

A. Foundation

The first part of this thesis is divided into two chapters. Chapter A.I explains the motivation for this work and presents the research gaps and questions as well as the structure, design, research contexts, and anticipated contributions of this cumulative dissertation. Afterwards, Chapter A.II provides the relevant theoretical background.

I. Introduction

The first Section, A.I.1, in this chapter highlights the motivation for and relevance of the research, followed by a description of the research gaps and questions (A.I.2) and the structure of the thesis (A.I.4). Afterwards, Section A.I.4 explains the research context and design. Finally, Section A.I.5 concludes this chapter with a description of the anticipated contributions for research and practice.

I.1 Motivation

Business models connect organizations with their external environment (Zott and Amit, 2013; Aspara et al., 2011). As such, their success is sensitive to changes in environmental conditions (Teece, 2010; Zott and Amit, 2007) and the organization's ability to react to them: "A business model needs to be managed. This requires anticipating the need for change or renewal and constantly adapting to the changing circumstances of the firm and the environment" (Demil et al., 2015, p. 7).

A fundamental environmental shift observable in recent years is the growing diffusion of digital technologies (Bharadwaj et al., 2013) in more and more areas of life (Yoo, 2010). These technologies have become increasingly ubiquitous and pervasive (Vodanovich et al., 2010), thus creating nomadic information environments (Lyytinen and Yoo, 2002). Stolterman and Fors (2004) explain, "This leads to a world that is increasingly experienced with, through, and by information technology. What we are witnessing is an ongoing radical digital transformation" (p. 689).

Information systems (IS) have transformed business ever since their first appearance (Porter and Heppelmann, 2014; El Sawy and Pereira, 2013; Oestreicher-Singer and Zalmanson, 2013; Venkatraman, 1994). However, the changing nature of information technology (IT) from a separated business tool towards an integral part of people's personal lives (El Sawy, 2003) has increased the magnitude of such transformation "once the power of cheaper, smaller, and more powerful computers escaped from corporate backrooms, and more neutral general-purpose digital networks (e.g., the Internet) emerged" (Tilson et al., 2010, p. 750). As a result, in more and more industries the reach of IS for businesses has been enlarged from being a support function for increasing business process efficiency and firm productivity to being a relevant ingredient in product or service innovation, even in non-IS industries (Matt et al., 2015; Nambisan, 2013). This development has been articulated in recent research claiming that the divide between business and IT must be overcome, as today the two perspectives have merged into one (Bharadwaj et al., 2013; Oestreicher-Singer and Zalmanson, 2013).

This development comes via two different – one rather technical, one rather social in nature – but intertwined paths: On the one side, due to the broad penetration of mobile devices, sensors, and Internet connectivity throughout more and more aspects of life, firms whose value propositions touch these areas must account for IS and their specifics, e.g., by implementing them into their products (Porter and Heppelmann, 2014). On the other hand, people transfer

their experiences with digital technologies into more and more contexts, including the business sphere (Berman, 2012), e.g., leading to entirely new expectations concerning the offerings of business IT or firms in general (Gregory et al., 2014).

The resulting effects affect such diverse areas as the product/service-offering (Nambisan, 2013), customer relationships (Setia et al., 2013) as well as associated resources and activities of a firm – in other words, a company's business model (Al-Debei, 2010). Changes in business models relate to the most radical levels of IT-enabled business transformation (Venkatraman, 1994) as well as to organizational transformation in general (Besson and Rowe, 2012). Today, incumbents in IS and non-IS industries alike are forced to adapt their business models, as the changing nature of IT (El Sawy, 2003) not only renders the creation of digital business models (Veit et al., 2014) relevant in more and more areas (Fichman et al., 2014) but also existing business models need to be adapted as digital technologies impact the internal and external social interactions and relationships that are part of every business model.

Thus, due to its holistic perspective and integrative nature capable of covering these aspects, the business model concept is a valuable unit of analysis for examining this transformational development (Veit et al., 2014; Priem et al., 2013). It links internal resources and activities with external stakeholders, describing which value is proposed to customers and how it is created and captured (Veit et al., 2014). Thus, successful business model designs reflect current customer demands and appropriate ways to satisfy them. Therefore, changes in the business environment lead to changes in the business model designs required (Giesen et al., 2009; Teece, 2010). With reference to digital technology-induced change, enhancements as well as disruptions of existing business models have been described (Loebbecke and Picot, 2015), thus indicating its importance for incumbent firms.

Sensing and reacting to fundamental environmental changes by transforming business models is a core managerial task (Wirtz et al., 2015; Khanagah et al., 2014; Aspara et al., 2011; Demil and Lecoq, 2010; Wirtz et al., 2010; Chesbrough and Rosenbloom, 2002). Incumbent firms, in contrast to entrepreneurial ones, are thus “constrained by path dependencies and inertia” (Zott and Amit, 2007, p. 182), thereby further heightening the organizational challenges of business model change. Research in the stream of disruptive technology (Christensen, 1997) has highlighted the fatal threats for established firms in times of discontinuous technological change driven by digital technologies (Lucas and Goh, 2009). However, subsequent research has shown that incumbents can survive such disruptive digital change (Agarwal et al., 2011) and that the determination of their survival is less a question of technological expertise than one of organizational capabilities in perceiving and appropriately reacting to such fundamental shifts (Lucas and Goh, 2009).

This thesis sets out to explore, first, the phenomenon of digital transformation as it manifests itself in business model change and, second, the organizational capabilities incumbent firms need to cope with the challenges associated with it. By doing so, this study aims to shed light on the nature of this important societal phenomenon (Loebbecke and Picot, 2015), support the academic advancement of the business model construct, and relate the phenomenon and construct to the literature on dynamic capabilities (Teece et al., 1997) to clarify their specific

configuration necessary in this context. Especially, the role of two specific dynamic capabilities, i.e., absorptive capacity (Cohen and Levinthal, 1990) and organizational ambidexterity (Gibson and Birkinshaw, 2004), is investigated in this regard due to their special relation to the fast paced and paradoxical tensions (El Sawy and Perreira, 2013; Yoo et al., 2012) created by the digital transformation of business models and the role of heterogeneous external knowledge for closing emerging capability gaps to ensure incumbent firm success (Yoo et al., 2012; Henfridsson et al., 2009a). Hence, in sum, this work aims to contribute to specific gaps in IS, strategic management, and organization science research and relate these disciplines to one another as the phenomenon in question demands it.

Apart from that, this thesis seeks to derive important implications for managerial practice as, first, managers from all industries are concerned with the digital transformation of their business models (ADL, 2015) and, second, the majority of them feels not prepared enough to cope with it (Roland Berger, 2015). Thus, as executives are actually facing the turmoil of digital transformation and expect guidance for the effective transformation of their business models (Hess, 2012), this thesis aims to support practitioners in identifying and resolving the managerial challenges associated with the digital transformation of their business models, thus allowing them to survive and thrive in the digital era.

I.2 Research Gaps and Research Questions

As outlined above, this study connects the phenomenon of digital transformation with the business model construct and organizational capabilities of incumbent firms. This conglomerate can and should be divided into four different parts, each of which represented by a specific research question. Figure A:1 provides an overview of the topics covered by them, which are then briefly explained in the following. The detailed theoretical background to all relevant topics is provided in chapter A.II.

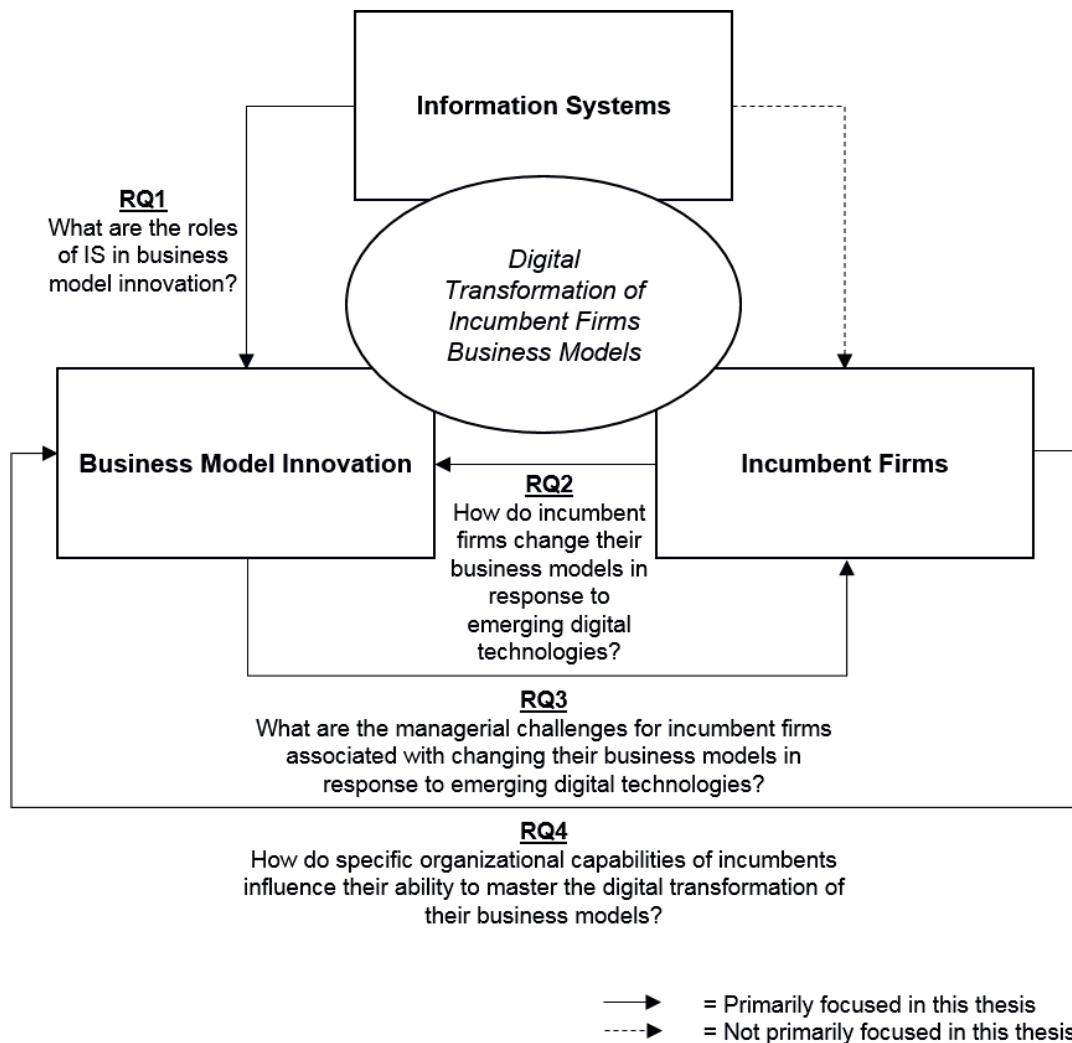


Figure A:1. Overview of research questions.

In general, the majority of business model research has taken a static view on the concept by, e.g., describing components or specific instances (Wirtz et al., 2015). This study focuses on the digital transformation of business models and therefore takes a dynamic perspective (Aspara et al., 2011; Demil and Lecoq, 2010). For such a case, the interaction between business models and the adaption factor leading firms to change them is of particular interest but yet poorly understood (Burkhart et al., 2011). In this thesis, emerging digital technologies are focused as an adaption factor. However, as Veit et al. (2014) point out: “Addressing the business model concept as an anchor for the identification of the impact of IT is a fairly novel endeavor” (p. 45). Moreover, the term digital technologies covers a diverse set of technologies (Bharadwaj et al., 2013). To initially capture and categorize this variety, this work, as a starting point, applies Watson et al.’s (2010) broad definition of IS as “integrated and cooperating set of people, processes, software, and information technologies to support individual, organizational, or societal goals” (p. 24).

Prior research has made some progress in categorizing the impact of IS on changes in internal processes, products, and services (e.g., Nambisan, 2013; Lyytinen and Rose, 2003). With reference to the impact of IS on a business model level, context- or technology-specific cases

have been described (e.g., Kamoun, 2008), often in an anecdotal manner (Westerman et al., 2014). However, a generalized elaboration of IS' impact on innovation on a business model level is missing (Veit et al., 2014).

This leads to the first research question:

1) *What are the roles of IS in business model innovation?*

While much work in the field of business models and business model innovation targets entrepreneurial firms, knowledge on business model change of incumbents remains relatively unexplored (Demil et al., 2015; Kim and Min, 2015). In the past, most research has focused on the creation of new business models, e.g., “in the context of start-ups, so we know less about business models of established firms—for example, how they change over time” (Demil et al., 2015, p. 2). To address the underresearched perspective on the dynamics of business models (Wirtz et al., 2015), a focus on firms with established business models is of particular value. Because incumbents are confronted with existing assets and knowledge, which could either be in conflict with or complementary to business model innovations (Kim and Min, 2015), findings from studies on entrepreneurial firms cannot generally be transferred. The literature on disruptive innovation has described how incumbents have failed to adapt their established business model designs (Lucas and Goh, 2009), despite substantial evidence that incumbents have in fact survived disruptions (Markides, 2006).

However, knowledge on the change patterns of business models in response to discontinuous change is scarce (Aspara et al., 2011). Khanagha et al. (2014), reflecting on prior research, state that “no one has taken a dynamic view on the process of business model transformation when environmental turbulence is at its most extreme” (p. 324). This especially holds true for the case of digital transformation where initial research has described the need for incumbent firms to change business models in response to digital technology emergence (e.g., Matt et al., 2015; Fichman et al., 2014). In contrast to new ventures, a delineation and analysis of the specific change patterns of incumbent firms' business models can provide valuable insights on the actual nature of digital transformation (Matt et al., 2015).

Therefore, this study addresses the following research question:

2) *How do incumbent firms change their business models in response to emerging digital technologies?*

With the increasing penetration of digital technologies throughout everyday life (Yoo, 2010), the need to innovate business models with IS is increasing. At the same time, the kind and nature of IS is changing, requiring fundamental change in almost every industry (Tilson et al., 2010; Jetter et al., 2009). Incumbent firms are struggling to take advantage of the possibilities afforded by digital technologies and have difficulties adapting their business models (Loebbecke and Picot, 2015).

Prior research has thoroughly investigated the tensions resulting from IT transformations (e.g., Gregory et al., 2015) as well as IT-enabled business transformation (Venkatraman, 1994). However, much of the existing work dates back on the pre-digital era (Besson and Rowe, 2012)

and focuses on the intrafirm perspective (e.g., business process change following the implementation of a new IS [McKeown and Philip, 2003]), thus on the less radical levels of IT-enabled business transformation (Venkatraman, 1994). Moreover, research from strategic management and organization science has provided insights on the general challenges for incumbent firms with respect to disruptive change (e.g., Hill and Rothaermel, 2003), and with respect to business model change in general (e.g., Chesbrough 2010).

Initial research from the emerging stream on digital innovation (Yoo et al., 2010) has detected managerial challenges, e.g., concerning conflicts between established and digital logics regarding product innovation rules and ecosystems (Hylving and Selander, 2012). However, managerial challenges arising when emerging digital technologies affect the business model level are less understood (Fichman et al., 2014). These issues are transformed into the following research question:

3) *What are the managerial challenges for incumbent firms associated with changing their business models in response to emerging digital technologies?*

Drawing from the case of Kodak, Lucas and Goh (2009) with respect to the organizational capabilities of incumbents when confronted with fundamental change driven by digital technologies state, “The most important observation is that management has to recognize the threats and opportunities of new information and communications technologies and marshal capabilities for change” (p. 54). Various other authors have also described the two factors of perceiving the need to change and then engaging in organizational change in business model innovation (e.g., Khanagah et al., 2014; Cavalcante et al., 2011; Wirtz et al., 2010; Chesbrough 2010).

To meet those requirements, incumbent firms must first acquire and integrate new external knowledge to understand and evaluate the potential impact of emerging digital technologies (Henfridsson et al., 2009a). This relates to an organizations’ absorptive capacity (Cohen and Levinthal, 1990), a dynamic capability (Teece et al., 1997). Moreover, once the potential of emerging digital technologies has been detected and understood, incumbent firms must reconfigure resources to respond to it (Pavlou and El Sawy, 2011). Unlike disruptive technology theory initially suggested (Christensen, 1997), discontinuous business model change is often not transitional in that it always leads from one dominant design to another with the necessary failure of incumbent business models. Instead, competing business models have been reported to exist in parallel (Markides, 2006). Consequently, incumbent firms, to survive disruptive change, must be able to explore and experiment with fundamentally new business models, deploy them in parallel, and if necessary, shift the focus from one to the other. This, in turn, relates to an organization’s ambidexterity (Gibson and Birkinshaw, 2004).

Hence, although dynamic capabilities are acknowledged in the literature, their influence in the context of the digital transformation of incumbents’ business models is not well understood (Karimi and Walter, 2015). As digital technologies and the innovations building upon them, due to their traits of convergence and generativity (Yoo et al., 2012), are particularly associated with the integration of heterogeneous external knowledge as well as paradoxical, fast-paced,

and disruptive change (e.g., Yoo et al., 2012; El-Sawy and Perreira, 2013), absorptive capacity and organizational ambidexterity have a special relation to the focus of this thesis, leading to the following research question:

- 4) How do specific organizational capabilities of incumbents (i.e., absorptive capacity and organizational ambidexterity) influence their ability to master the digital transformation of their business models?**

I.3 Structure of the Thesis

This dissertation is cumulative in nature and contains three parts. Part A explains the motivation for this research endeavor (A.I.1) and then details the research gaps and resulting research questions (A.I.2). In addition, the thesis structure (A.I.3), research context and design (A.I.4), and anticipated contributions (A.I.5) are presented. The next Chapter (A.II) lays the foundation for a comprehensive understanding of business model change, digital technologies, and incumbent firm management in times of disruptive change.

Part B represents the main body of this cumulative dissertation, comprising five studies that all address the general topic of the digital transformation of business models (see Table A-1).

Table A-1. Overview of studies included in the thesis.

No	Outlet	Status	Ranking (VHB)	Section	RQ	Main contribution
1	European Conference on Information Systems 2015	Published	B	B.I	1	Taxonomy of IS in business model innovation. Generalized role description of IS as enabler, capabilities and frames of reference with regard to business model innovation.
2	Information Systems Journal	Published	A	B.II & B.III	2, 3, 4	Business model change patterns (and related challenges) of incumbent firms in the software industry in response to disruptive digital technology. Generalized model of organizational capabilities (i.e., absorptive capacity and organizational ambidexterity) to explain time and extent of incumbent business model change.
3	Internationale Tagung Wirtschaftsinformatik 2015	Published	C	B.II	2	Business model change patterns of incumbent firms in the automotive industry in response to diffusion of digital technologies.
4	International Conference on Information Systems 2015	Published	A	B.III	3, 4	Ranking and description of the managerial challenges on the business model level resulting from digital transformation of business in the automotive industry as well as identification of organizational ambidexterity as an important ability to solve them.
5	International Conference on Information Systems 2015	Published	A	B.III	4	Assessment of the impact of external digital knowledge acquisitions and absorptive capacity of automotive incumbents on business model innovativeness and firm performance forecasts.

In Part C, the findings are summarized and synthesized. Subsequently, implications are derived for theory and practice before the limitations and further research opportunities are presented. Figure A:2 depicts the structure of this thesis.

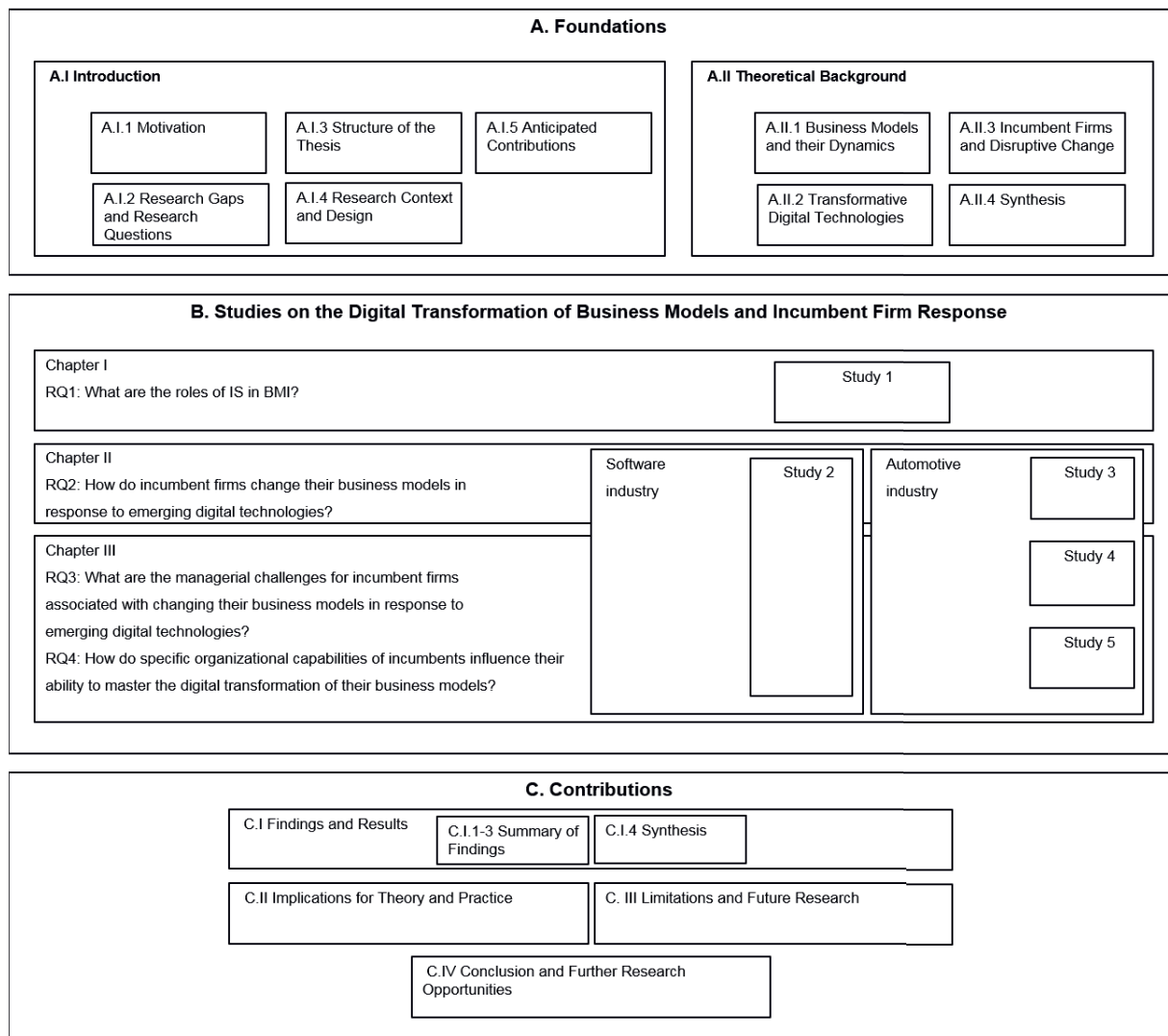


Figure A.2. Structure of the thesis.

I.4 Research Context and Design

Study 1 employs a meta-perspective on empirical research with respect to IS and business model change in order to shed light on the influence of IS and business model dynamics and to filter out generic roles of IS in business model innovations. For the purpose of taxonomy building, it draws from documented empirical research from diverse industry contexts, such as telecommunications, logistics, banking, or the music industry. To investigate the three subsequent research questions more deeply, following a theoretical sampling approach (Bhattacharjee, 2012), two research settings were chosen: the software and the automotive industries. Due to their special and distinguishing characteristics, these settings seem practical for studying the impact of digital technologies on business models of incumbent firms. The software industry has been noted for its special importance when researching transformative change (Martin, 2011), as “software markets are continuously affected by and shaped through disruptive technological trends” (Veit et al., 2014, p. 47). The automotive industry is one of the most important instances of “industries centered on traditionally non-digital artifacts” (Henfridsson et al., 2009a, p. 25) and “where the dominant mode of product development has

been shaped over long periods of incremental innovation” (ibid., p. 2), although this industrial-age industry (Yoo et al., 2010) is changing massively due to the advent of digital technologies (e.g., Hylving and Schultze, 2013) (see Table A-2).

By taking these two research contexts and the four respective studies (2–5) into focus, this work aims to gain a sound picture of the research topic. The selection is also related to the taxonomy developed in Study 1, which describes the dimensions that can be used to categorize work on IS’ influence on business model innovation. For instance, the example of cloud computing in the business software industry (Study 2) covers an IS industry where there is a direct effect of IS on an IS-focused business model innovation. In turn, the various business model changes due to digital technologies in the automotive industry, described in Study 3, target a non-IS industry, indirect effects of IS, and IS as well as non-IS-focused business model innovations. By including these different perspectives, it might be possible to achieve enough variance to detect overarching mechanisms of the phenomenon and the incumbent firm reactions, allowing more general implications to be derived in Part C. Moreover, as the investigation focuses on a complex social phenomenon, a mixed-mode design (Bhattacharjee, 2012) is applied to generate more profound insights by selecting both quantitative (Study 5) and qualitative (Study 2) methods (Wilde and Hess, 2007) and taking an intensive look at single firms (Study 2) as well as a broad view on the activities of industry incumbents as a whole (Study 3).

Research in the domain of IS generally aims to generate and disseminate knowledge on the interaction of IS and human organizations, thus belonging to social science (Bhattacharjee, 2012). Two research paradigms can be distinguished in this context: behavioral science and design science (Hevner et al., 2004). While the latter focuses on (pro-actively) creating problem-oriented artifacts (Wilde and Hess, 2007), the former – rooted in natural science (March and Smith, 1995) – is concerned with developing and justifying “theories (i.e., principles and laws) that explain or predict organizational and human phenomena surrounding the analysis, design, implementation, management, and use of information systems” (Hevner et al., 2004, p. 76). As this work follows such an analysis of the impact of IS on organizations (Wilde and Hess, 2007), aiming to explain the way digital technologies force incumbents to change their business models as well as the organizational capabilities that help them to do so, the primary focus of this work lies in the behavioral paradigm. Consequently, the research methods applied (e.g., multiple-case study, Delphi method, qualitative content analysis) can be assigned to the behavior-oriented method set of IS research (Wilde and Hess, 2007). Each method employed followed a well-established methodological procedure, described in seminal articles in the field of IS or management science (see Table A-2).

Epistemologically, there are three broad positionings that can be differentiated in IS research: positivism, interpretivism, and critical realism (see Gregor, 2006). Positivism assumes an objective reality that can be generally theorized upon (Wynn and Williams, 2012). In other words, “While theories may be created via reasoning, they are only authentic if they can be verified through observations” (Bhattacharjee, 2012, p. 8). In contrast, interpretivism states that reality is constructed by individuals in a specific context and therefore these subjective

perspectives must be taken into account when investigating social phenomena (Bhattacharjee, 2012). Critical realism assumes an “independent reality that comprises the world, even though humans are usually unable to fully understand or observe this reality, and that our knowledge of reality is fallible” (Wynn and Williams, 2012, 789). As this research attempts to increase understanding on digital technology–driven business model transformations of incumbent firms, it can be assigned to the positivist positioning, which implies a neutral, observer-like position of the researcher with regard to the phenomenon (Dubé and Paré, 2003; Orlikowski and Baroudi, 1991).

Table A-2 summarizes the research design of this work.

Table A-2. Overview of research design and core research questions.

No	RQ	Epistemology	Paradigm	Methodology (Seminal work)	Data collection	Data analysis
1	1	Positivistic	Behavioral science	Taxonomy building (Nickerson et al., 2013)	Structured literature review	Taxonomy building
2	2, 3, 4	Positivistic	Behavioral science	Multiple case study (Yin, 2003)	Interviews, firm documents, secondary data	Coding
3	2	Positivistic	Behavioral science	Qualitative content analysis (Krippendorff, 2004)	Structured secondary data collection	Coding
4	3	Positivistic	Behavioral science	Delphi Method (Schmidt, 1997)	Three-phase Delphi study	Coding
5	4	Positivistic	Behavioral science	Longitudinal panel data analysis (Ahuja and Katila, 2001)	Database retrieval, event study approach	Panel data regression

With the research design and context outlined above, this thesis relates specifically to the ‘IS organization and strategy’ stream of IS research according to Banker and Kaufman (2004). As already indicated by the authors, this stream in general, and this thesis with its focus on the dynamic capabilities of absorptive capacity and organizational ambidexterity specifically, is closely related to the fields of strategic management and organization science.

The thesis’ goal of providing insights on the digital transformation as it manifests itself in business model change and the respective studies contributing to this goal, i.e., studies 1, 2 and 3, relate to a Type I Theory as defined by Gregor (2006), i.e., theory for analysis. These theories are especially useful “when little is known about some phenomena” (p. 624), which applies to the research context of this thesis. Using frameworks, taxonomies and classification schemes, these type of theories provide descriptive and analytical insights on the phenomenon in question. In this work, this was attempted by taxonomy building in Study 1 as well as by describing business model change patterns of incumbents in Studies 2 and 3.

Furthermore, the goal of deriving insights on the organizational capabilities of incumbent firms for mastering the challenges of the digital transformation of their business models and the associated studies, i.e., Study 2, 4 and 5, relate to a Type IV Theory (Gregor, 2006), i.e., theory for explaining and predicting. The methods applied in the respective studies, e.g., multiple case study or statistical analysis, have been explicitly described as contributing to this type of theory, which imply “understanding of underlying causes and prediction, as well as description of theoretical constructs and the relationships among them” (p. 626).

I.5 Anticipated Contributions

This work links the business model concept to the emerging phenomenon of digital transformation. With this approach, this work anticipates contributing to IS research as it meets recent calls to investigate the transformative impacts of IS on established industries (Lucas et al., 2013; Yoo et al., 2010). Taking the holistic perspective of the business model (Priem et al., 2013) in focus to investigate the impact of emerging digital technologies on incumbent business is a yet understudied perspective in IS research (Veit et al., 2014) but offers the possibility to learn more about the nature of the phenomenon of digital transformation in general by, for instance, providing a general description of IS' role in business model innovations. Besides describing what changes result from the emergence of digital technologies, this work also seeks to determine how established firms react to it. Here, managerial challenges as well as organizational capabilities, going beyond what has been described with reference to digital (product) innovation (Yoo et al., 2012), will be delineated to contribute to these important but not yet well understood topics (Karimi and Walter, 2015; Fichman et al., 2014). By doing so, the organizational capabilities that echo the distinct characteristics of digital technologies and innovations building upon them (Yoo et al., 2012) will be derived. Thereby, insights on the changing, boundary-smashing nature of IS in both IT and non-IT organizations can be derived. Finally, as a business model can be viewed as result (Casadesus-Masanell and Ricart, 2011) or reflection of the realized business strategy (Demil et al., 2015), with the business model changes investigated, manifestations of the emerging theme of digital business strategies (Bharadwaj et al., 2013) can be observed, which contribute to a refined understanding of the concept.

Moreover, the work contributes to business model research. This comparatively young field has advanced in recent years and created the foundations to understand the concept of business models (Morris et al., 2013). Building upon this foundation, this thesis sheds light on the specific mechanisms of incumbent business model change in response to emerging digital technologies. By doing so, the thesis allows not only to describe the change towards digital patterns in business model design but also to generate insights on the dynamics of the concept in times of disruptive change and its interactions with managerial and organizational abilities in sensing and reacting to changing conditions (Chesbrough, 2010). With its focus on incumbent firms, this work contributes to closing research gaps concerning these dynamics in a contextual setting characterized by such aspects as legacy, path dependency, and organizational inertia (Demil et al., 2015). By focusing in depth on the dynamics of business model change and its underlying mechanisms as well as applying large-scale empirical research with an explicit focus on the concept, this work aims to help further consolidate the academic understanding of business models (Zott and Amit, 2013; Burkhart et al., 2011)

The challenges and reactions of incumbent organizations when confronted with disruptive change is an important field of interest in strategic management and organization science (Benner, 2010). Therefore, this work seeks to contribute to these fields by setting established constructs, organizational ambidexterity and absorptive capacity at the forefront, in the light of the concept of business models and the context of the digital transformation as experienced

by incumbent firms. It is argued that the aforementioned organizational abilities are of special relevance in this context. This research attempts to shed light on the specific configurations and foci that are of particular value for incumbent organizations that are confronted with digital transformation processes. In doing so, it aims to contribute to the further elaboration of the concepts by taking on most recent developments. Especially, the role of absorptive capacity targeted to different kinds of knowledge (e.g., market- and technology-related) (Weigelt and Sarkar, 2012) as well as the paradox (Smith and Lewis, 2011) and dynamic (Luger, 2014) view on organizational ambidexterity is investigated.

In addition, this work anticipates valuable contributions for business practitioners. First, the goal is to increase both awareness of the magnitude as well as understanding of the type of impact the digital transformation has on the business models of established firms. Second, managers should be enabled to detect potential challenges in recognizing and responding to the emergence of digital technologies. In particular, this work aims to make clear tensions between emerging new and an established, successful paradigm, manifesting itself in cognitions, structures, and business models. Third, this research attempts to derive recommendations for managers concerning a solution for these tensions. Openness towards broad external knowledge, a balanced evaluation and conscious integration of the knowledge, as well as the ability to handle two different paradigms at once with varying emphasis over time are offered as success factors that might be helpful for digital transformation of business models, regardless of the specific business context. Thus, it is intended to inform business audiences about not only how specific changes in business model designs in response to digital technologies may look but also which organizational abilities must be further developed to be able to identify and execute them. Table A-3 summarizes the anticipated contributions.

Table A-3. Summary of Anticipated Contributions.

Audience		Anticipated Contribution
Research	Information Systems	(1) Insights on the nature of digital transformation by explicating it employing the business model lens as well as on the impact of IS on the dynamics of business models in general.
		(2) Insights on the organizational consequences of digital technologies on a business model level as well as refined understanding on incumbent firm responses by executing digital business strategies.
	Organization Science	(1) Insights on the organizational challenges and tensions for incumbents resulting from the digital transformation of business models.
		(2) Relation and refinement of specific organizational capabilities (i.e., absorptive capacity and organizational ambidexterity) to the context of digital transformation and the business model concept.
	Strategic Management	(1) Indication of the importance of the digital transformation of business models for future incumbent firm success as well as the role of dynamic capabilities in this regard.
		(2) Indication of the importance to widen the scope of strategy research beyond the resource side and the usefulness of the business model concept in this regard.
Business Practice	(1) Understanding of the nature, process and magnitude of digital transformation of incumbent business models.	
	(2) Understanding of the resulting challenges for incumbent firms and insights on organizational capabilities to resolve challenges.	

II. Theoretical Background

As described in the previous chapter, this thesis focuses on business model changes of incumbent firms in response to emerging digital technologies. This chapter presents the foundations and related research on business model changes, digital technologies, and incumbent firm management in times of disruptive change. In doing so, it aims to provide the fundamentals and state of research on the themes as a grounding for the whole thesis while trying to minimize redundancies with the studies in Part B wherever possible. Consequently, the focus is rather on concepts and streams in the specific research areas, than on specific studies and single empirical investigations, which are reviewed in more detail in the respective background sections of the studies included in Part B.

II.1 Business Models and Their Dynamics

Although occasionally mentioned in business publications in the last half century, research on business models has substantially increased in the last 15 years with the advent of the Internet and electronic business (Wirtz et al., 2015; Osterwalder et al., 2005). Osterwalder et al. (2005) describe an evolutionary path of research regarding the business model concept, which El Sawy and Perreira (2013) develop further. According to the authors, the evolution involves six phases, from the definition and classification of business models up to dynamic business modeling. It should be noted that although research on this development path has progressed, none of the phases have reached final results or ultimate consensus.

Consequently, no commonly agreed upon definition has emerged, which is intensely criticized in the literature (e.g., Porter, 2001). Nevertheless, there are signs of convergence towards a common understanding (Morris et al., 2013; Zott and Amit, 2013). In this thesis, the following definition is applied because it relates to this emerging consensus in the literature (Zott et al., 2011) and is appropriate to the perspective on management that is applied in this work:

The business model describes the system of interdependent activities that are performed by the firm and by its partners and the mechanisms that link these activities to each other A business model is thus a template that depicts the way a firm conducts its business. It is crafted by a focal firm's managers in order to best meet the perceived needs of its customers. To fully address the market opportunity, the focal firm's business model often spans across the firm and its industry boundaries. While it is anchored on the focal firm, the business model is market-centric and designed to enable the focal firm not only to enhance total value for all business model participants but also to appropriate a share of the value created (Zott and Amit, 2013, p. 404).

Thus, a business model connects the focal firm and its offerings to other elements in a socio-technical regime, i.e., the set of relevant actors, technologies and knowledge in a given sector (Bidmon and Knab, 2014). In a similar vein, Priem et al. (2013) have described the business model, by the simultaneous focus on value creation and value capture, spans resource and demand side perspectives and thus conceptually connects these with the surrounding

business ecosystem, i.e., the environments “in which the success of a value proposition depends on creating an alignment of partners who must work together in order to transform a winning idea to a market success” (Adner, 2012, p. 4). Consequently, a business model’s success is dependent on the fit with this surrounding business ecosystem (Priem et al., 2013; Adner and Kapoor, 2010) and, thus, “must be evaluated against the current state of the business ecosystem, and against how it might evolve” (Teece, 2010, p., 189).

The second and third phases of the evolutionary path of the business model concept deal with the components that make up a business model (Osterwalder et al., 2005). Although again no definite consensus has been reached on this matter, some component descriptions have garnered much attention in academia and business practice (e.g., Al-Debei, 2010). One of the most prominent approaches (Peters et al., 2015) is Osterwalder et al.’s (2005) nine interrelated business model building blocks. Their comparatively detailed description of single elements make them of high differential value. Table A-4 describes them in greater detail.

Table A-4. Business model pillars and building blocks (adapted from Osterwalder et al., 2005, p. 10).

Pillar	Building Block	Description
Product	Value proposition	Explains the value offered to the customer by the company’s bundle of products and services
Customer Interface	Target customer	Describes the segments of customers to whom a company wants to offer value
	Distribution channel	Describes the various means of the company to get in touch with its customers
Infrastructure Management	Relationship	Explains the kind of links a company establishes between itself and its various customer segments
	Value configuration	Describes the arrangement of activities and resources within the firm
	Core competency	Outlines the competencies necessary to execute the business model
Financial Aspects	Partner network	Explains the network of cooperative agreements with other companies necessary to efficiently offer and commercialize value
	Cost structure	Sums up the monetary consequences of the means deployed by the firm to execute the business model
	Revenue model	Describes the way a company makes money through a variety of revenue flows

With the description of building blocks and pillars, Osterwalder et al. (2005) provide a reference model or ontology for describing business models – an instance of the fourth phase of the business model evolution path. The subsequent phase concerns the application of the business model concept. Here, research has used business model conceptualizations to describe adaptations of existing and potential new business models that draw upon new technologies (e.g., Peters et al. [2015] telemedicine for healthcare; Giessmann and Stanoevska-Slabeva [2012] cloud computing for the software industry; Wirtz [2010] web 2.0 for Internet firms; Kamoun [2008] RFID for logistics).

The sixth phase of the evolution path of the business model concept has been described as dynamic business modeling and concerns both theory building as well as taking the increasingly dynamic business environment into consideration when reflecting upon business models and their development (El Sawy and Perreira, 2013). Concerning the latter, research has recently begun to investigate how business model designs have been transformed over time (e.g., Antero et al. [2013] for the case of SAP). What is empirically less understood, from an intra-organizational perspective, is how this change process can be explained (Demil et al.,