questions according to the direction of the particular interview (Bryman & Bell, 2007; Eisenhardt, 1989).

The research design is organized as follows. The theoretical foundation is first developed, based on two qualitative case studies. A multiple case study approach seems to be suitable to gather insight on the BMI processes, especially to get a broader understanding on how incumbent firms pursue a BMI process. This is particular important to counterbalance the dominance of BMI publication on new and high-tech firms. The information gathered both from the academic review and from the practical part is then used inductively in order to identify prevalent characteristics of the BMI process in incumbent firms from mature industries and subsequently strive to generate new theory that can be applied by managers to pursue BMI.

5.3 Case Study Research

In order to build on the theoretical foundation and to develop an understanding of BMI among practitioners, a multiple case study has been applied.

5.3.1 *Empirical Setting*

Previous research on BMI has mainly focused on entrepreneurial firms. The process of BMI in incumbent firms in mature industries has been widely neglected. This research addresses this gap and suggests the waste management industry as research setting.
The German waste management sector seems to be an appropriate choice for this research study for several reasons. First, the industry is an established one and thus satisfies the need for research outside of new ventures. Second, the worldwide demand for recycling and waste management technologies is high and will continue to rise. In addition to the increasing demand, this sector has undergone rapid technological development over the last 10 years. Smart logistics through data analytics and sensor networks signify some degree of disruption in this industry. Moreover, this sector has been subject of extensive legislative changes at regional, national and european level. With the drive towards a circular economy these policies and regulations contain legally binding waste management activities. Consequently, this industry offers room for multiple new BMs and increasing opportunities and incentive for firms to innovate their BM. As such, this industry fulfils many desirable characteristics to this research study.

5.3.2 *Sample*

In total two case studies undertaken by two incumbent firms from mature industries provide the empirical basis of this study. The firms have been selected by a non-probability sampling method – convenience sampling. The main criteria for choosing these firms were: Firms had to (1) be well established, (2) operate in mature industries, (3) performed a BMI.

Firm Alpha operates in many fields of business: wastewater management, waste management, recycling and logistics services. In this present study, we focus on the waste management business sector. Alpha operates nine waste combustion facilities in Germany in which the firm converts waste into electricity and heat for industrial processing and for district heating systems.

Firm Beta is also engaged in waste management and renewable energy production. Beta, however, uses biogas to generate energy. The biogas at firm Beta is produced from the anaerobic digestion of the biogenic contents in waste and then transformed into electricity and gas. Beta runs five anaerobic digestion power plants in Germany.

5.3.3 *Operationalization of Key Constructs*

As clarified earlier in the literature review, the key concepts of this research paper in themselves have many meanings and interpretations. To solve this problem, this subsection provides clarity about the specific interpretation of them. To more clearly articulate how the key constructs are measured, each subsection begins with an introduction to the concepts and conceptualization prior to discussing operationalization.

Business Model

A BM can be viewed as *the logic of how a firm creates, delivers and captures value* (Osterwalder & Pigneur, 2010). This paper draws on the Business Model Canvas proposed by Osterwalder and Pigneur (2010). The BMC from Osterwalder and Pigneur (2010) has achieved tremendous popularity and has been by now widely applied both in academia (Ghezzi, Cortimiglia & Frank, 2015) and in practice (Gassmann et al., 2013). The wide adoption and use of Osterwalder and Pigneur's (2010) BMC, suggests it is valuable to be used in the present study. Following this view, the traditional BM as well as the new BM of each case firm will be described and illustrated by using the BMC including the nine components: value proposition, key partners, key activities, key resources, customer relations, channels, customers, costs and revenues.

Dynamic Capabilities / BMI Process Phases

Based on the work by Teece et al. (1997) and Teece (2007), DCs can be conceived of as an evolutionary process of a firm *to sense, seize and transform its resources and competences as needed to address rapidly changing environments*. Based on this, three characteristics of DC stand out that explain the process: the sensing, seizing and reconfiguring capacity. Sensing refers to identification and assessment of an opportunity or threat; seizing refers to mobilization of resources to address the opportunity or threat and to capture value from doing so, and reconfiguring refers to the continued reconfiguration (Teece, 2007). Performance of these activities draws, however, also on the skills and disciplines used by managers in the process of changing an existing BM (Teece, 2012). Following this view and the detail explanation in Chapter 4, a BMI process can be conceives as a DC. This allows for insights from the DC literature to be applied to the study of the process of BMI. Consequently, in order to shed lights on the process of BMI, three phases are identified, each of them resting on a particular set of activities:

Sensing

Sensing is defined as a firm process and managerial activities conducted inside a firm to identify, experiment with and exploiting new opportunities in the environment (Teece, 2014).

To operationalize the sensing capacity, this paper built on existing scales by Danneels (2008), Jantunen (2005) and Wilden, Gudergan, Nielsen and Lings (2013). Due to their quantitative nature of research, their items could not be used reused directly and had to be adapted to the aspect of this qualitative research.

Seizing

Seizing is defined as a firm process conducted inside a firm to mobilize resources to address opportunities and capture value from it (Teece, 2014).

To operationalize the seizing capacity, this paper could not build on existing scales because studies who measured the seizing capacity according to Teece´s (2007) definition, used measurements but did not report them (Nedzinskas, Pundzienė, Buožiūtė-Rafanavičienė & Pilkienė, 2013). Questions were thus generated based on the definition and underlying activities identified in the literature.

Reconfiguring (Transforming)
As outlined above, reconfiguring capacity is defined as firm process and managerial activities conducted inside a firm to achieve the required internal and external transformation (Teece, 2014). Second, reconfiguring requires governance, knowledge management, the management of co-specialization, and integration and coordination skills (Teece, 2007).
To operationalize the transforming capacity, this paper built on existing scales by Wilden and Gudergan (2015). Due to the reason that they measured for frequency of activities, the items were adapted to the aspect of this research.

Micro-foundations

Micro-foundations refer to managerial or organizational mechanisms, or micro-activities that underpin and enable the deployment of DCs, the higher-order category (Dosi et al., 2000). As such, there are lower order routine activities, firms engaged in to fulfil the tasks of sensing, seizing and reconfiguring (Eisenhardt & Martin, 2000).
It is a complex phenomenon to research and operationalize, but the underlying routines and practices are identifiable and have been empirically researched before (Eisenhardt & Martin, 2000). A particular important step towards a conceptualisation of the DC construct has been done by Pavlou and El Sawy (2011). They present a generic framework and a set of identifiable and specific micro-foundations. Based on the work by Teece et al. (1997) and Teece (2007), Pavlou and El Sawy (2011) distinguish four related but distinct types of micro-foundations, namely (i) sensing, defined as "the ability to spot, interpret, and pursue opportunities in the environment" (Pavlou & El Sawy, 2011, p. 243), (ii) learning, which refers to the "ability to revamp existing operational capabilities with new knowledge" (Pavlou & El Sawy, 2011, p. 244), (iii) integrating, relating to the "ability to embed new knowledge into the new operational capabilities by creating a shared understanding and collective sense-making" (Pavlou & El Sawy, 2011, p. 245), and (iv) coordinating, describing the "ability to orchestrate and deploy tasks, resources, and activities in the new operational capabilities" (Pavlou & El Sawy, 2011, p. 246). Even though their study was quantitative in nature and focused on the intensity of the outcomes of sensing, learning, integrating, coordinating; the questions were reformulated to suite this thesis.

Sensing was measured on the firm´s ability to screen and evaluate new business opportunities in the environment. Participants were asked to describe how their firm systematic find and recognize new business opportunities, participants were also asked to specify the methods used to evaluate the identified business opportunities. Moreover, participants were asked for their view on the extent to which the identified sensing activities were utilized in the process of BMI and they were asked to rate their importance for the overall success of the BMI process.

Learning was measured on the firm´s ability to create, diffuse and utilize knowledge throughout the firm. Participants were asked to describe the formal and informal systems that were in place to share information and assist knowledge transfer across the firm's units; and participants were asked for their view on the extent to which learning activities were utilized in the process of BMI and how the participants would rate the importance of learning activities for the overall success of the BMI process..

Integrating was measured by the firm's ability to combine individual knowledge to the collective level. Participants were asked to describe the relationships between central and peripheral firm members as well as between different firm members and departments in general. Participants were also asked to specify how central and peripheral collaboration throughout the firm occurred during the BMI process. And lastly, participants were asked for their view on the extent to which the identified integrating activities can be utilized in the process of BMI and they were asked to rate their importance for the overall success of the BMI process.

Coordinating was measured by the firm´s ability to orchestrate and deploy tasks and resources during the BMI process. Participants were asked how they experienced consultation in the firm and how tasks and resources were coordinated and synchronized among firm members and across departments. Lastly, participants were asked for their view on the extent to which the identified coordinating activities were utilized in the process of BMI and they were asked to rate their firm's coordinating activities for the overall success of the BMI process.

The understanding of these three key concepts is thus, derived primarily from interview data, and in particular based on the responses of the participants and their perceptions of the presence of the concepts in their workplace during the BMI process.

5.3.4 *Data Collection, Consistency and Trustworthiness*

The data collection was based on both desk and field research. The desk research included gathering information through websites and articles, as well as through public and internal documents received from the two firms, such as annual reports, financial reports and meeting protocols. The field research was carried out through in-depth interviews per case firm. The interviews were conducted with people in various positions within the case firm. Interview partners of both companies are listed below (Table 3, Table 4).

Participant	Corporate Position	Time in position (years)
1	CEO	12
2	CTO	7
3	CBDO	6
4	CFO	3

Table 3 *Interview Participants at Firm Alpha*

Participant	Corporate Position	Time in position (years)
1	CEO & Owner	9
2	Product Manager	7
3	Operations Manager	8
4	Sales Manager	7

Table 4 *Interview Participants at Firm Beta*

Each interview was semi-structured and lasted between one and two hours. The interview questions are open-ended. All interviews were transcribed, and reviewed by the participants. To validate data interpretation and clarify open questions, several follow up interviews have been held as well. Each follow up interview lasted up to one hour. An overview of all the data sources can be found in Table 5.

	Firm Alpha	Firm Beta
# of interviews total	7	8
# of interview participants	4	4
# of number of follow-up interviews	3	4
Total interview time	780 minutes	720 minutes
# of transcribed pages	60	71
# of internal company documents	5	7
# of press releases	6	11

Table 5 *Overview of Data Sources for Firm Alpha and Firm Beta*

In order to determine the quality and stability of the data listed above, it is essential to assess the reliability, or consistency, and validity, or trustworthiness, of this data. Whereas this has been approached in quantitative research through *internal validity*, *external validity*, *reliability* and *objectivity*, qualitative research is assessed by the four analogous criteria *credibility*, *transferability*, *dependability*, and *confirmability* (Guba & Lincoln, 1982), as shown in Table 6.

Conventional terms	Quantitative criteria	Qualitative criteria
Truth value	Internal validity	Credibility
Applicability	External validity or generalizability	Transferability
Consistency	Reliability	Dependability
Neutrality	Objectivity	Confirmability

Table 6 *Quality Criteria for Quantitative and Qualitative Research Methods* (Adapted from Guba, 1981, p.80; Guba & Lincoln, 1982, p.246)

The quality of this research is discussed in light of these four evaluation criteria proposed by Lincoln and Guba (1985). This seems to be appropriate for a few reasons. First, it has been acknowledged that quality criteria developed for quantitative studies, such as *generalizability*, *validity*, *reliability* and *replicability* cannot be applied to qualitative studies (Biederman, Mick, Faraone, Spencer, Wilens & Wozniak, 2003). Second, there is no agreement between qualitative researcher as to what criteria can be used to assess qualitative research (Spencer, Ritchie, Lewis, & Dillon, 2003). And third, as the evaluation criteria proposed by Lincoln and Guba (1985) have been widely used in studies for establishing the trustworthiness of qualitative data (Miles & Huberman, 1994; Yin, 1994); it is justifiable to use these criteria in this study to assess its research quality.

Credibility

Credibility refers to the fit between the participants´ view and the inquirer understanding of them (Schwandt & Schwandt, 2001). As such, it deals with the following question: "How congruent are one´s findings with reality" (Lincoln & Guba, 1985). Credibility in this study is attempted through triangulation. Authors argue that triangulation (using several sources of data) increases the trustworthiness of qualitative results (e.g., Guba, 1981; Lincoln & Guba, 1985). As a consequence, this study makes use of several sources of data (data triangulation), and uses different informants (informant triangulation) for the interviews. The reliance on multiple participants enables cross-checking of responses and a richer data set, which enables a better understanding of the complex

phenomenon. In addition, this study gathers participants' validation (member checks) throughout the data collection and analysis phase. Member checks have the potential to verify the interpretive accuracy and to strengthen the overall trustworthiness of the findings (Leech & Onwuegbuzie, 2007; Lincoln & Guba, 1985).

Transferability

Transferability refers to the degree to which the results of qualitative research can be transferred to other contexts or settings with other participants (Bitsch, 2005; Tobin & Begley, 2004). The transferability is relative low in this study due to the small sample and the use of convenience sampling. However, Payne and Williams (2005) point out that achieving generalisation is not the primary goal of a case study, rather the interpretations of the case study and its unique features. To approach further transferability, this study, thus, makes use of "thick descriptions" (Geertz, 1973). Geertz (1973) argues that explaining a phenomenon through thick descriptions which specifies many details, conceptual structure and meaning can lead to a higher transferability. As such, by describing the BMI phenomenon in sufficient detail, enables conclusion to other settings, situations and individuals, and consequently increases the external validity of this study (Lincoln & Guba, 1985).

Confirmability

Confirmability refers to the degree to which the results of the inquiry could be confirmed by other scholars (Baxter & Eyles, 1997). As such, it is "concerned with establishing that data and interpretations of the findings are not figments of the inquirer's imagination, but are clearly derived from the data" (Tobin & Begley, 2004, p. 392). Complete objectivity is difficult to maintain, but it is attempted to ensure as far as possible that the study findings accurately portray the participants' responses, rather than the preferences of the inquirer. To reduce the effect of inquirer bias, this study, thus, uses triangulation (across participants) and presents the results of the inquiry in a way that clearly differentiates between inquirers´ statements and the inquirer interpretations.

Dependability

Dependability refers to "the stability of findings over time" (Bitsch, 2005, p. 86). In fact, if a person wants to replicate this study, she/he should have enough information within this research report to obtain similar findings. The dependability in this study is; however, relatively low, as some documents cannot be attached to this research report. This is because of sensitive information and the need for anonymity. Nevertheless, to increase the dependability of this study, this study has used peer examination. A doctoral student, who had experience with qualitative research, reviewed and examined the research process and the data analysis in order to ensure that the findings were consistent and could be replicated. The process of peer examination is acknowledged to enhance the credibility of the inquiry (Bitsch, 2005; Krefting, 1991).

5.3.1 *Data Analysis, Consistency and Trustworthiness*

Data analysis was based on common techniques for grounded theory building combined with-case analysis to cross-case comparison (Eisenhardt, 1989; Taylor & Bogdan, 1984).

Preparation

The first stage of the procedure was internalised through transcription and translation of the interviews. All interviews were translated verbatim into English. The translation was carried out straight after the interviews to ruminate any clarification. The process was carried out on Microsoft Word Office. Second, the fully transcribed interviews and presentations relevant to the case studies

were exported to the QSR nVivo9 software. The coding started with data reduction (Miles & Huberman, 1994), where only data with direct relevance to the cases was selected.

Case analysis

The within-case analysis consisted mainly of data coding and theme development. The data coding procedure was based on open coding, where codes were introduced inductively to represent characteristics of BMI activities. The emerging codes were also modified iteratively through the analysis (Eisenhardt, 1989).

The first step in the within-case analysis involved the case description. It contained the traditional BMs of the firms and the development of the new BM. Both were described according to the Business Model Canvas proposed by Osterwalder and Pigneur (2010). In the second step the inquirer reviewed the data regarding the process and micro-foundations and categorized it according to the themes that became apparent. The themes represent the different phases in the BMI process, the underlying activities and the nature and role of micro-foundations. In fact, several core constructs have been identified. The coded segments were then revised into topics. These topics were then finally refined into significant broader patterns of meaning. The preliminary analysis came up with 11 main themes, which were aggregated into eight and further reduced to five most referred to themes. The analysis for the data was based on the transcriptions of all interviews, which were further triangulated with primary and secondary data to ensure a higher dependability of results. Moreover, case reports were discussed with firm representatives before identifying patterns of the BMI process. And lastly, pier examinations were used. In fact Ishak and Bakar (2012) point out that using an alternative method to double check the data improves the quality of the findings. The subsequent cross-case analysis discovered similarities and differences among cases, and helped to refine and verify the emerging themes.

5.4 Summary

This chapter provided a detailed explanation of the research approach and strategy, including all the methodological choices, and their implications. Consistent with the explorative nature of this study and with the main objective to identify, describe and understand the nature of BMI process in incumbent firms, a case study design was considered as the appropriate research design.

6. CASE STUDIES

6.1 Introduction

This chapter provides an in-depth understanding of the two case studies, whereby each case is presented individually. Each case study is structured along the sub questions of the present paper which leaves the following outline: (1) the first subsection provides a short description of the focal firm and its competitive landscape; (2) the next subsection describes and illustrates the traditional BM as well as the new BM along the nine building blocks of the Business Model Canvas, developed by Osterwalder and Pigneur (2010); (3) the third subsection describes the overall process of BMI and then explores the process phases and underlying activities from the sensing, seizing and transforming dynamic capability cluster perspective; (4) and the final subsection is structured along the four micro-foundations (sensing, learning, integrating, and coordinating) by Pavlou and El Sawy (2011) and illustrates how these functions were performed across each case study and what kind of role they have in the process of BMI.

6.2 In-Depth Case Study I: Firm Alpha

Based on a request from the case company all firm relevant information will be anonymised. The case company is referred to as "Firm Alpha" or "Alpha". Moreover, illusory names have been given to the company´s machinery and processes.

6.2.1 *Description of Firm Alpha and its External Environment*

Firm profile

Alpha provides a comprehensive range of water management solutions but also provides services in the field of waste management and energy generation. In this study the focus is placed on the waste management services offered by firm Alpha – from collecting and processing waste to recycling and converting it. Firm Alpha recovers energy in the form of electricity and heat through the combustion of waste (municipal solid waste and industrial waste); all of which then serves industrial companies, residential areas and private households.

The core competence of the firm revolves around the technology of waste combustion. Combustion reduces the mass and the volume of waste significantly and offers a power source which is cleaner and less polluting than traditional forms of energy, such coal-fired power plants. As such, firm Alpha creates value to its end-customers by offering an ecological cost effective way of energy recovery.

Firm Processes

The method of creating energy in the form of electricity or heat by waste combustion includes several process steps, which are explained in detail in the following. The first step is the collection at the power plant of waste materials from private household and business areas (municipal and industrial solid waste). The waste is unloaded from collection trucks and placed in a waste bunker. The municipal and industrial solid waste is then mixed with household waste by a crane. This is a necessary step in order to keep the conditions during the main process as constant as possible (e.g., combustion temperature). The mixed waste is then used in the next step, the actual process of combustion. During this step, the waste is lifted into a combustion chamber to be burned. The waste is transformed into bottom ash as well as hot flue gas. The hot flue gas runs through a heat-exchanger to produce to steam, which is then used to rotate the blades of a turbine to create mechanical energy. This energy caused by the high pressured steam turbine is used to generate electricity from an

attached generator. The last step is the flue gas treatment phase. Flue gas contains pollutants such as carbon dioxide, dust and soot, as well as unburned hydrocarbons. There are harmful for the environment and thus needs to be removed through so called flue gas cleaning systems. The main components of these systems are filtering, adsorption and absorption. For maximum removal of these substances, the flue gas has to pass through these cleaning stages. At the end, harmful substances are removed from the flue gas and emission levels are partly so low that they are scarcely detectable.

Competitive Environment

The level of complexity in Alpha's market has increased substantially over the past 20 years because the field of application has widened through technological advances. As such, its focus has shifted from developing stand-alone technologies to creating integrated, high-value system solutions. Besides technological advances, the market has been hit by fragile energy demands and low wholesale power prices but also by numerous new legal regulations. In turn, this changing landscape has far-reaching implications for the competitive positions of various power generators and has increased the pressure on firm Alpha to maintain its market position.

6.2.2 *Portrayal and Description of the Traditional and New Business Model*

Traditional Business Model

Alpha´s value proposition is to generate climate-neutral electric power and process steam from municipal, industrial and household waste for industrial processing and for district heating systems, and to provide its customer an affordable waste management solution. Alpha is thus offering its customer not only a power source that is cleaner and less polluting than traditional forms of energy, such as coal-fired power plants, but also a disposal solution that is less polluting and expensive than alternative solutions such as landfill.

As results of this traditional BM, Alpha has gained access to several groups of customers, ranging from craftsmen, waste collection companies, municipal utilities to industrial companies.

The key resources of the traditional BM of firm Alpha are waste, fuel, acids, capital, technology and employees.

The key activities include 1) waste distribution; 2) waste treatment; 3) combustion; 4) flue gas cleaning; 5) heat feeding into district heating networks; 6) process steam feeding into nearby industrial firms, and 7) electric power distribution to municipal utilities.

The development of these key activities has benefitted from a number of key partnerships that Alpha has developed with its customers, as well as with its suppliers. Especially waste collection companies have been pivotal for Alpha´s success. Alpha works constantly on these strong long-term relationships with its suppliers to secure a continuous delivery of waste materials. Some of the early partnerships have evolved into long formal arrangements which play a key role in terms of both sales and marketing. Relying mostly on the marketing techniques from its partners, firm Alpha has mostly relied on traditional channels.

Firm Alpha offers its customers solutions specifically tailored to their needs, waste types and requirements, and also puts considerable effort into research and development activities in order to offer a state-of-the-art combustion technology. As a consequence, the cost structure of Alpha can be described as value-driven. The cost structure, however, needs to be distinguished much more clearly between energy generation and energy distribution.

The fixed costs of the energy generation process are essentially capital costs (land, buildings, equipment, construction), whereas the operating costs include utility costs (water, electricity, gas), human resource costs, cost of chemical materials needed for air pollution control, cost of auxiliary fuel when needed and in addition the costs of maintaining and repairing the equipment at the power

plant. Unlike capital costs, Alpha´s total operating and maintenance costs are not fixed, and depend on how much waste is burned.
The cost structure for energy distribution is different than for energy generation, since there is basically no fuel cost involved with operating distribution wires. The main costs for energy distribution are capital costs, there are basically no other costs, because the cost of loading a given transmission line with additional electricity is low.
The difference between energy generation and distribution is also essential when breaking down Alpha´s revenues into waste disposal and selling electricity and heat. The most important revenue of firm Alpha is the revenue from the waste disposal fee, so called treatment fee. Industrial companies use Alpha´s facilities and pay the treatment fees. The treatment fee is depending on various factors such as market conditions, waste composition, price of competitive methods of waste disposal (landfill), operating costs, and the resulting amount of energy that could be sold. The treatment fee is then charged per ton of waste and charged to the originators. The other revenue stream of firm Alpha is caused by selling electricity to private households at the market price, and heat to industrial companies.
Figure 4 summarises the portrayal for the traditional BM of firm Alpha.

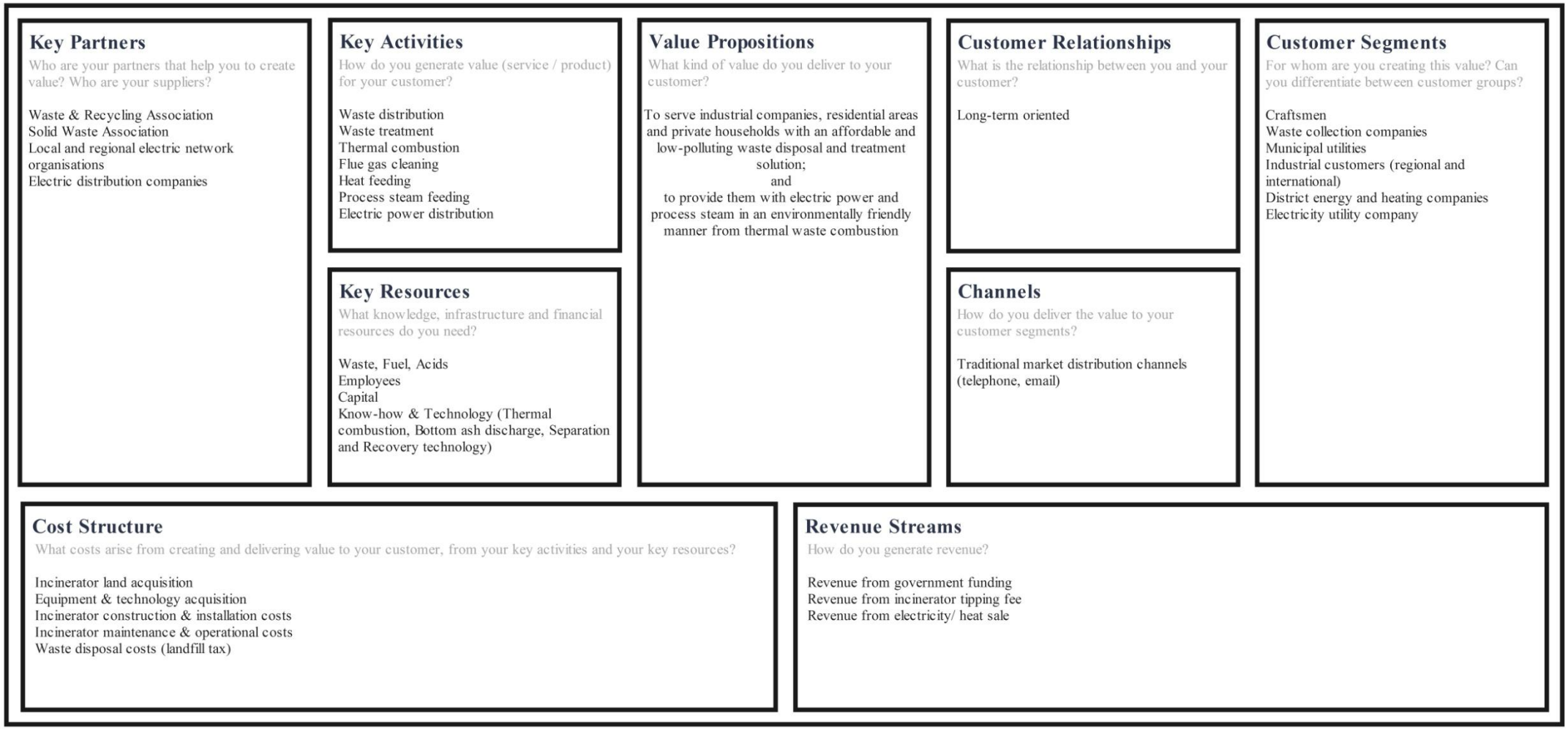

Figure 4 *The Traditional BM of Firm Alpha illustrated through the Business Model Canvas* (Source: Own illustration, based on Osterwalder & Pigneur, 2010, pp.18-19)

Drivers

Regulatory trends are the main reasons why firm Alpha started to rethink its core business activities. The history of the German legislation on waste management is complex, with many significant amendments made over the years. It is important to note that new regulations, and amendments to existing legislation are introduced relatively frequently and the information provided here only provides an indication of the range and nature of issues which are considered to be relevant to the background information for this case study. The waste framework regulation was introduced in 2010. The regulation set out procedures to be followed when disposing of, receiving and treating waste. The directive aims to prevent, or limit as far as feasible, negative effects on the environment form combustion, in particular pollution of air, surface water and groundwater, and the resulting risks to human health. Combined with a higher tax rate for depositing waste in landfills, ensured that power plants operate with lower environmental impacts. The landfill tax was introduced to ensure funding for the clean-up of contaminated landfill facilities. The rate was relatively low at the beginning (9€ per tonne), and thus not politically controversial, until it increased significantly over the years. Alongside these specific measures, a number of other regulatory measures have been introduced in Germany over the years to reduce the amount of waste generated and to encourage better waste management and treatment. In addition, more and more consideration was given to enhancing the utilization of secondary materials preserving natural resources and to protect the environment. The history of specific measures on waste management reached its peak in 2015. In 2015, the German government introduced not only a legislation, which implies a biomechanical pre-treatment of bottom ash waste before final disposal in landfills, but also announced a future landfill ban for untreated municipal solid waste. The deadline for total compliance with the landfill ban was set for 2020, thus allowing an overall transition period of 5 years. With these policies Germany was aiming at a modern circular economy with a significant positive impact on the environment. This decision, however, increasingly pressured firm Alpha to control and enrich its waste treatment processes. While regulatory trends explain much of the force that led to the development of a new BM at firm Alpha, other drivers are also at work, in particular new technologies, which reduce waste volumes and, in some cases, recover and recycle metals.

New Business Model

In order to comply with the tightening controls being applied by the regulatory authorities, firm Alpha was forced to identify new sources of revenue. One new growth area was particularly interesting for the firm Alpha as it was an opportunity for another income stream and a way to reduce the firm´s costs.

Power plants are a fundamental element of an environmentally sustainable society, as they contribute to recover electricity/heat of waste and reduce the environmental impacts caused by the final disposal of waste. However, combustion produces residues, in the form of bottom ash and fly ash, which need to be treated and recovered or disposed. The total residual composition of firm Alpha in 2015 is shown in Table 7.

Fly Ash	Bottom Ash
71,000	640,000

Table 7 *Composition of Combustion Residuals (in tons) of Firm Alpha in 2015*

The bottom ash is a mixture of many chemicals, from the plastic in the waste, and non-combustible materials such as minerals, metals, glass and ceramic. The amounts of metallic and mineral-rich items that can be found in the bottom ash vary, depending on the incoming waste composition. In a

study performed at firm Alpha, it was found that in 1000kg raw bottom ash, the mineral fraction account for 65%, ferrous metals account for 17%, non-ferrous metal account for 5% and glass and ceramic account for 12% of the bottom ash weight. The material overview of is shown in Table 8.

Material	Percent by Weight
Minerals	65.1
Ferrous Metal	17.3
Nonferrous Metal	5.1
Glass & Ceramic	12.6

Table 8 *Composition of Bottom Ash*

The content of metals present in bottom ash, and the approximate scrap values are listed in Table 9.

Metal	Amount (kg/tonne)	Estimated scrap price (€/kg)
Iron (Fe)	33.2	0.14
Aluminium (AI)	19.5	0.70
Copper (Cu)	2.5	4.00
Zinc (Zn)	0.9	1.40
Lead (Pb)	0.3	1.02

Table 9 *Mass and Value of the Metal present in Bottom Ash*

In terms of mass, iron comprises most of the metal present in bottom ash followed by aluminium. In terms of value, however, copper, which is found in smaller quantities, is of high economic importance.

As a consequence, there are important quantities of metals and minerals present in the bottom ash which possess richness in economic value and thus offer many opportunities for recycling. Whether or not the fractions of the bottom ash are, however, utilized, depends on the country and the respective legal framework. France and the Netherlands are examples of European countries which utilized the non-ferrous fraction of bottom ash as a sub-base material for road construction. In Germany, the bottom ash was generally landfilled and thus not utilized.

This practice has, however, become increasingly unacceptable and expensive for firm Alpha because of the increasing volume generated, the costs of operating landfill sites, and its potential hazardous effects. Moreover, as mentioned above, in 2010, the German government announced a landfill ban on municipal waste. The deadline for total compliance with the landfill ban was set for 2020, thus allowing an overall transition period of 10 years. The landfill ban was also seconded by a range of measures restricting the disposal of waste to landfills. This includes outright exclusions and requirements for pre-treatment, which, one interviewee says,

"Is a very complex and expensive process"

In order to prevent the increasing amounts of bottom ash from ending up at landfill sites, or to prevent the instalments of expensive treatment processes, it became increasingly important for firm Alpha to recycle valuable raw materials of the bottom ash.

Over recent decades, there have been several attempts to recover valuable metals from the bottom ash. The separation of ferrous metals is done by using a magnetic separation method. This method is commonly applied in many European countries and also in various power plants in Germany. The wide spread application of magnetic separation is based on the comparably low equipment costs and the simple process integration. In contrast, the procedure of non-ferrous metal recovery has been more complicated. The extraction of non-ferrous metals is mostly done by using eddy-current separators. The eddy-current separator is a device used to separate nonferrous metals from non-metals. It requires more refined processing, such as defined ranges of particle sizes, and only possesses an overall sorting efficiency of 66%. Moreover, the cost for the equipment and the energy coverage are also higher than for the magnetic separation method. To this day, it is still impossible to separate non-ferrous metals smaller than 7 mm with the eddy-current process. Considering that most of the precious metals in the bottom ash end up in the fraction smaller than 7mm, it makes this method less efficient. To achieve the best use of these non-ferrous metals, it is anticipated that the highest possible accumulation of the single metal fraction has to be reached.

Firm Alpha has addressed this challenge by developing a discharger system that can separate precious metals in the fraction size below 7mm. The discharger system employs an x-ray filtration and separation technology to identify and separate material based on its elemental structure or material density. The device is called X-ray Dry Recovery (XDR). The XDR separates metals with such high efficiency that also the smallest particles of metals can be recovered, which have not been feasible before. The XDR system also achieves very high throughputs and is also extremely maintenance friendly. Service tasks can be carried out quickly and the downtimes are therefore reduced to a minimum. The energy requirement is also far less and resulted in reduced operating costs. By the end of 2015, firm Alpha had developed and put into practice a low-cost and environmental-friendly treatment method to recover metals from bottom ash. This new method offered an improvement over conventional recovery methods, by not only providing the recovery of non-ferrous metals, namely aluminium, copper and iron, but also reaching a recovery rate as high as 97.6%. Conventional technologies for the separation and recovery of non-ferrous metals possess a rate of approximately 65%. Alpha´s new BM included not only producing electricity/heat as an end product of the combustion, but also reusing and selling its by-products, namely aluminium, copper and iron. Firm Alpha´s new technology for bottom ash discharge, separation and non-ferrous metal recovery resulted in major changes of the traditional BM as illustrated in Figure 5.

The new value proposition includes, firstly, producing sustainable energy and, secondly, by-products, namely aluminium, copper and iron, from the combustion of mixed waste. The obtained materials can be reused as raw materials in road construction and cement production. However, it can also be used in various commercial and industrial applications. It is mainly offered to manufacturers. These end-customers represent a completely different clientele. They are addressed through a direct sales force, differing from the traditional one, and a carefully selected network of sales representatives. In order to increase revenues, the business unit has further established partnerships with independent sales representatives, especially outside of Europe. The new social and sales applications help firm Alpha to connect with its customers, partners in an entirely new way. This is a necessary step, because firm Alpha cannot build on existing customer relationships from the traditional BM, as it does not address the same clientele. The only way for the new BM to succeed is thus, to convince new customers, one by one, of the quality of the value proposition.

The new key resources in the new BM are the technological know-how of metal recovery, the new machinery, and of course the skilled workforce of sales people, chemical engineers and machine operators. Without the skilled workforce, it would be impossible to claim the competitive advantage for this state-of-the-art technology. With regard to the skilled workforce, one interviewee pointed out,

"Engineers and machine operators must have competences in metallurgy, chemistry and materials science, they must carry out many different operations, and they must have extensive experience of chemical process development. We are moving towards science."

The additional key activities in the new BM are bottom ashes treatment, recycling of the recovered ferrous and non-ferrous metals, reuse of recovered inert materials, and disposal of the residues. It is however important that firm Alpha conducts the entire process of metal discharge, separation and recovery, because these areas are at present difficult to master by Alpha´s competitors and, therefore, provide a competitive advantage.

Moreover the complete procedure of metal recovery happens in an entirely new built-up compartment. Thereby, each purchase machine has been modified by engineers specifically hired for this new business field. Consequently additional costs incur on the new BM, because new land, equipment, technology and maintenance are of high importance to deliver the new value proposition.

Considerable cost savings have been achieved by recovering and recycling alternatives, rather than sending the waste to the landfill.

Consequently, the new BM allows firm Alpha to process three steams of revenue. In addition to the revenues from the combustion tipping fees and the electricity/heat sale, firm Alpha also generates revenue from the sale of recovered aluminium, copper and iron from the combustion process.

As such, the development and implementation of the new BM was very important for firm Alpha. Metal recycling has many important benefits and plays a powerful role in supporting both environmental and economic outcomes. It is highly successful in diverting metal scrap from landfills, and provides the raw material for new products. The new BM has thus a very positive impact on the financials, as it opens up a new revenue stream.

As well as enabling valuable metals to be recycled profitably from the bottom ash, the new BM also saves huge amounts of resources, energy and CO_2. Using metal recovery in power plants also means less metal to be extracted from mines. These numbers show that bottom ash metal recycling is more environmentally friendly than extracting and processing virgin material.

In addition to the savings in resources, energy and CO_2, the new BM also offers firm Alpha a competitive advantage over other power plants where a required alternative treatment infrastructure is not in place yet. By implementing this model, firm Alpha was able to position itself as an important innovative leader. As such, the new BM not only allowed Alpha to achieve new revenue streams but also facilitated innovative, social and environmental advances.

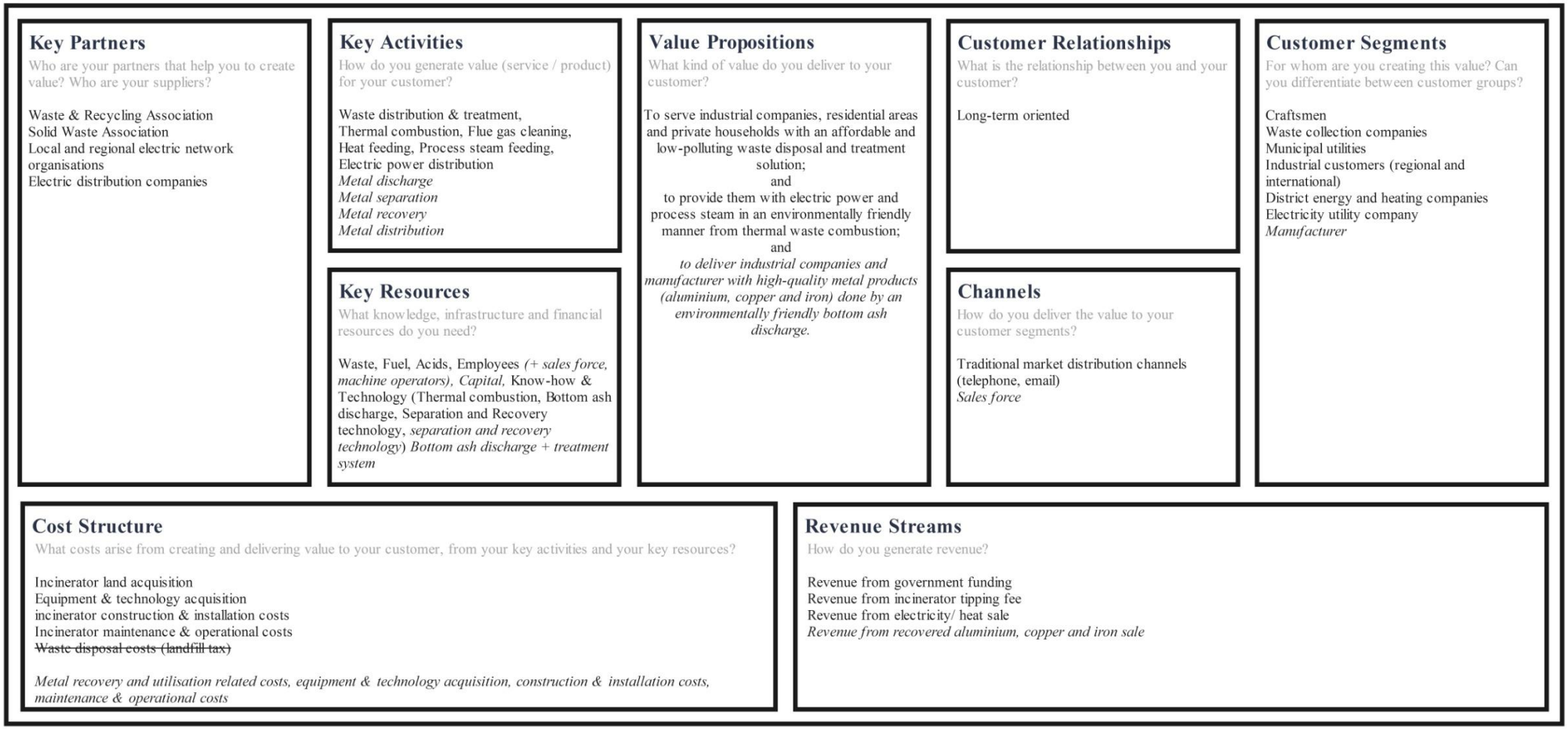

Figure 5 *Changes in the BM of Firm Alpha in Comparison to the Traditional BM Illustrated through the Business Model Canvas* (Source: Own illustration, based on Osterwalder & Pigneur, 2010, pp.18-19)

6.2.3 *The Business Model Innovation Process*

6.2.3.1 Description of the Business Model Innovation Process

Over the course of five years, firm Alpha gradually changed its BM. The business opportunity of Alpha was identified the first time in the exhibition. Various people in that specific exhibition were interested in the offering of metal. Alpha realized this new opportunity, and the top management team of Alpha was willing to carry out a deeper analysis of this emergent opportunity.

"Entering a declining market is really difficult, but entering a market that is growing is always easier."

Up until the start of this project, only ferrous metal particles (larger than 7 mm) had been able to be treated, leaving the fine fraction of particles below 7 mm unexploited which, however, involves an enormous potential of valuable non-ferrous metals. As a consequence, the aim of the new BM was to recover mainly the non-ferrous metals in bottom ash. One interviewee explained,

"We are already pioneers in the waste combustion technology; the new goal was to also become pioneers in bottom ash treatment."

Beside a clear goal target, a business plan was developed for the whole BMI project and was subsequently presented to various governmental authorities with the aim of being eligible for the so called European Commission Eco Innovation funding programme Firm Alpha was successful in receiving funding. The next step was to become familiar with the new technology of bottom ash recovery.

"We first needed to make sure that we master the technology."

To do so, firm Alpha established a separate R&D department with several development units that focused solely on the technology growth areas that firm Alpha deems strategically relevant in the context of bottom ash recovery. Typically, these employees came from the traditional R&D department or from other departments of the existing firm, but firm Alpha also recruited external personnel. The whole new R&D department reported straight to the CTO of the management board and together they developed Alpha's technology strategy. These activities were also reflected in the firm´s expenditure for R&D activities. Part of the annual R&D budget was, however, subsidised by governmental institutions.
At the same time, the sales force was highly engaged to involve partners from industry and research in this project. However, it took much longer than planned to receive agreements. One interviewee said,

"Getting academic support took much longer than planned."

He further explained, that

"Only very few saw the convenience of looking for metals in the finest proportion of the bottom ash. The concerns were that there are not enough metals in the fines, the metals are difficult to sort, and the smaller the piece of metal, the lower the tons per hour that can be treated and the more maintenance is required."

Ultimately firm Alpha was able to put a team together consisting of highly qualified partners from both research and industry, hence covering all necessary research steps.

As it was felt that firm Alpha at the time did not have the capacity to manage the project within its own power plant capacities, it was decided to set up a pilot plant. The reception of equipment and set up of different critical parts of the pilot plant was achieved with success in a short amount of time, so that the project was able to proceed. The project started up with a fairly high contingent of existing engineers, constructors, machine operators and researchers from firm Alpha. They were transferred from the traditional business to the new project. They were trained on the new machinery by their new supervisors. Within a short period of time (approximately 10 months), the project led to significant results. Through the contribution of the research and industry partners, scientists were able to develop a bottom ash separation machinery which uses an x-ray transmission technology to identify and separate material based on its elemental structure or material density. The machine is called X-Ray Metal Recovery (XDR). Within this machine, the bottom ash travels along a fast-running conveyor belt that ensures that particles are separated and equally distributed. While the particles pass the x-ray source and camera, they are recognised and categorised according to pre-set criteria which can be programmed into the system´s software. If the classification meets the previously defined criteria, the particle will be subsequently separated from the conveyor belt by air pressure. The air pressure is caused and regulated by air valves. The material that does not adhere to the pre-set criteria continues to another conveyor, where it is traditionally screened over an Eddy Current Separator, which utilizes rare earth magnets. By adding an additional step, that sends the bottom ash which was not recognized through another specially-designed Eddy Current Separator, serves as an added backup system and, thus, allows a more accurate separation. The XDR system was key for the whole BMI process, because it has several advantages compared to conventional metal separation techniques. The XDR separates metals with such high efficiency so that the smallest particles of metals can be separated and recycled; it allows the recovery of the finest and most valuable fraction of the bottom ash. Moreover, by ensuring that the XDR system is fully enclosed and kept in a slight vacuum, the dust emission of the bottom ash is reduced. While the XDR system was further optimized, the subsequent step was to engage actively in customer acquisition. However, very soon after engaging in active customer acquisition, it became obvious that parts of the workforce at firm Alpha resisted to the changes. One interviewee explained that,

"There was a certain perception that the current BM appeared to be successful, traditional, and well accepted. And thus the questions arose: ´Why should we change it and engage in something new?´ and ´Why can't things stay the way they are?´. Others, in particular the sales team, were concerned about ´advertising raw materials that we didn't even have yet´."

Moreover, various communication problems had been reported to the management board and above all technical managers were unwilling to release their top engineers for the BM development project. It was at this moment, when the management board realised that they had run into some serious problems: there were way too many players involved in the development of the new business. There were teams from science, engineering, marketing and the business end, and no one knew how to coordinate all of them. And in addition, the management board realised that they needed to deal not only with the BM change but also with the impact of this change on people. Given all these problems, the management board decided on some changes. The management board picked a project team of five to take charge and who would be given significant authority to organise and coordinate the new developments. One of the five was solely responsible to promote the project in the traditional business and to communicate the underlying business need for a change in the current BM. Moreover, firm Alpha offered as an incentive a mix of compensation packages linked to the success of the new business.

Once firm Alpha appointed a dedicated project team and several incentives, everything went smoothly, and employees were much more comfortable with the changes and therefore actively engaged in the development project. The changes had, however, led to no significant results on the

sales front. In fact, the sales force did not succeeded in selling the new value proposition, as the technical know-how needed to be increased considerably. In an attempt to change this, literally the whole sales team was trained by the CTO, CBDO and two external research partner, who were highly involved in the development of the XDR system. Similar problems as with the sales force also occurred amongst the machine operators and engineers who were transferred from the traditional BM to the new project. As evidenced through occasional complaints by the supervisors, the project team discovered that most of those employees lacked the basic necessary skills. Moreover, the intended training from their supervisors did not turn out as hoped. In fact, various employees did not have the motivation or the basic qualification to acquire the necessary knowledge. As a consequence, new operators and engineers were employed externally and assigned specially to the manufacturing machines. After approximately three years of intense development the realisation of the new BM was successfully completed. With an achievement of a certain degree of capacity utilisation and the new resources and processes in place to be proven effective and efficient, and an initial first customer base for the non-ferrous metal fraction, aluminium, copper and zinc, established, this project proved that the treatment of the finest fraction of the bottom ash into valuables was possible.

In 2017, the new BM was reintegrated into the routines, processes and systems of the traditional BM, and the BM development project was officially no longer viewed as just a ´project´. Remarkably, there was big resistance regarding the integration process. A possible explanation for this phenomenon could be that the employees had not been informed well enough. The management board identified several subsequent steps to make the integration phase successful, including opening communication channels and providing training. The most important step for the management was to open a dialog with the general employees to forestall speculations. In fact, the management board sent out a newsletter. It stated clearly the reasoning for the integration and also repeatedly emphasized the importance of the new BM for the firm's future. The management, in addition, established a constant conversation channel on what was happening day to day, and for what was to come in the future. Moreover, every supervisor had to schedule immediately a session with his or her group and explain why the transition was taking place, how it would impact each employee's job and exactly what was expected of each employee before, during and after the rollout. And most importantly, employees were repeatedly informed through several communication challenges that they would be given every opportunity to learn the new skills which would enable them to work with the new processes, if required. By the end of 2017, firm Alpha seemed to have successfully handled its BMI. It is important to mention, however, that the BMI process only included the change in one of the power plants of firm Alpha.

6.2.3.2 Business Model Innovation Process Phases and its Underlying Activities

The BMI process falls into three groups of activities and modifications (1) identification and assessment of opportunity (sensing), (2) mobilization of resources to address an opportunity and to capture value from it (seizing) and to (3) continues renewal (managing threats and transforming) (Teece, 2012). In the following subsection these three phases and their activities are presented more in detail with illustrations from the case findings.

The following subsection is structured along the three generic phases of BMI; sensing, seizing and reconfiguring. For each phase, this present paper, investigate the exact meaning in the overall process and present the main activities associated with the single phase. Results are enriched with quotes from the interviewees.

Phase I: Sensing

The sensing phase in the BMI process at firm Alpha can be described by activities which focus on the assessment of threats in the environment and by activities which focus on generating and specifying ideas for potential new BMs. Three main activities within the sensing phase were identified throughout the case study at Alpha.

The first activity refers to the understanding and monitoring of regulatory changes. All interview respondents from firm Alpha reported that a key activity was to keep track of regulatory content. The product manager reported from monthly meetings where new regulatory changes were assessed in terms of its business impact.

The second key activity within this phase refers to searching for innovative new value propositions. The CEO reported they hold ideation workshops where they invited internal and external participants. During these workshops, employees had the possibility to develop ideas and make suggestions for things to improve in their area that contribute to new value propositions.

Once a new value proposition was proposed, the management team engaged in a series of evaluation and validation activities. The CEO of Alpha reported how they reached out to potential customers to see whether they would be interested in buying by-products from firm Alpha. In parallel, firm Alpha started building a small internal team, which focused mainly on the validation and assessment of the new idea.

Phase I: Identifying, Experimenting With and Exploiting Business Opportunities	
Activities:	**Representative Quotations:**
Assessing legal and regulatory forces	"It is important for firms like ours to understand the ecosystem in which we operate and in particular how new regulations come about and affect our future business. It is a key precondition or let me say a key success factor for our firm to approach upcoming new regulation in advance." "In our industry, we are increasingly under pressure of technological, economic and social changes, but changes driven by law bring an even greater difficulty. You cannot get around the law. Staying on top of the law is essential to maintaining a competitive edge. Failing to do so means incurring fines, penalties and potential legal issues, or even closure if you are found to be non-compliant. All of which could cause you to fall behind your competition. Thus, keeping an eye on the legal developments well in advance could pay off big time in the end."

	"The pressure was significant. I mean it is nothing new, regulations and laws mandate all our practices from transport, treatment to storage, and disposal practices. It feels like all we do is maintaining safety, health and environmental compliance. This time it was different. I mean I noticed when we don't somehow make our power plant compatible with these regulatory requirements we lose our economic power."
Encouraging employee involvement in searching for innovative new value propositions	"We held regular meetings to ask for input from our own colleagues." "Twice we held ideation workshops."
Evaluating the ideated value proposition for business potential	"All new ideas are not necessarily viable options. Every idea needs to be tested and evaluated. There must be a market opportunity that is large enough to support the new business venture."

Table 10 *Major Managerial and Organizational Practices that Undergird the Sensing Phase of the BMI Process at Firm Alpha*

Phase II – Seizing

The second phase also plays a crucial role for the BMI process. The activities within this phase focus on the development of a new viable BM based on promising ideas identified in the ideation phase. Based on the findings from the interviews, three major activities were identified in this phase.
The first activity for this phase refers to the involvement and management of partners. The challenge identified refers to the integration of partners into the design of the concrete new BM.
The second activity refers to sustaining and improving technological competencies. In order to improve technological competencies at firm Beta, the CEO reported that performance-based bonuses were used as way to encourage the workforce to build upon their skills.
Moreover, the interviewees stated that they had difficulty to overcome the current business logic. As outlined by one of the CTOs, overcoming the current business logic is the first key challenge for the seizing phase.

Phase II: Mobilization of Resources to Address Identified Opportunities and to Capture Value from it	
Activities:	**Representative Quotations:**
Involving and managing partners	"Once you have decided to go for the new BM, it is all about managing the partners involved in it."
Overcoming the current business logic	"It is so difficult to break out of the dominant logic of the company and of the industry when you have been working within this company for many years, which is the case for most of us."
Sustaining and improving technological competencies	"We have to excel at many activities, however, there a small but essential number of technical competencies that we must have to survive and prosper."

	"It is always good to know which tech competences are most important for our success and where to position ourselves."
	"In today's environment of technological developments and disruptions, there is often a gap in our technical competencies."

Table 11 *Major Managerial and Organizational Practices that Undergird the Seizing Phase of the BMI Process at Firm Alpha*

Phase III - Reconfiguring

The last phase plays a crucial role for the BMI process. The activities within this phase focus on the implementation of the new BM into the established firm. Two major activities were identified for this phase.

The first activity to overcome internal resistance became obvious in almost all of the interviews of firm Alpha. As the Managing Director reported, that people do not like chance in particular if they do not see a reason to change, as the old BM is still working well. In order to manage the organizational change, he reported that they communicated openly and explained to the workforce how the new BM can help the firm.

A second challenge, which was reported throughout the interviews, refers to manage the chosen transformation approach. Typically, pilots, trial-and-error, and experimentation are employed to mitigate risk in the implementation process.

Phase III: Reconfiguring Business Opportunities	
Activities:	**Representative Quotations:**
Overcoming internal resistance	"The most challenging thing with change is to successfully implement the new business model. Only if you convince everybody of the new business model and get their full commitment, you can be successful."
	"Many employees did not understand the change and especially the need for this change – which is not a good prerequisite to enter a new market."
Pilots, trial-and-error, and experimentation	"The step-wise approach, that we applied was by far the best approach used and also allowed to make specific adjustments on a per operation basis."

Table 12 *Major Managerial and Organizational Practices that Undergird the Reconfiguring Phase of the BMI Process at Firm Alpha*

6.3 In-Depth Case Study II: Firm Beta

Based on the firm´s request, all relevant firm data will be anonymized. The case company is thus referred to as "Beta" or "Firm Beta".

6.3.1 *Description of Firm Beta and its External Environment*

Beta is a biogas power plant and is specialized in the areas of waste management and renewable energy production (electricity, heat). It turns agricultural / food waste especially from cropped green biomass into biogas or electrical power. The biogas is produced by a biological process called anaerobic digestion in which microorganisms break down the organic waste in the absence of oxygen. Beta is headquartered in Northern Germany and sustains power plant facilities in eight of the 16 constituent states in Germany. Beta has remained a family-owned business and has developed in one of Germany´s largest generators of green electricity.

Competitive environment:

Biogas power plants operate in a heavily regulated environment. Biogas power plants are subjected to several environmental regulations and have to require permits if they use, recycle, treat, store or dispose waste. Biogas power plants are also under political control. Substantial new policies and regulations have been introduced over the last two decades and have placed pressure on all players in the industry. The most notable legislation in the last decades was formed with the Renewable Energy Sources Act (EEG). The EEG changed the industry enormously, because it supported the electricity production from biogas with feed-in-tariffs. As a consequence, a dramatic increase in the construction of new biogas plants occurred. And while governmental support helped to drive down costs for other renewable sources of power, bio energy remained the most expensive source of power in Germany. As a result, the government reduced its funding significantly. The German government also introduced various other regulations. Most of them have been implemented on relatively short notice allowing no reasonable time to adapt to the changes. To comply with all imposed regulations, firm Beta had undergone major reformations.

6.3.2 *Portrayal and Description of the Traditional and New Business Model*

Traditional Business Model

The traditional value proposition of firm Beta is to provide customer with electricity, heat and gas in an environmentally friendly manner, first by converting organic waste into biogas; and secondly, by using biogas as a fuel to produce electricity and heat. The biogas generation process occurs through anaerobic fermentation – a superior alternative to composting – that is cost-effective and has almost no emissions that impact the environment negatively. In this way Beta manages to create a substitute to fossil fuels.

Beta´s key activity mainly lies in the energy generation from biogas. The process is divided into three phases: feedstock handling; anaerobic digestion; and biogas treatment. The first key activity of firm Beta is preparing the feedstock input. It encompasses receiving, conditioning and separating the waste. The waste is collected either by Beta itself or transferred from organic trash suppliers. The waste is then separated, into organic and in-organic waste, and mechanically reduced to small pieces by crushers. The second step is the anaerobic digestion process, in which the decomposition of the feedstock happens. The feedstock is broken down by the help of bacteria in an anaerobic (oxygen-free) environment. The process takes place in a digester which offers the best possible condition for micro-organism and bacteria to grow, resulting in a highly efficient breakdown of materials. The end

product of this fermentation process is biogas with methane (60%) and carbon dioxide (40%) as the main ingredients. But the biogas contains also aggressive hydrogen sulphide and is saturated with water vapour. Both of these substances must be removed to reduce the risk of corrosion, and the damage to metallic parts. After this purification process, the end substance consists of 97 % pure methane gas. The methane gas, as the final product of the process is either burned in the firm´s combined heat and power plant to generate electricity and heat; or it is cleaned and upgraded into the properties of natural gas and then fed into the public gas grid.
Firm Beta has also developed a number of key partnerships both in terms of material sourcing and in terms of distribution. In particular two partnerships have been crucial for Beta´s traditional BM. The first partnership is with an organic waste supplier that assists in providing the input materials; the other one is with the regional government which provides essential material and guidelines on the overall biogas generation process.
The key resource used in the energy generation process is organic waste. Organic waste is material that comes from either a plant or animal. These residues are all recycled in the traditional BM of firm Beta which is both beneficial for the environment and also helps Beta to reduce its production costs.
The remaining costs for Beta consist mainly of operation and maintenance costs. The most expensive part of the biogas generation process lies in the feedstock handling system and the biogas treatment process. This is due to the reason that both processes include machinery that often needs to be serviced. The maintenance costs of the digester are, however, relatively low. It does not require any service, if the plastic and other unfitting material have been removed beforehand.
The main sources of income of the traditional BM are the tipping fees for the waste treatment and the sale of energy (electricity and/or heat) and gas.
Figure 6 portrays the traditional BM of firm Beta through the Business Model Canvas.

Driver for the development of a new BM

Despite the many benefits; three major drivers were identified that led to the development of a new BM at firm Beta.
The driver which was particularly relevant for the development of the new BM was the government´s latest decision not to invest in renewable power projects anymore. Whereas the German government had set a series of legislative and financial incentives, such as an attractive feed-in tariff, throughout the last ten years, the investments were put on hold. And various other projects and incentives were cut back or were not even started.
Another driver was the increasing legislative pressure on the biogas industry. Prior to 2015, landfills were a reasonable way for firm Beta to dispose of residues from its energy generation process. Since then, higher landfill taxes and future bans on landfill disposal have been introduced. Moreover, new sustainability restrictions on feedstock for all biogas producers using anaerobic digestion came into effect, to ensure a greater use of waste and residues.

New Business Model

The firm's traditional BM played an important role for the subsequent new BM. In the traditional BM, firm Beta was operating waste treatment units to produce energy and gas. The energy generation process, however, does not only provide clean energy and gas, but also produces a by-product called digestate or bio-slurry. The bio-slurry contains a high amount of pathogens (bacteria, fungi, nematodes). It is, thus, classed as an odorous and hazardous substance that ultimately has to be disposed of in a secured landfill site at very high costs.
Bio-slurry is very hazardous if not handled properly; however, simultaneously it is a source of the three most important nutrients for plants: nitrogen, potassium and phosphorus. When composted with earthworms (vermicomposting), the organic substances can be stabilized and the harmful pathogens and heavy metals can be removed (Sinha, Heart, Bharambe & Brahambhatt, 2010). Vermicomposting

is a complex process that has a positive impact on soil and crops, and also produces higher numbers of macro and micronutrients than farmyard manure and natural compost. In addition, earthworms are also a good source of protein and, thus, can be used as a supplemental protein source to feed livestock. This whole idea of composting biogas plant slurry by earthworms builds the basis for the new BM at Beta.

The value proposition of the new BM is first to provide livestock farmers with a low-cost, high-protein and amino-acid-rich animal feed; and second to provide crop-based farmers with a pathogen-free, pH-neutral, nutritive bio-fertilizer that can maintain healthy soil and fight off pests and diseases. This is both done by vermicomposting hazardous biogas plant slurry. The granulated bio-fertilizer has many advantages over traditional fertilizers as it embraces the benefit traits from both, anaerobic fermentation and vermicomposting. Bio-slurry is fully fermented, and thus repels termites and pests that are attracted to raw dung; coupled with vermicomposting, it is enriched in nutrients, high quality humus, plant growth hormones, and particles that fight off viruses and contamination (Sinha et al., 2010). The granulated bio-fertilizer is suitable for trees, crops, gardens and lawns and is offered to famers, landowners, gardeners, gardencenters, landscaping companies, and any business that plants trees for consumption or beautification. The livestock feed is used by farmers to grow their livestock (pigs, cattle, poultry, rabbits and fish), but it can also be used for horses, pets, and circus and zoo animals. Due to the fact that earthworms provide as much of the protein that animals need, however, at a much lower environmental costs, it represents, thus, a low-cost alternative to conventional animal feed used in the fishery, poultry and dairy industry. In addition, earthworms possess the essential animal nutrient amino acid methionine which is absent in conventional animal feed grains.

The resources involved in the composting process are principally bio-slurry, some moist bedding, micro-organisms (bacteria, fungi, algae and protozoa) and to a lesser extent earthworms. New machinery (compost turner, fertilize screening machine, wire mesh tumbler, automated packaging machine, disc pang granulator, feed mills), microbes researcher, animal nutritionists and machine operators were also essential for the new BM.

Regarding the sourcing materials for the production, Beta relies on various partnerships from the old BM. Beta has, however, also developed a number of new partnerships. In particular two partnerships have been crucial for Beta in developing its organic fertilizer production line. The first was with a supplier for fertilizer packages that could meet the firm’s environmental specifications for both, fertilizer and animal feed, and the other was with a supplier of microorganisms, which also helped throughout the composting process. The same supplier also provided Beta with the required composting containers and tools to begin with.

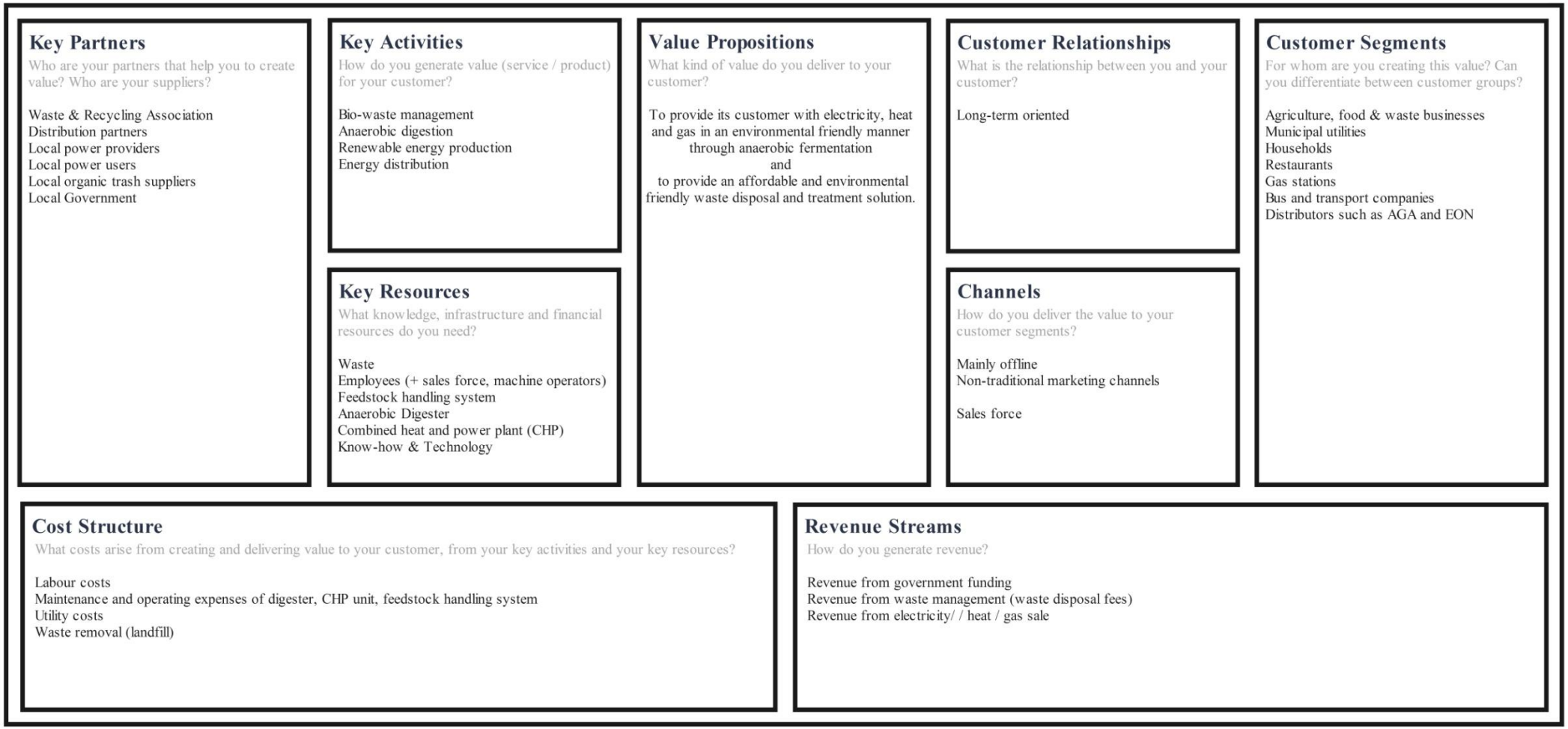

Figure 6 *The Traditional BM of Firm Beta illustrated through the Business Model Canvas* (Source: Own illustration, based on Osterwalder & Pigneur, 2010, pp.18-19)

The cost structure can be described as both cost and value-driven. This is due to the fact that extensive researcher and experts are needed in order to serve a high-quality end product to the customers. The new BM, however, also pays close attention to costs in order to get customers to purchase from Beta.
Beta´s key activities of the new BM mainly lie in the production of both animal feed and fertilizer. As such Beta is involved in producing, handling, packaging, storing, and distributing activities. Beta, however, also has been involved in researching new formulas and different additives for various applications, in order to adjust the product to the customer´s needs. Moreover, selling and promoting has already been essential for Beta´s traditional BM, but with the new BM, a special focus was placed on customer acquisition rather than on customer retention. Besides selling its new value proposition, the new BM has also led to significant changes in the firm's customer relationships. Besides offering products to the customer´s needs, Beta has also developed lasting relationships with some of its customers, in particular with local crop farmers who had started ordering the firm´s fertilizer early on. Beta stays in regular contact with them to reach out if they have any concerns, issues, or feedback.
The fertilizer is sold through a direct sales force or through farmer cooperatives, distributors, plant sellers, retail companies or through plant exhibitions and trade fairs. The animal feed is mainly sold through feed distributors and retail companies. Each customer communicated with one of Beta´s sales staff or sales representatives, either by on-site visits, by email, or by telephone.
Revenues from the new BM are generated by selling the fertilizer to crop-based farmers and gardeners and selling animal feed to livestock farmers.
Figure 7 portrays the new BM of firm Beta through the Business Model Canvas.

Based on follow-up discussions with all interviewees the main effects by the new BM can be described as follows: The development and implementation of the new BM was very important for firm Beta. It gave firm Beta access to unexploited customer segments. Being the first firm to sell animal-by-products as food stock and being one of few seller of organic fertilizer, it was able to leverage its market position to gain access to new growth opportunities beyond its core customer base and beyond its core business. Having been the innovator of the idea to vermicomposting puts it also ahead of competition. The new BM also enabled firm Beta to make better use of its own by-products, using and selling it in a new way provides Beta with higher returns. Besides the better use of by-products, additional revenues from new customer segments were created.

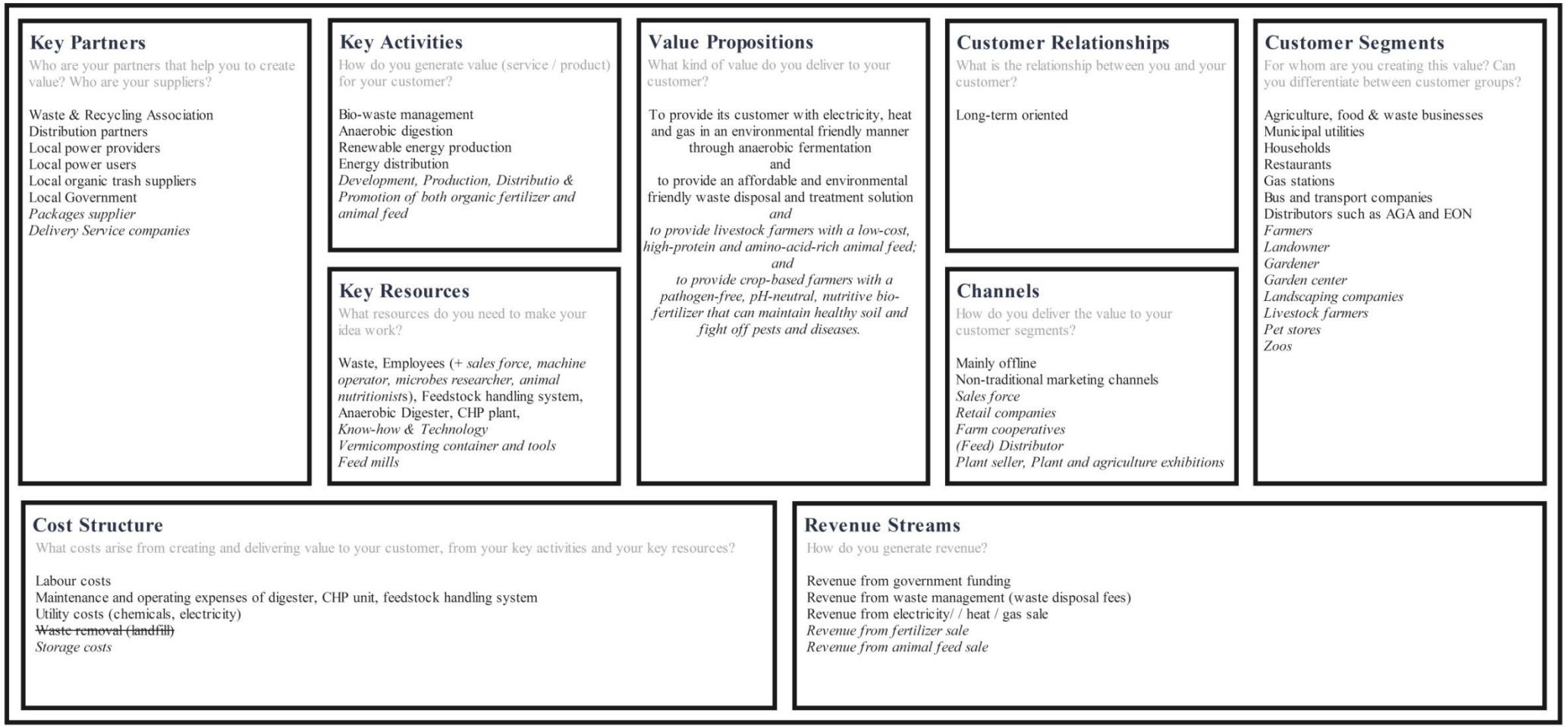

Figure 7 *Changes in the BM of Firm Beta in Comparison to the Traditional BM Illustrated through the Business Model Canvas* (Source: Own illustration, based on Osterwalder & Pigneur, 2010, pp.18-19)

6.3.3 *The Business Model Innovation Process*

6.3.3.1 Description of the Business Model Innovation Process

Over the course of five years, firm Beta gradually changed its BM, from the traditional BM, to an innovative and unique BM combining the production of animal feed for livestock farmers and the production of bio-fertilizer for crop-based farmers with its traditional BM, allowing firm Beta to move from a biogas only power plant to an organic fertilizer and animal feed production company.
The starting point for rethinking the traditional BM was a customer request. In 2010 the product manager noted that some customers, in particular businesses of agricultural production, increasingly requested organic matter to improve their humus. The product manager realized this as a new opportunity and directed a research team to this idea. The team quickly created a rough concept plan. The board of directors, however, were sceptically, since their existing business was still on the rise, they were not willing to make any changes to their existing BM.
During a meeting with the management board, Beta´s regulation manager presented his worries about the increasing regulatory compliances. Based upon the statement, firm Beta realized that a new business opportunity is needed as the account manager continued and communicated his worries about the increasing cost pressure of landfill taxes and recommended repositioning towards other areas of revenue and ways to reduce the expected costs. It was at this time, when the account manager also referred back to the initial idea of an organic fertilizer production line. He argued during the interview:

"An organic fertilizer production is capital intensive, but looking at the long-term cost we have to take it into account as a profitable and responsible solution."

These observations formed a new basis for discussion at the larger management circle. The board of directors consequently decided to initiate an innovation workshop to find business ideas on how to improve Beta´s profitability. They invited the management board and participants from all major functions. The workshop, however, was not successful in finding ideas worth to pursue. In the end discussion, a workshop participant, however, noted that his dad, a biologist, discovered that using earthworms benefit a particular flower to grow faster and also to be healthier. Triggered by this remark, the management board gained interest in the initial idea of a fertilizer production line. Only two months later the board of directors decided to pursue with the new idea.
The project team was restructured, and a new team of employees were formed to focus solely on the new business opportunity. The vast majority of team members had come from Beta´s traditional R&D department, but several external experts were also brought in. The final project team consisted of the product manager, three developing managers, two environmental engineers, one chemist, one soil expert, two biologists, one geologist and one hydrologist. The product manager was the head of the new project team and reported directly to the board of directors.
Over the next several months all the required components for a complete business plan were designed. Part of the process of writing the business plan involved having to elicit market feedback from farmers. During these interactions, the project team gained a thorough understanding of what farmers found appealing and how well competitors' products actually served its customers. In fact, it became obvious, that several farmers struggled with organic fertilizer products.

"*There was the perception that current organic fertilizers had similar effects as chemical fertilizers only that they were more expensive and not suitable to all varieties of plants."*

With reference to the information gathered, the project team defined new product requirements. This list of attributes and criteria were used throughout the whole development project. The project team

initiated a small working space within the company and began to optimize the vermicompost according to the previously defined criteria. The development process was driven by a few product leads and a number of quality assurance microbiologists. They were responsible to ensure that production regulations and standards were met and to collect product samples for the purpose of laboratory testing. Their quality assurance work was involved throughout the entire development process, from bio-slurry control, through intermediate fertilizer testing, to the finished fertilizer release testing. Once the vermicompost met the previously defined criteria such as pH value, homogeneity, and nutrients; a whole organic fertilizer production plant was established. Beside this development, the product team realized that despite providing superior quality, the fertilizer had to be priced competitively. The subsequent steps were thus to effectively reduce the composting and curing times to produce the vermicompost at lower costs.
Simultaneously the end product was tested by independent laboratories. This was a necessary step to acquire internationally and industry recognized certifications and accreditations from the German and European Ministry of Agriculture. Once the product quality was fully confirmed, and the first customer base was established, the project team began building out the distribution network. Before reaching out to potential distribution partners, the some employees from the traditional BM´s sales force was trained on the new distribution strategy. However, as evidenced through occasional complaints, the project team discovered that the sales force however was resistant to the new task.

"With the new value proposition the sales force was burden with a different type of sale. They had to stop focusing on individual end users and start focusing on signing up distributors."

It became obvious that the resistance was rooted in the sales force fear of not having the required skills. The project team noticed its sales force fear and committed significant resources to training and instruction, and additionally recruited new sales staff to establish a distinct sales force for the new BM. The growth was slow in the early phase, but Beta experienced a major breakthrough when the largest garden supplier in Germany agreed to sell Beta´s fertilizer online. This growth continues as Beta´s sprouts were picked up by a number of companies. Additionally, even though Beta´s concepts of zero-emission, all-natural and environmentally friendly biogas production have always been a source of commendation for the firm. The new value proposition, however, caught people´s attention and Beta increasingly received public recognition and positive press coverage for its efforts. Once a reduction of composting and curing time was achieved (through adjustment of bedding conditions and the use of an earthworm species with a shorter life-cycle), and an initial customer base was acquired, it was proven that the new value proposition was sustainable. Shortly after, the production of the fertilizer began; the chance arose to extend the value proposition.

"When we started, there was a general belief that our new business activities could only be beneficial to crop famers. But shortly after the product release, we started to see a great demand from a wider target group, such as the fishery, poultry and dairy industry."

In fact, customers increasingly requested the production of feed protein by earthworms. Earthworms possess a nutritional profile similar to other protein sources currently used in animal feeds. After inspection, and approval by the board of directors, the product manager initiated a small pilot facility where earthworms were multiplied, grown and harvested. An intensive research effort had been made by animal nutritionists to identify if the non-conventional alternate protein source was suitable for animal feed.

"A lot of research had gone into this. We first had to determine whether or not earthworms could be used as animal feed and then we had to develop the animal feed formula."

Once the formula, or recipe, was developed, the ingredients were mixed together into a powdered form, packed as a complete feed in an organic container and stored at 0-20°C till needed.

"It was perfect timing. I mean 15 years ago; the EU barely even allowed the feeding of animal proteins to food production animals. Since then, however, new legislations have been introduced that allows the use of animal proteins for feed."

After getting approved by the animal welfare institute, herbicide and pesticide tested, and winning customers, it was proven that converting organic waste into protein-rich feeds was sustainable. Subsequently, the resources and processes necessary to pursue with the new value proposition on a large scale were acquired and an animal feed processing plant was created. At this time the board of directors decided to fully integrate the new BM into the traditional BM.

6.3.3.2 Business Model Innovating Process Phases and its Underlying Activities

As outlined in Chapter 4, the BMI process falls into three groups of activities and modifications (1) identification and assessment of opportunity (sensing), (2) mobilization of resources to address an opportunity and to capture value from it (seizing) and to (3) continues renewal (managing threats and transforming) (Teece, 2012). In the following subsection these three phases and their activities are presented more in detail.

Phase I – Sensing

The sensing phase in the BMI process at firm Beta can be described by activities which focus on the assessment of opportunities and threats in the environment and by activities which focus on generating and specifying ideas for potential new BMs (Wagner et al., 2017). Three key activities have been identified with this phase at firm Beta.

The first activity within this phase refers to the understanding of new customer demand. The product manager of firm Beta reported how the simple technique of "listening" to customers enabled firm Beta to identify a real new BM opportunity. In fact, the new business opportunity of producing bio-fertilizer was identified the first time when an existing customer reached out and asks for organic matter derived. The product manager realized this as a new opportunity, and was willing to carry out a deeper analysis of this emergent opportunity. He built a small research team, which focused mainly on this unusual customer request, and later on established a whole new value proposition around it.

The second key activity within this phase refers to the assessment of legal and regulatory forces. The director of firm Beta reported that regulatory changes had a tremendous impact on the business of Beta. He explained that they arranged regular meetings with colleagues from the government relations department in order to get a regular political, legal and regulatory briefing on all issues that can impact the business. They then followed up on these changes.

Table 13 summaries the major managerial and operational practices identified at firm Beta associated with the sensing phase of the BMI process.

Phase I: Identifying, Experimenting With and Exploiting Business Opportunities	
Activities:	**Representative Quotations:**
Understanding new customer demand	"The reason we have changed out business model was triggered by an unusual request by one of our customers. This was the reason we tried out something really different."
Assessing legal and regulatory forces	"The industry itself is another. The industry is nowadays driven by an external pressure of new regulations and polices. If you don't somehow make you operation compatible with these regulatory requirements it means incurring fines, penalties and potential legal issues, or even closure if you are found to be non-compliant."
	"Monitoring new laws is a complex and ever-changing process. However, failing to do so could cause you to fall behind your competition. Only if you understand the legislative and regulatory environment that you're operating in, allows you to plan for those changes effectively. In the end, the more you understand the more you can control the impact of the expenses on your bottom line."
	"You cannot just sit back and wait for new regulations to mandate you."

Table 13 *Major Managerial and Organizational Activities that Undergird the Sensing Phase of the BMI Process at Firm Beta*

Phase II – Seizing

Following the positive outcomes of the activities identified in the phase one, firm Beta entered the second phase, seizing. The seizing phase played a crucial role for the BMI process at firm Beta. During this phase BM requirements were identified and the new BM concept was further tested and developed. Based on the findings from the interviews, three major activities were identified.

The first activity referred to the understanding of customer (farmer) needs. The activity identified refers to the integration of customers into the actual design and development process of the new BM. The product manager at firm Beta emphasized that it was the needs of the farmers and their suggestions that set the starting point for the product requirements for the organic fertilizer.

The second activity identified for the seizing phase of the BMI process refers to hiring personnel. Interview respondents from Beta reported that they extended their competence base by hiring three quality assurance microbiologists. Their knowledge of the overall biological process had a drastic impact on the end product, and thus for the business success.

As outlined by one of the CTOs, another key task in the seizing phase refers to product testing and validation. The firm invested substantial time and efforts to develop, test and validate the new idea to produce bio-fertilizer but also to produce animal feeds. This was also a necessary step to acquire internationally and industry recognized certifications and accreditations from the German and European Ministry of Agriculture as the product manager explained.

Phase II: Mobilization of Resources to Address Identified Opportunity and to Capture Value from It	
Activities:	**Representative Quotations:**
Conducting market research-gathering customer feedback	"We presented out initial idea to local farmers and then incorporated their feedback into our product requirements." "Our customer base became our own R&D department. They were the ones who helped to identify the specifications, did the product reviews, and decided what elements are important and what could be postponed to a later release." "During the feedback sessions with our customers, we become aware of what farmers found appealing and how well competitors' products actually were serving its customers."
Hiring or cooperating with skilled people	"We spent a lot of time figuring out whom to partner with, doing really careful diligence. I mean we cannot operate a green power plant and then source materials that are produced and supplied in an unsustainable fashion."
Optimization, Verification, Testing	"Vermicomposting is a complex process requiring endless quality checks, edits, and adjustments." "It was just like cooking in the kitchen - you had to experiment and mix up all ingredients and see what worked. If your vermicompost was to dry, you had to change the temperature or add more water and vice versa." "We had no customer base - no one had ever heard of us, even less of vermicomposting. So we had to prove its quality by acquiring all the needed certifications in our area of specialisation." "The biogas plant slurry was fed to the earthworms under controlled laboratory conditions for 30 days. Various bio-chemical factors before and after vermicomposting were measured and adjusted. The biomass was, then, controlled in regards to pH level, pathogen substances, and nutrient balance; and the overall effect on soil properties and plant growth were also examined periodically."

Table 14 *Major Managerial and Organizational Activities that Undergird the Seizing Phase of the BMI Process at Firm Beta*

Phase III – Reconfiguring

The final phase, reconfiguring, was dedicated to the production ramp-up and launch of the new BM. The main activities in this phase focused on raising awareness and understanding about the new BM and building the necessary skills to operate it throughout the entire firm. Two major activities were identified for this phase.

The first activity refers to fostering employee motivation and commitment, by raising awareness and understanding about the new BM. Interview respondents from Beta reported that it was essential to communicate the changes on all levels.

A second activity, which was reported throughout the interviews, is the defining, clarifying and enforcing responsibilities.

Phase III: Business Opportunities	
Activities:	**Representative Quotations:**
Fostering employee motivation and commitment	"It is not that easy to just integrate another BM into established structures and processes. Only if you had convinced everybody of the new BM you managed to integrate the two BMs successfully."
Defining, clarifying and enforcing responsibilities	"A successful integration is only possible if the new processes are clarified and developed and if all employees do adopt them."
	"We first had to identify connections, overlaps and similarities between the processes of the two businesses and uncover opportunities to integrate."

Table 15 *Major Managerial and Organizational Activities that Undergird the Reconfiguring Phase of the BMI Process at Firm Beta*

6.4 Summary

The aim of this chapter was to explore the nature of the BMI process in two incumbent firms from mature industries. Two retrospective case studies were conducted to empirically investigate how the process of BMI unfolds in these firms and to investigate the activities that undergird the BMI process. Based on the findings of this chapter, a cross-case analysis will be conducted in Chapter 7.

7. SYNTHESIS OF FINDINGS

The within-case analysis in the last chapter enabled us to examine the BM process of each individual case firm. This chapter discusses the main findings from the both case firms in place, and links them to the research questions formulated in Chapter 1. The findings on the basis of (1) the overall BMI characteristics, the (2) overall BMI process structure, the phases and the underlying managerial and organizational activities, and (3) the role of micro-foundations in the BMI process are outlined.

7.1 General BMI characteristics

Based on the data collected it is possible to depict several BMI characteristics. Six major categories can be summarised: primary external triggers, primary internal triggers, enabling triggers, delaying circumstances; as well as BMI categorization and typology.

External Triggers

- Firms were *restricted* to new *legal requirements*. The pressure to avoid compliance risks motivated both case studies to work intensively to realise a change in the traditional BM.
- It was the *market conditions*, such as the increased total waste generation in Germany and the increase in metal prices, which played a major role in making the new value proposition of both firms happen.
- The increasing *shift* in *consumer behaviour* towards sustainability, forced both firms to promote environmentally friendly methods in their operations.

Internal Triggers

- There was a *strong attitude* of the management board to not only create a positive impact but also to become a pioneer in the new technology.
- The new opportunity was considered to be a *win-win situation* for firm Alpha, as it opened up a new revenue stream and reduced the firm´s operating costs and compliance risks. These three aspects encouraged the management board to get seriously involved in the BMI process.

Enabling Triggers

- The design of the new BM and the whole development project was initially steered by the management board. The *high priority and support* of the management board guaranteed that the required resources were provided fast and bureaucratically, enabling a simpler and faster BMI process.
- It was the *contribution of the academic and industry partners but also the contribution of new personnel*, their judgments, knowledge and their competences, which have paved the way to a successful BMI.
- Both analysed firms have invested into *technology* development. Firm Alpha mostly invested in the development of x-ray transmission technologies while Firm Beta mainly in vermicomposting technologies. It was the technology in both cases that opened the way to the new value propositions.
- *New regulations* did not only force the two case firms to adjust their existing BM, but also gave firm Beta a reason to develop an entirely new value proposition. For safety reasons most animal by-products had been subject to severe restrictions in their use for feed farm animals in the EU. The European Commission started to reform these stringent rules and authorized its use. This new regulation was the first step in a series of events which led to the new value proposition of Firm Beta.

Delaying Circumstances

- There was a *lack of communication* within both case firms. This lack of communication created distrust and uncertainty in the workplace, leading to lower employee engagement levels and resistance.
- The *firm´s training programmes in* firm Alpha had not been adapted to the requirements of the new BM. As a result, the sales force was lacking the required technical know-how to sell the new value proposition.
- There were *conflicts* with employees in the case study Beta regarding the new BM. Some employees lacked the specific skills and knowledge needed to adapt easily to the new BM and some employees feared losing their jobs. This fear caused stress and discomfort for many employees.
- There was a *lack of enthusiasm* from the research and industry partners regarding the feasibility of the new technology. Metal recovery had been considered by some to be unprofitable and too risky, which slowed down the BM development for firm Alpha. The use of by-products for animal stock had been considered by some as unethical which left firm Beta with constraints.

This summary of findings shows that the external trigger was considered more likely than the internal trigger to drive the BM changes, and that internal barrier were considered more likely to delay process of BMI.

Business Model Innovation Categorization and Typology

A comparison of the two BMIs employed by the two case firms reveals that both BMIs can be categorized as *unique* (see Chapter 2.3.3 for a detailed explanation). Firm Alpha and firm Beta both created an innovative new BM derived from their own technological breakthrough. Their process of BMI thus falls into the category of a unique BM, as the new BM did not exist by another firm.

Furthermore, a comparison of the two types of BMI employed by the two case firms reveals that they both emphasized radical innovations and expansions into new target markets and thus can be categorized as radical new BMIs. Whereas radicalism refers to the newness of each building block and complexity refers to the number of building blocks that have changed it is important to mention that Beta´s BMI process was to some extent more complex and new. Firm Alpha introduced two new value propositions and also included several more changes in building blocks than firm Alpha. As a consequence, Beta´s degree of innovation, acquisition of new customers, and speed of innovation were all notably fast and extensive. Nevertheless, regardless of the two new value propositions at firm Beta, a relatively high degree of radicalism can be observed at both firms.

7.2 The Business Model Innovation Process, its Phases and Underlying Managerial and Organizational Activities

This first major finding of this thesis sheds light on the nature of the BMI process, the process phases and the underlying organizational and managerial activities. Findings give evidence that incumbent firms can manage to innovate their traditional BM by using a structured innovation process. Three phases can be distinguished: A sensing phase, within which a threat and a new opportunity were identified, followed by the development, selection and validation of a new BM to pursue the previously identified opportunity. A seizing phase, during which new BM and technology in place were further developed, tested and adjusted; and a reconfiguring phase, during which the new BM was scaled up in size and implemented into the whole firm. Table 16 shows the specific underlying organizational and managerial activities that were observed in the case studies for each process phase. Each process phase and key underlying managerial and organizational activities will be discussed in turn.

(1) Phase 1: Sensing

The sensing phase was the initial step and focused on assessing new threats, identifying and creating new BM alternatives. The phase included the following five activities: 1) practices to assess legal and regulatory forces; (2) practices to search for innovative ideas, (3) practices to identify target market, customer demands, (4) practices to build workforce involvement and commitment in ideation; and (5) practices to evaluate and validate the new idea for feasibility and viability.

All interview respondents reported that the starting point for the sensing phase was triggered by a challenge, namely new regulations. Both firms considered in the study were restricted by the upcoming government regulations. These new regulations forced the firms to adjust their BM in order to comply with the new laws and regulations in place. In both research sites the BMI process was however, initiated by a member of top management. Whereas the managing director of Alpha decided an idea on its own, firm Beta engaged in a more formal assessment by putting together a small group of employees to ideate an alternative BM which could save their firm. The idea was then further evaluated on feasibility and strategic fit. At the end of the phase the final idea/BM was selected and relevant change management principles were enacted. The whole phase of finding a new idea and finally a new BM was rather short in both case studies (approximately half a year). The new idea in both cases was considered to be unique as it created a win-win situation for the firms by reducing costs and compliance risks and increasing revenues. These three factors encouraged the management board of both case firms to appreciate and to get involved into the process of BMI. By involving the CTO, CBDO and the CFO directly in the process in firm Alpha, it was feasible to develop the technical, financial and business infrastructure way faster compared to firm Beta.

(2) Phase 2: Seizing

The second phase focused on researching, testing and adjusting the new BM on a larger scale. The seizing phase involved the following main activities: (1) practices to sustain and improve technological competencies (2) practices to involve customers in the development phase, (3) practices to acquire and allocate resources (human, financial, intangible etc.), and (4) practices to test the new BM.

This phase lasted approximately two years and included a surprisingly short period of time for developing the new BM included for Firm Alpha the XDR machinery development (approximately 12 months) and for firm Beta the vermicomposting technology (approximately 8 months). Despite

this rapid progress the BM this realization phase was a difficult undertaking for both case firms. Principally this was happening at firm Alpha due to the fact that the whole BMI process was mainly driven and piloted by the management board. In the course of the project, there were many occasions were false decisions were taken or could not be taken quickly enough by the management board due to their other responsibilities in the firm. The management board became aware of this issue and initiated a team composed of a separate little R&D team, several research and industry partners, machine operators and engineers, and finally a project team who was responsible for the coordination of the whole BMI process.

(3) Phase 3: Reconfiguring

During the reconfiguring phase the focus for the both case firms in the sample switched from designing, testing and adjusting the BM to spreading it out to the whole firm. During this last phase the main activities performed were: (1) practices to define, clarify and enforce responsibilities, and (3) practices to foster employee motivation and commitment.

The subsequent process phase was realized in about one year. The fast progression was happening at firm Alpha due to the fact that the new metal recovery process did not have a significant impact on the operational performance of the power plant. The new system of metal recovery is mainly a supplement to the whole process chain of the power plant. And as the power plant was already installed with several conveyor belts at the end of the combustion process, it was an ideal starting position for the reintegration of the two processes. Hence, the integration phase was more focused on the operational aspects and qualitative aspects of the change and involved areas such as structural, culture and policy factors. The integration phase of firm Beta was however realized in a about twice the time. This was due to the fact that the new BM consisted of far more changes of the traditional BM components, and the new components had also a significant impact on the operational performance of the power plant. Therefore, such sub phase began with extensive deployment pilot studies, where multiple BM integration strategies were tested beforehand.

BMI Process Phases and their underlying activities	
BMI Process Phases:	**Underlying Activities:**
Phase I: Identifying, Experimenting With and Exploiting Business Opportunities (Sensing)	(1) practices to assess legal and regulatory forces; (2) practices to search for innovative ideas, (3) practices to identify target market, customer demands, (4) practices to build workforce involvement and commitment in ideation; (5) practices to evaluate and validate the new idea for feasibility and viability.
Phase II: Mobilization of Resources to Address Identified Opportunities and to Capture Value from it (Seizing)	(1) practices to sustain and improve technological competencies (2) practices to involve customers in the development phase, (3) practices to acquire and allocate resources (human, financial, intangible etc.), (4) practices to test the new BM.
Phase III: Managing Threats and Transformations (Reconfiguring)	(1) practices to define, clarify and enforce responsibilities, (2) practices to foster employee motivation and commitment, decentralization and decomposability.

Table 16: *The Main Phases of the BMI Process and the Underlying Activities*

7.3 The Notion and Role of Micro-foundations in the Process of Business Model Innovation

This second major finding of this thesis sheds light on the notion of micro-foundations and their role in the BMI process. Findings give evidence that all four micro-foundations (sensing, learning, integrating, and coordinating) suggested by Pavlou and El Sawy (2011) have been identified in both case studies.
Furthermore findings give evidence regarding the role of the micro-foundations of DCs in the process of BMI; two roles of micro-foundations can be distinguished: first-order creating micro-foundations (FOCM) and first-order realizing micro-foundation (FORM).
First, the present study gives evidence to the perceived role of the two micro-foundations sensing and learning in the process of BMI. Both micro-foundations helped firm Alpha and firm Beta to create the potential value of the BMI process and thus to create the BM dimensions "value delivery´ and ´value proposition´ and the higher-order capabilities. The sensing and learning micro-foundations, thus, can be referred to as first-order creating micro-foundations (FOCM).
Second, the results of the present paper gave support to the perceived role of the integrating and coordinating micro-foundations. They are both required to realize the BMI process, to achieve the BM dimension ´value capture´ and thus to also to achieve the value of the higher-order capabilities. They can be referred to as first-order realizing capabilities (FORC).

7.4 A Dynamic Capability based Framework of the Business Model Innovation Process

Figure 8 provides an illustration of the findings of subsection 7.2., 7.3 and 7.4. The framework contains (i) the overall BMI process structure, (iii) the starting and end point, (ii) three individual process phases with their respective activities, and (iii) underlying micro-foundations.

The framework entails three major BMI process phases: the sensing, seizing and reconfiguring phase. Within the sensing phase the new idea for a BM is developed and validated. Within the seizing phase the actual BM is designed, tested, adjusted and implemented on a larger scale; and the new and stable BM is then implemented into the established firm (reconfiguring phase).
The sensing phase is enacted after the *starting point*. The starting point refers to a moment in time when the firm has acknowledged an impetus for initiating a BMI process. The *endpoint* refers to the end of the overall BMI process. This occurs, when the new BM is officially integrated into the established firm. There is, however, no exact endpoint of the overall BMI process, as the BM is scaled up and refined further.
Figure 8 illustrates the three phases and their underlying activities as a certain chain of events and as quite linear. While this holds generally true, as the overall BMI processes might follow these certain chain of events linearly, each process phase requires room for multiple iterations. Firm Beta showed that ideas for the new BM were not conceptualized entirely in the first attempt and the firm had to go back to the sensing phase to re-conceptualize and create some alterations in the BM before being able to operationalize it in the next phase. Moreover, firm Alpha showed that they run into a number of problems in the sensing phase. The firm had to re-iterate a number of times as the proposed technology or machinery required further grounding.

Furthermore, the four micro-foundations (sensing, learning, integrating, and coordinating) acknowledged by Pavlou and El Sawy (2011) have been identified in both case studies. They are deployed throughout the three phases, concentrating with a changing role on the process phases. They are, however, all essential to the achievement of the BMI process, whereby the sensing and learning micro-foundations largely help to create the first two BMI process phases, the coordinating and integrating micro-foundations largely help to realize the last process phase of the BMI.

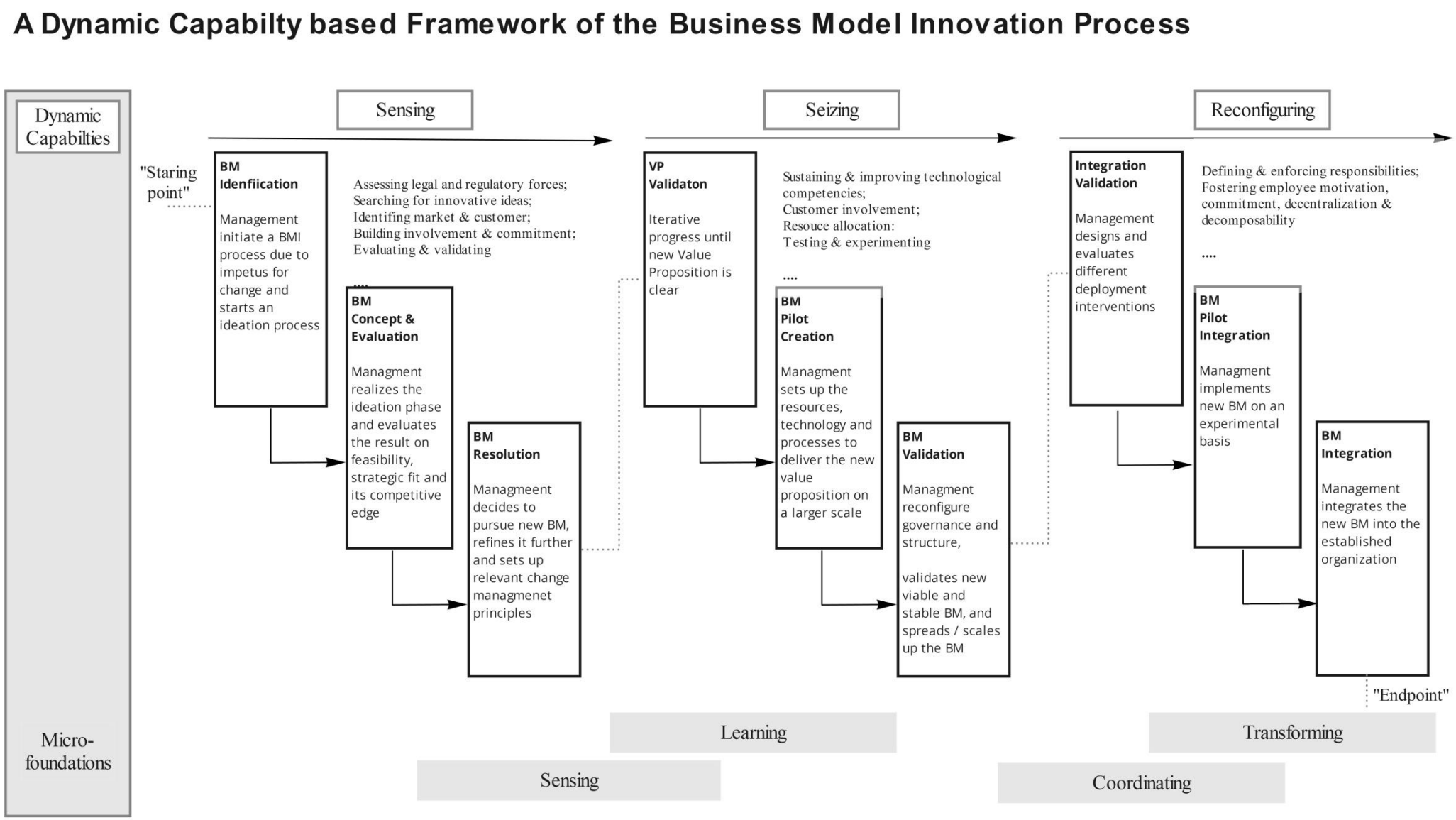

Figure 8: *A Dynamic Capability based Framework of the Business Model Innovation Process* (Source: Own illustration)

8. CONCLUSION

The BMI concept is gaining substantive attention in academia and in practice, emphasizing its role to act as a mechanism to help firms remain competitive and survive in rapidly changing business environments (Johnson et al., 2008; Zott & Amit, 2007). However, little advancement has been made towards a holistic understanding of the nature of the BMI process, along with its underlying enabling micro-foundations, especially in the context of incumbents from mature industries.
This empirical investigation aimed to address this deficiency and investigate the process through which BMI occurs in two waste management operations and identify the role of micro-foundations. In particular this research formulated the following research question:

How does the process of BMI unfold and what role do the micro-foundations of dynamic capabilities play within this process?

Combining the theoretical insights of the literature on DCs and BMI, the paper refined the process of BMI as a cluster or three capacities sensing, seizing and reconfiguring, with its underlying micro-foundations (learning, sensing, integrating, coordinating) influencing the development of the BMI process. Following this view, the study has shed light on the research question in a number of ways.

First, this thesis suggests that incumbent firms can manage to innovate their BM by following three major phases:
The sensing phase was the initial step and was focused on identifying new BM alternatives, and creating and evaluating the new value propositions. This phase include activities to assess legal and regulatory forces, activities for identifying changing customer needs and external technologies, building commitment, and activities for evaluating and validating.
The second phase focused on researching and developing the new BM, including the design, testing and refinement of the new value proposition and technology in place. The seizing phase involves activities for selecting and improving technologies, cultivating customer involvement, and activities for resource allocation, testing and experimenting.
During the last phase the focus for the both case firms in the sample switched from designing and adjusting the new BM to spreading it out. This phase thus involves the realignment of tangible and intangible assets in a way that allow the new BM to take over the traditional BM. The reconfiguring phase involves activities for fostering employee commitment and activities to define and enforce responsibilities.

Second, in order to purse a BMI process, incumbent firms from mature industries need to build certain capabilities that facilitate the process of BMI. The four micro-foundations (sensing, learning, integrating, coordinating) suggested by the literature have been identified in both case studies. In addition, the present study gives evidence to the role of the micro-foundations in the process of BMI within the research context. Sensing and learning micro-foundations both help to *create* the BMI process, to create higher-order capabilities and thus to create the BM dimension ´value offering´ and ´value delivery´; whereas the integrating and coordinating micro-foundations both are required to *realize* the BMI process, to realize higher-order capabilities and to finally achieve the ´value capture´ dimension. The sensing and learning micro-foundations, thus, can be referred to as first-order creating micro-foundations (FOCM) and the integrating and coordinating micro-foundations can be referred to as first-order realization micro-foundations (FORM).

8.1 Practical Implications

While a number of scholars had pointed out the practical relevance of BMI to remain competitive and survive in changing environments, it had remained unclear how incumbent firms innovate a BM and what kind of micro-foundations are relevant for business manager to achieve such a BMI. Scientifically-derived frameworks and concepts supporting managers in their BMI efforts are missing in literature, but highly requested (Bucherer et al., 2012; Kim & Min, 2015; Lüttgens & Montemari, 2016; Martins et al., 2015).
The present study contributes towards filling these gaps, by developing a framework which addresses the different phases of the BMI process, from early conceptualization to implementation. This framework can guide incumbent firms through their BMI process with its different phases and activities and help to map the enabling micro-foundations. Nevertheless, there is no universal method to BMI or a definite set of micro-foundations which managers should adopt. This study only highlights those BMI process phases, activities and micro-foundations carried out by business mangers across two case studies. The findings, thus, could be used by business manager as an assessment tool to reflect upon their overall BMI processes and whether they devote enough attention to enabling micro-foundation that are relevant for performing a BMI process.

8.2 Theoretical Implications

Despite the acknowledgement of the importance of a BMI, existing research offers only limited clarity on the BMI process within incumbent firms from mature industries, and fails to sufficiently provide guidance to practitioners on how to successfully adopt their BM to changes in market demands, while at the same time leveraging and building their internal firm. In addressing these literature gaps, the theoretical contributions are as followed:
First, the scope of BMI literature is expanded from new firms (often high tech, start-up, and spin off companies) to incumbent firms, especially in the context of mature industries.
Second, the paper contributes to a better understanding of the BMI process by providing an integrative framework, which systematically outlines how a BMI unfolds in incumbent firms.
Third, although theoretical links between DCs, its underlying micro-foundations and BMI are currently being laid out in the strategic management literature, to date little empirical efforts have been made to investigate the BMI process of incumbent firms through a DC perspective. The present study contributes to filling this gap and reveals the micro-foundations that underlie the dynamic capabilities of BMI. Thus, this paper follows recent calls in the literature that have drawn attention towards enhancing the concept of DC by exploring the micro-foundations that make up the DC concept (Ambrosini & Bowman, 2009; Wang & Ahmed, 2007).

8.3 Limitations and Avenues for Future Research

Despite its contributions and strong implications, this present paper comes with several limitations. The chosen research set-up has advantages but also certain limitation in it usage. First, the researchers´ own subjective feeling may influence the case study (researcher bias). Second, dealing with interviews in this study as the primary source of data, provides limitations such as interviewees biased and/or incomplete representations of other members of the organization. In addition, interview respondents were primarily from the ranks of middle to top management, neglecting to a wider extent other internal and external stakeholder views. Third, the sample of this study is neither comprehensive nor reprehensive and only reflects the perspective of two German waste management firms, the findings, thus, do not lay claim to statistical but rather to analytical generalizability.

Beside limitations and challenges, the developments discussed in this thesis also offer interesting potential for further research. They include the following:

The process of BMI. Further research holds great promise if it aims to gain a better understanding of the phases and the micro-foundations that characterize the BMI process of incumbents in mature industries. Future studies should test the present findings in a study of a broader sample of firms with similar characteristics to the two focal firms. This would help to find out if the proposed BMI process can be successfully replicable to firms of similar characteristics. Apart from this, future research on the BMI process should also investigate circumstances, where the BMI process does not lead to success and examine differences in the process.

The role of management and personnel. One insight of the thesis is that top managers were key in initiating the overall BMI process. Future research should extent the number of involved parties in order to understand the role of other key personnel affecting the development and employment of a BM.

Cross-national and cross-industry comparison. Different industry or national settings may require distinctive BMI process characteristics. Future research on BMI should zoom in on these differences and observe traits of practice convergence or divergence.

Further contextual factors. The present study predominantly focused on the overall BMI process and its underlying strategizing activities. On that note, there are differentiating factors external to this context that needs additional consideration, such as corporate culture, which could affect the overall BMI process and the efficiency of its underlying micro-foundations. Further research could help practitioners to better understand the scale and complexity of such influences and to evaluate prevention efforts.

Knowledge gained from additional research in these areas holds the potential to considerably determine BMI practice as well as innovation research in the coming years.

9. REFERENCES

Abell, P., Felin, T., & Foss, N. (2008). Building micro-foundations for the routines, capabilities, and performance links. *Managerial and Decision Economics*, *29*(6), 489-502.

Afuah, A., & Tucci, C. L. (2001). *Internet Business Models and Strategies*. New York, NY: McGraw-Hill.

Agarwal, R., & Helfat, C. E. (2009). Strategic renewal of organizations. *Organization Science*, *20*(2), 281-293.

Ambrosini, V., & Bowman, C. (2009). What are dynamic capabilities and are they a useful construct in strategic management?. *International journal of management reviews*,*11*(1), 29-49.

Amit, R., & Schoemaker, P. J. (1993). Strategic assets and organizational rent. *Strategic Management Journal*, *14*(1), 33-46.

Amit, R., & Zott, C. (2001). Value creation in e-business. *Strategic Management Journal*, *22*(6-7), 493-520.

Amit, R., & Zott, C. (2010). Business model innovation: Creating value in times of change.

Amit, R., & Zott, C. (2012). Creating value through business model innovation. *MIT Sloan Management Review*, *53*(3), 41.

Andries, P., & Debackere, K. (2006). Adaptation in new technology-based ventures: Insights at the company level. *International Journal of Management Reviews*, *8*(2), 91-112.

Andries, P., & Debackere, K. (2007). Adaptation and performance in new businesses: Understanding the moderating effects of independence and industry. *Small Business Economics*, *29*(1), 81-99.

Arend, R. J. (2013). The business model: Present and future—beyond a skeumorph. *Strategic Organization*, *11*(4), 390-402.

Arthurs, J. D., & Busenitz, L. W. (2006). Dynamic capabilities and venture performance: The effects of venture capitalists.*Journal of business venturing*, *21*(2), 195-215.

Aspara, J., Hietanen, J., & Tikkanen, H. (2010). Business model innovation vs replication: financial performance implications of strategic emphases. *Journal of Strategic Marketing*, *18*(1), 39-56.

Augier, M., & Teece, D. J. (2009). Dynamic capabilities and the role of managers in business strategy and economic performance. *Organization Science*, *20*(2), 410-421.

Baden-Fuller, C., & Morgan, M. S. (2010). Business models as models. *Long Range Planning*, *43*(2), 156-171.

Barjak, F., Niedermann, A., & Perret, P. (2013). *The Need for Innovations in Business Models. School of Business, University of Applied Sciences and Arts Northwestern Switzerland European Union Service Contract No* (Vol. 2). SC-RTD.

Barney, J. (1991). Firm resources and sustained competitive advantage. *Journal of Management*, *17*(1), 99-120.

Barney, J. A. Y., & Felin, T. (2013). What are microfoundations? *Academy of Management Perspectives*, *27*(2), 138-155.

Barreto, I. (2010). Dynamic capabilities: A review of past research and an agenda for the future. *Journal of Management*, *36*(1), 256-280.

Baxter, J., & Eyles, J. (1997). Evaluating qualitative research in social geography: establishing 'rigour'in interview analysis. *Transactions of the Institute of British Geographers*, *22*(4), 505-525.

Bernroider, E. W., Wong, C. W., & Lai, K. H. (2014). From dynamic capabilities to ERP enabled business improvements: The mediating effect of the implementation project. *International Journal of Project Management*, *32*(2), 350-362.

Bettis, R. A. (1991). Strategic management and the straightjacket: An editorial essay. *Organization Science*, *2*(3), 315-319.

Biederman, J., Mick, E., Faraone, S. V., Spencer, T., Wilens, T. E., & Wozniak, J. (2003). Current concepts in the validity, diagnosis and treatment of paediatric bipolar disorder. *The International Journal of Neuropsychopharmacology*, *6*(3), 293-300.

Bitsch, V. (2005). Qualitative research: A grounded theory example and evaluation criteria. *Journal of Agribusiness*, *23*(1), 75-91.

Björkdahl, J., & Holmén, M. (2013). Business model innovation–the challenges ahead. *International Journal of Product Development*, *18*(3/4), 213-225.

Bock, A. J., Opsahl, T., George, G., & Gann, D. M. (2012). The effects of culture and structure on strategic flexibility during business model innovation. *Journal of Management Studies*, *49*(2), 279-305.

Bouchikhi, H., & Kimberly, J. R. (2003). Escaping the identity trap. *MIT Sloan Management Review*, 44(3), 20-27.

Bourreau, M., Gensollen, M., & Moreau, F. (2012). The impact of a radical innovation on business models: Incremental adjustments or big bang?. *Industry and Innovation*, *19*(5), 415-435.

Brea-Solís, H., Casadesus-Masanell, R., & Grifell-Tatjé, E. (2015). Business model evaluation: quantifying Walmart's sources of advantage. *Strategic Entrepreneurship Journal*, *9*(1), 12-33.

Brousseau, E., & Pénard, T. (2007). The economics of digital business models: A framework for analyzing the economics of platforms. *Review of Network Economics*, *6*(2).

Bryman, A., & Bell, E. (2007). Business research strategies. *Business research methods*. Oxford, UK: Oxford University Press.

Bucherer, E. (2010). Business Model Innovation. *Guidelines for a Structured Approach.* Aachen, Germany: Shaker.

Bucherer, E., Eisert, U., & Gassmann, O. (2012). Towards systematic business model innovation: lessons from product innovation management. *Creativity and Innovation Management*, *21*(2), 183-198.

Cai, J., & Tylecote, A. (2008). Corporate governance and technological dynamism of Chinese firms in mobile telecommunications: A quantitative study. *Research Policy*, *37*(10), 1790-1811.

Cantrell, L. J. (2000). Changing business models: Surveying the landscape. *Accenture Institute for Strategic Change*.

Casadesus-Masanell, R., & Ricart, J. E. (2010). From strategy to business models and onto tactics. *Long Range Planning*, *43*(2), 195-215.

Casadesus-Masanell, R., & Ricart, J. E. (2011). How to design a winning business model. *Harvard Business Review*, *89*(1/2), 100-107.

Casadesus-Masanell, R., & Zhu, F. (2013). Business model innovation and competitive imitation: The case of sponsor-based business models. *Strategic Management Journal*, *34*(4), 464-482.

Cavalcante, S., Kesting, P., & Ulhøi, J. (2011). Business model dynamics and innovation:(re) establishing the missing linkages. *Management Decision*, *49*(8), 1327-1342.

Cavusgil, E., Seggie, S. H., & Talay, M. B. (2007). Dynamic capabilities view: Foundations and research agenda. *Journal of marketing theory and practice*, 15(2), 159-166.

Chatterjee, S. (2013). Simple rules for designing business models. *California Management Review*, *55*(2), 97-124.

Chesbrough, H. (2010). Business model innovation: opportunities and barriers. *Long Range Planning*, *43*(2-3), 354-363.

Chesbrough, H., & Rosenbloom, R. S. (2002). The role of the business model in capturing value from innovation: evidence from Xerox Corporation's technology spin-off companies. *Industrial and Corporate Change*, *11*(3), 529-555.

Collis, D. J. (1994). Research note: how valuable are organizational capabilities?. *Strategic Management Journal*, *15*(S1), 143-152.

Conner, K. R., & Prahalad, C. K. (1996). A resource-based theory of the firm: Knowledge versus opportunism. *Organization Science*, *7*(5), 477-501.

Crossan, M. M., & Apaydin, M. (2010). A multi-dimensional framework of organizational innovation: A systematic review of the literature. *Journal of Management Studies*, *47*(6), 1154-1191.

Crowston, K., & Kammerer, E. E. (1998). Coordination and collective mind in software requirements development. *IBM Systems Journal*, 37(2), 227-245.

Danneels, E. (2008). Organizational antecedents of second-order competences. *Strategic Management Journal*, *29*(5), 519-543.

DaSilva, C. M., Trkman, P., Desouza, K., & Lindič, J. (2013). Disruptive technologies: a business model perspective on cloud computing. *Technology Analysis & Strategic Management*, *25*(10), 1161-1173.

D'Aveni, R. A., & Gunther, R. E. (1994). *Hypercompetition: Managing the dynamics of strategic maneuvering*. New York, NY: The Free Press.

Day, G. S. (1994). The capabilities of market-driven organizations. *The Journal of Marketing*, 37-52.

De Reuver, M., Bouwman, H., & Haaker, T. (2013). Business model roadmapping: A practical approach to come from an existing to a desired business model. *International Journal of Innovation Management*, *17*(01), 1-18.

Demil, B., & Lecocq, X. (2010). Business model evolution: in search of dynamic consistency. *Long Range Planning*, *43*(2), 227-246.

Demil, B., Lecocq, X., Ricart, J. E., & Zott, C. (2015). Introduction to the SEJ special issue on business models: business models within the domain of strategic entrepreneurship. *Strategic Entrepreneurship Journal*, *9*(1), 1-11.

Desyllas, P., & Sako, M. (2013). Profiting from business model innovation: Evidence from Pay-As-You-Drive auto insurance. *Research Policy*, *42*(1), 101-116.

DeTienne, D. R., & Chandler, G. N. (2004). Opportunity identification and its role in the entrepreneurial classroom: A pedagogical approach and empirical test. *Academy of Management Learning & Education*, *3*(3), 242-257.

Di Stefano, G., Peteraf, M., & Verona, G. (2010). Dynamic capabilities deconstructed: a bibliographic investigation into the origins, development, and future directions of the research domain. *Industrial and Corporate Change*, *19*(4), 1187-1204.

Dierickx, I., & Cool, K. (1989). Asset stock accumulation and sustainability of competitive advantage. *Management science*, 35(12), 1504-1511.

Dmitriev, V., Simmons, G., Truong, Y., Palmer, M., & Schneckenberg, D. (2014). An exploration of business model development in the commercialization of technology innovations. *R&D Management*, *44*(3), 306-321.

Dosi, G., Nelson, R., & Winter, S. (Eds.). (2000). *The nature and dynamics of organizational capabilities*. New York, NY: Oxford University Press.

Doz, Y. L., & Kosonen, M. (2010). Embedding strategic agility: A leadership agenda for accelerating business model renewal. *Long Range Planning*, *43*(2), 370-382.

Dubosson-Torbay, M., Osterwalder, A., & Pigneur, Y. (2002). E-business model design, classification, and measurements. *Thunderbird International Business Review*, *44*(1), 5-23.

Eisenhardt, K. M. (1989). Building theories from case study research. *Academy of Management Review*, *14*(4), 532-550.

Eisenhardt, K. M., & Brown, S. L. (1999). Patching. Restitching business portfolios in dynamic markets. *Harvard business review*, 77(3), 72-82.

Eisenhardt, K. M., & Martin, J. A. (2000). Dynamic capabilities: what are they?. *Strategic Management Journal*, *21*(10-11), 1105-1121.

Eisenhardt, K. M., & Sull, D. N. (2001). Strategy as simple rules. *Harvard Business Review*, *79*(1), 106-119.

Eisenhardt, K. M., Furr, N. R., & Bingham, C. B. (2010). CROSSROADS—Microfoundations of performance: Balancing efficiency and flexibility in dynamic environments. *Organization Science*, *21*(6), 1263-1273.

Eisenmann, T. (2002). *Internet business models: Texts and cases.* New York, NY: McGraw-Hill/Irwin.

Enkel, E., & Mezger, F. (2013). Imitation processes and their application for business model innovation: An explorative study. *International Journal of Innovation Management*, *17*(01), 1-41.

Eppler, M. J., Hoffmann, F., & Bresciani, S. (2011). New business models through collaborative idea generation. *International Journal of Innovation Management*, *15*(06), 1323-1341.

Eriksson, P., & Kovalainen, A. (2008). Qualitative research evaluation. *Qualitative methods in business research*. London, UK: SAGE Publications.

Eriksson, T. (2014). Processes, antecedents and outcomes of dynamic capabilities. *Scandinavian Journal of Management*, *30*(1), 65-82.

Feagin, J. R., Orum, A. M., & Sjoberg, G. (Eds.). (1991). *A case for the case study*. Chapel Hill, NC: UNC Press Books.

Felin, T., & Foss, N. J. (2005). Strategic organization: A field in search of micro-foundations. *Strategic Organization*, 3(4), 441-455.

Felin, T., & Foss, N. J. (2009). Organizational routines and capabilities: Historical drift and a course-correction toward microfoundations. *Scandinavian Journal of Management*, *25*(2), 157-167.

Felin, T., & Powell, T. C. (2016). Designing organizations for dynamic capabilities. *California Management Review*, *58*(4), 78-96.

Foss, N. J., & Saebi, T. (2017). Fifteen years of research on business model innovation: How far have we come, and where should we go?. *Journal of Management*, *43*(1), 200-227.

Frost, T. S., & Zhou, C. (2005). R&D co-practice and 'reverse'knowledge integration in multinational firms. *Journal of International Business Studies*, *36*(6), 676-687.

Galunic, D. C., & Eisenhardt, K. M. (2001). Architectural innovation and modular corporate forms. *Academy of Management Journal*, *44*(6), 1229-1249.

Galunic, D. C., & Rodan, S. (1998). Resource recombinations in the firm: Knowledge structures and the potential for Schumpeterian innovation. *Strategic Management Journal*, *19*(12), 1193-1201.

Gambardella, A., & McGahan, A. M. (2010). Business-model innovation: General purpose technologies and their implications for industry structure. *Long Range Planning*, *43*(2), 262-271.

Garcia, R., & Calantone, R. (2002). A critical look at technological innovation typology and innovativeness terminology: a literature review. *Journal of Product Innovation Management*, *19*(2), 110-132.

Garud, R., & Nayyar, P. R. (1994). Transformative capacity: Continual structuring by intertemporal technology transfer. *Strategic management journal*, 15(5), 365-385.

Gassmann, O., Frankenberger, K., & Csik, M. (2013). *Geschäftsmodelle innovieren*. München, Germany: Hanser Verlag.

Gavetti, G., & Levinthal, D. (2000). Looking forward and looking backward: Cognitive and experiential search. *Administrative Science Quarterly*, *45*(1), 113-137.

Geertz, C. (1973). *The interpretation of cultures* (Vol. 5019). New York, NY: Basic books.

George, G., & Bock, A. J. (2011). The business model in practice and its implications for entrepreneurship research. *Entrepreneurship Theory and Practice*, *35*(1), 83-111.

Ghezzi, A., Cortimiglia, M. N., & Frank, A. G. (2015). Strategy and business model design in dynamic telecommunications industries: A study on Italian mobile network operators. *Technological Forecasting and Social Change*, *90*, 346-354.

Giesen, E., Berman, S. J., Bell, R., & Blitz, A. (2007). Three ways to successfully innovate your business model. *Strategy & Leadership*, *35*(6), 27-33.

Gilbert, C., Eyring, M., & Foster, R. N. (2012). Two routes to resilience. *Harvard Business Review*, *90*(12), 65-73.

Grant, R. M. (1996). Toward a knowledge-based theory of the firm. *Strategic Management Journal*, *17*(S2), 109-122.

Guba, E. G. (1981). Criteria for assessing the trustworthiness of naturalistic inquiries. *Educational Technology Research and Development*, *29*(2), 75-91.

Guba, E. G., & Lincoln, Y. S. (1982). Epistemological and methodological bases of naturalistic inquiry. *Educational Technology Research and Development*, *30*(4), 233-252.

Hamel, G., & Ruben, P. (2000). *Leading the revolution* (Vol. 286). Boston, MA: Harvard Business School Press.

Harreld, J. B., O'Reilly III, C. A., & Tushman, M. L. (2007). Dynamic capabilities at IBM: Driving strategy into action. *California Management Review*, *49*(4), 21-43.

Heaton, S., Linden, G., & Teece, D. (2014). Business model innovation and organizational design: a dynamic capabilities perspective.

Helfat, C. E., & Peteraf, M. A. (2003). The dynamic resource-based view: Capability lifecycles. *Strategic Management Journal*, *24*(10), 997-1010.

Helfat, C. E., & Peteraf, M. A. (2009). Understanding dynamic capabilities: progress along a developmental path. *Strategic Organization*, 7(1), 91-102.

Helfat, C. E., & Peteraf, M. A. (2015). Managerial cognitive capabilities and the microfoundations of dynamic capabilities. *Strategic Management Journal*, *36*(6), 831-850.

Helfat, C. E., & Winter, S. G. (2011). Untangling dynamic and operational capabilities: Strategy for the (N) ever-changing world. *Strategic management journal*, 32(11), 1243-1250.

Helfat, C. E., Finkelstein, S., Mitchell, W., Peteraf, M., Singh, H., Teece, D., & Winter, S. G. (2007). *Dynamic capabilities: Understanding strategic change in organizations*. Oxford, UK: John Wiley & Sons.

Henderson, R. (1994). The evolution of integrative capability: innovation in cardiovascular drug discovery. *Industrial and Corporate Change*, *3*(3), 607-630.

Hodgson, G. M. (2012). The mirage of microfoundations. *Journal of Management Studies*, *49*(8), 1389-1394.

Ishak, N., & Bakar, A. (2012). Qualitative data management and analysis using NVivo: an approach used to examine leadership qualities among student leaders. *Education Research Journal*, *2*(3), 94-103.

Jantunen, A. (2005). Knowledge-processing capabilities and innovative performance: an empirical study. *European Journal of Innovation Management*, *8*(3), 336-349.

Jaworski, B. J., & Kohli, A. K. (1993). Market orientation: antecedents and consequences. *Journal of marketing*, *57*(3), 53-70.

Johannessen, J. A., Olsen, B., & Lumpkin, G. T. (2001). Innovation as newness: what is new, how new, and new to whom?. *European Journal of Innovation Management*, *4*(1), 20-31.

Johnson, M. W. (2010). *Seizing the white space: Business model innovation for growth and renewal*. Boston, MA: Harvard Business Review Press.

Johnson, M. W., Christensen, C. M., & Kagermann, H. (2008). Reinventing your business model. *Harvard Business Review*, *86*(12), 57-68.

Khanagha, S., Volberda, H., & Oshri, I. (2014). Business model renewal and ambidexterity: structural alteration and strategy formation process during transition to a Cloud business model. *R&D Management*, *44*(3), 322-340.

Kim, S. K., & Min, S. (2015). Business model innovation performance: When does adding a new business model benefit an incumbent?. *Strategic Entrepreneurship Journal*, *9*(1), 34-57.

King, A. A., & Tucci, C. L. (2002). Incumbent entry into new market niches: The role of experience and managerial choice in the creation of dynamic capabilities. *Management science*,*48*(2), 171-186.

Koen, P. A., Bertels, H. M., & Elsum, I. R. (2011). The three faces of business model innovation: Challenges for established firms. *Research-Technology Management*, *54*(3), 52-59.

Kogut, B., & Zander, U. (1996). What firms do? Coordination, identity, and learning. *Organization Science*, 7(5), 502-518.

Kohli, A. K., & Jaworski, B. J. (1990). Market orientation: the construct, research propositions, and managerial implications.*Journal of marketing*, *54*(2), 1-18.

Krefting, L. (1991). Rigor in qualitative research: The assessment of trustworthiness. *American Journal of Occupational Therapy*,*45*(3), 214-222.

Laaksonen, O., & Peltoniemi, M. (2018). The essence of dynamic capabilities and their measurement. *International Journal of Management Reviews*, *20*(2), 184-205.

Laamanen, T., & Wallin, J. (2009). Cognitive dynamics of capability development paths. *Journal of Management Studies*,*46*(6), 950-981.

Lambert, S. C., & Davidson, R. A. (2013). Applications of the business model in studies of enterprise success, innovation and classification: An analysis of empirical research from 1996 to 2010. *European Management Journal*, *31*(6), 668-681.

Lane, P. J., Koka, B. R., & Pathak, S. (2006). The reification of absorptive capacity: A critical review and rejuvenation of the construct. *Academy of management review*, 31(4), 833-863.

Lawson, B., & Samson, D. (2001). Developing innovation capability in organisations: a dynamic capabilities approach. *International Journal of Innovation Management*, *5*(03), 377-400.

Leech, N. L., & Onwuegbuzie, A. J. (2007). An array of qualitative data analysis tools: A call for data analysis triangulation. *School Psychology Quarterly*, *22*(4), 557.

Leih, S., Linden, G., & Teece, D. J. (2015). Business model innovation and organizational design: A dynamic capabilities perspective. In Foss, N. J., & Saebi, T. (Eds.), *Business model innovation: The organizational dimension* (pp. 24–42). Oxford, UK: Oxford University Press.

Liao, J., Kickul, J. R., & Ma, H. (2009). Organizational dynamic capability and innovation: An empirical examination of internet firms. *Journal of Small Business Management*, *47*(3), 263-286.

Lichtenthaler, U., & Lichtenthaler, E. (2009). A capability-based framework for open innovation: Complementing absorptive capacity. *Journal of Management Studies*, *46*(8), 1315-1338.

Lincoln, Y. S., & Guba, E. G. (1985). *Naturalistic inquiry*. Beverly Hills, CA: SAGE Publications.

Lindgardt, Z., Reeves, M., Stalk, G., & Deimler, M. S. (2009). Business model innovation. *When the Game Gets Tough, Change the Game, The Boston Consulting Group, Boston, MA.*

Lippman, S. A., & Rumelt, R. P. (1982). Uncertain imitability: An analysis of interfirm differences in efficiency under competition. *The Bell Journal of Economics*, 418-438.

Lüttgens, D., & Montemari, M. (2016). New Ways of Developing and Analyzing Business Model Innovation. *Journal of Business Models*, 4(3).

Magretta, J. (2002). Why Business Models Matter. *Harvard Business Review, 80(5)*, 86-92.

Maijanen, P., & Jantunen, A. (2016). Dynamics of dynamic capabilities-the case of public broadcasting. *International Journal of Business Excellence*, 9(2), 135-155.

Malone, T. W., & Crowston, K. (1994). The interdisciplinary study of coordination. *ACM Computing Surveys (CSUR)*, 26(1), 87-119.

Markides, C. (2006). Disruptive innovation: In need of better theory. *Journal of Product Innovation Management*, *23*(1), 19-25.

Markides, C. C., & Oyon, D. (2010). Ambidextrous or Stuck in the Middle? How to compete with two business models in the same industry. *Working Paper.*

Markides, C., & Charitou, C. D. (2004). Competing with dual business models: A contingency approach. *The Academy of Management Executive*, *18*(3), 22-36.

Markopoulos, P., Martens, J. B., Malins, J., Coninx, K., & Liapis, A. (Eds.). (2016). *Collaboration in creative design: Methods and Tools*. Springer.

Marsh, S. J., & Stock, G. N. (2006). Creating dynamic capability: The role of intertemporal integration, knowledge retention, and interpretation. *Journal of Product Innovation Management*, *23*(5), 422-436.

Martins, L. L., Rindova, V. P., & Greenbaum, B. E. (2015). Unlocking the hidden value of concepts: a cognitive approach to business model innovation. *Strategic Entrepreneurship Journal*, *9*(1), 99-117.

Massa, L., & Tucci, C. L. (2013). Business model innovation. *The Oxford handbook of innovation management*, *20*(18), 420-441.

Matzler, K., Bailom, F., Friedrich von den Eichen, S., & Kohler, T. (2013). Business model innovation: coffee triumphs for Nespresso. *Journal of Business Strategy*, *34*(2), 30-37.

McDermott, C. M., & O'Connor, G. C. (2002). Managing radical innovation: an overview of emergent strategy issues. *Journal of Product Innovation Management*, *19*(6), 424-438.

McGrath, R. G. (2010). Business models: A discovery driven approach. *Long Range Planning*, *43*(2), 247-261.

Mezger, F. (2014). Toward a capability-based conceptualization of business model innovation: insights from an explorative study. *R&D Management*, *44*(5), 429-449.

Miles, M. B., & Huberman, A. M. (1994). *Qualitative data analysis: An expanded sourcebook*. Thousand Oaks, CA: SAGE Publications.

Mitchell, D., & Coles, C. (2003). The ultimate competitive advantage of continuing business model innovation. *Journal of Business Strategy*, *24*(5), 15-21.

Moingeon, B., & Lehmann-Ortega, L. (2010). Creation and implementation of a new business model: A disarming case study. *Management*, *13*(4), 266.

Morgan, N. A., Vorhies, D. W., & Mason, C. H. (2009). Market orientation, marketing capabilities, and firm performance.*Strategic management journal*, *30*(8), 909-920.

Morris, M., Schindehutte, M., & Allen, J. (2005). The entrepreneur's business model: toward a unified perspective. *Journal of Business Research*, *58*(6), 726-735.

Mors, M. L. (2010). Innovation in a global consulting firm: When the problem is too much diversity. *Strategic Management Journal*, *31*(8), 841-872.

Mudambi, R., Mudambi, S. M., & Navarra, P. (2007). Global innovation in MNCs: The effects of subsidiary self-determination and teamwork. *Journal of Product Innovation Management*, *24*(5), 442-455.

Narver, J. C., & Slater, S. F. (1990). The effect of a market orientation on business profitability. Journal of marketing, 54(4), 20-35.

Nedzinskas, Š., Pundzienė, A., Buožiūtė-Rafanavičienė, S., & Pilkienė, M. (2013). The impact of dynamic capabilities on SME performance in a volatile environment as moderated by organizational inertia. *Baltic Journal of Management*, *8*(4), 376-396.

Okhuysen, G. A., & Eisenhardt, K. M. (2002). Integrating knowledge in groups: How formal interventions enable flexibility. *Organization Science*, *13*(4), 370-386.

Osterwalder, A. (2004). *The business model ontology: A proposition in a design science approach*. Dissertation, University of Lausanne, Switzerland.

Osterwalder, A., & Pigneur, Y. (2010). *Business model generation: a handbook for visionaries, game changers, and challengers*. Hoboken, New Jersey: John Wiley & Sons.

Osterwalder, A., Pigneur, Y., & Tucci, C. L. (2005). Clarifying business models: Origins, present, and future of the concept. *Communications of the Association for Information Systems*, *16*(1), 1.

Pauwels, K., & Weiss, A. (2008). Moving from free to fee: How online firms market to change their business model successfully. *Journal of Marketing*, *72*(3), 14-31.

Pavlou, P. A., & El Sawy, O. A. (2011). Understanding the elusive black box of dynamic capabilities. *Decision Sciences*, *42*(1), 239-273.

Payne, G., & Williams, M. (2005). Generalization in qualitative research. *Sociology*, *39*(2), 295-314.

Peteraf, M. A. (1993). The cornerstones of competitive advantage: a resource-based view. *Strategic Management Journal*, *14*(3), 179-191.

Plé, L., Lecocq, X., & Angot, J. (2010). Customer-integrated business models: a theoretical framework. *Management*, *13*(4), 226-265.

Pohle, G., & Chapman, M. (2006). IBM's global CEO report 2006: business model innovation matters. *Strategy & Leadership*, *34*(5), 34-40.

Prahalad, C. K., & Bettis, R. A. (1986). The dominant logic: A new linkage between diversity and performance. *Strategic management journal*, 7(6), 485-501.

Pramataris, K. C., Papakyriakopoulos, D. A., Lekakos, G., & Mylonopoulos, N. A. (2001). Personalized interactive tv advertising: The imedia business model. *Electronic Markets*, 11(1), 17-25.

Priem, R. L., & Butler, J. E. (2001). Is the resource-based "view" a useful perspective for strategic management research?. *Academy of Management Review*, *26*(1), 22-40.

Sabatier, V., Craig-Kennard, A., & Mangematin, V. (2012). When technological discontinuities and disruptive business models challenge dominant industry logics: Insights from the drugs industry. *Technological Forecasting and Social Change*, *79*(5), 949-962.

Saebi, T., Lien, L., & Foss, N. J. (2017). What drives business model adaptation? The impact of opportunities, threats and strategic orientation. *Long Range Planning*, *50*(5), 567-581.

Sanchez, P., & Ricart, J. E. (2010). Business model innovation and sources of value creation in low-income markets. *European Management Review*, *7*(3), 138-154.

Sandström, C., & Bjork, J. (2010). Idea management systems for a changing innovation landscape. *International Journal of Product Development*, *11*(3-4), 310-324.

Santos, J., Spector, B., & Van der Heyden, L. (2009). Toward a theory of business model innovation within incumbent firms. (Working paper no. 2009/16/EFE/ST/TOM).*Fontainebleau, France: INSEAD.*

Schneider, S., & Spieth, P. (2013). Business model innovation: Towards an integrated future research agenda. *International Journal of Innovation Management*, *17*(01), 1340001.

Schneider, S., & Spieth, P. (2014). Business model innovation and strategic flexibility: Insights from an experimental research design. *International Journal of Innovation Management*, *18*(06), 1440009.

Schulze, A., & Hoegl, M. (2008). Organizational knowledge creation and the generation of new product ideas: A behavioral approach. *Research Policy*, *37*(10), 1742-1750.

Schwandt, T. A., & Schwandt, T. A. (2001). *Dictionary of qualitative inquiry*. Thousand Oaks, CA: SAGE Publications.

Seelos, C., & Mair, J. (2007). Profitable business models and market creation in the context of deep poverty: A strategic view. *The Academy of Management Perspectives*, *21*(4), 49-63.

Shafer, S. M., Smith, H. J., & Linder, J. C. (2005). The power of business models. *Business Horizons*, *48*(3), 199-207.

Shane, S., & Venkataraman, S. (2003). Guest editors' introduction to the special issue on technology entrepreneurship. *Research Policy*, *32*(2), 181-184.

Shi, Y., & Manning, T. (2009). Understanding business models and business model risks. *The Journal of Private Equity*, *12*(2), 49-59.

Sinha, R. K., Herat, S., Bharambe, G., & Brahambhatt, A. (2010). Vermistabilization of sewage sludge (biosolids) by earthworms: converting a potential biohazard destined for landfill disposal into a pathogen-free, nutritive and safe biofertilizer for farms. *Waste Management & Research*, *28*(10), 872-881.

Sorescu, A., Frambach, R. T., Singh, J., Rangaswamy, A., & Bridges, C. (2011). Innovations in retail business models. *Journal of Retailing*, *87*(1), 3-16.

Sosna, M., Trevinyo-Rodríguez, R. N., & Velamuri, S. R. (2010). Business model innovation through trial-and-error learning: The Naturhouse case. *Long Range Planning*, *43*(2), 383-407.

Spencer, L., Ritchie, J., Lewis, J., & Dillon, L. (2003). Quality in qualitative evaluation: A framework for assessing research evidence. London, UK: Cabinet Office.

Steenkamp, C. J. H., & Arnoldi-Van der Walt, S. E. (2004). Web phenomenon applied as ICT platform in support of business model innovation. *SA Journal of Information Management*, *6*(1).

Stewart, D. W., & Zhao, Q. (2000). Internet marketing, business models, and public policy. *Journal of Public Policy & Marketing*, *19*(2), 287-296.

Subramanian, A. M., Chai, K. H., & Mu, S. (2011). Capability reconfiguration of incumbent firms: Nintendo in the video game industry. *Technovation*, *31*(5-6), 228-239.

Taran, Y., Boer, H., & Lindgren, P. (2015). A business model innovation typology. *Decision Sciences*, *46*(2), 301-331.

Täuscher, K., & Abdelkafi, N. (2017). Visual tools for business model innovation: Recommendations from a cognitive perspective. *Creativity and Innovation Management*, *26*(2), 160-174.

Taylor, S. J., & Bogdan, R. (1984). *Introduction to qualitative research methods: The search for meaning*. New York, NY: John Wiley & Sons.

Teece, D. J. (2007). Explicating dynamic capabilities: the nature and microfoundations of (sustainable) enterprise performance. *Strategic Management Journal*, *28*(13), 1319-1350.

Teece, D. J. (2009). *Dynamic capabilities and strategic management: Organizing for innovation and growth*. Oxford, UK: Oxford University Press.

Teece, D. J. (2010). Business models, business strategy and innovation. *Long Range Planning*, *43*(2-3), 172-194.

Teece, D. J. (2012). Dynamic capabilities: Routines versus entrepreneurial action. *Journal of Management Studies*, *49*(8), 1395-1401.

Teece, D. J. (2014). The foundations of enterprise performance: Dynamic and ordinary capabilities in an (economic) theory of firms. *Academy of Management Perspectives*, *28*(4), 328-352.

Teece, D. J., Pisano, G., & Shuen, A. (1997). Dynamic capabilities and strategic management. *Strategic Management Journal*, *18*(7), 509-533.

Tiantian, G., & Yezhuang, T. (2015). Performance mechanism of coordination capability based on dynamic capability framework: the mediating role of operational capabilities. *International Journal Service, Science and Technology*, *8*(2), 197-206.

Tobin, G. A., & Begley, C. M. (2004). Methodological rigour within a qualitative framework. *Journal of Advanced Nursing*, *48*(4), 388-396.

Tripsas, M., & Gavetti, G. (2000). Capabilities, cognition, and inertia: Evidence from digital imaging. *Strategic Management Journal*, *21*(10), 1147-1161.

Verona, G., & Ravasi, D. (2003). Unbundling dynamic capabilities: an exploratory study of continuous product innovation. *Industrial and Corporate Change*, *12*(3), 577-606.

Visnjic, I., & Neely, A. (2011). From Processes to Promise: How complex service providers use business model innovation to deliver sustainable growth. *Cambridge Service Alliance White Paper*.

Visnjic, I., Wiengarten, F., & Neely, A. (2016). Only the brave: Product innovation, service business model innovation, and their impact on performance. *Journal of Product Innovation Management*, *33*(1), 36-52.

Voelpel, S. C., Leibold, M., & Tekie, E. B. (2004). The wheel of business model reinvention: how to reshape your business model to leapfrog competitors. *Journal of Change Management*, *4*(3), 259-276.

Voss, C., Tsikriktsis, N., & Frohlich, M. (2002). Case research in operations management. *International Journal of Operations & Production Management*, *22*(2), 195-219.

Wagner, D., Wenzel, M., Wagner, H. T., & Koch, J. (2017). Sense, seize, reconfigure: online communities as strategic assets. *Journal of Business Strategy*, 38(5), 27-34.

Wang, C. L., & Ahmed, P. K. (2007). Dynamic capabilities: A review and research agenda. *International Journal of Management Reviews*, 9(1), 31-51.

Wernerfelt, B. (1984). A resource-based view of the firm. *Strategic Management Journal*, *5*(2), 171-180.

Wernerfelt, B. (1995). The resource-based view of the firm: Ten years after. *Strategic Management Journal*, *16*(3), 171-174.

Wilden, R., & Gudergan, S. P. (2015). The impact of dynamic capabilities on operational marketing and technological capabilities: investigating the role of environmental turbulence.*Journal of the Academy of Marketing Science*, *43*(2), 181-199.

Wilden, R., Gudergan, S. P., Nielsen, B. B., & Lings, I. (2013). Dynamic capabilities and performance: strategy, structure and environment. *Long Range Planning*, *46*(1-2), 72-96.

Williamson, O. E. (1999). Strategy research: governance and competence perspectives. *Strategic Management Journal*, *20*(12), 1087-1108.

Winter, S. G. (2003). Understanding dynamic capabilities. *Strategic Management Journal*, *24*(10), 991-995.

Wirtz, B. W., Pistoia, A., Ullrich, S., & Göttel, V. (2016). Business models: Origin, development and future research perspectives. *Long Range Planning*, *49*(1), 36-54.

Wirtz, B. W., Schilke, O., & Ullrich, S. (2010). Strategic development of business models: implications of the Web 2.0 for creating value on the internet. *Long Range Planning*, *43*(2), 272-290.

Wójcik, P. (2015). Exploring Links between dynamic capabilities perspective and resource-based view: a literature overview. *International Journal of Management and Economics*, 45(1), 83-107.

Wu, L. Y. (2010). Applicability of the resource-based and dynamic-capability views under environmental volatility. *Journal of Business Research*, 63(1), 27-31.

Yin, R. (1994). Case study research: Design and methods. Thousand Oaks, CA: SAGE Publications.

Yunus, M., Moingeon, B., & Lehmann-Ortega, L. (2010). Building social business models: Lessons from the Grameen experience. *Long Range Planning*, *43*(2), 308-325.

Zahra, S. A., & George, G. (2002). The net-enabled business innovation cycle and the evolution of dynamic capabilities. *Information Systems Research*, *13*(2), 147-150.

Zahra, S. A., Sapienza, H. J., & Davidsson, P. (2006). Entrepreneurship and dynamic capabilities: A review, model and research agenda. *Journal of Management Studies*, *43*(4), 917-955.

Zollo, M., & Winter, S. G. (2002). Deliberate learning and the evolution of dynamic capabilities. *Organization Science*, *13*(3), 339-351.

Zott, C., & Amit, R. (2007). Business model design and the performance of entrepreneurial firms. *Organization Science*, *18*(2), 181-199.

Zott, C., & Amit, R. (2008). The fit between product market strategy and business model: implications for firm performance. *Strategic Management Journal*, *29*(1), 1-26.

Zott, C., & Amit, R. (2010). Business model design: an activity system perspective. *Long Range Planning*, *43*(2), 216-226.

Zott, C., Amit, R., & Massa, L. (2011). The business model: recent developments and future research. *Journal of Management*, 37(4), 1019-1042.