

UNIVERSITAT POLITÈNICA DE VALÈNCIA

FACULTY OF MANAGEMENT



**AN EMPIRICAL STUDY TO REVIEW
BUSINESS MODEL THEORY IN THE
DANISH RAILWAY SECTOR**

HIGHER DOCTORAL THESIS

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An empirical study to review business model theory in the Danish railway sector

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N O M I N A T I O N

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Contributions:

A Series of Publications

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2. Molina, M.D.M.; Roldsgaard, K.; Segarra, M.O.; & Molina, B.D.M., "A Proposal of a Business Model in the European Passenger Railway Sector to Reduce its Environmental Impact", In: Golinska & Romano (eds.) *Environmental Issues in Supply Chain Management: New Trends and Applications*, Part III Sustainability Issues: Sector Specific Solutions, 2012, Ch. 4, pp. 237-249, Springer, Berlin, Germany. ISBN: 978-3-642-23561-0.
3. Molina, M.D.M.; Roldsgaard, K.; Segarra, M.O.; & Molina, B.D.M., "New Business Models in the Railway Sector in Denmark and Spain and their Environmental Impact" [In Spanish], In: Hernández Mogollón et al. (eds.) *Ferrocarril, Turismo y Sostenibilidad*, 2012, Ch. 8, pp. 127-139, Septem Ediciones, Oviedo, Spain. ISBN: 978-84-15279-46-4.
4. Roldsgaard, K. & Trujillo-Ruiz, F.B.; & Sieben, M.L., *Educational Innovation through Participatory Activities*, Proceedings of the International Conference on Innovation, Documentation and Teaching Technologies, Valencia, Spain, 8-9 May, 2014. ISBN: Forthcoming.
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10. Roldsgaard, K., *Road out of the Crisis* [In Danish], Ministry of Transport, Reference number: 2011/3533, November 2011, Copenhagen: Denmark.

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Presentation of the thesis

Honorary Professor Gambardella, a key theorist in the field of technological innovation, introduced me to a selection of articles from the Long Range Planning special issue on business models in Fall 2009, which I used as a theoretical basis for a dissertation in the field of Economics and Management of Innovation and Technology to obtain the academic qualification as 'Dottore Magistrale' at Bocconi University in Milan, Italy in October 2010. As a continuation, I then wrote the Doctoral Research Proposal, which was accepted by the Doctoral Committee at the Polytechnic University of Valencia in December 2010.

Timeline of the doctoral investigation

In January 2011, I started as a visiting PhD student in the Department of Operations Management at the Copenhagen Business School I started a research collaboration with one of the Vice Presidents in the Danish State Railways (DSB). In October 2011, I was invited by the Spanish National Transport Commission Optired (P-68/2011) to take part in the experts' meeting about the Liberalization of Rail Traffic for Passengers in Madrid, Spain. In the subsequent three months, I discussed the basic assumptions and challenges for facilitating a necessary business-model innovation in the Danish railway sector with the Danish Minister of Transport (Henrik Dam Kristensen), who subsequently distributed the report 'Road Out of the Crisis' in the ministry and network to 'improve the administration of the continuous work with the railway system and transport sector in general' in December 2011 (Reference number: 2011-3533).

In January 2012, I presented a second report DSB's business model with the key results of the empirical study to the senior management of the Danish railways. In April 2012, I presented the key results in the Official Research Summit co-organized by the Danish Authority of Science, Technology and Innovation. I then wrote a third report to the Spanish Railway Foundation about the unexpected repercussive effects related to the economic disaster that occurred to the Danish State Railways after it expanded its operations into the Swedish railway sector (see Roldsgaard,

2012). I then co-authored a chapter in *Septem Ediciones* to propose a proactive vision for the development of the railway operator's business model (see Molina et al., 2011). I then co-authored a peer-reviewed article in *Springer* to describe an exemplar business-model innovation 'Bring Your Bike' in the Copenhagen Commuting Systems, which increased the number of passengers caring their bike by 300 percent in less than two years (see Molina et al., 2012). I was then invited by CPH:DOX Scandinavia's largest Film Festival to take part in a panel debate with the Permanent General Director of the Growth and Development Ministry in Denmark on the topic of Financial Crisis, Growth and Green Conversion in November 2012.

In January 2013, I started the writing of the doctoral thesis. In March 2013, the Danish Government made it official to invest 3.75 billion euros in the development of the Danish railway sector, which is the largest investment in the history of the Danish railway sector. In April 2014, I presented the results of the doctoral investigation at the official symposium on Transport Liberalization organized by the UNED Department of Administrative Law in Madrid, Spain. In May 2013, I was selected to present the key results of the doctoral investigation to the researchers of the project 'Growth via Leadership' with official representatives from the Danish Business Authority in Copenhagen. In June 2013, I published another peer-reviewed article with Professor Dr. Miguel de Molina (Vice Dean) in the Journal of Law of the European Union (see Roldsgaard & Molina, 2013). In September 2013, I was selected as one of four people by the UNED Department of Administrative Law to present a vision for the liberalization of the Spanish railways for passengers, including discussing the number of operators entering the railways, the award criteria to be fulfilled by the operator in relation to the product and geographical scope of the licenses to be granted, regarding the liberalization of railway passenger traffic announced by the Spanish Ministry. In December 2013, we received the final review of the doctoral thesis.

In January 2014, I prepared the submission of the doctoral thesis. In March 2014, the doctoral thesis was submitted in a revised form.

Impact of the doctoral investigation

The doctoral investigation has had an impact on the political decision announced in March 2013 to invest 3.75 billion euros in the development of the Danish railway sector, which was confirmed by the political parties

of the Danish government in January 2014. The UNED Department of Administrative Law in Madrid, Spain provided a unique opportunity to present the results of the doctoral investigation to public audiences at the official symposium on Transport Liberalization in April 2013, after the members of the Spanish Transport Committee 'Optired' had recognized the importance of the results. The results have likewise been presented to representatives of the Danish Business Authority (i.e. Official Growth Advisors of the State) in Copenhagen, Denmark in May 2013.

The results have been published in the Journal of Law of the European Union (Revista de Derecho de la Unión Europea) in the June-September issue in 2013. In addition to the contribution to the transport policy in two European countries, new insight into areas of cognitive leadership that have great influence on the survival and the future success of politically driven organizations is published in the doctoral thesis. In summary, the results of the doctoral investigation have been presented to a range of audiences across Northern and Southern Europe, including Denmark's Membership Organization for Managers, the Danish Ministry of Transport, the Danish Business Authority, the Spanish National Transport Committee, and Law Researchers of the European Union.

Valencia, March 3, 2014

Kasper Roldsgaard

Abstract

PURPOSE:

The purpose is to explore the basic assumptions for innovating the Danish railway operator's historic business model in an unprecedented institutional crisis.

METHOD:

A management survey collects 22,729 responses from 368 managers (80% of the managers in the Danish railways with average seniority of 15 years) to explore these basic assumptions to specify the areas of leadership that have a significant impact on facilitating innovation of business models in times of crisis.

RESULTS:

Successful leadership in a crisis depends on the articulation of the basic assumptions and challenges for the development of the current business model. It is not enough to make goals for the future, as the related challenges should also be articulated. A core task for strengthening the development in the railway sector is to prioritize new infrastructure projects to innovate the existing railway operations gradually, rather than starting new business ventures.

ORIGINALITY/VALUE:

Management studies in times of crisis are rare. Furthermore, the causes of the institutional crisis in the Danish railway sector have until now not been studied from a management perspective based on the managers' understanding of the factors affecting the innovation management of a business model in crisis. The doctoral thesis identifies some emerging areas of cognitive leadership that have not yet received sufficient attention in the literature on business models, but nonetheless the company managers believe that the areas of cognitive leadership have a significant impact on the survival of the organization and its future success.

Resumen

PROPÓSITO:

El objetivo principal de la tesis doctoral consiste en dar respuesta a las hipótesis básicas que puedan facilitar la innovación del histórico modelo de negocio del operador ferroviario danés durante una crisis institucional sin precedentes.

MÉTODO:

El estudio cuantitativo ha analizado 22729 respuestas de 368 gerentes (80% de los gerentes en los ferrocarriles daneses, con un promedio de antigüedad de 15 años) para explorar esas hipótesis básicas, especificando las áreas de liderazgo que se suponen tienen un impacto significativo en la facilitación de la innovación de los modelos de negocio en el tiempo de crisis evaluado.

RESULTADOS:

Durante una crisis, para alcanzar éxito en el liderazgo no es suficiente definir metas para el futuro, ya que los retos actuales también deben estar bien articulados. Una tarea fundamental para fortalecer el desarrollo en el sector ferroviario es dar prioridad a los proyectos de infraestructura que permiten innovar en los servicios ferroviarios actuales gradualmente, en lugar de iniciar nuevos proyectos empresariales.

ORIGINALIDAD/VALOR:

Los estudios sobre la gestión del modelo de negocio en tiempos de crisis son escasos. Además, las causas de la crisis institucional en el sector ferroviario danés no han sido estudiadas hasta ahora desde una perspectiva de gestión basada en la opinión y experiencia de los gerentes de la empresa acerca de los factores que afectan a la gestión de la innovación de un modelo de negocio. La tesis doctoral identifica algunas áreas emergentes de liderazgo cognitivo que todavía no han recibido suficiente atención en la literatura sobre los modelos de negocio, pero que sin embargo los gerentes de las empresas creen que tienen un impacto significativo sobre la supervivencia de la organización y su éxito futuro.

Resum

PROPÒSIT:

El objectiu principal de la tesi doctoral consisteix a donar resposta a les hipòtesis bàsiques que puguin facilitar la innovació de l'històric model de negoci de l'operador ferroviari danès durant una crisi institucional sense precedents.

MÈTODE:

L'estudi quantitatiu ha analitzat 22729 respostes de 368 gerents (80% dels gerents en els ferrocarrils danesos, amb una mitjana d'antiguitat de 15 anys) per explorar aquestes hipòtesis bàsiques, especificant les àrees de lideratge que se suposen tenen un impacte significatiu en la facilitació de la innovació dels models de negoci en el temps de crisi avaluat.

RESULTATS:

Durant una crisi, per assolir èxit en el lideratge no és suficient definir metes per al futur, ja que els reptes actuals també han d'estar ben articulats. Una tasca fonamental per enfortir el desenvolupament en el sector ferroviari és donar prioritat als projectes d'infraestructura que permeten innovar en els serveis ferroviaris actuals gradualment, en lloc d'iniciar nous projectes empresarials.

ORIGINALITAT/VALOR:

Els estudis sobre la gestió del model de negoci en temps de crisi són escassos. A més, les causes de la crisi institucional en el sector ferroviari danès no han estat estudiades fins ara des d'una perspectiva de gestió basada en l'opinió i experiència dels gerents de l'empresa sobre els factors que afecten la gestió de la innovació d'un model de negoci. La tesi doctoral identifica algunes àrees emergents de lideratge cognitiu que encara no han rebut prou atenció en la literatura sobre els models de negoci, però que no obstant això els gerents de les empreses creuen que tenen un impacte significatiu sobre la supervivència de l'organització i el seu èxit futur.

Chapter 1

Introduction

Management studies conducted in a situation of a company crisis are rare. An institutional crisis has been widely recognized in the transport sector, but the causes of the crisis have not been studied, which was the motivation for investigating the causes of the crisis in greater detail; not by interviewing a few managers as in the study by Achtenhagen et al. (2013) or Aspara et al. (2013), but by scaling up the investigation from a few initial in-depth and semi-structured interviews to a comprehensive management survey with about 80% of the managers of a large organization. The present study analyzes the barriers and opportunities for facilitating the innovation of the railway operator's business model in crisis. A comprehensive management survey was used to test the 'current belief system of the company' (Baden-Fuller & Haefliger, 2013) to obtain a deep understanding of the possibilities within the current business model constellation. The doctoral investigation seeks to answer some of the long-standing challenges posed by Chesbrough (2010), who asks when does a novel technology require a novel business model and when does the combination of the two lead to a competitive advantage? Baden-Fuller & Haefliger (2013) raise this question to answer: What determines the direction of technology evolution?

The doctoral investigation aimed to answer this question with reference to technological innovation in the railway sector and the innovation of the railway operator business model by examining the responses

provided by over 350 managers, who have in common that they are considered experts specialized within specific fields of expertise in the railway sector. The managers taking part in the doctoral investigation are not just some random managers from some random companies; they are managers with a seniority of 15 years in average.

The exploration of gaps in the management agenda was operationalized by using the leadership agenda for managing business-model innovation (Doz & Kosonen, 2010) to identify the cognitive areas of leadership that are assumed by the managers in the company to have great importance for the survival of the organization and its future success. The doctoral investigation thus followed the encouragements by some of the key theorists within the field of business models to “unpick the interdependencies between business model choice, technological innovation, and success or failure” (Baden-Fuller & Haefliger, 2013, p. 423) in the Danish railway sector as a case of learning of the cognitive areas that are assumed to be important for the survival of organizations and the continued success during periods of an emergent crisis.

1.1 Background for the study

The doctoral investigation started by conducting nearly 20 in-depth and semi-structured interviews with a few managers in addition to attending several strategic meetings in Spring 2011. The scope was then narrowed down to a study of the problems related to a near failure of the multi-million project known as the “travel card project” (In Danish: Rejsekort), through a series of semi-structured interviews with the managers responsible for the project.

A total of 81 pages of transcription was generated and then organized into twelve categories with a total of 110 search words (open codes) to give the reader an understanding of the comprehensiveness of the data that had first been collected. In the process of transcribing, coding and interpreting the interviews, an economic disaster suddenly became evident as a result of an international expansion of the railway services into Sweden in Spring 2011. It was then decided to replace the already

collected data by a superior data collection method (management survey) that was focused on 'the many' rather than 'the few' selected managers, thus following a quantitative approach. Hence, the qualitative data about a single near-failure (multiple-year, multiple-million) project based on a few interviews was replaced by a comprehensive study including about 80% of the managers in the case company (n=368), following a fully structured interviewing technique operationalized via a management survey to systematically test the basic assumptions and fundamental challenges for facilitating business-model innovation in the Danish railway sector.

1.2 Ideal timing

The study aims to explore the basic assumptions of the managers working inside the company to better understand the causes that led to the emergence of the crisis in the past: and to know what are the cognitive factors that influence business-model innovation in the railway sector in order to better understand the factors that influence on the avoidance and outcome of the institutional crisis when looking forward. The ideal timing of the study was to some extent a result of luck, being at the right place and knowing the right people, but it was also a result of hard work during a preliminary field study that was recognized by the senior management, which paved the way to obtain the permission to perform the comprehensive management study in times of an economic crisis not seen before in its history.

Searching for DSB results in a total of 1,528 journalistic articles published in *Information*, which is known as one of the most reliable source of news in Denmark. The first graph describes the overall level of attention of the Danish State Railways in the Danish press from 1996 to 2012. The second graph describes the results a combined search for DSB and crisis (in Danish: krise), resulting in 74 journalistic articles published in the same period. The data thus confirms that the company was in a historic crisis when the doctoral investigation was performed in 2011, as evidenced in the comparatively higher level of attention to the second crisis. Comparing the two graphs, the percentage of the critical

journalistic articles is notably higher when the second crisis is observed in 2011. This is evident as the overall number of articles about DSB declines in the 15-year period, while the number of critical articles related to DSB and crisis reaches a similar level in 1998 and 2011. The ideal timing of the empirical study is described in figure 1.3.

The first graph shows that the Danish State Railways received a relatively high level of attention at the end of the 1990s and beginning of the 2000s, while the attention of the company in the press remained at a historic low, but constant level of overall attention in the press in the five-year period from 2007 to 2012. The second graph specifies the emergence of two crises, the first in 1998 and the second in 2011. The graph specifies some important points of history including a focus on infrastructure projects at the end of the 1990s and beginning of the 2000s, while a series of commercial projects gradually gets associated with the a series of smaller crises in an increasing amount of journalistic articles at the end of the 2000s, leading up to the institutional crisis in 2011.

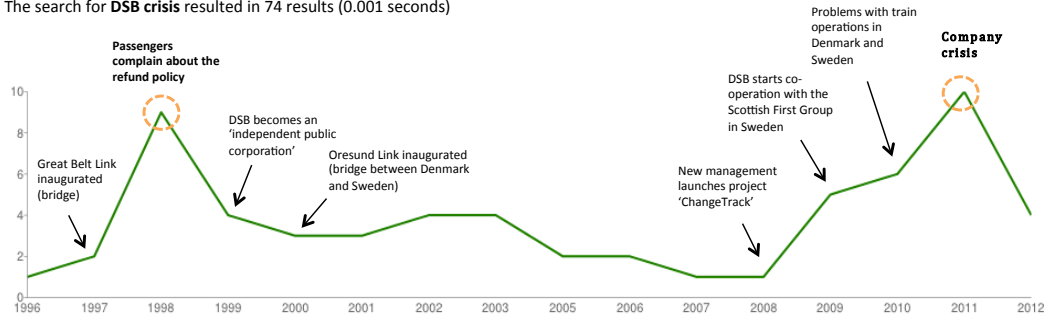
The second graph thus illustrates that several smaller crises often have to be managed simultaneously. Therefore, there are many factors that influence the complexity of running a company during a time of institutional crisis, which was a key reason why it was necessary to study the crisis of the Danish railways from multiple perspectives. The present study seeks to address the challenges of cognitive leadership in a time of crisis. This is not a study of failure, but of the cognitive leadership challenges related to a necessary business-model innovation in the Danish railway sector in a period of institutional crisis, which could ultimately lead to one of two possible outcomes: *failure* or it could lead the company out of the crisis. A crisis in this context refers specifically to a strategy, project or investment, which completely fails for which reason the study of a crisis is related to the study of mistaken beliefs, unsuccessful operations, or *unintended outcomes* (Roldsgaard, 2012a).

Figure 1.1: Level of attention in press 1996-2012

The search for **DSB** resulted in 1528 results (0.003 seconds)



The search for **DSB crisis** resulted in 74 results (0.001 seconds)



Source: The Author, based on information.dk

1.3 Ideal timing

The multiple-year delayed trains IC4 project has led to significant cost overruns, not only in terms of the unforeseen extra cost of producing the trains, but also in terms of paying a high rent for the parallel licensing of expensive rolling stock during many years, not to forget the cost of the lost revenues of a well-functioning railway service and the negative impact of the reputation of the company in the population. The emphasis on special requirements is furthermore suggested to be a common denominator of a series of unsuccessful large-scale infrastructure projects observed in the field study ranging from: (a) the IC4 project; to (b) the DSBFirst project; onto (c) the travelcard project.

As an alternative to the 'big bang' project or 'black hole' investment approach to large scale projects, the high-speed railway lines in Spain have been implemented in a series of projects to connect two cities (i.e. transport from a to b) with the official declared aim to gradually develop an integrated railway high-speed infrastructure. Every single high-speed railway ("AVE") line has been announced as an independent project, which means that the planning and execution of the high-speed railway lines were implemented in a series of smaller steps, which decreased the complexity of the individual projects, while pointing the development of Spanish railway infrastructure in the direction of creating an integrated high-speed railway infrastructure.

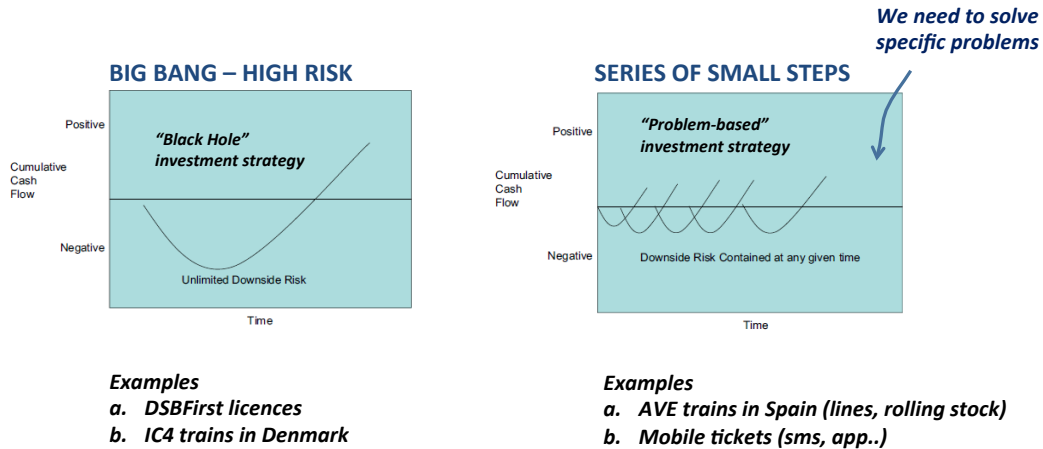
The innovative approach to the project management provides a rich opportunity to learn from the mistakes of the past, while preparing new projects. The focused step-by-step approach to the project management of macro projects furthermore improves the opportunities for exploiting the constant evolution of 'gradually disruptive technologies' in the railway sector. McGrath (2010) points out that the discovery-driven planning is ideally executed in a series of smaller projects (plural); as opposed to one all-inclusive project (singular) where the 'black hole' investment is predicted to end up with a positive result even though this has seldom been the result when looking back at the development of the railway projects during the past 30 years (Flyvbjerg, 2006b). The

development of mobile tickets has been recognized as a success in the Danish railway sector (Molina et al., 2012).

The research into the long-range planning through the management of a series of smaller projects is suggested to be relevant not only because we know that the cost of technology decreases over time, but also because new technology continuously outperforms older technology. Agreeing on minimum acceptable outcomes of macro projects is relevant (Thompson & MacMillan, 2010).

The long-range planning of a superior railway service via a series of projects (i.e. planning of individual railway lines) that collectively aims to gradually changing the current railway service was proposed to the Danish ministry of transport (Roldsgaard, 2011) as a strategy to make the infrastructure projects more manageable. For example, the mobile tickets have been implemented through a series of smaller projects, which made it easier to manage the implementation of the projects; and the outcome of the projects have resulted in a wide selection of different types of mobile tickets (sms, apps, vouchers) to solve specific problems (Molina et al., 2012) as visualized in the figure 1.2.

Figure 1.2: Progression in small steps rather than a big bang



Source: The Author, based on McGrath, 2010

The Danish State Railways gradually received a growing level of media coverage due to the outcome of the big bang projects. The media coverage of the crisis was intense and almost every other day a new scandal was revealed, which led to a complete replacement of the first and second tier of the management of the Danish State Railways in the period from early 2011 to early 2013. The coverage of the crisis affected the managers working inside the Danish Railways, which radically changed the scope of the research. The official recognition of the crisis opened a door for an opportunity to collect rich and unique data to investigate the barriers and opportunities for facilitating a necessary innovation of a historical business model in a company crisis not previously seen since it was established in 1885.

The emergence of the crisis therefore suddenly provided an unexpected opportunity to conduct a comprehensive management study to provide innovative interpretations of the challenges for cognitive leadership in an institutional crisis to advance the existing knowledge about the management of business-model innovation. As a result of this, the six months of participant observation forced me to reconsider the data collection strategy. I began to see the business-model challenge seemed to be linked to the collective short-term memory of the former management of the Danish railways. At the same time, when reviewing the literature on the topic up until 2011 to prepare the management survey, I gradually realized how the extant literature about business models had largely overlooked the impact of the cognitive factors that I assumed plays an important role for the survival of the organization and its future success.

The opportunity to scale up the study of an unprecedented crisis at a meta- level, not limited to a selection of random interviews with some 'top managers and other key actors in the organization' (as in the study of Achtenhagen et al., 2013), by including all managers working in the case company. This unique opportunity therefore paved the way for the collection of data to fill in a gap in the saturated research on business models in order to advance the current understanding of the most important opportunities and barriers for business-model innovation, as

encouraged by Chesbrough (2010). After negotiating the idea of performing a comprehensive survey with the former top management of the Danish railways, the permission was finally granted in June 2011. In the following months, the survey was prepared, tested and re-tested in a pilot study with five managers. An operational control group of about 80 managers was used as an ahead-group (by one week) to minimize the risk of collecting data with errors. Since no report of error was received during this week, the survey was launched at a national level to include 475 managers in September 2011.

1.4 Defining crisis

A crisis describes a point in a story or drama when a conflict reaches its highest tension and must be resolved (American Heritage Dictionary, 2006), which means that a crisis may be conceptualized as a decisive point in history - or the plot of a play or story upon which the outcome of the management response to the situation (Baldick, 2008).

Crisis origins from Greek meaning 'turning point' and should therefore strictly refer to a moment in time or *situation* (a discontinued process) rather than a continuing process (Allen, 2008), which means that a deep understanding about the basic assumptions and challenges in the representative period become interesting to study. The cross-sectional study of a profound crisis as it happens therefore seems to be the ideal approach, which can be combined by various longitudinal studies to map out 'important events' over time in order to understand the critical situation that needs to be analyzed in-depth.

A crisis is not static, but dynamic in nature. A crisis develops over time, mostly within a short time frame, which makes a business model *in crisis* interesting to study when the crisis is at its peak. The point when the crisis reaches its highest tension was confirmed by a longitudinal analysis of the level attention in the press (see Figure 1.1. at page 15). A crisis has been described as a turning point - for better or worse - especially a sudden change, usually for the better (Merriam-Webster Dictionary, 2005), but not always. A crisis has been recognized as a

highly volatile dangerous *situation* requiring immediate remedial action (Thesaurus Heritage Dictionary, 1995).

The historical timeline of attention in the press describes the emergence of several smaller crises (more than one crisis) with the institutional crisis being an accumulation of the smaller crises that all together adds up to the economic problem in 2011. For this reason, it becomes relevant to look at the concept of crisis in an empirical context as a result of the existence of a sustained crisis (Roldsgaard, 2012). A crisis in this context may refer to a situation or process of transformation where the old system can no longer be sustained (Venette, 2003), which therefore offers an opportunity to challenge established ways of thinking. A crisis is therefore like a double-edged sword as it can lead to failure or success. This duality makes it interesting to study the complexity of managing a large company during periods of crisis.

A crisis has thus been characterized by abnormality, instability, and zero hour - a point in time when a vital decision has to be made, for example, to achieve a disruptive change in the current operations. It remains an open question why some companies emerge stronger and better from a crisis, while others fail. Until now, the 'cognitive frames' that shape the development and innovation of business models have been largely overlooked in the literature on the topic (Baden-Fuller & Haefliger, 2013), which represents a novel challenge in the field of business models. It has been argued that the inability of the management to recognize the crisis at its early stages before it reaches a serious point, where the crisis become critical is due to denial and other psychological responses (Mitroff, 2005, p. 36), while others have pointed out the inconsistency between the limited number of studies about cognitive leadership and its great importance for the continued success and survival of organizations (Mumford, 2013).

The irony is that it gets increasingly difficult for management researchers to get inside the company to study the crisis as it happens - and not only in retrospect when the conclusion is known as in the study of Aspara et al., (2013). The pluralistic nature of having three

complementing studies was thus considered a necessity to generate a comprehensive understanding of the crisis in the Danish railway sector. Crisis in this context thus represents a notion of a 'stable subject area' in which new critical theory and philosophical ideas might emerge (Rendtorff, 2013): and therefore it might also have a place in the existing literature on business models. The term crisis has in this philosophical context been described as a 'confrontation between old and new' (Rendtorff, 2013), indicating that a new corporate era of success can initiate from such an event. A crisis therefore has the capacity to:

rupture with the old ways of thinking and a chance of dislodging rigid ways of thinking, including those in the academy (p. 1).

A crisis can in this context be understood as a 'turning point in mental disorder' (Glazier, 1992), inter alia, of the people in charge of the current operations, which was a key motivation for performing a psychometric analysis across multiple groups of managers within a collective system to examine the shared beliefs about the basic assumptions and challenges related to the current operations. This approach represents a new type of study referred to as 'business model system' analysis (Baden-Fuller & Haefliger, 2013).

In summary, a crisis has been defined as a difficult or dangerous situation that needs serious attention (Merriam-Webster Dictionary, 2014) or a time or state of affairs requiring prompt or decisive action (Merriam-Webster Dictionary, 2008) or the turning point for better or worse (Merriam-Webster Dictionary, 2005).

1.5 Problem in present theory

A problem in the present theory is specified to explain why the Danish State Railways is a good case to learn more about the relationship between business-model innovation and cognitive leadership. The relationship has been recognized (Baden-Fuller & Haefliger, 2013; Aspara et al., 2013; Doz & Kosonen, 2010; Chesbrough, 2010), but it remains unfinished (Achtenhagen et al., 2013).

The labeling of Nokia as a 'case of success' (Aspara et al., 2013) seems to contrast with the common understanding of the conclusion of the same company (Roldsgaard, 2010, 2011). Rather, Nokia represents an iconic example of why *being a pioneer and first mover is not always an advantage* (Markides & Sosa, 2013). The passive neglect of the emerging crisis had the consequence that Nokia continued in the same direction although the market has taken a radical shift in a new direction when Apple and Google launched their new superior mobile phones (Roldsgaard, 2011).

The problem of inaccurate or inappropriate judgment has historically been described as 'Failure of foresight' (Wilensky, 1967), 'Failure of perception' (Turner, 1976) or Failure of the 'Inside view' (Kahneman, 2011) in the long-standing management literature, while recent literature on business models has described a related problem when a previous successful company keeps doing what used to be the right thing for too long and thus falls victim of its own business model (Doz & Kosonen, 2010).

A similar problem has been observed when the management not only keeps doing what used to be the right thing for too long, but in addition neglects to invest money in the development of a new core product (Roldsgaard, 2011). The latter problem is related to the Innovator's Dilemma (Christensen, 1997) when a disruptive shift in the market gets ignored by the incumbent, that is, by the senior managers who are responsible for the decisions to reconfigure the existing business model (Johnson et al., 2008) or by replacing the existing business model by a new superior business model (Chesbrough, 2010).

The examples of failure-related challenges have in common that they follow the same idea that the management's hypotheses need to be tested in action and revised when necessary as described in the business-model literature (e.g. Magretta, 2002; Teece, 2010). Conceptualizing Nokia as an extraordinary case of success not only goes against the common idea that it failed, but the authors also arguably fail

in presenting the relevant explanations why the previous success mobile phone company failed.

It seems difficult to generate any relevant knowledge about which areas of cognitive leadership that affect the success of business-model transformation positively or negatively through a review some archival documents and a few reproductive interviews (Aspara et al., 2013).

This approach to the study of the 'cognitive drivers' seems to represent a rather fragile ground for deriving any accurate and reliable conclusions about the basic cognitive challenges for successful leadership in a time of crisis. The doctoral thesis has for these reasons presented a counter argument for the ideal study of a well-known company in crisis. It seems difficult to understand why some academics from Finland have decided to describe the success of Nokia "to provide new insights into how executives' cognitive processes can influence corporate business model transformation decisions" (p. 459) by conducting a few interviews. The authors suggest that:

The Finnish telecommunications giant Nokia is an illuminating example of a corporation that made a successful business model transformation - or turnaround - that rescued the firm from near bankruptcy and set it on the path to becoming one of the world's great corporate success stories of the 1990s and 2000s (p. 462).

The first half of the argument could be justified due to the historic success of the Nokia mobile phones in the 1990s, but the second half of the argument concerning the 2000s is misleading at best and directly incorrect at worst. Ironically, the same authors present the results of a study of a company that has not succeeded in transforming its business model successfully after Apple and Google introduced new superior mobile phones that gradually removed the income basis of Nokia. Not only is it too easy to be wise in hindsight, but we also know that a longitudinal analysis without a cross-sectional study of the actual institutional crisis is not the ideal approach to understand the how and why the cognitive forces interact in times of crisis.

The illusion of constructing a laudatory or eulogistic picture of a previously successful company is unsustainable when it seem to be unaware of what had caused the success in the past, while it remains an open question what when wrong in the management of Nokia as it went from being the world's leader in mobile technology to being sold to save what was left from a previously successful company. Conceptualizing Nokia as a 'success story' in the 2000s, while leaving out any serious discussion of the importance of technologic innovation for business-model innovation poses a potential threat to the credibility of the literature on business models for which reason it seems appropriate to correct this fallacy.

Finally, we know that a longitudinal study of a company crisis can be associated with a risk to drag inaccurate or erroneous conclusions from a distant analysis of the evolution over time if such studies are based on a few interviews and some random archival reviews of the past as in the study of Nokia (Aspara et al. 2013) without any probing or retesting of the results in the 2010s. The problem of this second-best approach to study the underlying barriers and opportunities for business-model innovation in a time of crisis is that it potentially fails to recognize the basic assumption upon which the management decisions are made in critical situations, which not only affect customers but also the employees working in the company.

1.6 Cognitive leadership

Cognitive leadership has been broadly defined as 'a broad range of approaches to leadership emphasizing how leaders and followers think and process information' (Avolio et al., 2009). Cognitive leadership is therefore distinct from transactional leadership based on 'rewards contingent on performance' (Avolio et al., 2009, p. 427):

One of the essential building blocks in the cognitive leadership literature is the idea of a schema, which is a broad organizational framework that helps one to understand and make sense of a given context or experience (p. 427).

The leadership agenda (Doz & Kosonen, 2010) was used as a scheme that is recognized as a *conceptually valid* framework that already existed in the literature on the topic to better understand the factors that impact cognitive leadership during periods of crisis, following the works that take a cognitive science approach (Wofford et al., 1998; Mumford et al., 2003; Lord & Hall, 2005; Mumford et al., 2007; Avolio et al., 2009; Mumford, 2013).

Recent developments in the state-of-the-art psychological literature have pointed out two distinct types of cognitive leadership (Avolio et al., 2009). The first approach has examined the way *shared thinking* contribute to the leader's cognitive attributes or abilities (Lord & Hall, 2005), while the second approach has examined how interactions that occur with between individuals affect cognitive leadership (Mumford et al., 2007).

Research in cognitive management follows the ideal of mapping of the mental state of the people working in the organization as an essential schema for the management of politically driven organizations. The Leadership Agenda for the renewal and development of business models (Doz & Kosonen 2010) was used as a scheme to better understand the factors that affect the leadership of politically driven organizations in times of crisis. The cognitive approach to leadership recognizes that agreement or disagreement among members of a collective system can affect organizational development positively or negatively. Cognitive management is very important for the survival and continued success of the organization (Mumford, 2013).

Others have described the risk of organizational inertia as a stagnant situation where the renewal and transformation of the current business model is necessary for the continued success of large companies (Hienerth et al., 2011), which means the change of the current business model becomes crucial.

A related problem in this context is that change in the current model not always comes to the benefit of all people working in the organization

(Velu & Stiles, 2013), which tends to work against the renewal and transformation of a well-established business model especially if the proposed change in the current model puts the responsible leaders' careers at risk (Chesbrough, 2010). Others have described the resulted of a lock-in situation, being defended by numerous actors who wish to maintain the current model (Doz & Kosonen, 2010).

Related studies within organizational sciences have explained how different types of memory influence on the organizational development *as it happens* (Schatzki, 2006). This type of study follows the first approach with emphasis on the individual leader's cognitive attributes or abilities as a self-concept, while the present study examines the pluralism of cognitive leadership in a collective system of shared beliefs or internal disagreement.

The second approach acknowledges that agreement or disagreement among the members in a collective system can influence firm performance and organizational development positively or negatively. In this context, Doz & Kosonen (2010) describe the unfortunate situation of business-model inertia to explain a situation when nothing 'new' happens in the indirect study of Nokia when a radical change was most obviously required for the survival of the previously successful mobile company and its future success.

1.7 Underlying assumptions

Aspara et al. (2013) describe "empirical snapshots of particular firms' business model" as something that should be avoided and instead suggest that longitudinal studies are the best way to understand how "business model transforms over time" (p. 459). However, this argument is controversial because a crisis calls for an in-depth study of the actual situation rather than merely a mapping the development over time.

Understanding the development of general trends is of course important to understand the context, but it is not in itself sufficient to understanding the motives and deeper causes that triggered the crisis. As

opposed to this idea, the collective short-term memory of the former Nokia Management seems to provide an exemplary case of why a previously successful company failed, among others, because the responsible managers seemed to have forgotten that technological innovation was at the core of its success within mobile technology that started 15 years ago, but ended 5 years ago (Roldsgaard, 2010).

This point is almost completely ignored in the same study of the alleged successful 'corporate business-model transformation'.

The problem is that if the deeper causes of the crisis are not removed, it is probably only a matter of time before the same company will face a subsequent crisis that has the potential to spiral out of control. It has been suggested as a central learning in the study of the Danish State Railways that disregarding the underlying assumptions and challenges has the potential to lead the focus away from obtaining an understanding of the root causes that triggered the crisis initially and perhaps more interestingly it will be unlikely to achieve an understanding of the underlying cognitive forces that defend and maintain the system's existence in its present condition when a fundamental change seems necessary (Roldsgaard, 2012a).

In terms of methodology to study the basic assumptions and challenges, it is very difficult to establish the level of trust required for revealing the deeper motives and personal opinions about the causes and issues that led up to the crisis through a few classic personal interviews, not only due to the intimate nature of personal interviews, but also because the interviewee will most likely not wish to risk his career by revealing either confidential or sensitive information about the company.

A management survey has the capacity to remove this barrier by listing statements and questions to be answered, where the individual person in a large investigation does not feel responsible for the results. Focus is thus shifted from gaining and building trust through personal interviews to formulating and designing different relationships to be tested through

a questionnaire in order to have a more complete idea of the assumptions.

In psychology, the management survey has long been considered a common research approach (Nunnally & Bernstein, 1994) that has likewise been widely applied in management research (Edwards, 2001; Hinkin, 1998). As an alternative to conducting personal interview, a comprehensive survey was used to generate information about the basic assumptions and challenges related to a necessary business-model innovation in the Danish railway sector in the present study.

1.8 The business model as an object of study

The components of a business model are essential (Osterwalder et al., 2010) as a starting point to understand the concept, while theorists within the field of business models have pointed out that further research is needed to better understand how business-model innovation occur (Baden-Fuller & Haefliger, 2013).

The business model has been described as a delivery system (Roldsgaard, 2010), while others have specified that business-model innovation incorporates two value delivery systems (Baden-Fuller & Haefliger, 2013) with emphasis on two dimensions: (i) value creation; and (ii) value capture (Drucker, 1967). However, the business model has also been an object of critique for over 10 years (Porter, 2001; Zott et al., 2011), but the same authors ironically seem to have contributed to more rather than less confusion about what is a business model and what is it not (DaSilver & Trkman, 2013) or why it is important (Teece, 2010). Not surprisingly, the complaining has been perceived as unconstructive for the development of the business-model literature (Baden-Fuller & Haefliger, 2013).

A related problem is that the mainstream management academics have rarely given the business model proper attention in the past, even though it is considered profoundly important to the world of work because of its great practical application and operational value (Baden-Fuller &

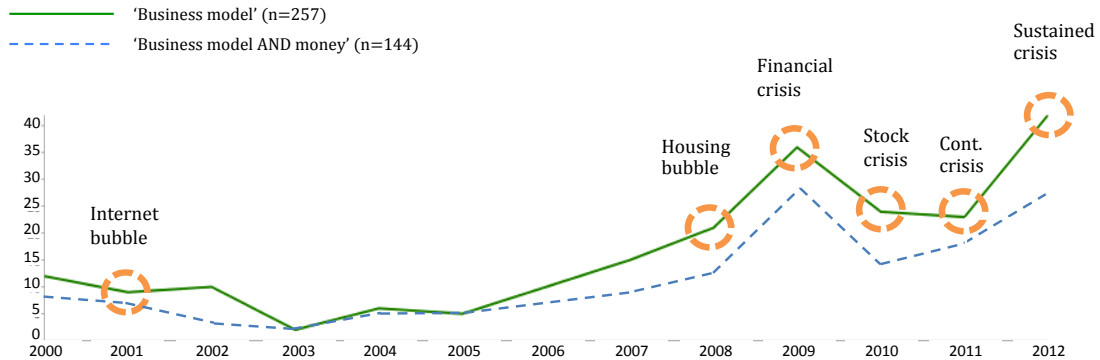
Morgan, 2010). It has been argued that the business model has been misused by practitioners (Magretta, 2002) as a shortcut to gain access to finance high-risk projects that too often had no real value (Porter, 2001), which became evident in the aftermath of the Internet Bubble Burst in the early 2000s, but the business model has also been profoundly misunderstood by academics (DaSilver & Trkman, 2013).

To further clarify the use of the term 'business-model innovation' it refers to a change, transformation or reconfiguration of the existing business model that enables the company to improve profitability or competitiveness or both. Competitiveness in this specific context (i.e. railway sector) refers to the inter-modal competition with other means of transport. A similar result has been acknowledged in the long-standing management literature (Drucker, 1967; Magretta, 2002; Teece, 2010; Chesbrough, 2010; Bock et al., 2012; Baden-Fuller & Haefliger, 2013).

In order to bring clarity, the result of a longitudinal analysis in the Danish press of the use of the term business model ('forretningsmodel') suggests that the ability to make money ('penge') is a vital for any company or business organization. The surprisingly clear relationship between 'business model' and 'money' (i.e. make money or earn a profit) confirms that the ability to make money is assumed to be a central challenge for the management of business-model innovation. Two search results were retrieved from information.dk on 2013-01-01.

The graph describes the longitudinal evolution of the journalistic articles containing only 'business model' (in Danish: 'forretningsmodel') in relation to the results of the journalistic articles containing the term 'business model' and 'money' (in Danish: 'penge'). As a result of the clear relationship between these two variables, we know that monetization (i.e. ability to make money) is an irreplaceable element that cannot be ignored. The combined results are summarized in figure 1.2.

Figure 1.3: Relationship between business model and money



Source: The Author, based on information.dk

Despite the obvious link with monetization (Afuah, 2004), we know that the business model construct is not limited to the idea of monetization. Yet, the ability to 'capture value' does not necessarily enable the company to make money although this seems to be assumed in the first-class literature on the topic. It has been argued that the customer value proposition lays at the heart of any business model (Johnson et al., 2008), while key partners and customer segments are two other essential components of any business model (Osterwalder et al., 2010), representing a two-sided platform (Rochet & Tirole, 2006), which have to be balanced (Eisenmann et al., 2011).

More recently, management academics have conceptualized the business model as an integral part of strategic management (Roldsgaard, 2012), closely linked with technological management or even as a stand-alone concept in its own right (Baden-Fuller & Haefliger, 2013). The new topic of interest includes how technology and business models interact (Baden-Fuller & Haefliger, 2013). Research into the relationship between business-model innovation and technological innovation has been highlighted (Chesbrough & Rosenbloom, 2002; Chesbrough, 2010), while Baden-Fuller & Haefliger (2013) encourage researchers to determine if business-model innovation is potentially separate from technologic innovation?

1.9 Assumptions about the railway operator's business model

The basic assumption about the railway operator's business model is presented below to describe how it is coupled with the infrastructure manager, which means that the business model of the railway operator is depended on investment in the infrastructure to run electrified rolling stock in addition to ensuring timely and reliable trains. Figure 1.3 is a development of the works with the former coordinator of the Spanish transport committee (Dr. Ramos Melero) in 2011. It describes why investment in the infrastructure is important for the innovation of the railway operator's business model, while it also explains why commercial activities are assumed to be at the core of the railway

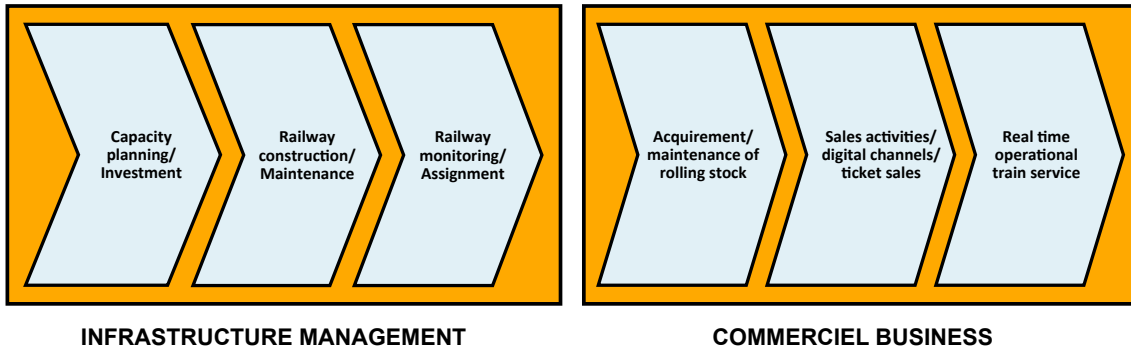
operator's business model, including the operational cost of production on a continuous basis as well as the acquirement of rolling stock.

The railway operator's business model is assumed to be dependent on the long-term investment in the infrastructure (i.e. long-term capacity planning) for which reason the success of the commercial activities that lay at the core of railway operator's business model are assumed to be contextually dependent on the innovation of the core product (i.e. transport from a to b) as described in figure 1.4.

Yet, it still remains an open question if technological innovation is more important than commercial activities - or vice versa - or if they are equally important for business-model innovation in the railway sector? The doctoral investigation seeks to investigate this relationship in greater detail to better understand the importance of technological innovation in the railway sector. The two areas of responsibility reflect the structure of most railway sectors of the European member states (Germany and France among the few still preferring an integrated model). Although the model is simple and straightforward, it seems to have not been fully understood when following the discourses at 'top level' or in press when the institutional crisis of the Danish operator was at its highest peak of tension in 2011.

Furthermore, the European Commission has opted for the separation of responsibilities as announced in the fourth railway package in January 2013 with the objective to facilitate competition by liberalizing the railway traffic for passengers in the member states of the European Union, including harmonizing the technological standards by 2020. In addition to standardizing diverse technology standards in the different member states, inability to separate the two fields of responsibility has been suggested to be one of the core challenges for the development of a single European railway market (Roldsgaard & Molina, 2013). The understanding of this relationship is therefore considered to make clear from the very beginning before going into analytical detail about the institutional crisis observed in the Danish railways in 2011.

Figure 1.4: Coupled business model construct



Source: The Author, based on a dialog with Dr. Ramos Melero

1.10 Originality of the study

That only few management studies exist recording sensitive data about leadership does not make such data less important. Rather on the contrary, it is argued that it makes such data even more valuable and original. The fact that it gets increasingly difficult for researchers to gain access to study the challenges and issues that emerge during periods of crisis could be a good explanation why studies of business models in crisis have been so rarely reported in the literature on the topic.

The irony is that the access to the company gets increasingly more interesting but at the same time increasingly more difficult for management researchers as the pressure intensifies. Most managers are willing to be interviewed in a period of success, while few are likely to accept an interview during a critical moment of time, which may explain why such studies of the management during periods of crisis are rare. This is no surprise due to the psychological intelligence of protectionism and survival instincts that seem to reside inside most human beings in critical situations.

The ideal timing of the study is considered essential for contributing with new valuable knowledge via a thorough examination of the cognitive aspects about the challenges for managing business-model innovation that seem to be only partially explored in the literature (e.g. Aspara et al., 2013; Achtenhagen et al., 2013). This is another reason why the present study is suggested to be valuable to the research community specialized in business models, because the present study was executed precisely at a critical point in time that was characterized by a 'crisis agenda', 'turbulent period' and 'leadership vacuum' in the own words of the managers taking part in the management study. A manager with 25 years of seniority points out that:

'the questions refer to a turbulent period that starts almost precisely with the dismissal of [the CEO], and the leadership has been remarkably absent in the corresponding period [...] the past six months was characterized by a crisis agenda.' (Manager A) DSB has been at a standstill in the period from 17 March to 1 August [2011], which corresponds precisely to the past 6 months that was defined as the

timeframe for the study about the challenges for cognitive leadership. So, unless this is part of the exercise, the timing is quite bad. (Manager B)

However, this was precisely the purpose. Another manager confirms that: A manager with a seniority of 34 years concludes that the 'questions relate well with the company's current situation'. Together, the comments suggest that the present study was in fact conducted at a critical moment in time that was characterized by a high uncertainty in the company. The present study is therefore suggested to be difficult to replicate, which makes it competitive, unique and original.

1.11 Testing basic assumptions

The importance of decision-making and cannibalization has been described in the recent literature on business models (Velu & Stiles, 2013), but it is still not clear what impacts the decisions inside the company during a period of crisis. It seems not sufficient simply to conclude that the top management must be 'cognizant of the mechanisms to manage conflicts in the strategic decision making process so as to be able to run new and existing business models in parallel' (p. 456) when in fact 'change is often not going to benefit all persons' (p. 449) working in the organization. The basic assumption is that technological innovation is essential, while the commercial activities are less important for facilitating business-model innovation in the railway sector. Hence, an interrelationship was explicitly assumed in the management survey. The word essential was defined as 'Extremely important', while the words moderately important were defined as 'Moderately important' on a seven point Likert-type scale. As an extension of the relationship between technological innovation and business-model innovation, a complementing study was executed by listing fourteen options to specify the most important opportunities and barriers for business-model innovation in a period of crisis, evaluated by the managers. The second study aims to add further information about which one is more important or dependent for facilitating business-model innovation in the railway sector. The national infrastructure manager (i.e. technological innovation) was referred to as 'core product' in the present study, while the railway operator's business model was referred to as 'commercial

activities' in order to operationalize the core-periphery theory (Thompson, 1967). The 'core product' was defined as 'transport from a to b' to estimate the importance of technological innovation, while the commercial activities were defined as 'value adding activities to support (deliver) the core product' and get paid for doing so, which is the formal responsibility of the railway operator. The managers knew the terminology applied. Not a single comment was received about the terminology to explore this relationship out of the 103 comments received, which means that there were no doubt about the terms used in the management survey. The conceptual clarity is considered an advantage when interpreting the results because it adds to the reliability that the variables measure the target statement without deferring.

1.12 Research objectives

The purpose of the doctoral investigation was to review business model theory in the Danish railway sector. The doctoral investigation explores the basic assumptions and cognitive challenges for facilitating business-model innovation in the Danish railway sector by interviewing 368 managers about their understanding of the factors that influence the avoidance, emergence and outcome of a crisis. The comprehensive study consists of three embedded studies to address the challenge of innovating the railway operator's business model in crisis.

The first research objective aimed to examine the relationship between technological innovation and business-model innovation in the railway sector (about 10% of the data). In continuation, the second study aimed to specify the most important opportunities and barriers for the long-term development of the railway operator's business model in a profound crisis (about 15% of the data). The second study thus examines the management's hypothesis of the importance of expanding the operations in international markets to either confirm or disprove this hypothesis. The third study explores the cognitive areas of leadership that have great importance for the survival of organizations and the continued success (about 75% of the data).

Table 1.1: Research objectives

No.	Operationalizing theory	Research objectives
1	Thompson's (1967) core-periphery theory is operationalized to study the relationship between technological innovation and business-model innovation in the railway sector in a time of crisis.	Examine the relationship between technological innovation and business-model innovation in the railway sector in a time of crisis.
2	Chesbrough (2010) business-model innovation theory is operationalized to study the barriers and opportunities for facilitating a necessary business-model innovation in a time of crisis.	Examine the relationship between barriers and opportunities for the innovation of the Danish State Railways' business model in a time of crisis.
3	Doz & Kosonen's (2010) leadership agenda is operationalized to study the most critical points of the leadership agenda during in a time of crisis.	Explore the relationship between the importance of the points of the leadership agenda and the former top management's attention given to these points in critical period leading up to the institutional crisis.

Source: The Author

The first two study objectives are suggested to be relevant to define transport policy (about 25% of the data collected), while the third study (about 75% of the data collected) is suggested to be relevant to management researchers to determine the most important 'cognitive factors' to be considered not only during a profound institutional crisis, but also to avoid its emergence based on the assumption that cognitive leadership affect both the avoidance and outcome of an institutional crisis. The outcome of the third study is considered to have the strongest potential for making an original contribution to the literature about business model or psychological literature about cognitive leadership in times of crisis as it explores some cognitive areas of leadership that are assumed to have great importance by the managers working in the railway sector for the management of business-model innovation.

1.13 Summary

The emergence of an institutional crisis motivated the author of the doctoral thesis to examine the areas of cognitive leadership that are assumed to have great importance for the survival of organizations and their continued success by interviewing about 80% of the managers via a comprehensive survey. Few studies exist of the underlying challenges for facilitating business-model innovation in a period of crisis, but the management literature remains incomplete without such studies.

A crisis can be reduced to a 'decisive point', 'turning point' or 'crossroad' in a historical perspective, but it is argued that the researcher should not only *zoom out* to understand the development of general trends over time. Instead, the present study is designed to *zoom in* to get a closer look into the underlying assumptions and challenges in a critical situation that has essential impact on the survival of organizations and their future success. A crisis has been recognized as a highly volatile dangerous situation requiring immediate remedial action (Thesaurus Heritage Dictionary, 1995).

A crisis develops over time, mostly within a short time frame, which makes a business model in crisis interesting to study when the crisis is at

its peak. The point when the crisis reaches its highest tension was confirmed by a longitudinal analysis of the level attention in the press. The research community can learn from the study of the Danish State Railways in several ways. the Danish State Railways is a good case for exploring the underlying assumptions and challenges for managing a necessary business-model innovation, which refers to a development or change of the existing business model to enable the company to make a profit, while strengthening its competitiveness in the long-term. the Danish State Railways is used as a model to study the 'cognitive drivers' (Baden-Fuller & Haefliger, 2013).

The cognitive areas of leadership that have great importance for survival of organizations and future success are specified, while the Danish State Railways is interesting to study because it loses its ability to make money in a period of stable passenger growth. The present study focuses on the cognitive areas of leadership that are believed to have great importance for the continued success and survival of organizations by 80% of the managers working in the company. The problematization of a historic business model in crisis leads to the research question.

Research Question. *What are the basic assumptions and challenges for facilitating a necessary business-model innovation in the Danish railway sector in a time of crisis?*

Chapter 2

Progression of the literature

The literature review starts by providing a historical review of the tendencies in the literature on business models during the past 20 years to establish an initial overview. More specifically, some of the general tendencies and longitudinal progression in the literature about business models are outlined in this chapter in terms of citations and publications, including the top 100 most cited works (chapter 2). In continuation, a study of the progression in the literature is reviewed in greater detail by studying the rhetorical practices in a collection of articles on the topic (chapter 3), before publishing the results of a meta-analysis of articles to specify a gap that this study aims to fill (chapter 4).

The meta-analysis of divergent literatures about business models was executed to identify a gap in the saturated literature on the topic that the present study aims to fill. Surprisingly, the meta-analysis of previous articles published on the topic suggests that the relationship between business-model innovation and *failure* remains an underrated category of research. The meta-analytical review indicates that failure remains unexplored in the central literature on the topic, even though few would deny that it is a possible outcome of an organizational crisis.

A comprehensive bibliometric search was performed in the Web of Science database to explore if other authors had already covered this gap in the past, but no such work was found. The results of the bibliometric

search are published in this chapter to establish an initial overview before going into detail about the opportunities for constructing theoretical contributions. Hence, the literature review follows a simple three-step procedure. First, the results of the progression of the field of business model are presented to establish an initial overview. Second, the results from a study of the rhetorical practices in the recent literature provide an insight into the quality of the state-of-the-art literature on the topic. Third, a meta-analysis of multiple articles evaluates concepts of relevance to the study of business models in order to specifying an opportunity for a theoretical contribution by specifying a gap in the literature that the present study aims to fill.

Despite the exponential increase of citations of “business model” from 2 citations in 1995 to over 2,200 citations in 2013, it seems that the studies of failures have been largely overlooked in the discourse on the topic. The bibliometric study was performed to investigate this hypothesis in greater detail to confirm a systematic bias towards success from business-model innovation, while *failures* have been largely left out of the current discourses on the topic. In the rare cases, where failure is actually recognized as a possible outcome in the literature on the topic, the attention is rapidly switched back to why a company was successful in the past (e.g. Aspara, Lamberg, Laukia and Tikkanen, 2011; Aspara et al., 2013). Before going into greater detail of why the under-appreciation of failure as an outcome of business-model innovation is a problem, the figure describes the progression during the past 20 years, performed on January 25, 2014.

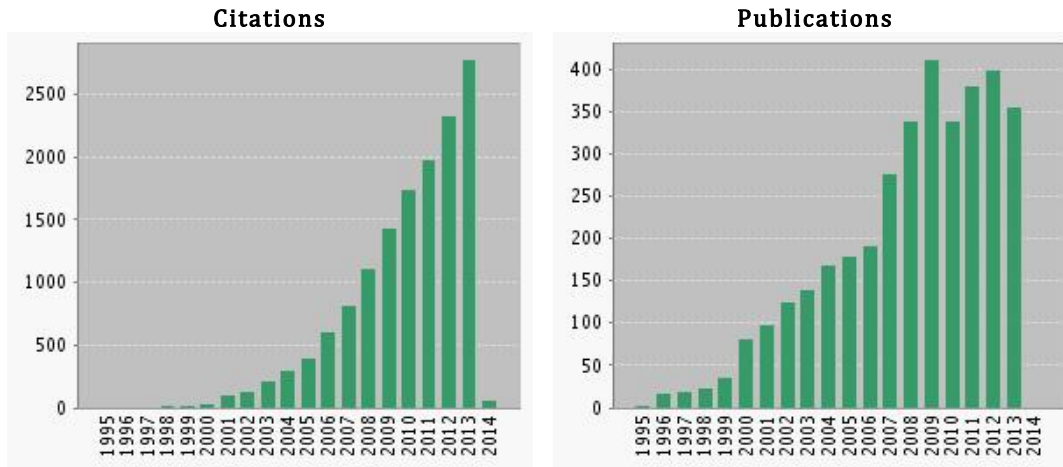
Figure 2.1 describes how the business model has become attractive to many management academics, leading to a new momentum as a stand-alone concept (Baden-Fuller & Haefliger, 2013), which is consistent with the increasing number of citations and publications on the topic during the past 20 years. However, that so many academics have started to use the term ‘business model’ across historically non-correlated fields of research (Molina et al., 2012) motivated the author to reconsider the prevailing argument that the field of business models is confounded by confusion and different definitions (Porter, 2001; Zott et al., 2011;

George & Bock, 2011). The motivation was fueled by the observation of the development of coherent ideas that have not always received much attention in the recent literature on the topic. The problem of focusing only on the negative side of the development of the concept is that this argument implicitly suggests the absence of a well-developed field of research that is, in no small part, fragmented (George & Bock, 2011), and thus assumed to be under-developed. So, while the business model construct has become attractive to mainstream management academics (Baden-Fuller & Haefliger, 2013). Still, the topic remains unfinished, which has been seen as an opportunity for constructing theoretical contributions (Achtenhagen et al., 2013), rather than a limitation. The increase of citations in the leading journal articles during the past 20 years supports the authors' argument.

The progression of the literature thus draws on the findings from an advanced bibliometric study performed in the Web of science database. The longitudinal study of the literature published on the topic starts by documenting an increased interest in the study of business models during the past 20 years. This progression has also been specified in the recent literature on the topic. For example, Achtenhagen et al. (2013) state that the field of business models has made much progress recently, while others have detailed that the progression has been especially evident during the past ten years (Roldsgaard, 2012) and that the interest in the topic has radically increased during the past few years (Molina et al., 2012; Baden-Fuller & Haefliger, 2013).

However, while the business model has received a constant growing level of attention from management academics and practitioners over the past 10 years (Roldsgaard, 2012), the railway sector has been almost non-existent in the literature about business models (Molina et al., 2012). Despite the obvious importance of the core concept of the business model within the field of management, the importance of the business model construct has been overlooked by the mainstream of management academics until recently (Teece, 2010; Baden-Fuller & Morgan, 2010).

Figure 2.1: Progression the past 20 years



Source: Web of Science, 2014

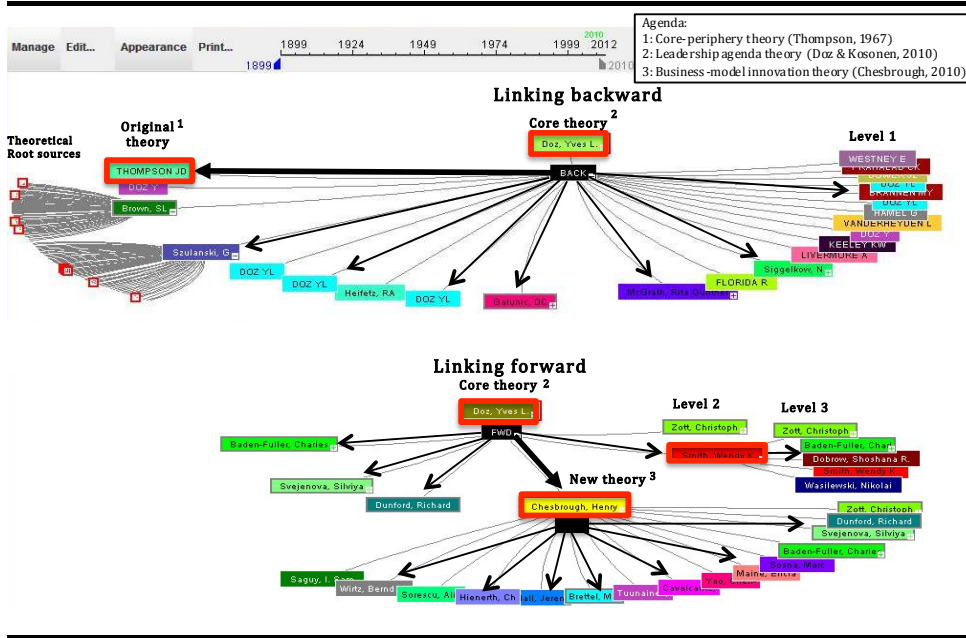
2.1 Synthesized coherence

The connection between the theories that were used to generate data about the underlying assumptions and challenges for facilitating a necessary business-model innovation in the Danish railway sector are mapped out in figure 2.2.

The figure describes the link between the leadership agenda theory, which was operationalized to study the most critical variables of leadership during periods of crisis – and the two related theories that were used to generate data of relevance for transport policy and regulation. The figure describes the connection between the three theories to illustrate how established scholars have connected those theory different theories in the past.

The upper part of the figure illustrates the extensive linkages backward, while the lower part specifies the linkages illustrate the connection to subsequent published works. The upper part of the figure connects the leadership agenda theory (Doz & Kosonen, 2010) to the core-periphery theory (Thompson, 1967), which was operationalized to explore the relationship between technological innovation and business-model innovation in the railway sector. The lower part of the figure connects leadership agenda theory (Doz & Kosonen, 2010) to the business-model innovation theory (Chesbrough, 2010) that was operationalized to study the cognitive barriers and opportunities for facilitating business-model innovation in the Danish railway sector.

Figure 2.2: Correlation between the core articles



Source: Elaboration based on Web of Science, 2014

The clear connection between different theories in the extant literature is interesting because it provides some general evidence of synthesized coherence (Locke & Golden-Biddle, 1997). It is interesting because this finding challenges the predominant claim that the business model is only confound by confusion (Bock et al., 2011) as a result of different definitions (e.g. Zott et al., 2011).

These authors implicitly suggest that the field is characterized by inconsistencies, but this claim may turn out to be potentially biased toward maximizing the self-interest of the corresponding authors, who have, arguably, done little to solve the problem of the absence to the development of coherent ideas about the business model as an object of study for researchers. At the same time, it is fully acknowledged that the definitions of the business model construct have not always been entirely coherent, but this does not necessarily mean that the research is incoherent (unless the work is entirely based on a single definition).

All fields of research have different definitions, but this does not necessarily make the research studies incoherent. In fact, a bibliometric study performed in the Thompson Reuters' Web of Knowledge database (i.e. the worlds most advanced database for scientific studies) suggests that synthesized literatures co-exist (rather than contradict) in clearly different areas of research. Interestingly, this argument seldom seems to have attracted much attention by the key theorists in the field of business models, who instead seem motivated to maximize self-interests by linking back to their own work (Amit & Zott, 2001) to position their own works in favorable terms (Zott et al., 2011). Yet, the co-existence of divergent conceptualization and applications of the business-model construct may actually turn out to be considered a good thing because it allows the business-model construct to be considered as a 'stand-alone concept' in its own right (Baden-Fuller & Haefliger, 2013), even across historically uncorrelated fields of research (Molina et al., 2012). Five different perspectives are outlined to support this argument.

First, the 'sustainability' or 'ethical' perspective on business models is a rooted approach with a very broad focus from 'spiritual growth' and 'business career' at an individual level (Barnett, 1985); to corporate social performance at firm level; onto corporate strategies and environmental regulations at society level (Rugman & Verbeke, 1998). The sustainability approach has historically centered on the social control of business models (Jones et al., 1982), for example, by reviewing aspects of the strategic behavior of firms such as contracting stakeholders to benefit from ethics in the economy through shared norms and ethical rules (Jones, 1995). More recent literature on the topic has shifted the focus in the direction of conceptualizing a 'sustainability business model' informed by an 'ecological modernization perspective of sustainability', where sustainability concepts shape the driving force of the firm and its decision making (Stubbs & Cocklin, 2008); to go beyond 'the what' and 'the why' to understand organizational development of a 'sustainable enterprise' (Zollo et al., 2013).

Second, the 'electronic' perspective on business models is probably the most known perspective, which has historically focused on the importance of value creation for Internet business models. The review of the top 100 works showed that this approach was put at center stage at the end of the 1990s (e.g. Shaw et al., 1997; Ghosh, 1998; Magretta, 1998) and also during the beginning of the 2000s (e.g. Gordijn et al., 2000; Mahadevan, 2000; Amit, & Zott, 2001; Lee et al., 2003; Hu et al., 2004; Schultze & Orlikowski, 2004; Koh & Kim, 2004; Manthou et al., 2004). Interestingly, the article about 'electronic business models' (Amit & Zott, 2001) remains the most cited article with an average of nearly 40 citations per year.

Third, the 'entrepreneurial' perspective on business models is a well-known approach, which is not surprisingly focused on 'entrepreneurial strategies for creating value' (Hitt et al., 2001), 'entrepreneurial strategies for wealth creation' (Hitt et al., 2001), 'entrepreneurial ventures' or 'new ventures' (Doganova & Eyquem-Renault, 2009). This approach has acknowledged the need for a unified perspective on business models and *start-up* business (e.g. Morris et al., 2005) with

emphasis on 'business model design and the performance of entrepreneurial firms' (Zott & Amit, 2007).

Forth, the 'marketing' perspectives on business models is an emerging approach that focuses on subjects such as 'service science' (Maglio et al., 2013), 'value-proposition design' (Maglio et al., 2013), 'value drivers' (Benson-Rea, 2013), 'customer participation' (Djelassi & Decoopman, 2013), 'business context' (Barquet et al., 2013), 'network configuration' (Frankenberger et al., 2013), 'partnership' (Ng et al., 2013), 'changing role of middlemen' (Olsson et al., 2013), 'transition from products to solutions' (Ferreira et al., 2013), and 'entrepreneurship marketing' (Wallnoefer & Hacklin, 2013).

Fifth, the 'innovation' perspective on business models focuses on technological innovation, profitability, and strategy in terms of competitiveness or 'route to market' (Teece, 2010). Authors following the business-model innovation approach have historically explained why business models matter (Magretta, 2002), for example, by specifying the role of capturing value from innovation (Chesbrough & Rosenbloom, 2002) or how replication of business models can function as a strategy for transforming existing business models over time (Winter & Szulanski, 2001). Recent articles have echoed the importance of testing the management's hypothesis about the basic assumptions of business models (e.g. Teece, 2010; Gambardella & McGahan, 2010; Williamson, 2010; Baden-Fuller & Haefliger, 2013).

The purpose was to contribute to the business-model innovation perspective with emphasis on the management of technologies and business development. The goal of the literature review was *not* to engage in the controversy about 'what is a business model and what is it not' (e.g. Amit & Zott, 2001; Shafer et al., 2005; Zott et al., 2011; Nielsen & Bukh, 2011; DaSilver & Trkman, 2013). On the contrary, the goal was to develop a coherent idea of a largely unexpressed consensus about some undisclosed points of interaction between multiple authorships as a method to examine how multiple networks of authors have linked by shared perspectives as well as to know which theoretical concepts are

considered the most important by some of the key theorists in the field. The exploration of the underlying consensus among multiple groups of authors about the importance of long-established theoretical concepts invokes maturity and progression by making the importance of specific emerging or well-established theoretical concepts in quantifiable numbers in the meta-analysis, including specifying how different theoretical concepts have been coupled in the literature on the topic. Another related argument is that the business model has not only been misinterpreted and misused by practitioners (Porter, 2001); it has been inadequately understood and applied by scholars (DaSilver & Trkman 2013). Some scholars suggest that the literature on the topic remains fragmented and confounded by inconsistent definitions and construct boundaries in academia, while the business model has gained widespread use in the practice community (George & Bock, 2011, p. 83).

The business model has received growing attention in the recent decade (Molina et al., 2012), but the business model construct remains underestimated as an object of analysis by management academics (Teece, 2010; Baden-Fuller & Morgan, 2010). The growing public recognition of the usefulness of the business model therefore seems to fly against an academic reluctance to acknowledge the term, its uses and its consequences (Baden-Fuller & Morgan, 2010). Teece (2010) develops this argument by specifying that the business model describes *'the management's hypothesis about what customers want, how they want it, and how the enterprise can organize to best meet those needs, get paid for doing so, and make a profit'* (p. 172). Doz & Kosonen (2010) specify the challenge of transforming the business model of previously successful companies, where the status quo tend to be defended by multiple sources when a change is essentially important. The authors explain the management dilemma:

many CEOs we met were in the very painful situation of knowing what the deficiencies of their business model were ... anticipating how these issues would ultimately turn into financial problems, and yet feeling powerless in being able to change course (p. 378).

The present research seeks to further investigate this management dilemma, but before reaching this point some general questions need to be answered first. For example, what are the most cited articles on the topic? What are the oldest works in the Thompson's Web of Science database? What is the dominant language of publication? What are the most important concepts for the study of business models?

2.2 Category analysis

A search in the Web of Science database for business model (date: January 25, 2014) results in 51,677 published works, while the search for 'business model' (with quotation) results in 3,606 works. The bibliometric study specifies that English is the dominant language in the literature on the topic with over 95% of all publications registered on the topic in the Web of Science Category of Management, predominantly by researchers in the USA.

So, while English is clearly the dominating language on the topic, especially by researchers in the USA but also researchers in the UK, it means that the publications in this field are greatly influenced by the research traditions in the English-speaking countries. The results of the bibliometric study are further detailed in table 2.1.

Top 3 Web of Science Categories (Rounded numbers)					
Category	(Count, %)	Research Area	(Count, %)	Type	(Count, %)
Management:	827 (23%)	Computer Science:	1,322 (37%)	Papers:	1,927 (53%)
Computer Science:	735 (20%)	Business Economics:	1,190 (33%)	Articles:	1,671 (46%)
Business:	698 (19%)	Engineering:	1,050 (29%)	Editorial:	86 (2%)

Table 2.1: Category analysis
Source: Web of Science, 2014

The category analysis shows that *Management* is the leading Web of Science Category for the study of business models with about 20% of the total works. Together two categories *Management* and *Business* have

over 35% of all works, according to the classification of the journals. In simpler terms, the works can be divided into three research areas: (a) Computer Science, (b) *Business Economics*, and (c) Engineering with 99% of the total works registered in these areas. Note that the numbers are rounded, which is the reason why results of *document types* add up to 101%. The top 3 of the Web of Science Category analysis are summarized in table 2.1.

The outcome of the category analysis shows that *Proceeding papers* account for about 53% of all works, while *Articles* account for about 46%. Only about 2% of the works identified were classified as editorials. The present study focuses on the articles published in the leading journals within the Web of Science *Category of Management* since they are assumed to have the highest quality. In conclusion, we now know that the most important category is *Management* and that *English* is the dominant language within this field of research, but it remains to be answered: What are the oldest and most cited works about business models registered in the Web of Science database?

2.3 *Oldest works*

The review of the top 100 most cited works confirms that especially researchers from the United States of America influenced the non-synthesized progression in the early literature dating back to the end of the 1990s. Yet, the literature is not strictly incoherent since this would mean that the results of previous studies contradict or counter-argue each other (Locke & Golden-Biddle, 1997). The problem is rather that there has been a lack of a common research program of business models in the early literature, as noted by Osterwalder (2005).

Table 2.2: Oldest works

Oldest works in the Web of Science Database				
Year	Author(s)	Title	Journal	Cited
1969	Durrhammer	Account framework and business model[.]	Zeitschrift fur betriebswirtschaft	0
1971	Friedman	Chemical specialties- a business model	Chemical technology	0
1985	Barnett	A business model of enlightenment	Journal of business ethics	9
1991	Reinsel et al.	Harmonization of information-systems - a farm business model approach	American journal of agricultural economics	0
1993	Fisher et al.	Gp system architecture - how well does the gmp business model fit the european scene	Conference proceedings	0
1993	Kwong	Canadian universities in an age of austerity - moving towards the business mode	Oxford review of education	0
1993	Timpka et al.	Bar code technology in health-care - using a business model for study of technology application and dissemination	Conference proceedings	0
1993	Robertson	Establishing strategic direction in higher-education institutions	Public money & management	0
1993	Forge	Business models for the computer industry for the next decade - when will the fastest eat the largest?	Futures	3
1996	Chan	Globalization of internet access	Conference proceedings	0

Source: Web of Science, 2014

The distinct perspectives in both the oldest works and the one hundred most cited works provide convincing evidence that the literature is, in no small part, disconnected. Hence, so far the bibliometric analysis is consistent with the predominant view that the field of research on business models remains 'fragmented and confounded by inconsistent definitions and construct boundaries' (George & Bock, 2011, p. 83). This seems especially clear when reviewing the oldest works registered in the Web of Science database, which supports the claim that the literature on business models have historically been divided and developed in different directions, which altogether suggests the existence of an underdeveloped category of research (Locke & Golden-Biddle, 1997). The 10 oldest works registered in the Web of Science database are listed in the table below to specify this claim. From the table it appears that literature dates back to 1969, but it also appears that the oldest works registered in the Thompson Reuters' Web of Science database remains largely non-cited for which reason the theorists in the field have considered these works irrelevant for which reason it, arguably, makes little sense to review these works in greater detail. Only two articles have been cited in clearly uncorrelated areas of research. The table, furthermore, specifies the existence of the two major document types: conference proceedings and journal articles.

2.4 Most cited works

The review of the one hundred most cited articles details how different researchers have worked in different sub-domains within the Web of Science Category of Management. This finding is consistent with the widespread claim that the published works in the past have been unmindful to the extent that these works have not pointed to the development of common ideas (Osterwalder, 2005; George & Bock, 2011; Nielsen & Bukh, 2011; Zott et al., 2011). Yet, the wide range of journals within different fields can at the same time be considered a requirement to achieve progressive coherence of an emerging field of research (Locke & Golden-Biddle, 1997), but it requires the development of coherent ideas related to the core category 'business model'. This extensive list of journals includes: *Strategic Management Journal*;

Industrial Corporate Change, Organizational Science; Harvard Business Review; Journal of Business Research; Long Range Planning; California Management Review; Academy of Management Executive; Academy of Management Review; Research Policy; Management Decision; Leadership quarterly, and so forth.

Table 2.3 provides detail into the different contexts the business model has been applied by different researchers for full disclosure and transparency. After reviewing the top 100 most cited articles, it can be concluded that the variety is great. Even though a substantial literature has emerged about business models during the past 20 years (dating back to 1969), a lack of consensus to achieve ‘progressive coherence’, where scholars from different fields of specialization converge on a common vision (Locke & Golden-Biddle, 1997) is still valid at this point of the analysis. This is not to say that the business-model construct should not be studied using a variety of theoretical perspectives and research methodologies because the goal is not to develop a one-fits-it-all standardized recipe or formula for the study of the management of business-model innovation.

The connection between the one hundred most cited articles remains controversial, but the review of the most cited works does not lend support to claim that the field of business models is *non-coherent* because that would mean that the different scholars would present counter arguments to correct other scholars, but this is not suggested to be the problem. Rather, there is simply a lack of synthesized coherence (Locke & Golden-Biddle, 1997) – or lack of consensus – about the multiple roles of the business-model construct, but lack of consensus does not necessarily mean that the field of study is incoherent, but that scholars have different opinions about the aspects and applications of the business model.

Table 2.3: Most cited works

The first 10 out of 100 Most Cited Articles in the Web of Science Database

Nr	Cited	Author(s)	Title	Journal	Year
1	554	Amit & Zott	Value creation in e-business	Strategic management journal	2001
2	328	Chesbrough & Rosenbloom	The role of the business model in capturing value from innovation: evidence from Xerox Corporation's technology spin-off companies	Industrial and corporate change	2002
3	261	Hitt et al.	Strategic entrepreneurship: entrepreneurial strategies for wealth creation	Strategic management journal	2001
4	223	Winter & Szulanski	Replication as strategy	Organization science	2001
5	172	Magretta	Why business models matter	Harvard business review	2002
6	161	Meuter et al.	Choosing among alternative service delivery modes: An investigation of customer trial of self-service technologies	Journal of marketing	2005
7	146	Rugman & Verbeke	Corporate strategies and environmental regulations: An organizing framework	Strategic management journal	1998
8	144	Morris et al.	The entrepreneur's business model: toward a unified perspective	Journal of business research	2005
9	137	Teece	Business Models, Business Strategy and Innovation	Long range planning	2010
10	136	Mahadevan	Business models for Internet-based E-commerce: An anatomy	California management review	2000

Source: Web of Science, 2014

Table 2.4: Most cited works (continued)**11-20 out of 100 Most Cited Articles in the Web of Science Database**

Nr	Cited	Author(s)	Title	Journal	Year
11	127	Hart & Milstein	Creating sustainable value	Academy of management executive	2003
12	114	Magretta	The power of virtual integration: An interview with Dell computer's Michael Dell	Harvard business review	1998
13	110	Booth & Zemmel	Prospects for productivity	Nature reviews drug discovery	2004
14	105	Zott & Amit	The fit between product market strategy and business model: Implications for firm performance	Strategic management journal	2008
15	100	Venkatraman & Henderson	Real strategies for virtual organizing	Sloan management review	1998
16	93	Koh & Kim	Knowledge sharing in virtual communities: an e-business perspective	Expert systems with applications	2004
17	86	Moore et al.	Conflicts of interest and the case of auditor independence: Moral seduction and strategic issue cycling	Academy of management review	2006
18	84	Chesbrough	Business Model Innovation: Opportunities and Barriers	Long range planning	2010
19	84	Schultze & Orlikowski	A practice perspective on technology-mediated network relations: The use of Internet-based self-serve technologies	Information systems research	2004
20	83	Zott & Amit,	Business model design and the performance of entrepreneurial firms	Organization science	2007

Source: Web of Science, 2014

The literature on the topic would therefore more adequately be characterized as a *non-synthesized* coherence due to the different uses of the business-model construct in different fields of study, although some scholarly works do cite and draw connections between the related articles. A major limitation of the backward-looking analysis is that it excludes most recent works, which was confirmed in the review of the top 100 most cited works in January 2014 shows that 93% of the most cited works were published in the period from 2000 to 2010. The limitation of the backward-looking bibliometric study has also been noted by similar studies (Coombes & Nicholson, 2013), while others suggests that it is time to relearn the importance of the business model as an object of analysis to prove its relevance via a different studies when looking forward (Teece, 2010; Baden-Fuller & Morgan, 2010; DaSilva & Trkman, 2013; Baden-Fuller & Haefliger, 2013).

2.5 Most relevant articles selected for the literature review

The author of the doctoral thesis therefore reviewed one hundred recommended articles in the ScienceDirect database *in addition* to the review of the most cited works in the Thompson Reuters' Web of Science database as a basis for the literature review. The top results of the one hundred recommended articles are visualized in the screenshot in figure 2.3. The results of the literature review are described in the next two chapters. Chapter 3 describes the results of the rhetorical practices in the literature on the topic to gain an in-depth understanding of the recent and topical knowledge about business models based on a review of over 500 pages published in the first-class articles on the topic. Chapter 4 describes the results of a targeted and systematic review of a selection of the advanced articles comprising of over 350 pages (i.e. over 300 pages of raw text) on the topic to explore the underlying consensus among the key theorists in the field of business models about the importance of related theoretical concepts.

Figure 2.3: Recommended articles

100 recommended articles for:

Business Models: A Discovery Driven Approach Original Research Article
Long Range Planning, Volume 43, Issues 2-3, April-June 2010, Pages 247-261
 Rita Gunther McGrath
[View This Article](#)

Search within results
 Search

Refine results

Publication
 Journal (100)

Journal/Book Title
 Long Range Planning (36)
 European Management Journal (6)
 Journal of Business Venturing (5)
 Technovation (5)
 Industrial Marketing Management (4)
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- Business Models, Business Strategy and Innovation** Original Research Article
Long Range Planning, Volume 43, Issues 2-3, April-June 2010, Pages 172-194
 David J. Teece
[Show preview](#) | [PDF \(661 K\)](#) | [Recommended articles](#) | [Related reference work articles](#)
- Business Model Innovation: Opportunities and Barriers** Original Research Article
Long Range Planning, Volume 43, Issues 2-3, April-June 2010, Pages 354-363
 Henry Chesbrough
[Show preview](#) | [PDF \(202 K\)](#) | [Recommended articles](#) | [Related reference work articles](#)
- Business-Model Innovation: General Purpose Technologies and their Implications for Industry Structure** Original Research Article
Long Range Planning, Volume 43, Issues 2-3, April-June 2010, Pages 262-271
 Alfonso Gambardella, Anita M. McGahan
[Show preview](#) | [PDF \(140 K\)](#) | [Recommended articles](#) | [Related reference work articles](#)
- Business Models as Models** Original Research Article
Long Range Planning, Volume 43, Issues 2-3, April-June 2010, Pages 156-171
 Charles Baden-Fuller, Marv S. Morcan

Source: Science Direct, 2014

2.6 Summary

Key theorists have argued that the study of business models should not only be reduced or limited to an academic circular discussion of components and different definitions that contribute little to the progression of the discipline. This is not to argue that the definition of the business model is unimportant, but to suggest that the field of study could be enriched by offering a full spectrum of current and emerging challenges for facilitating business-model innovation through analyses of individual firms (Sosna et al., 2010; McNamara et al., 2013; Benson-Bea et al., 2013). This approach goes beyond some of the technical circular discussions that sometimes seem to spin in circles (Amit & Zott, 2001, 2007, 2008; Zott et al., 2011).

A second approach in the literature on the topic has emerged, which acknowledges the business model as an object of analysis, which is not limited to the circular discussions about the definitions and different components of the business model. For example, cognitive leadership has been recognized as an emerging topic of interest to the key theorists in the field of business models (e.g. Baden-Fuller & Haefliger, 2013; Aspara et al., 2013; Achtenhagen et al., 2013). The conceptualization of the business model construct as an object of research acknowledges that business-model innovation is a persistent challenge that includes a constant revision of the firm's business model (and creation of new business models to replace old business models to shape the development of the current industry) based on management learning (Sosna et al., 2010) 'system learning' (Itami & Nishino, 2010); testing of management hypotheses in action (Magretta, 2002; Teece, 2010; Doz & Kosonen, 2010); not to forget new technology (Gambardella & McGahan, 2010; Baden-Fuller & Haefliger, 2013).

The present study uses the Danish State Railways as a model for examining the basic assumptions and cognitive challenges for facilitating a necessary business-model innovation in a time of crisis. The investigation of the former top management's hypothesis is suggested to be beneficial for at least two reasons: (1) it works as a robust anchor to

establish a solid basis for a critical analysis of long-term ideas in the management literature, and (2) it has the capacity to contribute with new knowledge about new ideas in the academic world.

Chapter 3

Rhetorical practices

The study of the rhetorical practices (techniques, methods and discourses) centers on a collection of 30 documents of the special issue on business models published in the *Long Range Planning* journal in the period 2010 to 2013. The study included an introduction to the special issue (editorial), 19 articles, and a resume of some of the key contributions of the articles (executive summaries). One article was added in 2010 (a few months later), while another article was added in 2011. In 2013, a new collection of 7 articles was published in a new special issue.

The collection of these 'core articles' includes over 500 pages written by 58 authors who have banded together to construct a home for the study of business models. However, it is important to underline that the study of the rhetorical practices was not limited to the core articles, but included also other milestone articles after reviewing the top 100 most cited works on the topic.

This chapter thus develops the findings presented in the previous chapter, not by focusing on the non-correlated articles that we know exists in the management literature, but by analyzing some of the rhetorical practices in the recent literature on business models in order to describe a synthesized progression across the divergent articles published in the Long Range Planning Journal. For comparison, the

original study by Locke & Golden-Biddle (1997) comprised a total of 353 pages. So, while the analysis of 28 articles is evidently a rather narrow sample, the comprehensiveness of the data is still great, since the data sample comprises of a total of over 500 pages.

Added to this, the literature review was expanded, inter alia, by a general analysis of the one hundred most cited articles on the topic presented in the previous chapter. A key reason for selecting the articles published in the Long Range Planning is that they are of high quality. The journal is ranked in the first quartile within its three categories (1) Business, (2) Management, and (3) Planning & Development.

The impact factor of the journal 3.667 documents that it is very well positioned within its categories. The bibliometric study furthermore details that the 180 cites to the articles published in the special issue on business models in 2010, referred to as 'core articles' in the thesis, have significantly influenced the impact factor of the journal. The journal is therefore very well positioned in its categories.

The impact factor is significantly influenced by the 180 cites to the journals published in 2010. This is also evident in the 5-year Impact Factor of 2.885. In conclusion, the articles published in 2010 have had a high impact on the Impact Factor of the target journal. The statistics thus provide a robust argument for analyzing precisely these articles in greater detail.

The reasoning for this choice is that the different articles are based on a combination of longitudinal and cross-sectional studies, which means that the collection of articles describes the development of both literature and specific case studies over time, while the cross-sectional studies of provide profound knowledge and insight into current challenges related to the management of business-model innovation.

The review of the rhetorical practices therefore aims to construct *synthesized coherence* and *progressive coherence* (Locke & Golden-Biddle, 1997) between divergent articles recently published on the topic

by reinterpreting existing works in order to challenge the common understanding that progressive coherence does not exist (e.g. as argued by Zott et al., 2011; George & Bock, 2011). A related central argument for selecting precisely these articles is that they follow a shared idea (a common vision) to construct a home for the study of business models.

The purpose was therefore not to construct discord by describing how some authors remain dissatisfied with previous work, but instead to describe the development of shared beliefs about some of the basic assumptions and suggested head-on challenges for managing the innovation of business models.

The goal was to describe that considerable agreement exists to challenge the intellectual thinking that the field of business models only remains fragmented and under-developed. The contributions of the first special issue in 2010 will be reviewed in greater detail, while the articles published in the second special issue in 2013 are used to extend the analysis. By examining this sample of 28 journal articles, comprising of nearly 450 pages, the doctoral thesis seeks to develop a grounded theory (Glaser & Strauss, 1967).

The contributions of the key theorists from field of specialization in the field of business models are analyzed and interpreted, following a common vision to correct the mistakes of the early literature about business models to replace it with new insights about specific issues and challenges related to the emerging discipline of management of business-model innovation.

The importance of the selected literature is furthermore 'evidenced by the fact that, in the three years since publication, the Long Range Planning (2010) special issue on business models attracted more than 150,000 downloads and more than 3,500 Google Scholar and more than 500 ISI citations' (Baden-Fuller & Haefliger, 2013, p. 419).

The interpretive exercise was helpful in making sense of a set of emerging practices in the field of business models. One of the major

advantages of selecting the articles published in one special issue on business models along with the subsequent published articles in the same journal was that it became possible to describe how different authors had contributed to a growing understanding of the business model construct in the past as well as to understand some of the central challenges suggested by the same authors when looking forward by drawing on a selection of first-class articles about business-models from researchers previously working in disparate domains.

Another central rationale for selecting the articles is that they all together constitute a platform for analyzing the progressive coherence of the same field of knowledge. This approach acknowledges the interplay between the field's evolution and change over time by pointing out how widely shared perspectives relate to the commonly accepted opportunities and difficulties for facilitating business-model innovation.

In addition, this approach enabled the author of the doctoral thesis to describe how opportunities for contributing with new knowledge have been achieved in the past and thereby building an understanding of how different authors have constructed new opportunities for scientific contributions by advocating their own perspectives, but at the same time contributing to the development of a common idea.

The state-of-the-art articles published in the Long Range Planning journal constitute a platform for reviewing some of the consensual positions about *different* problems, challenges and issues to develop a common ground for the study of business models. Altogether, this body of research offers insights into how business models change over time as well as the problems and issues associated with the implementation of new technology.

The study of the rhetorical practices is not limited to these articles, but the outcome of the study of these articles are foregrounded because they are assumed to be of high quality since they are published in the highest ranked journal on the topic. The state-of-the-art articles published in the

top-journal Long Range Planning were reviewed in detail to provide an insight into the quality of the recently published articles on the topic.

The advanced articles published in this journal are widely recognized. For example, this journal has been identified as the most influential journal that exists related to the study of business models by ranking it number 1 out of the top 25 journals for the articles published between 1970 and 2011 (Coombes & Nicholson, 2013).

The articles were organized not by publication year, but by their main contribution, which is an accepted and recognized approach for constructing progressive coherence of an emerging field of study (Locke & Golden-Biddle, 1997).

An advantage of positioning multiple groups of studies into a coherent body of knowledge is that it provides a unique opportunity for describing how a cumulative and ongoing progress of the business-model literature. Instead of pointing out what is missing, the progression of the rhetorical practices about shared theoretical perspectives and different methods illuminates how the research on the topic has emerged and developed recently.

A final key argument for selecting these articles is that experienced researchers with authority had already endorsed the selected articles. The articles included in the analysis are therefore assumed to be important to the research community with an interest in the field of business models.

The non-included articles are not necessarily uninteresting or non-unique or unimportant, but they were knowingly excluded to develop an understanding of the progression that has been observed in the recent literature by drawing connections between some of the most advanced articles published about implicit assumptions and central challenges.

For the first time, a meta-analytic review of leading journal articles on the topic of business models is presented in tables using a 'mosaic of

quotations', inspired by the study by Locke and Golden-Biddle (1997), to underscore the embedded quality of the articles, implicitly to describe the deeper motivations for operationalizing theories in the field of business models to review the development in the Danish railway sector.

3.1 Variety of methodologies

Following the principle of constant comparison, an overview of the central claims and different methodologies by the authors are provided to describe how scientific contributions have been constructed by using cases to illuminate different problems and issues. Virtually, all articles of the sample draw attention to the importance of value creation and value capture, while different authors contribute with new knowledge by applying notably different methodologies (See table 3.2 at page 70). The different methodologies and cases have been used to analyze different problems and issues in different industries:

- a : Theory building
- b : Conceptual study
- c : Case study
- d : Single case (one)
- e : Comparative cases (two)
- f : Multiple cases (three or more)
- g : In-built examples (short-hand descriptions)
- h : Longitudinal scope
- i : Research triangulation
- j : Video or audio recordings
- k : Observations
- l : Company reports (archival material)
- m : Interviews
- n : Questionnaire

Theory building is frequently observed, for example, to conceptualize the business model as a model (Baden-fuller & Morgan, 2010), 'dynamic consistency' (Demil & Lecocq, 2010), web 2.0 services (Wirtz et al., 2010), 'creative freedom' as a mechanism for managing business model

changes (Svejenova et al., 2010), 'killing two birds with one stone' to profit now while learning for the future (Itami & Nishino, 2010). Others have pointed out that every organization has a business model but not every organization has a strategy (Casadesus-Masanell & Ricart, 2010) to build a new theory to suggest that business models are the outcome of concrete choices and the consequences of these choices. Other authors have engaged in research triangulation as a method to build new theory (e.g. Zott & Amit, 2010). Hence, theory building is considered of central concern for many of the key theorists in the field of business models.

For the most part different methods and techniques are combined. The case study seems the most common approach to build theory. Different kinds of case studies have been used to report the findings from single cases (e.g. Demil & Lecocq, 2010; Sosna et al., 2010) to a series of in-built cases (e.g. Teece, 2010; Gambardella & McGahan, 2010; Thompson & MacMillan, 2010; McGrath, 2010; Smith et al., 2010; Chesbrough, 2010; Williamson, 2010; Sabatier et al., 2010; Hienerth et al., 2011). Interviewing has been widely applied as a technique for collecting data (e.g. Dunford et al., 2010; Svejenova et al., 2010; Sosna et al., 2010), while others have used questionnaires (Wirtz et al., 2010), observation (Svejenova et al., 2010) or archival data (e.g. Aspara et al., 2013). Variety is thus argued to be a central part of constructing synthesized coherence.

Table 3.2 provides an overview of the journal articles by outlining the central claims and the methodologies used for each study. The comparison of the methodologies shows that the authors have used different approaches to elaborate on barriers and opportunities for the management of business-model innovation. The table organizes the authors into five groups.

Table 3.1: Variety of methodologies

<i>Authors</i>	<i>Central claims</i>	<i>Methodologies</i>		
Baden-fuller & Morgan, 2010	Business models are ideal model organisms for research investigations	a, b, h, i		
Teece, 2010	Business models are under-estimated in academia, more research is encouraged	c, f, g		
Gambardella and McGahan, 2010	Business models are designed to solve problems and capitalize on opportunities created by original breakthroughs	c, f, g		
Thompson & MacMillan, 2010	Business models are based on imperfect knowledge which may turn out to be decisive for success or failure	c, f, g, h, i		
Zott & Amit, 2010	Business models are systems of interdependent activities which regulate the company's boundaries for doing business	a, b, i		
Demil & Lecocq, 2010	Business model adaptation is a constant fine-tuning process	a, c, d, h		
Doz & Kosonen, 2010	Business model rigidity may lead to organizational inertia	c, f, g		
Dunford, Palmer and Benveniste, 2010	Business models evolve from their initial conception to be fine-tuned by 'doing' throughout their existence	c, d, m, i		
Wirtz, Schilke and Ullrich, 2010	Business model adaptation is now a major task for executives	a, b, e, h, i, k, l, m, n		
Svejenova, Planellas and Vives, 2010	The dominant logic behind the business model is the engine behind successful functioning and future viability	a, b, e, h, i, j, k, l, m		
McGrath, 2010	The business model offers strategists a fresh way to consider their options in uncertain and unpredictable environments	c, f, g		
Smith, Binns, and Tushman, 2010	The business model has become a source of competitive advantage in an increasingly complicated world	c, f, g		
a = Theory building	d = Single case (one)	g = In-built examples	j = Video or audio recordings	m = Interviews
b = Conceptual study	e = Comparative cases (two)	h = Longitudinal scope	k = Observations	n = Questionnaire
c = Case study	f = Multiple cases (three or more)	i = Research triangulation	l = Company reports	

Source: The Author

Table 3.2: Variety of methodologies (continued)

<i>Authors</i>	<i>Central claims</i>	<i>Methodologies</i>
Yunus, Moingeon and Lehmann-Ortega, 2010	Successful business models are designed to solve economic and social problems	c, f
Chesborough, 2010	Opportunities and barriers are essential elements to enable business model innovation	c, f, g, m
Williamson, 2010	Doing nothing is not an option! Cost innovation is essential to be able to compete and profit	c, f, g
Casadesu-Masanell & Ricart, 2010	Strategy and business model should be clearly distinguished, more focus on tactics	a, b, g, i
Sosna, Treviño-Rodríguez, Velamuri, 2010	Trial-and-error is a precondition for developing business models in practice	c, d, m
Sabatier, Mangematin and Rousselle, 2010	The application of new technology requires that the renewed business models continue to make profits	c, f, g
Dahan, Doh, Oetzel, and Yaziji, 2010	Partnership collaboration to create and deliver value is an important part of business model innovation	b,*
Hienerth, Keinz and Lettl, 2011	User collaboration is another method to overcome or remedy organizational inertia	c, f, g

a = Theory building	d = Single case (one)	g = In-built examples	j = Video or audio recordings	m = Interviews
b = Conceptual study	e = Comparative cases (two)	h = Longitudinal scope	k = Observations	n = Questionnaire
c = Case study	f = Multiple cases (three or more)	i = Research triangulation	l = Company reports	* = Sociological Methods and Research

Source: The Author

The first group of authors describes the business model as an object of study for research investigations (Baden-Fuller & Morgan, 2010), while others specify that the system of knowledge constantly regulate the company's boundaries for doing business (Zott & Amit, 2010). I

n this context, the business model is based on imperfect knowledge for which reason the project management of large projects become decisive for success or failure of companies (Thompson & MacMillian, 2010). Gambardella & McGahan (2010) remind us that the business model is designed to solve problems in the market.

Following this line of reasoning, the most successful business models are carefully designed to exploit the opportunities created by original technological breakthroughs and commercial concepts. For example, by coupling the breakthrough technologies of smaller companies to large corporations in the medical business sector as an innovative method to exploit the established infrastructure of large corporations.

Teece (2010) agrees with this idea and he claims that the business model is under-estimated in academia and that more research on the topic is encouraged.

The second group of authors develop this idea by describing the important role of the adaptation of existing business models for success or failure (Doz & Kosonen, 2010) as a fine-tuning process (Dunford et al., 2010) with emphasis on new resource development (Demil & Lecocq, 2010) in order to adapt the existing business model to the emergence of new demands in changing environments (Wirtz et al., 2010).

The third group of authors argues that the business model offers a fresh way or tool for company managers and management academics to consider different options and opportunities in uncertain, unstable and largely unpredictable environments (McGrath, 2010). Accordingly, the business model is considered rewarding as a tool for the executive managers (or entrepreneurs) to challenge the dominant logic that guides the development of the business model (Svejenova et al., 2010).

This way the business model becomes a tool, object, engine or catalyst to challenge, change and improve the present routine practice in the market. In this context, the business model becomes a source or resource to gain competitive advantage in an increasingly complicated world (Smith et al., 2010).

The fourth group of authors emphasizes the importance of learning system that is behind the development of business models (Itami & Nishino, 2010) to solve economic or societal problems (Yunus et al., 2010). In this context, it becomes relevant to explicitly examine the barriers and opportunities to facilitate business-model innovation of a well-established company (Chesbrough, 2010).

For example, cost innovation is described as an opportunity for facilitating business-model innovation to enhance profitability and competitiveness — and if a critical situation emerges then doing nothing is not an option (Williamson, 2010). A critical situation is for example a crisis as a result of decreasing profits or decreasing competitiveness.

The fifth group of authors emphasizes the importance of strategy and *tactics* to increase competitiveness and profitability (Casadesus-Masanell & Ricart, 2010). In this context, it has been argued that trial-and-error experimentation is a precondition for developing business models (Sosna et al., 2010), while others emphasize that the successful implementation of new technology is contingent on the profitability of the business model (Sabatier et al., 2010).

Finally, partnership collaboration is considered an important part of business-model innovation (Dahan et al., 2010), while others emphasize the importance of user collaboration as a method to overcome or remedy organizational inertia (Hienerth et al., 2011).

3.2 Development of coherent ideas

Coherent ideas are developed on the following pages by drawing and citing on the related articles, including using dense quotations as a

technique to describe synthesized and progressive coherence in the recent literature on the topic, implicitly to suggest the presence of a well-developed field of study. A central line of thought describes how the literature is focused on the successful management of business-model innovation, while the same authors provide different arguments of the fruitfulness and utility of the business model as a construct of analysis. For example, Chesbrough (2010) describes how the economic value of any technology remains latent until it becomes commercialized so as to specify that:

“The same technology commercialized in two different ways will yield two different returns ... a mediocre technology pursued within a great business model may be more valuable than a great technology exploited via a mediocre business model.”

This idea is developed by many of the authors writing about business models. For example, Teece (2010) writes that getting the business model right will contribute to the firm’s competitive advantage, while getting it wrong will lead to the contrary outcome so as to conclude that business-model innovation may not seem heroic, but without it there may be no reward. Teece (2010) specifies that:

“In essence, a business model [is] a conceptual, rather than financial, model of a business. It makes implicit assumptions about customers, the behavior of revenues and costs, the changing nature of user needs, and likely competitor responses. It outlines the business logic required to earn a profit and, once adopted, defines the way the enterprise ‘goes to market’.”

Following this argument of intellectual thinking, the management of business-model innovation is to some extent management of testing implicit assumptions about earning a profit and responding to competitor markets, including shaping the development of the market by developing new products and services to outperform existing companies in the market. Baden-Fuller & Morgan (2010) clarifies that:

“Business models are to management what model organisms are to biology: examples to study ... Models are used to demonstrate a technology, [like recipes] they give advice about how to do something so the results come out right [but at the same time acknowledging that] not all cooks can make all recipes work - and different combinations [ways to make and bake the cake] can create success ... Business models have the

characteristics and fulfill the roles of ideal types: they are based on both observation and theorizing. But what empirical and conceptual scientific work goes into establishing them?"

This way, ideas develop by different authors following a common vision to openly debate the usefulness of the business model as a construct for academia. The related stream of thought emphasizes the importance of understanding the head-on challenges related to the management of business-model innovation.

For example, Gambardella & McGahan (2010) specify the challenge of developing technological solutions to exploit commercial opportunities in addition to solving technological problems. In this process, traditional planning measures and risk analytical algorithms are still important to reduce uncertainty (Thompson & MacMillan, 2010).

3.3 Types of contribution

The three types of contributions (Locke & Golden-Biddle, 1997) are represented in the sample of articles for which reason it can be considered complete from a theoretical point of view, although it at the same time, arguably, remains unfinished (Achtenhagen et al., 2013).

Both arguments are important since the completeness of the study does not suggest that the field of study is finished, but rather that more knowledge is encouraged. It would be quite odd to claim that an entire field of knowledge would be finished as this would contrast with the general understanding of continuity upon which the science's discipline rests. The three types of contributions are described in table 3.3.

The incompleteness argument has been the mostly reported of these three types of contributions in the articles analyze, whereas many authors not included in the present analysis seem to have used an inadequacy argument as a method to contribute with new knowledge, including those studies that complain about the different definitions (e.g. Zott et al., 2011).

Table 3.3: Rhetorical practices

Types of contribution (Representative examples)	
Authors	Rhetorical practices
Teece, 2010	Incompleteness - The economic literature pays little or no attention to the business model, which is a hindrance to our understanding of the shifting business models that can be observed. Radical shifts in behavioral patterns are ignored and therefore remain unexplained.
Baden-fuller & Morgan, 2010	Inadequacy - The business model is profoundly important to the world of work, yet management academics rarely put the concept center stage. Public perception of its usefulness seems to fly against this academic reluctance to acknowledge the term, its uses and its consequences.
Sosna, Trevinyo-Rodríguez, and Velamuri, 2010	Incommensurability - The early business model research presented a static perspective, but recent studies have acknowledged that business models develop over time. A new dynamic perspective corrects the old view as it acknowledges that the development of the business model requires constant revision, adaptation and fine tuning - ideally based on trial-and-error learning.

Source: The Author

3.4 Progressive coherence

The progressive coherence of the recent developments is very clear in the special issue on business models. Many examples could be provided. For example, McGrath (2010) links the discovery-driven approach with multiple works, such as, disruptive innovation (Christensen, 1997), business-model innovation (Chesbrough, 2007) to describe a progressive coherence over time. She explains that business models matter by referring to the long-time established works by Magretta (2002) and the importance of the design of the business model for the performance of entrepreneurial firms by linking this argument to the works of the most cited authors on the topic (Zott & Amit, 2007).

Authors	Implications of failures or crisis
McGrath, 2010	"The history of such technological shifts suggests that most experiments with new technologies <u>fail</u> - but without such <u>failures</u> the eventual new 'victorious' design would not have had a chance. ... so it's not surprising that incumbent firms often <u>fail</u> to respond effectively to the threats signaled by the advent of innovative new models. The work of Clayton Christensen shows why: new models are often designed for customers that an incumbent doesn't serve, at price points they would consider unattractive, and builds on resources that they don't have: from the perspective of an established firm, new models can look positively unattractive."
Yunus, Moingeon and Lehmann-Ortega, 2010	"In the midst of the current financial and economic <u>crisis</u> , some companies have begun to question their role more fundamentally and seem to be awakening to social change issues. ... Taken altogether, research on social business could be a factor in changing the capitalist system, by helping both academics and practitioners to challenge the current dominant shareholder paradigm. ... a major challenge for companies, as it entails questioning the models that have previously led them to <u>success</u> ... questioning the current rules of the game was at the very heart of [Company A] ... [while Company B shows that] the combination of the two partners' resources and skills led this <u>successful</u> venture ... a series of small experiments minimizes risk and maximizes learning, [this is] not intuition, but involves the ability (and intention) to make changes if the first chosen path turns out <u>unsuccessful</u> The product [was] trial-marketed at a much lower price than that of imported products, but did not <u>succeed</u> . One reason was that the project lacked the right kind of partners to make it happen, a type of problem that was overcome ... by partnering with an organization that could offer such knowledge."
Sosna, Treviño-Rodríguez, and Velamuri, 2010	"Without the strength to endure the <u>crisis</u> , one will not see the opportunity within. It is in the process of endurance that opportunity reveals itself. ... a severe <u>crisis</u> can provide a strong impetus to overcome [cognitive] barriers, and in fact may even be necessary in order to initiate deep enough reflection on the currently prevailing dominant logic and status quo of the business model design. Reorientations [which] occur after periods of <u>crisis</u> or poor performance, can lead to a greater search for new solutions. Survival can mark the start of the adaptation process: indeed, organizations that survive the immediate threat of a change event often face lower risks of <u>failure</u> If a business model might seem a rather conceptual construct, it is grounded in some day-to-day realities. Its <u>successful</u> design and continuous development is - to a large degree - fueled by using imagination and experimentation to find out what your current (or potential) customers want, and then organizing yourself to give it to them, while retaining a sufficient proportion of it for you to stay in business."

Table 3.4: Progressive coherence

Source: The Author

The study about opportunities and barriers for facilitating business-model innovation (Chesbrough, 2010) draws on, and refers to, the

discovery-driven approach as a fruitful approach. The two authors both highlight the benefit of experimentation even though some experiments will fail. The recent first-class literature on the topic has described shared head-on challenges for both new and existing business models as illustrated in table 3.6.

3.5 Rhetorical practices

Forming different thematic points of views is considered beneficial for formulating different ideas for investigation: and it suggests the emergence of a well-developed field of study (Locke & Golden-Biddle, 1997). Rhetorically, forming different thematic points of view under the headline of 'incompleteness' is particularly helpful for the development of general ideas for investigation (Locke & Golden-Biddle, 1997).

It is therefore considered constructive that the authors have developed different topics of concern by drawing and citing upon previous works including those in the special issue on business models, following a common vision to construct a home for the study of business models. Teece (2010) explains why this is necessary:

business models have no place in economic theory, they likewise lack an acceptable place in the organizational and strategic studies, and in marketing science ... it is simply assumed that if value is delivered, customers will always pay for it (p. 175).

A critique presented and supported by these authors is that the economic literature has historically paid little or no attention to the development of business models, which is a hindrance to our understanding of how companies shape and adapt to challenging environments over time (Baden-Fuller & Morgan, 2010; Teece, 2010).

Not surprisingly, the incompleteness problematization also seems to be the most common approach observed in the articles included in the sample although this was not a criterion for the retention of these articles. On the contrary, it was a key criterion for choosing the articles that they were characterized by variety of thematic views, adding with

complementing knowledge about what is already known about the topic. Baden-Fuller & Morgan (2010) argue that the business model already plays a central role in progressing management thinking and that business models are examples to study for management researchers just like model organisms are for biology researchers.

Business models therefore have similar attributes of the model organisms of biology as well as mathematical models of economics in addition to core assumptions from the strategic management literature that have been reviewed in action to understand why some business models are successful, while others are not. Based on this intellectual reasoning it seems relevant to ask: if the business model representative of a company in an industry or for a genre of firms that practice different business models? Or both?

One answer is that the business model embodies multiple roles as a conceptual framework to describe, analyze and classify the purpose of a business as an object for scientific investigation; both of a genre of firms that practice different business models (e.g. McNamara et al., 2013) as well as the business model of the railway operator which is the representative of a central part of entire industry due to the monopoly situation (i.e. absence of competition *in* the market). A resume of some of the rhetorical arguments presented to lend support of this claim is presented table 3.5.

Table 3.5: Rhetorical argumentation

Example of rhetorical practices		
Authors	Topic	Quotes
Baden-Fuller & Morgan, 2010	Business models as models	<p>“Business models are to management what model organisms are to biology: examples to study.” (p. 163)</p> <p>“In both biology and economics, as in management, models are used to address and help solve one basic problem - lack of knowledge. All three fields have grand theories, and lots of detailed studies, but sometimes lack a way to fit general ideas to the descriptions of events and objects of life in order to understand them. This is where models come in.” (p. 162)</p> <p>“Business models have the characteristics and fulfill the roles of ideal types: they are based on both observation and theorizing. But what empirical and conceptual scientific work goes into establishing them?” (p. 162)</p>

Source: The Author

Hence, the model organisms of biology are more similar to business models than to the models of economics (Baden-Fuller & Morgan, 2010), although the profitability and competitiveness remain core aspects of virtually any business model (Chesbrough & Rosenbloom, 2002). Teece (2010) specifies this argument:

Clearly, the study of business models is an interdisciplinary topic which has been neglected — despite their obvious importance, it lacks an intellectual home in the social sciences or business studies. (p. 176)

As a result, business model theory has lacked an intellectual home in the social sciences or business studies until recently. Not only have business models had no home in economic theory; they lack an acceptable place in organizational and strategic studies, and in marketing science. The authors have developed different topics of concern by drawing and citing upon previous works, including other articles published in the same journal.

Common for the notably different studies in the same issue is that they for the most part end up presenting some head-on challenges, ultimately to describe how a company or group of companies have successfully responded to these challenges in the past. Yet, that ample attention has been devoted to all those positively related factors of success does not make the study of the challenges and basic assumptions about existing business models less important.

That authors in the past have preferred to study the success of companies does not make it less important to provide examples of companies that have failed to adjust their business model. Not only do we want to know how the business model is defined, categorized and which elements business models embrace, we also want to know why some different models are successful, while others are not.

The study of business models takes on aspects of model *organisms* similar to those from biology of life sciences as well as the financial models of *economics* and theories of *competitiveness* of the field of strategy. The wide range of different business-model definitions is

therefore a good start, but it does not explain why companies are successful or why others fail. Teece (2010) specifies the critique of the neglect of the concept in the long-standing literature, while he also clarifies some of the implicit assumptions of the business model:

The concept of a business model lacks theoretical grounding in economics or in business studies. Quite simply there is no established place in economic theory for business models; and there is not a single scientific paper in the mainstream economics journals that analyses or discusses business models in the sense they are defined here. The absence of consideration of business models in economic theory probably stems from the ubiquity of theoretical constructs that have markets solving the problems that - in the real world - business models are created to solve. (p. 175) ... In essence, a business model [is] a conceptual, rather than financial, model of a business. It makes implicit assumptions about customers, the behavior of revenues and costs, the changing nature of user needs, and likely competitor responses. It outlines the business logic required to earn a profit and, once adopted, defines the way the enterprise 'goes to market'. (p. 173)

Finding out how to capture value from innovation is a key factor in the development of a business model. The development of new products and services must be coupled with a strategy that defines how to deliver value and a method to capture the benefits (Roldsgaard, 2010). Businesses must design models to form transactions, which cannot be performed in the market without human interaction. In continuation of this argument, Teece (2010) provides an operational definition of the business model:

A business model is the management's hypothesis about what customers want, how they want it, and how the enterprise can organize to best meet those needs, get paid for doing so, and make a profit. (p. 172)

The present study uses this operational definition to review the management's hypothesis via a meta-analysis of the managers' perceptions and beliefs about the basic assumptions and central cognitive challenges for innovating the existing business model of the railway operator.

McGrath (2010) looks backward to draw conclusions about the past, while others elaborate on the management in a crisis situation (Yunus et al., 2010). Others articulate the opportunities that often emerge after a

period with poor performance (Sosna et al., 2010). Opportunities include reorientations to challenge the dominant logic of the senior executive managers, which means that a crisis can mark the starting point for breaking with the status quo of the current business-model design. Others argue that a failure (or crisis) has the capacity to inform new approaches via experimentation in the market to improve the current understanding 'within the constraints of affordable loss' (Chesbrough, 2010, p. 362).

The author of the doctoral thesis likewise argue that a failure (or crisis) has the power to inform and *justify why* a new approach may be necessary via data collection focused on breaking with the current understanding or dominant logic of the senior political leadership or executive management. In this context, the business model can work as a (industry, company or entrepreneurship) recipe or cognitive device for managers or management researchers (Sabatier et al., 2010; Roldsgaard, 2010; Baden-Fuller & Morgan, 2010; Baden-Fuller & Haeflinger, 2013).

Specifically, the business model has been classified as an 'innovation device' that is of central importance for business-model innovation and entrepreneurship (Doganovaa & Renault, 2009) or likewise as a 'company recipe' (Roldsgaard, 2010) or 'industry recipe' (Spender, 1989). In other words, the business model construct embody multiple and mediating roles. The pluralism of the business-model construct is therefore not seen as a weakness or threat, but rather as a strength or opportunity for scientific contributions.

A series of dense quotations are used to describe previous scholarly work to point out consensual positions about different issues. As a method to develop new and established business models, it is argued that the discovery-driven approach is beneficial with substantial emphasis on experimentation. Or, as McGrath (2010) puts it:

old-fashioned ideas like having profits - or failing profits, even revenues - continue to matter. Nonetheless, the idea that a company can create a competitive advantage by doing something differently - adopting a new business model - has remained with us. Some observers have gone so far as to suggest that a business model offers a new way of analyzing companies

that is superior to traditional concepts such as position within an industry. It is worth, therefore, reflecting a bit on where the concept might take us and what we might expect from business models in the future. (p. 247)

However, while a strong emphasis on experimentation may be encouraged in times of abundant success, the present study suggests that the same 'recipe' may lead to or worsen an emerged crisis and even failure if the experimentation is not carefully targeted at developing the core product and executed in delimited projects. Experimentation with commercial activities should, therefore, be used with caution and if possible with a pilot study to test assumptions in action before scaling up the experiment, just as in scientific research.

This argument will be retained throughout the entire thesis since it seems to be one of the central lessons learned from the study of the unexpected effects occurring from expanding the railway services into international markets without proper testing of the assumptions of profitability, assuming that an increase in passengers would simply lead to an increase in profits (Roldsgaard, 2011, 2012a).

Furthermore, the unexpected loss from the expansion was to a great extent a result of an undeveloped railway infrastructure and a fleet of elder rolling stock based on old diesel technology in Denmark and Sweden. To explain the seriousness of not testing basic assumptions, a comparison with mobile technology is used to make the point clear. The old diesel train technology can be compared with the outdated Nokia type-phones with no or slow Internet connection.

The shared problem is that an old infrastructure does not allow the use of modern mobile phones or likewise an old infrastructure does not allow the operation of modern trains that are much faster, more reliable and even cheaper to operate. The problem is therefore that the technology is the basic fundament upon which profits are made and it also decides the competitiveness of the train services. The example specifies the deeper motivation of the theoretical relevance of testing the hypothesis that technological innovation is potentially more important

than business-model innovation based on commercial activities, which is the first hypothesis to be tested in the present study.

The author of the doctoral thesis argues that experimentation with new technology is encouraged *in pilot studies* is important before launching new commercially oriented ventures. This is not to provide a counter argument, but simply to point out that experimentation, of course, has a positive side, while the other side of the coin should not be neglected. Ironically, the flip side of the coin seems not to have received much attention in previous studies (e.g. Chesbrough, 2010; McGahan, 2010; Sosna et al., 2010). Also, because applying the discovery-based approach to initiating large-scale commercial projects have turned out to be highly problematic (Roldsgaard, 2012b).

Based on this learning, experimentation with new marketing-based activities may be discouraged, especially during times of crisis; at least until the core product has been reinforced or improved. The important point here is not if the crisis is emerging or if it has emerged or if it could emerge, but simply to highlight that experimentation also has the capacity to lead the company in a wrong direction. In contrast, facilitating a series of smaller focused experiments has the capacity to minimize risk and maximize learning (Yunus et al., 2010). This point is further developed by drawing attention to the importance of questioning the current rules of the game in a time of crisis:

a major challenge for companies ... entails questioning the models that have previously led them to success. This in turn requires revisiting a number of basic assumptions, and resembles what Argyris and Schön have described as 'double loop' learning [which] forces the organization to transform its fundamental references and adopt new ones. (p. 312)

The ability to change the rules of the game therefore seems of central importance of the management of business-model innovation, especially in a time of crisis. Seeing a crisis as an opportunity for innovating the existing business model develops this idea, but it requires overcoming the cognitive barrier to challenge the way the existing model works on a day-to-day basis (Sosna et al., 2010):

Without the strength to endure the crisis, one will not see the opportunity within. It is in the process of endurance that opportunity reveals itself (p. 383) ... a severe crisis can provide a strong impetus to overcome [cognitive] barriers, and in fact may even be necessary in order to initiate deep enough reflection on the currently prevailing dominant logic and status quo of the business model design. Reorientations [which] occur after periods of crisis or poor performance, can lead to a greater search for new solutions. Survival can mark the start of the adaptation process: indeed, organizations that survive the immediate threat of a change event often face lower risks of failure (p. 397) ... If a business model might seem a rather conceptual construct, it is grounded in some day-to-day realities. Its successful design and continuous development is - to a large degree - fueled by using imagination and experimentation to find out what your current (or potential) customers want, and then organizing yourself to give it to them, while retaining a sufficient proportion of it for you to stay in business (p. 403)

So, while these authors describe the importance of seeing an emerging or emergent crisis in a positive light with focus on the emerging opportunities from a crisis to challenge the current practice, they likewise underscore the importance of experimentation and imagination to *reframe* the current model. However, the present study suggests that these two elements are not necessarily among the important points of the leadership agenda (Doz & Kosonen, 2010), at least not in a time of profound crisis. Furthermore, the proposal to give current or potential customers simply what they want to capture sufficient value for the company (Sosna et al., 2010), while downplaying the role of 'the how' has the potential to result in a crisis.

Its successful design and continuous development is - to a large degree - fueled by using imagination and experimentation to find out what your current (or potential) customers want, and then organizing yourself to give it to them, while retaining a sufficient proportion of it for you to stay in business. Value must be created, delivered and appropriated as easily as possible for all concerned. (p. 403)

In mathematical terms, it is like ignoring a variable in an equation and expecting the correct solution. Because, we have to remember that it includes not only what customers want, but also how customers want it (Teece, 2010).

The point here is that the development of the existing business model should not only be organized to what customers want because the

customer is not the only factor, but also to invest in new technology that provides a superior product or service. For example, train passengers want faster trains to reduce the travelling time, instead of desperately trying to find out what customers want through different commercial initiatives, which seemed to be a central learning in the study of the Danish State Railways with a strong focus on 'commercial growth', which ended in economic disaster.

The problem is that 'the how' too often seems to have been neglected in the studies of failures or near-failures, as argued in the present study, for the most part due to unexplained reasons although 'the how' remains at the center of business-model innovation since it describes how value is delivered as an intermediary between creating and capturing value (Roldsgaard, 2010). Various types of triangulation have been used by the authors of the data sample to pin-point the development of coherent ideas, for example, about developing business models to exploit the value of technologies (Chesbrough, 2010; Gambardella & McGahan, 2010; Teece, 2010; Baden-Fuller & Haefliger, 2013).

The study of the rhetorical practices shows how the various types of triangulation have been used, between multiple viewpoints on specific embedded theoretical concepts, to pave the way for new contributions to the field of study. The triangulation is used to pin-point core concepts with a focus on previous works relevant for the management of business-model innovation; from providing a critique of the early business-model literature; to the utility of the business model as an object of research; onto describing the importance of the business model to capture money from technology. Four different examples for developing ideas through researcher triangulation are illustrated in table 3.7.

Authors	Literature triangulation
Baden-fuller & Morgan, 2010	"Management scholars generate descriptions of firm behaviours that capture their salient features: like scale models, these <u>business model</u> descriptions are neither so general that they fail to distinguish the main differences between firms, nor are they so absolutely particular that they cover every last detail of contract and activity. Scholars recognise that firms - for all sorts of reasons - do not all behave the same: but nor are they all completely different, for if they were, every firm would appear to have a different <u>business model</u> ."
Casadesus-Masanell and Ricart, 2010	"scholars (such as Lee) have pointed out that radical changes in some parts of a firm's <u>business model</u> can have tremendous performance implications." "While not formal, Magretta's implicit idea is that a <u>business model</u> is about how an organization earns money by addressing these two fundamental issues - how it identifies and creates value for customers, and how it captures some of this value as its profit in the process [as emphasized by Peter Drucker in his elaboration on a "good" <u>business model</u>]."
Sosna, Treviño-Rodríguez, and Velamuri, 2010	"whereas the early <u>business model</u> research presented a static perspective, recent studies have acknowledged that initial business models are frequently revised and adapted." "An emerging dynamic perspective sees <u>business model</u> development as an initial experiment followed by constant revision, adaptation and fine tuning based on trial-and-error learning."
Demil & Lecocq, 2010	"Baden-Fuller and Morgan [2010] propose describing . . . <u>business models</u> as tools, arguing that management scholars and practitioners can use <u>business models</u> to describe and give labels to 'how firms operate in various different generic ways and then classify firms (or activities) according to which kind of <u>business model</u> they follow'. As tools for inquiry, we argue that <u>business models</u> are useful when industries change rapidly. New technologies may require new <u>business models</u> to capture value, as in the biotech industry, where scientists have been able to create value from their scientific results, thus extending the existing pharmaceutical industry value chain backwards towards basic scientific research. Existing <u>business models</u> are the sources of inspiration for the creation of new businesses based on innovative technologies."

Table 3.6: Synthesized coherence
Source: The Author

3.6 Shift in the literature

A disruptive shift has been observed in the rhetorical practices that acknowledge its worth, which has shifted the focus back to the long-standing challenge of managing the innovation of individual firms' existing business-models. The shift in the rhetorical practices is consistent with the original works by Peter Drucker (1954), who was the first to describe that the business model has to fulfill at least two major features: (a) ability to *create* products and services for which customers are willing to pay a price, and (b) ability to *develop* mechanisms to deliver and capture value. As pointed out in the table 3.6, the Internet business-model has been an object of criticism to gain access to finance of projects with limited 'real value' (Porter, 2001), while it has recently been recognized that the business model remains an important unit of analysis (Magretta, 2002; Teece, 2010; Baden-Fuller & Morgan; Sosna et al., 2010;

Baden-Fuller & Haefliger, 2013). The term Business Model has been part of academic jargon for a long time, but it has remained underestimated as a subject for research until recently (Teece 2010).

Authors	Rhetorical practices
Porter (2001)	<p>“Words for the Unwise: The misguided approach to competition that characterizes business on the Internet has even been embedded in the language used to discuss it. Instead of talking in terms of strategy and competitive advantage, dotcoms and other Internet players talk about “business models.” This seemingly innocuous shift in terminology speaks volumes. <u>The definition of a business model is murky at best</u> most often, it seems to refer to a loose conception of how a company does business and generates revenue. Yet <i>simply having a business model is an exceedingly low bar to set for building a company.</i>” (p. 73) (emphasis added)</p>
Magretta (2002)	<p>“<u>The irony [...]</u> is that when used correctly, [discussions about business models] actually forces managers to think rigorously about their business. A business model’s great strength as a planning tool is that it focuses attention on how all the elements of the system fit into a working whole. (p. 6) ... <i>Profits are important not only for their own sake but also because they tell you whether your model is working. If you fail to achieve the results you expected, you reexamine your model.</i> [In conclusion:] Business modeling is the managerial equivalent of the scientific method - you start with a hypothesis, which you then test in action and revise when necessary.” (p. 5) (emphasis added)</p>
Sosna et al. (2010)	<p>“the early business model research presented a <u>static perspective</u>, [but] An emerging <u>dynamic perspective</u> sees business model development as an initial experiment followed by constant revision, adaptation and fine tuning based on [generative] trial-and-error learning. (p. 384) ... <i>We conclude that business model research should complement meta-level studies by offering analysis at lower (individual firm or even product category) levels.</i>” (p. 401) (emphasis added)</p>

Table 3.7: Shift in the literature
Source: The Author

Previously the business-model construct was not seen as an adequate object of research even though its worth has been widely acknowledged in the practice community (Baden-Fuller & Morgan, 2010) and in the public media (Roldsgaard, 2011). The business-model construct has been overlooked in economics literature (Teece, 2010) or it has been reduced to an object of criticism in management and business studies literatures based on the claim that it has been misused in the practice community (Porter, 2001). But, the business-model construct has also been misunderstood in the academic community (George & Bock, 2011), inter alia, by constructing discord to promote one’s own works. However, the complaining about previous works (Zott et al., 2011) has been described as unconstructive (Baden-Fuller & Haefliger, 2013).

3.7 Competing ideas about social impact

Reviewing the social perspectives was one of the more interesting tasks because it gradually appeared that different social perspectives to some extent compete against each other. The social perspectives, therefore, present not entirely coherent ideas about the relationship between the management of business-model innovation and social impact, which made it interesting to focus attention to this embedded concept. When reviewing the social perspectives, it became surprisingly clear that they had been developed in different directions and therefore not entirely following one coherent idea. A summary of the competing ideas is described in table 3.9.

Perspectives	Problematization	Authors
Social networks	Fill in a gap	Wirtz et al., 2010
Social collaborations	New alternative viewpoint	Dahan et al., 2010
Social objectives	Corrective viewpoint	Yunus et al., 2010
Social system of works	Alternative thesis	Itami & Nishino, 2010

Table 3.8: Competing social perspectives
Source: The Author

The different social perspectives are for the most part not contradictory in a classic sense since the authors for the most part do not provide contradictory results, but the interpretation of the rhetorical practices clearly suggests the existing of competing ideas on the same topic. The competing social perspectives draw upon different conceptual uses of the ‘social impact’ on business-model innovation.

The first authorship describes some of the implications of the Internet (Web 2.0) for the strategic development of established business models, using favorable expressions such as ‘social networks’, ‘social interaction’ and ‘social trust’ (Wirtz et al., 2010), which is clearly different from how the next two authorships engage in corporate-NGO collaboration to

obtain legitimacy (Dahan et al., 2010) or developing 'social business models' via 'social objectives' in developing countries (Yunus et al., 2010) to describe the benefits of this idea in favorable expressions such as 'social business models', 'social objectives', 'social innovation', 'social value', 'mutual benefits', and so forth.

Interestingly, a fourth authorship challenge the competing ideas about the 'social impact' on business-model innovation by taking a different approach to study the relationship between social impact and business-model innovation since it did not position itself as a social perspective.

Itami & Nishino (2010) provide an alternative thesis of an overlooked dimension in the established literature on the topic, which they refer to as the 'learning system' that is behind the development of new and established business models. Itami & Nishino (2010) use expressions such as 'system of works', 'real meet', 'learning system' to describe the importance of the collective social system of interaction, which implicitly acknowledges that the human interaction inside the organization plays a key role for profitability and progress.

The central claim here is that companies should not only aim for short-term profits, but they should also seek to develop the 'learning system' that is behind - and responsible - for business-model innovation so as to 'kill two birds with one stone' (Itami & Nishino, 2010).

The different types of problematization are interesting to comment on since they draw upon different rhetorical methods to construct the competing social perspectives in order to make a contribution to the literature. The first group of authors identify and specify a lacuna to fill in a gap in the literature about the - in their opinion - overlooked and under-rated importance of Web 2.0 services to build 'social trust' (Wirtz et al., 2010).

Wirtz et al. (2010) claim that the web 2.0 services have the capacity to 'create value' in 'social networks' at the world wide web by linking back to their own works (Wirtz & Lihotzky, 2003) to argue that organizations

could benefit from implementing new internet services (Wirtz et al., 2010):

we focus on the Web 2.0 phenomenon, a new wave of Internet developments that is likely to lead to fundamental changes in how both Internet and traditional business models function. Recent Web 2.0 developments include, for example, the increased pervasiveness of social networks and relevance of user-generated content, facets on which this article elaborates. A reconfiguration of established Internet business models seems advisable in order to meet the needs of new and radically shifting Internet user behavior. (p. 273) ... Despite the hype, there is still much confusion about the Web 2.0. 'Nobody even knows what it means' (p. 276)

However, the 'Web 2.0 phenomenon' does for the most part not replace, but extend the 'old' information processing technologies, which seems to be assumed by the authorship (Wirtz et al., 2010). The simple point-and-click system upon which the worldwide network of information is based on still seems to matter and not only in terms of user-generated content. Software as a product (Web 1.0) as a traditional information processing remains a core element that cannot be replaced, but only extended.

The premise of the study (Wirtz et al., 2010) is therefore open to discussion because the basic assumption of a paradigmatic shift is disputable because it indirectly tends to suggest that the superior paradigm replaces 'the old' system. Instead one would rather consider the two components of the same system as integrated and therefore the Web 2.0 services are dependent on the basic system information technologies. One should also not forget that:

Web 2.0, in general, refers to the web applications that have transformed following the dotcom bubble. It describes the new age of the Internet — a higher level of information sharing and interconnectedness among participants. Web 2.0 does not refer to any technical upgrades to the Internet; it simply refers to a shift in how it is used. (Investopedia Financial Dictionary, 2013)

In fact, one has to remember that:

Web 2.0 is not a specific technology; rather, it refers to two major paradigm shifts. The one most often touted is "user-generated content," which relates more to individuals. The second, which is

equally significant, but more related to business, is "cloud computing."
(Computer Encyclopedia, 2013).

Of the two general approaches, cloud computing seems not a less interesting object of study as that of the user-generated content, which is emphasized in the study about the 'strategic development of business models' with a focus on some of the implications of the Web 2.0 for Creating Value on the Internet (Wirtz et al., 2010).

While the development of Web 2.0 services to create value via social interaction seems an interesting idea, the same authorship speaks little about capturing the value from such services or perhaps more importantly the associated cost of developing, implementing and maintaining software as a service.

The social impact via online interaction on the development of new and established business models by using new Web 2.0 services (Wirtz et al., 2010) remains open to discussion since it has been developed upon an untested hypothesis about 'a new wave of Internet developments that is likely to lead to radical changes in how both Internet and traditional business models function' (p. 273). The word 'likely' describes the uncertainty related to the benefits from social interaction with users.

As described in the table on the next page, the fourth authorship takes a different approach by downplaying the role of the 'social factor' instead to focus on the 'human factor' of managing business-model innovation in a 'system of work' (Itami & Nishino, 2010). This authorship suggests to 'kill two birds with one stone' by shifting the focus away from profitability in the short-term; instead to focus attention to the collective learning in the business-model system by engaging with the people working inside the organization in order to profit in the long-term.

This approach acknowledges the business model as a model that is developed, innovated and managed by a complex 'system of work', which explains the strong focus of the present study on testing the management's hypothesis about the basic assumptions for developing

the existing business model of the Danish State Railways to make it more profitable and competitive.

The competing ideas about the 'social business model' have been identified in the study of the rhetorical practices. One authorship presents a new perspective in favor of 'building' social business models between non-profit Nongovernmental Organizations (NGOs) and multinationals to help facilitate 'new modes of value creation' to earn and build legitimacy (Dahan et al., 2010), while another group of authors provides a corrective view by reminding that profitability still remains an essential concern for any business organization in the 'capitalist system' (Yunus et al., 2010).

The point here is that the business model needs to be adjusted according to the geographic positioning of the same company in different countries, including cultural, economic and institutional issues, to create 'mutual benefits' from developing existing business models via 'social objectives'.

It is an interesting viewpoint to develop existing business models via 'social objectives' to make the business more robust, for example designed to alleviate poverty (Yunus et al., 2010), but it remains unanswered how the 'social dimension' impacts on business-model innovation in developed countries, not to decrease poverty but rather to increase resilience, which seems especially relevant in a time of crisis characterized by shocks and disruptions in psychological, political, or economic sense.

Resilience in this context means that you draw a circle around it to state all the things that may be added and everything that must be removed for the system to work. The final group of authors describes an alternative perspective with emphasis on the 'system of work', which is assumed to play a key role for profitability and progress.

Table 3.9: Competing social perspectives

Social perspectives	Rhetorical practices
1. Social interaction with users at the Internet is too important to ignore	<p>Strategic Business Model Implications of the Web 2.0 for Creating Value on the Internet (Wirtz et. al., 2010):</p> <p>Quote: "Being unable to adapt one's business model in the face of significant environmental change has proved deadly for many firms." (p. 273) "Social networks have become crucial tools to stay in touch on the Web 2.0." (p. 281)</p> <p>Keywords: Environmental change, social networks, social trust, Web 2.0.</p>
2. Solving social issues is important to obtain legitimacy (NGO)	<p>Co-creating New Business Models for Developing Markets through Corporate-NGO Collaboration (Dahan et. al., 2010):</p> <p>Quote: "[The] article [aims] to extend the business model literature beyond the traditional focus on private sector value creation towards models where businesses [can work together] to create new products and services, pioneer new delivery methods, improve the quality of existing products and services" (p. 328)</p> <p>Keywords: Societal problems, social issues, social innovation, mutual benefits.</p>
3. Corporate social responsibility (CSR) remains dependent on the economic responsibility	<p>Building Social Business Models Through Social Objectives Based on Lessons Learned and Practice Experiences (Yunus et. al., 2010):</p> <p>Quote: "despite CSR advocates proposing a 'triple bottom line', only one ultimately matters in the capitalist system (p. 309) ... It is a no-loss, no-dividend, self-sustaining company that repays its owners' investments" (p. 311)</p> <p>Keywords: Social business model, social objectives, Triple bottom-line.</p>
4. Social system of works inside the organization plays a key role for profitability and progress	<p>Killing Two Birds with One Stone to Profit for Now and Learning for the Future (Itami & Nishino, 2010):</p> <p>Quote: "the profit model is very important... [but] its importance [has been] over-emphasized [because] the firm ... has to aim for future growth potential, too, and so managers need to look for both profit opportunities for the short-term and learning potential for the long-term." (p. 369)</p> <p>Keywords: Profit opportunity, future growth, learning system, system of work.</p>

Source: The Author

3.8 Challenge intellectual thinking

The present study seeks to challenge intellectual thinking by exploring some of the misperceptions in the psychological state of mind of the management from a critical perspective, both by exploring underlying difficulties in the past; and investigating how the 'system of work' can ideally function when looking forward. Not only with emphasis on the causalities between technological innovation and business-model innovation in the Danish railway sector, but also by exploring the gaps in the leadership agenda in order to test some of the basic assumptions of the management. The present study, thus, follows a both-and approach that includes both a study of the underlying causalities and an exploration of inconsistencies in the management agenda. Smith et al. (2010) explain the theoretical rationale of this research strategy:

We suggest complex business models that can host *contradictions* ... can lead organizations to develop dynamic, flexible and adaptive capabilities to succeed for the short as well as the longer term ... We find that these processes enable senior leadership teams to both engage with and manage the inherent tensions created by their *paradoxical strategies* ... we describe enable senior leaders to *support continued tensions*, rather than seeking 'resolutions' that may, in fact, end up limiting the firm's long-term strategic opportunities. Complex business models demand leaders capable of communicating an overarching vision, building inconsistent organizational designs, *managing ongoing conflict* and of long term, integrative thinking. (pp. 449-450, emphasis added)

First, investigating the potential separation of the distance/regional company (DSB) and the s-train company (Copenhagen commuting services) could have been interesting, but it would then be partially incomplete since the international companies (e.g. DSBFirst, DSB Väst) would be difficult to incorporate in the study. So, although it could have been interesting to analyze how the different senior leadership teams manage paradoxical strategies between the local computing company (Unit one), distance railway company (Unit two), and international companies (Unit three) this was out of the scope of the present study. Furthermore, it could raise issues of researcher ethics to explore the cross-subsidization of new business models in the railway sector in an international context due to the current industry structure, where the Ministry of Transport formally owns the railway operator. The Danish

State Railways is owned by the state, which means that the cross-subsidy from the parent company to international operating companies is forbidden by European law, which excludes such study. So, while the purpose was not to explore a potential lack of understanding of the trade-offs, interdependencies and differences between co-existing business models of the same company, it is still fully recognized that such a situation could potentially:

hinder new business model innovations by locking [the] firm in to its status quo, [including overlooking] the benefits of having a stable source of income from old business models that can cross-subsidize new business models, [which] is a fruitful and relevant area for future research. (Sosna et al., 2010, p. 403)

Second, the purpose was not to engage in conflict via a dialectic study with focus on ‘managing ongoing conflict’ between these units of business or to study potential ‘inconsistent organizational designs’ as encouraged by Smith et al. (2010). Instead, the purpose was to investigate some of the ‘silent’ assumptions and underlying challenges for facilitating business-model innovation in the Danish railway sector, following ‘integrative thinking’ of long term. This approach has been suggested to be relevant because discontinuities and disruptions in the market call for changes and adaptations of existing business models (Doz & Kosonen, 2010):

over time, efficient firms naturally evolve business models of increasing stability - and therefore rigidity [...] stability is also likely to result in a growing rigidity, which inevitably limits a firm’s strategic agility and thus its ability to renew and reform itself. (p. 370) Transforming the business model of a successful company is never easy [...] inertia from many sources defends the status quo [...] strategic agility is most obviously a keystone (p. 381)

Hence, the testing of silent management assumptions are, therefore, suggested to be of central concern to the head-on challenge of changing and adapting existing business models over time. The study of the ‘system of work’ is an alternative to study ‘related trade-offs’ between co-existing or embedded business models of the same company (Smith et al., 2010; Sosna et al., 2010). The purpose was to challenge intellectual thinking by engaging in the long-standing idea of organizational learning

to explore some of the basic assumptions of the 'system of work' (Itami & Nishino, 2010). The purpose of the present study was not to engage in conflict, but to actively explore and exploit the knowledge about each point of the fifteen leadership agenda (Doz & Kosonen, 2010), including analyzing the importance of each agenda point. This idea is operationalized below with reference point to the emerging subject matter of 'cognitive leadership'.

3.9 Leadership agenda

The leadership agenda (Doz & Kosonen, 2010) was selected as the core theory to be tested in the present study. The purpose was to explore gaps in the leadership agenda of the Danish State Railways in the critical situation that led up to the institutional crisis. The motivation was to identify the areas of cognitive leadership that are considered critical by the managers working the railway sector for over 15 years in average. The present study operationalized the leadership agenda to test the basic assumptions of the most important points of leadership in a time of crisis. The leadership agenda for accelerating business models at organizational level was applied as a conceptual framework instead of building up one from ground zero.

The objective was not to disprove or confirm old theory, but to build a new theory about the most critical points of leadership in times of crisis. Each point of the leadership agenda was operationalized into three points of measurement to be tested in the management survey. The points of the leadership agenda were organized into three batteries with a total of 45 statements to be tested. The definitions of the leadership agenda are described to bring clarity and transparency in table 3.10.

The leadership agenda	
Indicator	Wording
Theme 1. Strategic sensitivity: The sharpness of perception of, and the intensity of awareness and attention to, strategic developments.	
1. Anticipating:	Sharpen foresight: Explore future usage concepts.
2. Experimenting:	Gain insight: Probe, discovering 'lead locations' or 'innovation hotspots'.
3. Distancing:	Gain perspective: Nurture an 'outside-in' perspective.
4. Abstracting:	Gain generality: Restate business models in conceptual terms.
5. Reframing:	See the need for business model renewal: Engage in honest, open and rich dialogue around strategic issues.
Theme 2. Leadership unity: The ability of the top team to make bold, fast decisions, without being bogged down in top-level 'win-lose' politics.	
6. Dialoguing:	Surface and share assumptions, understanding contexts: Explore underlying assumptions and hypotheses, not just conclusions, developing common ground.
7. Revealing:	Make personal motives and aspirations explicit: Provide transparency and clarity of motives brings mutual respect and trust, and understanding of positions.
8. Integrating:	Build interdependencies: Define a common agenda that conditions success.
9. Aligning:	Share a common interest: Go beyond incentives; give deeper common meanings.
10. Caring:	Provide the personal safety needed to be playful.
Theme 3. Resource fluidity: The internal capability to reconfigure capabilities and redeploy resources rapidly.	
11. Decoupling	Gain flexibility: Organize by value domains.
12. Modularizing:	Dis-/assemble and business systems: Develop 'plug and play' functionality.
13. Dissociating:	Separate resource use from resource ownership; and negotiate resource access and allocation.
14. Switching:	Use multiple business models: Have different business model infrastructures in parallel and aligning and switching products between them.
15. Grafting:	Acquire to transform oneself: Import a business model from acquired company.

Table 3.10: Leadership agenda

Source: Doz & Kosonen, 2010

The leadership agenda theory was operationalized into three trials. By trial is meant a formal examination of evidence provided by three hundred and sixty-eight managers (n=368). The managers working inside the Danish State Railways were asked how much attention the former top management had given to each of the agenda points, which was compared to the assumed importance of the same points as a method to identify the most critical areas of the leadership agenda in a time of crisis. Specifically, the first and second trials were designed to

test-retest how much attention the former management had given to each point of the leadership agenda in the past six months leading up to the peak of the institutional crisis in 2011, while the third trial was designed to test the importance of the variables of the leadership agenda.

3.10 Summary

Three theories were identified for the management survey via the literature review. First, the leadership agenda (Doz & Kosonen, 2010) was applied to explore gaps in the management agenda to identify the critical areas of cognitive leadership in times of crisis. In addition, the core-periphery theory (Thompson, 1967) was applied to study the relationship between technological innovation and business-model innovation. Finally, the business-model innovation theory (Chesbrough, 2010) was operationalized as a list of single and multiple choices to explore the underlying assumptions and challenges for facilitating a necessary business-model innovation in the Danish railway sector. The three areas of analysis are described in greater detail in Chapter 6 'Design of the management survey' at page 197.

Chapter 4

Meta-analysis of first-class articles

The meta-analysis aims to bring clarity to established ideas and emerging concepts: and to articulate unexpressed underlying consensus about accepted connections between multiple theoretical concepts. This chapter thus provides a unique insight into the underlying relationships between related theoretical concepts, including reviewing the importance of these concepts with the aim to examine similarity and diversity across a collection of first-class journal articles. The meta-analysis clarifies the link between business-model innovation and product/service management (e.g. Teece, 2010; Williamson, 2010; and Gambardella & McGahan, 2010).

A meta-analysis of a selection of first-class articles on the topic are systematically reviewed in this chapter to examine the basic assumptions into a coherent idea of an unexpressed consensus about certain undisclosed points of interaction between multiple authorships, as an innovative method to illustrate how different authors have connected across different research themes within the field of business models and thus contributed with the development of a shared and complementing knowledge about theoretical perspectives related to the study of business models. For example, what is the underlying consensus about the most important research categories by some of the theorists in the field? How do the different authorships position themselves in relation to different theoretical concepts?

The meta-analysis describes the underlying assumption between business-model innovation and *success* by the majority of the theorists in the field of business models, while *failure* or *crisis* have only received a marginal level of attention by the authors. But, does business-model innovation always end with a positive result?

The connections between the research themes that emerged from the meta-analysis reveal that these connections are for the most part unexpressed in the articles. For example, Demil & Lecocq (2010) claim to examine the evolution of business models, using the term 'dynamic consistency' for the purpose, but instead put emphasis on change management and resource development, while leaving business-model evaluation in the background. Second, the meta-analysis specifies opportunities for original contributions that are likely to be considered relevant by the theorists in the field of business models. For example, the meta-analysis suggests that innovation, strategy, product, change, and success are among the most important research themes that can be coupled with the study of business models.

The meta-analysis then specifies how three authorships draw connections between business-model innovation and success (Doz & Kosonen, 2010; Smith et al., 2010; Hienerth, 2010), while others draw 'strong' connections between business-model innovation and strategy (e.g. Smith et al., 2010; Casadesus-Masanell & Ricart, 2010).

The meta-analysis provides an enriched insight into the most important concepts related to the management of business-model innovation, but it also provides a solid ground for constructing a new theory about an incompleteness gap in the literature that the present study aims to fill. The strong connection with innovation is not that surprising due to the common use of the combined concept of business-model innovation that has been widely repeated across multiple works, while the connection between business model and strategy has been highlighted by many in the past, both directly (e.g. Teece, 2010; Doz & Kosonen, 2010; Casadesus-Masanell & Ricart, 2010) and indirectly (e.g. Williamson, 2010; Smith et al., 2010; McGrath, 2010; Hienerth et al. 2011).

The meta-analysis specifies that several authors assume that *change* is an even more decisive factor of the management of business-model innovation than strategy (e.g. Sosna et al., 2010; Demil & Lecocq, 2010; Svejenova et al., 2010; Chesbrough, 2010); although only few authors claim to examine the relationship between business-model innovation and change management (e.g. Svejenova et al., 2010; Wirtz et al. 2010; Doz & Kosonen, 2010).

The meta-analysis provides an analytical overview of how authors have positioned themselves according to selected and combined theoretical concepts, which is rewarding not only to explain how different concepts have been combined by some of the key theorists in the past, but also to specify where new knowledge is likely to be considered relevant by the key theorists in the field of business models when looking forward. The meta-analysis organizes a set of fifteen theoretical concepts into three categories.

Five core concepts specify important related theoretical concepts, while five semi-peripheral concepts specify some research areas that could potentially be of high interest for scholars with an interest in business-model innovation since these concepts have been widely acknowledged, but at the same time given relatively little attention in the recent literature on the topic.

Five peripheral theoretical concepts specify potentially overlooked theoretical concepts that may be considered fruitful to develop the existing knowledge about the management of business-model innovation. The peripheral concepts are suggested to be harder to make relevant, but the potential impact of connecting a peripheral theoretical concept to the core concept (business model) has the potential to yield a great impact on the existing literature.

4.1 Selection of articles for the meta-analysis

A collection of first-class journal articles published in the top journal Long Range Planning was selected for the meta-analysis, but why

precisely this journal and why precisely these articles? Why were they selected for the meta-analysis?

The LRP journal has been ranked as number 1 of the top 25 journals on the topic between 1970 and 2011 (Coombes & Nicholson, 2013) and the journal is very well positioned in its web of science categories. We now know that it is in fact a leading top journal within its three categories.

Category	Total Journals in Category	Journal Rank in Category	Quartile in Category
Business	116	8	Q1
Management	174	15	Q1
Planning & Development	55	2	Q1

Table 4.1: Classification of the LRP journal within its categories
Source: Web of Science, 2014

The bibliometric analysis details that the journal is very well positioned within its three web of science categories. Furthermore, the selected articles published in the special issue on business models in the journal in 2010 have received 10 times more cites than the total of the articles published in 2011 and 20 times more than the total of articles published on the LRP journal in 2012.

The importance of the selected articles has been highlighted by the fact that they have been downloaded more than 150,000 times, cited more than 3,500 times in the Google Scholar index and received more than 500 ISI citations in the three years since publication in the LRP (2010) special issue on business models (Baden-Fuller & Haefliger, 2013).

One more important reason for selecting the articles published in the same journal was that it became possible to describe how different authors had contributed to a growing understanding of the business-model construct, following the idea that these articles collectively aim to construct a foundation for the study of business models. The collection of

articles highlights the importance of the business model as a stand-alone concept that can be combined with other theoretical concepts, such as, technological innovation, strategy and change.

The meta-analysis of these articles seeks to explore some of the central challenges assumed by the authors by drawing on a selection of first-class articles on the topic by researchers previously working in disparate domains. The reinterpretation was especially helpful in making sense of a set of emerging practices in the field of business models by mapping out the positioning of the authors according to related theoretical concepts.

Another major advantage of reviewing the collection of articles is that the authors had explicitly united forces to elaborate on the importance the business model as a core concept within management and business studies. The complex interplay between multiple works is analyzed in great detail to describe the field's evolution by pointing out how related theoretical concepts relate to the management of business models.

The study of the rhetorical practices in the previous chapters systematically described how the authors have used a variety of different methods to construct opportunities for scientific contributions by advocating their new perspectives in order to contribute to the development of coherent ideas.

The meta-analysis aims to further specify the underlying consensus of importance embedded theoretical concepts in numerical summaries. The articles were serialized not by publication year, but by their main contribution, which is an accepted and recognized approach for constructing progressive coherence of an emerging field of study (Locke & Golden-Biddle, 1997).

4.2 Impact of the journal

A bibliometric study was performed in the web of science database to review the impact factor of the journal. The histogram shows how the

impact factor of the journal has increased notably during the past five years. This is also evident in the current Impact Factor of 3.667, which is higher than the 5-year Impact Factor of 2.885.



Figure 4.1: Impact factor of the journal
Source: Web of Science, 2014

The contributions of the special issue in 2010 will be reviewed in greater detail due to the collective high impact of these articles, while the articles published in 2013 are used to extend the analysis.

The doctoral thesis seeks to develop a grounded theory (Glaser & Strauss, 1967) by analyzing 21 articles published in the LRP journal comprising of over 300 pages of raw text following the vision to replace 'the early research' on business models (Sosna et al., 2010) with a new understanding of the most important theoretical concepts related to the management of business models.

The bibliometric study furthermore specified that the impact factor has been significantly influenced by the 180 cites to the articles published in 2010. In conclusion, the articles published in 2010 have had a high impact on the Impact Factor of the journal article.

The ranking of the journal Long Range Planning within the Thompson Reuters' Web of Science Categories of Planning & Development, Business,

and Management describes that the LRP journal is very well positioned within its categories.

Category 1. Planning & Development (Number 2 out of 55 journals)

Mark	Rank	Abbreviated Journal Title (linked to journal information)	ISSN	JCR Data ^(j)					Eigenfactor [®] Metrics ^(j)		
				Total Cites	Impact Factor	5-Year Impact Factor	Immediacy Index	Articles	Cited Half-life	Eigenfactor [®] Score	Article Influence [®] Score
<input type="checkbox"/>	1	J PEASANT STUD	0306-6150	868	5.805	3.636	2.068	44	2.5	0.00320	1.131
<input type="checkbox"/>	2	LONG RANGE PLANN	0024-6301	1413	3.667	2.885	0.529	17	>10.0	0.00230	1.013
<input type="checkbox"/>	3	RES POLICY	0048-7333	9291	2.850	4.387	0.847	131	9.1	0.01587	1.548
<input type="checkbox"/>	4	J AM PLANN ASSOC	0194-4363	1490	2.319	2.059	0.360	25	>10.0	0.00222	0.944
<input type="checkbox"/>	5	J REGIONAL SCI	0022-4146	1265	2.279	1.947	0.618	34	>10.0	0.00335	1.011

Category 2. Business (Number 8 out of 116 journals)

Mark	Rank	Abbreviated Journal Title (linked to journal information)	ISSN	JCR Data ^(j)					Eigenfactor [®] Metrics ^(j)		
				Total Cites	Impact Factor	5-Year Impact Factor	Immediacy Index	Articles	Cited Half-life	Eigenfactor [®] Score	Article Influence [®] Score
<input type="checkbox"/>	1	ACAD MANAGE REV	0363-7425	16810	7.895	11.578	1.200	30	>10.0	0.02034	6.229
<input type="checkbox"/>	2	J MANAGE	0149-2063	8294	6.704	7.754	0.842	57	>10.0	0.01705	4.069
<input type="checkbox"/>	3	ACAD MANAGE J	0001-4273	18591	5.906	10.031	0.550	60	>10.0	0.02861	5.573
<input type="checkbox"/>	4	INT ENTREP MANAG J	1554-7191	430	5.053		0.192	26	2.6	0.00148	
<input type="checkbox"/>	5	ADMIN SCI QUART	0001-8392	11743	4.182	7.693	0.375	16	>10.0	0.00860	5.593
<input type="checkbox"/>	6	J MANAGE STUD	0022-2380	5000	3.799	4.744	1.127	63	8.5	0.01048	1.924
<input type="checkbox"/>	7	MANAGE DECIS	0025-1747	2347	3.787	2.467	0.173	98	6.3	0.00551	0.695
<input type="checkbox"/>	8	LONG RANGE PLANN	0024-6301	1413	3.667	2.885	0.529	17	>10.0	0.00230	1.013
<input type="checkbox"/>	9	J ORGAN BEHAV	0894-3796	5433	3.626	4.226	0.516	64	>10.0	0.00966	2.086
<input type="checkbox"/>	10	J CONSUM RES	0093-5301	10337	3.542	4.641	0.452	84	>10.0	0.01399	2.214

Category 3. Management (Number 15 out of 174 journals)

Mark	Rank	Abbreviated Journal Title (linked to journal information)	ISSN	JCR Data ^(j)					Eigenfactor [®] Metrics ^(j)		
				Total Cites	Impact Factor	5-Year Impact Factor	Immediacy Index	Articles	Cited Half-life	Eigenfactor [®] Score	Article Influence [®] Score
<input type="checkbox"/>	1	ACAD MANAGE REV	0363-7425	16810	7.895	11.578	1.200	30	>10.0	0.02034	6.229
<input type="checkbox"/>	2	J MANAGE	0149-2063	8294	6.704	7.754	0.842	57	>10.0	0.01705	4.069
<input type="checkbox"/>	3	ACAD MANAGE J	0001-4273	18591	5.906	10.031	0.550	60	>10.0	0.02861	5.573
<input type="checkbox"/>	4	INT ENTREP MANAG J	1554-7191	430	5.053		0.192	26	2.6	0.00148	
<input type="checkbox"/>	5	J APPL PSYCHOL	0021-9010	21544	4.758	7.313	0.548	84	>10.0	0.03436	3.684
<input type="checkbox"/>	6	MIS QUART	0276-7783	7277	4.659	7.474	0.705	61	9.9	0.01030	3.071
<input type="checkbox"/>	7	J OPER MANAG	0272-6963	4825	4.400	7.130	0.351	37	8.0	0.00984	2.281
<input type="checkbox"/>	8	ADMIN SCI QUART	0001-8392	11743	4.182	7.693	0.375	16	>10.0	0.00860	5.593
<input type="checkbox"/>	9	ACAD MANAG ANN	1941-6520	487	4.103	7.030	1.364	11	4.1	0.00544	4.649
<input type="checkbox"/>	10	ASIA PAC J MANAG	0217-4561	1080	4.099		0.481	52	5.3	0.00179	
<input type="checkbox"/>	11	ORGAN RES METHODS	1094-4281	2274	3.926	4.888	0.607	28	7.3	0.00808	2.738
<input type="checkbox"/>	12	J MANAGE STUD	0022-2380	5000	3.799	4.744	1.127	63	8.5	0.01048	1.924
<input type="checkbox"/>	13	MANAGE DECIS	0025-1747	2347	3.787	2.467	0.173	98	6.3	0.00551	0.695
<input type="checkbox"/>	14	PERS PSYCHOL	0031-5826	4387	3.702	6.045	0.174	23	>10.0	0.00849	3.628
<input type="checkbox"/>	15	LONG RANGE PLANN	0024-6301	1413	3.667	2.885	0.529	17	>10.0	0.00230	1.013

Table 4.2: Journal ranking
Source: Web of Science, 2014

4.3 Motivation for the meta-analysis of scholarly works

The motivation for conducting a meta-analysis was anchored in an exploratory search for some embedded theoretical concepts that had been emphasized by some of the key theorists in the recent literature on

the topic. Searching for innovation, strategy and change were used to generate a few analytical summaries since these concepts were assumed to be dominant embedded perspectives in the discussions about business-model innovation. The analytical summaries for specific theoretical concepts provided an alternative to compare different definitions and components of the business-model. For curiosity reasons, routine, social and culture were furthermore operationalized since these concepts were assumed to be given little attention in the same collection of articles.

The meta-analytical review of the literature was driven by a desire to find out more. A series of theoretical codes were conceptualized into a system of categories to construct a grounded theory based on the assumption that the information was already there and that it just had to be unfolded (Glaser & Strauss, 1967).

The experimental review of existing theory did not aim to reject or confirm old theory, but to build a new theory. It was important that experienced researchers with authority had already endorsed the selected articles. The articles included in the meta-analysis are therefore assumed to be important to the research community with an interest in the field of business models.

Fifteen theoretical concepts were selected to study the underlying silently assumed relationships with the business-model core concept. The non-included concepts are not necessarily uninteresting or unimportant, but they were knowingly excluded to develop an understanding of the progression that has been observed in the recently published works on the topic by drawing connections between some of the most advanced articles published about implicit assumptions and central challenges.

The meta-analysis began by highlighting smaller paragraphs in order to define a set of theoretical codes, following the encouragement to contrast thematic conceptualizations with descriptions of the business-model construct to ground a new theory (Glaser, 2001) as an alternative to

engage in the dispute about 'what is a business model and what is it not' (e.g. Zott et al., 2011, Nielsen & Bukh, 2011; DaSilver & Trkman, 2013).

The purpose was to challenge intellectual thinking by providing an anti-thesis to the assumption that the literature on the topic is only confound by confusion, different definitions and perceptions of the business-model construct; instead to suggest that the development of coherent ideas have emerged during the past five years.

The purpose was therefore not to construct discord by describing how some authors remain dissatisfied with previous works, but instead to describe the development of shared beliefs about some of the basic assumptions and suggested head-on challenges for the management of business-model innovation.

The goal was to describe that considerable agreement exists to challenge the intellectual thinking that the field of business models only remains fragmented and under-developed. The state-of-the-art articles published in the Long Range Planning journal constitute a platform for reviewing some of the consensual positions about different problems, challenges and issues to develop a common ground for the study of business models.

Altogether, this body of knowledge offers insights into how business models change over time as well as the problems and issues associated with the implementation and commercialization of new technology. The purpose was, therefore, not to explore if these concepts are or could potentially be components of the business-model construct, but to explore how authors have associated these concepts to the management of business-model innovation in the past, including specifying the underlying consensus - across multiple authorships - about the importance of related concepts.

A central rationale for selecting the articles is that they, all together, constitute a platform for reviewing the underlying consensus of previous works to construct opportunities for advancing the existing knowledge

about business models. Multiple studies were analyzed in a coherent body of knowledge by examining how they relate to each other and to explore how different authorships position themselves according to specific theoretical concepts.

4.4 Methodology

A total of 336 searches were performed inside 21 articles in order to ground a new theory about the underlying relationships within and across multiple state-of-the-art articles on the topic. The author thus takes up the encouragement of combining qualitative-quantitative data to examine the contributions in a specific field of study (Locke & Golden-Biddle, 1997, p. 1060), including positioning of multiple authorships according to specific theoretical concepts. Sixteen theoretical concepts were organized into keywords, following the principle of constant comparison (Glaser, 1965).

The Glaserian method of grounded theory has a strong focus on 'theoretical sensitivity' (Glaser, 1978) in order to refit theoretical concepts into a coherent system and deducing categories of the data that integrate around the core. This method was deliberately selected instead of developing a 'paradigm model' (i.e. tree diagram) based on deductive clustering of categories *with* intermediaries (Strauss & Corbin, 1997, 1998). The Glaserian method was applied to let a new theory emerge from the data (Glaser, 1992, 2005) through a deduction of multiple direct relationships with the core *without* intermediaries in a simple and straightforward two-step procedure.

The first procedure consisted of 'substantial' coding of the data (i.e. the articles) to identify the theoretical concepts for the meta-analysis, while the second procedure focused on further refitting and refining the selected theoretical concepts - integrated around the core concept - with a rigid focus on analytical scope and optimization of the results.

The procedure was continued until new patterns did not emerge from the data. The second procedure has been described as 'theoretical' coding to develop highly refined themes through a combination of an inductive

conceptualization of the theory and deductive testing of this theory (Glaser & Strauss, 1967). The theoretical codes were derived from the articles published in the special issue on business models, following the logic of grounded theory (Glaser & Strauss, 1967). The second procedure continued with the 'theoretical coding' to make constant comparisons of the theoretical codes with focus on the emergence of data.

The Glaserian method thus combines the traditional 'substantive' coding procedures with the analytic procedure of constant comparison of the emerged data - based on a systematic analysis of fifteen theoretical concepts, which were organized into a system of categories to ground a new theory about the importance of these concepts for the management of business-model innovation. I also wondered why only a few authors seem to have focused on the social and cultural aspects related to the innovation of established business models. So, I got motivated to find out more. A system of theoretical concepts was developed to study the underlying relationships between them, as illustrated in figure 4.3.

Searching for fifteen themes in twenty-one journal articles aimed to draw connections across embedded theoretical concepts. The connections between the core variable 'business model' and fifteen theoretical concepts aimed to position the works by over 40 authors according to specific theoretical concepts, before specifying an incompleteness gap in the saturated literature that the present study aims to fill. The purpose was to draw connections between divergent articles published on the topic as an innovative method to review some of the basic assumptions in the state-of-the-art literature on the topic.

A computer-based search engine was used to generate data. An advantage of the computer-controlled method was that the data could be objectively evaluated to produce new knowledge about the similarities and differences across multiple articles. The articles were thus gathered to generate data in order to systematically develop a theory derived from the data. The advanced search function 'Match Exact word or phrase' (Shift+Ctrl+F) in Adobe was used to systematically generate data to ground a new theory about the underlying consensus across multiple

authors concerning the importance of specific theoretical concepts. In summary, the search for specific theoretical codes resulted in a rather large data collection. Initially the focus was on examining the rhetorical practices (discourses, techniques and methods), but the theoretical coding gradually led the focus in the direction of constructing analytical tables based on numerical summaries.

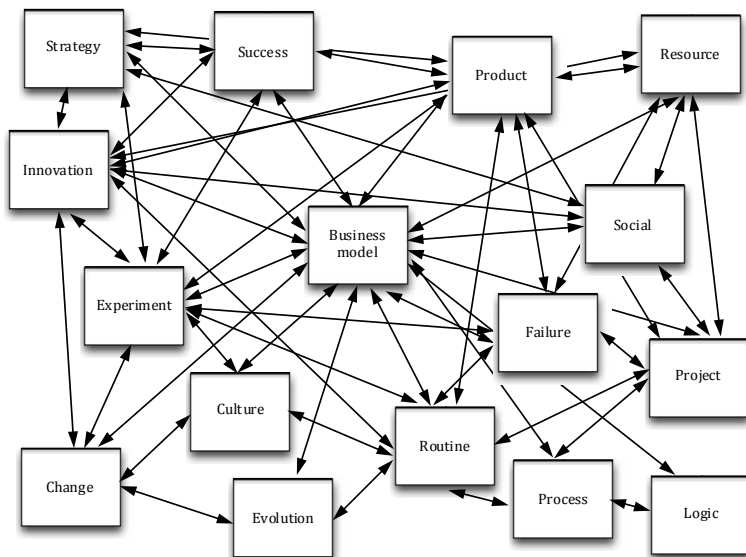


Figure 4.2: System of theoretical concepts
Source: Web of Science, 2014

The selection of theoretical codes were first reviewed in three selected state-of-the-art articles on business models (Teece, 2010; Doz & Kosonen, 2010; Baden-Fuller & Morgan, 2010) to explore underlying consensus among these authors about important concepts as well as to explore gaps in the literature on the topic as an alternative to study different definitions as illustrated in the table below. The articles were reviewed a second time after some months to get an objective distance to the literature. The initial objective was to search for gaps within the

existing literatures as an alternative to invent new definitions or to engage in the recurring discussions about what is a business model and what is it not. I was surprised that the routine seemed to be omitted in the first-class journals on the topic because it lies at the heart of evolution theory (Nelson & Winter, 1982).

4.4.1 Pilot study

The pilot study indicated some potential gaps in the literature on business models, so I decided to examine this initial proposition in greater detail. The initial experimental search included the above-mentioned six theoretical codes within three articles as a start. Since the results generated from the initial pilot study were rather interesting, it was decided to expand the collection of articles to embrace the entire collection published in the LRP journal. The three hundred thirty six cases (n=336) were reviewed in a rigid two-step procedure to clean the data. The result of a pilot study is described in table 4.3.

Match Exact search for individualized items		Underlying consensus?			Incompleteness gaps or irrelevant concepts?			Long-standing debate about definitions of the construct	
Author(s)	Business model	Innovat*	Strateg*	Chang*	Routine*	Social*	Cultur*	Number of pages	Definition
Teece, 2010	239	76	41	20	0	3	0	23	A business model <u>reflects</u> 'the management's hypothesis about what customers want, how they want it, and how the enterprise can organize to best meet those needs, get paid for doing so, and make a profit'. (p. 172)
Doz & Kosonen, 2010	106	10	44	27	3	0	3	13	A business model <u>is</u> a set of inter-dependent operational relationships between the company and its customers, suppliers, partners and other stakeholders, but also among its internal units and departments. The relationships are articulated in procedures or contracts and embedded in tacit action routines.
Baden-Fuller & Morgan, 2010	152	17	6	19	1	4	0	16	A business model <u>defines</u> the business's activities in a way that matches the generic level of behavior and suggests why it works, as it embodies the essential elements and how they are to be combined in order to make them work. Of course, not all cooks can make all recipes work - and not all business models may work for different companies with diverse products and services in different contexts.

Tacit assumptions or under-researched themes?

*Open search technique to capture all instances, e.g. innovation, innovate, innovating, etc.

Is one better than the other?

Table 4.3: Pilot study

Source: The Author

As the table illustrates, the purpose was to explore common features across divergent articles and to explore incompleteness gaps in the

saturated literature on the topic, as a considered alternative to engage in the discussion about the business model construct.

The summaries of search results are representative of a collection of observations that were identified in the articles by searching for theoretical codes, referred to as cases in the meta-analysis. Using the terminology of Glaser & Strauss (1967), the core variable 'business model' was linked to a set of sub-core variables, referred to as (embedded or correlated) theoretical concepts in the present study. To explain the comprehensiveness of the work behind the meta-analysis, one of the 336 search results is described in figure 4.3.

The figure shows the search results for one theoretical concept (strategy) in one article (Teece, 2010). The three hundred thirty six cases (n = 336) were systematically reviewed in a rigid two-step procedure to clean the data. The first procedure eliminated invalid cases in the core text within each article. Of the first six preliminary theoretical codes, deviations were only found when searching for social. For example, when searching for social impact (code=social*) it was necessary to eliminate a few cases because of the diverse meaning of the theoretical concept (social impact).

Specifically 'socialize' and 'socializing' appeared in one article and they had to be removed because they had a clearly diverse meaning. The second procedure eliminated cases outside the core text. As illustrated in figure 4.4, the search for 'strateg*' resulted in 72 results, but was adjusted to 41 after eliminating invalid cases recorded in the references, bibliographies and appendices. The two procedures were repeated 336 times (i.e. 672 times). The two procedures were repeated for all 16 theoretical codes in the 21 articles one after another in a multi-step procedure to demonstrate latent consensus (or disagreement) about the importance related to the theoretical concepts.

Page 1	Page 2
<p>Search Results</p> <p>Summary</p> <p>Searched for : strating In document: 12 (PDF)Articles/Business Model Theory(LRP)/Business Models, Business Strategy and Innovation.pdf 1 document(s) with 72 instance(s) Saved on : 17-03-2011 20:05:01</p> <p>File : Business Models, Business Strategy and Innovation.pdf Title : Business Models, Business Strategy and Innovation Subject : Author : David J. Teece Keywords :</p> <p>Document Metadata</p> <p>Title: Business Models, Business Strategy and Innovation Found 1 instance(s) in additional metadata</p> <p>Page: 1</p> <ul style="list-style-type: none"> Business Models, Business Strategy and Innovation David J. Teece Whenever a business enterprise is connections with business strategy, innovation management, and economic theory. 2009 Published by Elsevier <p>Page: 2</p> <ul style="list-style-type: none"> defined by business strategists if it how does one build a sustainable competitive advantage and <p>Page: 3</p> <ul style="list-style-type: none"> same as a strategy: the distinction and the relationship between the two will be retains their distribution strategies e if not their whole business models. Notwithstanding how the Business Models, Business Strategy and Innovation <p>Page: 4</p> <ul style="list-style-type: none"> organizational and strategic studies, and in marketing schools. However, there has been some 	<p>Page: 5</p> <ul style="list-style-type: none"> Business Models, Business Strategy and Innovation <p>Page: 7</p> <ul style="list-style-type: none"> The rules for strategic engagement promulgated by Shapiro and Varian are core elements of one elements of strategy in the information services sector.12. In traditional information providers, Business Models, Business Strategy and Innovation <p>Page: 8</p> <ul style="list-style-type: none"> requirements. Business models, strategy and sustainable competitive advantage? A business model articulates the logic. starts business strategy. Coupling strategy and business model analysis is needed to protect business strategy. Coupling strategy and business model analysis is needed to protect competitive advantage <p>Page: 9</p> <ul style="list-style-type: none"> start a business strategy. Coupling strategy analysis with business model analysis is necessary in business strategy. Coupling strategy analysis with business model analysis is necessary in order to Selecting a business strategy is a more granular exercise than designing a business model. model. Coupling competitor strategy analysis to business model design requires segmenting the market, creating the business model/strategy from being undermined through imitation by competitors or disintermediation to by customers.13 Strategy analysis is thus an essential step in designing a competitively the filters when strategy analysis improves, it is unlikely to be viable, as many to replicating its strategy, or entry direct to customers would upend their existing channel issues, the whole strategy depended on the availability of numerous non captive suppliers elements of its strategy that make its business model difficult to imitate. Search engine Business Models, Business Strategy and Innovation <p>Page: 11</p> <ul style="list-style-type: none"> Business Models, Business Strategy and Innovation <p>Page: 12</p> <ul style="list-style-type: none"> implemented its online strategy, by offering customers a choice of how to return their capturing value of strategies. Business models to capture value from technological invention
Page 3	Page 4
<p>The profiling</p> <ul style="list-style-type: none"> capturing value of strategies. Clearly technological innovation by itself does not automatically guarantee business without a commercialization strategy as Long Range Planning, vol 43 2002 183 <p>Page: 13</p> <ul style="list-style-type: none"> engaged with careful strategic analysis, are necessary for technological innovation to succeed commercially; otherwise, and the technology strategy right included (the CAT scanner) and known (help entrepreneurs and strategists figure out appropriate business model/designs and technology strategies by designs and technology strategies by delineating important features of business model choices, and predicting development and commercialization strategy is a necessity. The other extreme case is the Business Models, Business Strategy and Innovation <p>Page: 15</p> <ul style="list-style-type: none"> Business Models, Business Strategy and Innovation <p>Page: 17</p> <ul style="list-style-type: none"> go-to-market strategy. Once articulated, it is likely that the logic will have Business Models, Business Strategy and Innovation <p>Page: 18</p> <ul style="list-style-type: none"> dominant design' emerges? Strategic requirements are likely to be different in the pre- and the market entry strategy a viable entry timing is a strategy, rather than a timing is a strategic, rather than a business model issue, it may depend in <p>Page: 19</p> <ul style="list-style-type: none"> Business Models, Business Strategy and Innovation <p>Page: 20</p> <ul style="list-style-type: none"> coaxed. neither business strategies, business structures nor business models can be properly calibrated a priori is, market entry strategies for innovators) testable propositions further be advanced (including by current actors), but strategic studies will have to advance further as a field before connections to business strategy, innovation management and economic theory. Long Range Planning, vol 43 	<p>Page: 21</p> <ul style="list-style-type: none"> is/it's on. The strategy and organizations literature has done little better. Like other interdisciplinary behavior, competition, innovation, strategy and competitive advantage. Our understanding of the nature of the in e-business. Strategic Management Journal 22, 493&520 (2001); and C. Zott and Business Models, Business Strategy and Innovation <p>Page: 22</p> <ul style="list-style-type: none"> between product market strategy and business model: implications for firm performance, Strategic Management Journal for firm performance, Strategic Management Journal 29, 1626 (2008) define a business model translated into management/strategy constructs, as Michael Porter, Competitive Strategy, Free Press, (1982) Michael Porter, Competitive Strategy, Free Press, (1982) did, I suggest the benefits of Information Rules: A Strategic Guide to the Network Economy, Harvard Business School Press, Boston. The rules for strategic engagement that they promulgate are core elements of strategy in core elements of strategy in the information services sector, and here a e elsewhere be informed by strategy analysis. 12. A. Shuen, Web 2.0: A Strategy Guide, O'Reilly, Web 2.0: A Strategy Guide, O'Reilly, Sebastopol, (2008) p. 2- 13. See also at IBM, driving strategy into action, California Management Review 49(4) (2007), 14. <p>Page: 23</p> <ul style="list-style-type: none"> sustainable enterprise performance. Strategic Management Journal 28(13), 1376&1380 (2007), 24. An application retain their value. Strategic Management Journal 12(2), 65&68 (1991), 35. Peter Burrows, Dynamic capabilities and strategic management, Strategic Management Journal 18(7), 509&533 (1997), 0. and strategic management, Strategic Management Journal 18(7), 509&533 (1997), D. J. Teece Dynamic Capabilities and Strategic Management: Organizing for Innovation and Growth, Oxford University Press (industrial organization, business strategy, organizational economics, and public policy. He is the author of Dynamic Capabilities and Strategic Management: Organizing for Innovation and Growth (Oxford University Press, Business Models, Business Strategy and Innovation

Figure 4.3: Example of the search results

Source: The Author

4.4.2 System of categories

A system of categories was developed based on a rigid analysis of fifteen theoretical concepts in relation to the core concept: the business model. The reinterpretation of existing works thus provides an opportunity to describe how multiple authors have used different combinations of embedded concepts linked to the management of business-model innovation. The categorization of the theoretical concepts is useful in that it both specifies the most important theoretical concepts for the management of business-model innovation and it also highlights a set of articles related to each individual concept.

The method to identify the most important theoretical concepts is based on the adjusted number of times the concept appears in the article divided by the adjusted number of pages. The number of times that the concept appeared in the individual article was used to sort the ranking of the concepts. The adjusted numbers of counts were transformed into standardized results by dividing it by the adjusted number of pages of the article. The analytical summaries of the average appearances of the concept in the individual articles thus functioned as the anchor for making a constant comparison of the data.

Then, the minimum and maximum number of appearances of the individual concepts in the individual articles were listed to develop the analysis, which was again developed by listing the average appearances in the corresponding articles along with an overview of the number of articles that included the theoretical concept in the article. The corresponding minimum and maximum counts were likewise listed in standardized numbers to facilitate a constant comparison of the data. Finally, the standard deviations and variances of the appearances were listed to complete the analysis.

Table 4.4: System of categories

Sorted by mean

	<i>Adjusted counts</i>					<i>Standardized results</i>					<i>Classification</i>	
	Total	Min	Max	Average	Article hits	Mean	Min	Max	SD	Var	Highlighted articles	Category
Business model	2186	16	239	104	21	7,105	1,500	13,000	3,329	11,486	21	a
Innovation	517	1	76	25	21	1,810	0,067	7,889	2,013	4,021	7	a
Strategy	514	4	107	24	21	1,705	0,438	7,636	1,897	3,422	7	a
Product	452	3	58	22	21	1,498	0,200	3,412	0,961	0,899	7	a
Change	502	0	115	24	20	1,476	0,000	6,389	1,585	2,401	8	a
Success	315	1	59	15	21	1,036	0,053	3,105	0,750	0,535	3	a
Social	315	0	150	15	14	0,970	0,000	9,375	2,267	4,917	3	b
Experiment	254	0	59	12	14	0,917	0,000	6,556	1,606	2,486	4	b
Resource	276	0	94	13	19	0,856	0,000	5,222	1,118	1,218	2	b
Process	295	0	126	14	19	0,839	0,000	6,632	1,426	1,954	2	b
Project	159	0	81	8	14	0,509	0,000	5,400	1,199	1,379	1	b
Evolution	107	0	36	5	13	0,301	0,000	2,000	0,490	0,229	1	c
Failure	90	0	23	4	16	0,271	0,000	1,095	0,318	0,107	0	c
Logic	36	0	8	2	9	0,201	0,000	0,789	0,224	0,053	0	c
Culture	69	0	15	3	16	0,119	0,000	0,533	0,173	0,029	0	c
Routine	22	0	8	1	8	0,064	0,000	0,381	0,106	0,011	0	c
Total	305	6	21	15	21	-	-	-	-	-	-	-

Source: The Author

4.5 *Meta-analysis of scholarly works*

The purpose was to systematically review latent consensus and potential discord among researchers via a meta-analysis of a complete selection of articles published in a leading top journal dedicated to the study of business models. The horizontal analysis across concepts within the individual articles focuses on clarifying how scholars have combined different theoretical concepts to construct opportunities for scientific contribution. The exploitative nature of the top-down analysis (vertical analysis) of the individual concepts examines similarities and differences among multiple scholarly works to clarify the shared underlying agreement about the importance of different theoretical concepts.

The reinterpretation of scholarly works divides into three continuing sections. The first section reviews the core concepts (Category A) and their relation with the business model. The next section with the five semi-peripheral theoretical concepts (Category B) then continues by exploring their connections with the business model. Finally, the third section (Category C) finishes by elaborating on the peripheral theoretical concepts to complete the meta-analysis.

The concepts ranked in 'Category A' are suggested to be central research themes that can serve as stand-alone concepts in their own right — or be combined. As a rule of thumb, every time business model is mentioned in the first-class articles on the topic, it is accompanied — either directly or indirectly — by one of the related theoretical concepts: innovation, strategy, product, change or success (Category A). These theoretical concepts are therefore assumed to be of high importance for the management of business-model innovation.

The meta-analysis suggests that product/ service management, change management and success *factors* tend to be more indirectly commented, while success *cases* are directly commented. The reason is to some extent explained by the fact that success describes the output of business-model innovation, while technological innovation, and

strategic, change and product management describe the theoretical input for the management of business-model innovation.

The method used to reinterpret the scholarly works has two dimensions following the classical paradigms of exploration and exploitation. The first dimension explores how scholars have made connections between theoretical concepts within the individual articles, while the second dimension examines similarities and differences in the authors' awareness of, and attention to, the same theoretical concepts across multiple scholarly works. The exploratory search of the external linkages within the individual articles (horizontal analysis) follows a discovery-driven approach to draw connections between core and peripheral theoretical concepts in relation to the business model as described in figure 4.4.

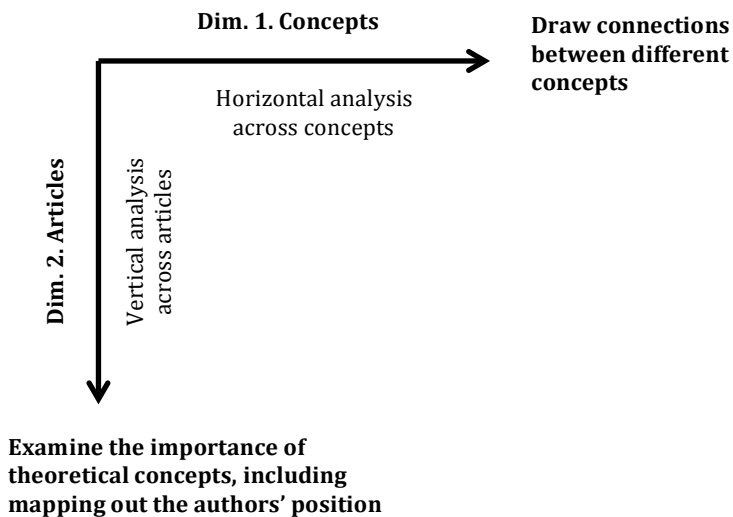


Figure 4.4: Reinterpretation of scholarly works
Source: The Author

The horizontal analysis explores external linkages with the aim to draw connections between different concepts, while the vertical analysis across multiple articles provides an enriching overview of the aggregated awareness of, and attention to, the importance of specific theoretical concepts related to the management of business-model innovation.

The vertical analysis reviews the importance of the concepts in aggregated numbers to clarify how different authors have positioned their contributions to theoretical concepts related to the management of business-model innovation. The combined analysis is suggested to be beneficial since it both explores the latent relationships - often unexpressed causalities - between different concepts that some of the key theorists have intended to establish by drawing substantial attention to the importance of the selected concepts. To summarize, the horizontal analysis draws connections between one or more of theoretical concepts with the business model, while the vertical top-down analysis summarizes the number of indicated articles that are expected to be of high relevance assumed by some of the key theorists within the field of business models.

The analysis thus provides an enriching insight into the most important concepts related to the management of business-model innovation, but it also provides a solid ground for constructing a new theory about an incompleteness gap in the saturated literature that the present study aims to fill. The reinterpretation of the different combinations of the theoretical concepts across multiple articles is useful to position multiple authors according to multiple theoretical concepts: and to examine how these authors have connected these theoretical concepts to the management of business-model innovation.

The meta-analysis of leading articles on the topic of business models is presented in numerical summaries as a method to 'externalize' the silent assumptions and agreements about the importance of related theoretical concepts. The highlighted articles are based on a minimum threshold of 1,500 times of appearance at every page of the article in average. The

highlighted articles are foregrounded since it is assumed that these articles are particularly relevant for the theoretical concepts.

The meta-analysis shows that the business model appears 7.105 times per page on average across the articles, while innovation is the most important related theoretical concept with an average of 1.810 times per page. The meta-analysis thus supports the contraction of the two concepts 'business-model innovation' since innovation is assumed by the authors to be the most important concept for the management of business models. The meta-analysis then specifies that strategy is considered a highly important concept for the management of business-model innovation. Strategy gets almost the same average score as innovation.

The meta-analysis then specifies that the product (or service) is of high importance for the management of business-model innovation. It appears that the product has been put at center stage for the management of business-model innovation. Product/service management has been presented at a high consistent level by over 40 authors specialized in the first-class articles on the topic, which suggests that product/service management has been accepted as a fundamental aspect of - or unit of analysis related to - the management of business-model innovation. Although the adjusted counts for product is slightly lower than change, it has been presented at a more consistent level since the arithmetic mean of the appearances across the articles is higher.

For this reason, it can be argued that product/service management represents a vital dimension of the management of business-model innovation. Next, the meta-analysis specifies that change management is another vital aspect for the management of business-model innovation. The meta-analysis is suggested to be fruitful for achieving a better understanding of the deeper motivations underlying the presented theories to be tested in the present study, but perhaps more importantly, also for specifying how the results from the present study may contribute to the literature on the topic.

A threshold of 1.500 was used as a minimum threshold to identify the important articles about specific theoretical concepts, while a higher threshold of 8.500 could have been used to highlight seven articles strongly positioned to explain the importance and fruitfulness of the business-model construct (Teece, 2010; Baden-Fuller & Morgan, 2010; Casadesus-Masanell & Ricart, 2010; Sabatier et. al., 2010; Chesbrough, 2010; Zott & Amit, 2010).

A lower threshold of 3.000 for the core concept 'business model' could have been used to indicate articles as 'outliers' since they seem to speak about other theoretical concepts than the business model (Itami & Nishino, 2010; Thompson & MacMillan, 2010; Demil & Lecocq, 2010). For example, these authors have highlighted the importance of the 'system of works' (Itami & Nishino, 2010), 'principles for creating new markets' (Thompson & MacMillan, 2010), and 'dynamic consistency' (Demil & Lecocq, 2010).

Interestingly, only one of the seven articles published in 2013 cites the works of Itami & Nishino (Baden-Fuller & Haefliger, 2013), while none of the articles cites the works by Thompson & MacMillan, which confirms the hypothesis that they may be considered of relatively low importance. Four of the seven articles published in 2013 cite the works by Demil & Lecocq (Baden-Fuller & Haefliger, 2013; Achtenhagen et al., 2013; Velu & Styles, 2013; McNamara et al., 2013).

One reason is, perhaps, that this authorship explicitly claims to explore the characteristics of the 'evolution of business models' and the transformational view on business model referred to as 'dynamic consistency' (Demil & Lecocq, 2013). Interestingly, the meta-analysis challenges the claim of this authorship since it suggests that the corresponding authorship focuses only a marginal level of attention to the concepts that they claim to explore (i.e. 'business model' and 'evolution'); instead to direct the attention of article towards change management of development of (new) resources.

A different way to interpret the ‘outliers’ is that they simply put some original ideas in the foreground, while leaving the core concept in the background. Not necessarily to neglect the central concept, but to challenge the fellow scholars by encouraging the consideration of these new ideas. Following this line of reasoning, an argument for not excluding these articles from the analysis is that they contribute with new interesting ideas that have great potential to enrich the discipline of business-model innovation, for example, by coupling it to the long-standing challenge of business-model innovation and *project management* (Thompson & MacMillan, 2010):

A management mindset for tackling near-Knightian environments [is beneficial] to anticipate second order effects ... by specifying clear disqualifying conditions that preclude [the] launch [of new projects] ... to anticipate unintended consequences [and thus fruitful for defining a set of] principles for creating new markets (pp. 293-294)

So, on the one hand, the positioning of the articles in the periphery may suggest that the novel ideas and new viewpoints are somewhat controversial or not completely supporting the coherent idea of the importance of the business-model as a stand-alone concept in its own right. While, on the other hand, it can be argued that these authors challenge the dominant view that is, in no small part, focused on the core concept: the management of business models. The remaining ten articles are characterized by a high stable elaboration of the business model in relation to two or more theoretical concepts.

An advantage of serializing multiple groups of studies into a coherent body of knowledge is that it provides an opportunity for describing how a cumulative and ongoing progress about business models has emerged and continues. The meta-analysis explores underlying relationships between theoretical concepts related to the management of business-model innovation both within the selected articles as well as across multiple articles to ground a new theory about the underlying consensus assumed by some of the key theorists in the field by operationalizing the constant comparison method (Glaser, 1965, 2005). The external linkages are visualized in table 4.5.

Table 4.5: Meta analysis of journal articles

Author(s)	Business model	Innovation (1)	Strategy (2)	Product (3)	Change (4)	Success (5)	Social (6)	Experiment (7)	Resource (8)	Process (9)	Project (10)	Evolution (11)	Failure (12)	Logic (13)	Culture (14)	Routine (15)
Teece, 2010	11,381	3,619	1,952	2,143	0,952	1,095	0,143	0,095	0,095	0,190	0,000	0,143	0,714	0,524	0,000	0,000
Doz & Kosonen, 2010	8,833	0,833	3,667	1,417	2,250	1,500	0,000	0,667	1,250	0,833	0,417	0,417	0,167	0,000	0,250	0,250
Baden-Fuller & Morgan, 2010	11,692	1,308	0,462	0,231	1,462	1,308	0,308	2,846	0,385	0,308	0,231	0,462	0,077	0,077	0,000	0,077
Wirtz et al., 2010	5,875	0,625	0,438	0,875	3,000	0,938	4,375	0,000	0,375	0,313	0,375	0,000	0,063	0,125	0,000	0,125
Itami & Nishino, 2010	2,667	0,167	1,000	1,333	0,667	0,667	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000
Casadesus-Masanell & Ricart, 2010	11,684	0,526	5,632	0,368	1,684	0,053	0,105	0,000	0,421	0,316	0,105	0,000	0,000	0,789	0,000	0,000
Sabatier et al., 2010	12,400	0,333	1,067	1,067	0,133	0,400	0,000	0,000	0,733	1,200	0,133	0,000	0,333	0,467	0,000	0,000
Williamson, 2010	4,600	5,900	2,300	3,200	2,300	1,300	0,000	0,200	0,200	0,400	0,100	0,000	0,100	0,000	0,000	0,000
Dahan et al., 2010	6,800	0,933	1,067	2,933	0,133	1,067	3,000	0,000	1,467	0,400	0,933	0,067	0,067	0,133	0,533	0,000
Smith et al., 2010	5,364	0,909	7,636	1,636	0,545	2,364	0,727	0,364	0,818	0,000	0,000	0,000	0,273	0,091	0,455	0,182
Gambardella & McGahan, 2010	4,778	7,889	1,000	1,778	0,000	1,000	0,111	0,222	1,000	0,444	0,000	0,222	0,000	0,000	0,000	0,000
Sosna et al., 2010	7,476	2,000	0,619	1,238	2,619	0,905	0,000	1,810	0,238	1,857	0,000	0,429	1,095	0,333	0,095	0,381
Thompson & MacMillan, 2010	2,933	0,067	0,467	0,867	0,067	1,867	0,933	0,200	1,067	0,733	5,400	0,133	0,600	0,067	0,333	0,000
McGrath, 2010	6,500	0,857	2,214	1,071	0,714	1,000	0,214	2,929	0,286	0,857	0,000	0,286	0,643	0,143	0,000	0,000
Chesbrough, 2010	13,000	3,778	0,444	1,333	1,222	0,889	0,000	6,556	0,556	0,889	1,000	0,000	0,889	0,667	0,222	0,000
Demil & Lecocq, 2010	1,500	0,667	0,500	0,833	6,389	0,611	0,000	0,000	5,222	0,556	0,167	2,000	0,000	0,056	0,000	0,111
Zott & Amit, 2010	9,667	0,556	0,778	1,222	0,444	0,111	0,556	0,000	1,000	0,222	0,000	0,111	0,000	0,111	0,000	0,000
Yumus et al., 2010	5,125	1,750	0,625	1,250	0,688	0,438	9,375	1,125	0,625	0,188	0,563	0,000	0,063	0,000	0,000	0,000
Svejenova et al., 2010	6,250	1,400	1,350	0,200	3,850	0,250	0,050	0,400	1,650	0,350	0,100	0,950	0,150	0,250	0,150	0,000
Dunford et al., 2010	6,000	1,000	1,059	3,412	0,294	0,882	0,059	1,471	0,000	0,941	0,059	0,882	0,353	0,118	0,353	0,059
Hienert et al., 2011	4,684	2,895	1,526	3,053	1,579	3,105	0,421	0,368	0,579	6,632	1,105	0,211	0,105	0,263	0,105	0,158
Mean	7,105	1,810	1,705	1,498	1,476	1,036	0,970	0,917	0,856	0,839	0,509	0,301	0,271	0,201	0,119	0,064
Std. Dev.	3,329	2,013	1,897	0,961	1,585	0,750	2,267	1,606	1,118	1,426	1,199	0,490	0,318	0,224	0,173	0,106
Var.	11,486	4,021	3,422	0,899	2,401	0,535	4,917	2,486	1,218	1,954	1,379	0,229	0,107	0,053	0,029	0,011
Min	1,500	0,067	0,438	0,200	0,000	0,053	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000
Max	13,000	7,889	6,736	3,412	6,389	3,105	9,375	6,556	5,222	6,632	5,400	2,000	1,095	0,789	0,533	0,381
Summary of indicated articles	21	7	7	7	8	3	3	4	2	2	1	1	0	0	0	0

4.5.1 Core concepts

Research related to one or more of the five core concepts are expected to be relatively easy to make relevant to scholars interested in business-model innovation. The analytical summaries in the table specify the level of attention that each author or authorship has devoted to the core concept (the business model) in relation to five important theoretical 'core' concepts.

4.5.1.1 Business models and innovation management

Seven groups of authors position themselves in relation to innovation management. The common feature for the authorships, who highlight the importance of innovation is that they describe 'the why' rather than 'the how' the business model must be designed to capture the economic value from technological innovations.

For example, Teece (2010) claims to explore the connections with business strategy, innovation management, and economic theory, while the meta-analysis clarifies that he connects the management of business models with innovation management as a strategy for the firm to become competitive. The meta-analysis furthermore specifies that he connects this strategy with a consistent focus on product development; while he presents a critique that the business-model construct has been overlooked by economists.

Sosna et al. (2010) follow a different avenue by describing how business-model innovation was a dynamic evolution over many years. The authorship therefore describes the discipline of business-model innovation as a 'continuous fine-tuning and adaptation to ensure sustainable value creation, robustness and scalability' (p. 400).

The same authorship therefore highlights the importance of trial-and-error experimentation to accelerate learning at multiple levels (individual, group or organizational levels). Yunus et al. (2010) present a different idea with emphasis on collaboration and social innovation to

solve societal problems by arguing that companies can become more profitable and competitive via collaborations local individuals and organizations to:

go beyond the traditional focus on private sector value creation towards models where businesses [can work together] to create new products and services, pioneer new delivery methods, improve the quality of existing products and services (p. 328).

Gambardella & McGahan (2010) indirectly develop the idea of pioneering new delivery methods as well as improving the quality of existing products and services by focusing the scholarly attention to the management of business-model innovation with emphasis on technological and product innovation by innovating the route to market.

Gambardella & McGahan (2010) connect the management of business-model innovation with a long range of classic concepts, such as, technology licensing and commercial strategy, as well as operating costs, pricing, profits, rivalry and efficiency.

This viewpoint is interesting as it encourages the commercialization of new technologies via an upstream collaboration with the goal to connect, and thus exploit, the long-established production and distribution channels of larger corporations as an innovative method of smaller companies to reach downstream customers.

Finally, it is interesting to note how the innovation scholars repeat that not all companies have a strategy, but that all organizations have a business model. The business-model can therefore not be ignored, since it decides how the company makes a profit, how it delivers value to its customers and how it competes against rivals in the market.

Williamson (2010) goes one step further by connecting the development of business models with 'cost innovation' to compete in a global market, pointing out that 'doing nothing is not an option' in a chaotic or critical situation where the company finds itself under an intense or intensifying pressure on multiple fronts for accelerating the innovation of the existing

business model. Specifically, he focuses the attention to the underestimated importance of 'cost innovation' as a method or strategy to change the way the company competes and thus making it more competitive against other (low cost) products in the market.

The method outlined here is to reinvent the cost structure of the company as a means to improve the ratio between costs and revenues in order to make the existing business model more robust and competitive. The purpose of business-model innovation is therefore to make the existing business model more robust and resilient to shocks and discontinuities in the external environment.

4.5.1.2 Business models and strategic management

Seven groups of authors describe the importance of strategic management for the management of business-model innovation. The three innovation scholars emphasize the importance of strategy with special emphasis on route-to-market, commercialization strategy and user-driven innovation (Teece, 2010; Williamson, 2010; Hienerth et al., 2011), while four groups of authors follow a different route by connecting the discussions about the management of business models with strategy by emphasizing choice and consequence of the design of the business model (Casadesus-Masanell & Ricart, 2010; Smith et. al., 2010; Doz & Kosonen, 2010; McGrath, 2010). Casadesus-Masanell & Ricart (2010) distinguish between business model, strategy and tactics, putting emphasis on the importance of tactics. McGrath (2010) instead argues in favor of implementing a discovery-driven approach to facilitate both strategic development and business-model innovation. McGrath (2010) specifies that:

the business model concept offers strategists a fresh way to consider their options in uncertain, fast-moving and unpredictable environments (p. 247)

Doz & Kosonen (2010) strongly argue in favor of 'embedding strategic agility' through a leadership agenda for accelerating business model renewal and transformation, while others argue that business models have become a source of competitive advantage with emphasis on the

strategic challenge of managing and exploiting the inherent tensions between multiple business models, which require advanced management skills (Smith et al., 2010):

Paradoxical strategies thrive within complex business models, which [can be improved by exploiting the inherent] tensions emanating from inconsistencies or contradictions [between business agendas] (p. 450) ... The critical role of leadership in managing the tensions involved in complex business models is a theme across several articles in this issue. Doz and Kosonen identify leadership unity and integration as a means of achieving strategic agility, while McGrath highlights the role of leaders in searching and experimenting, and in knowing when to shift business models. We echo the critical role of leadership for the successful management of complex business models, and focus on leadership strategies designed to both achieve integration and leadership unity, while at the same time retaining clear distinction and differentiation between contradictory business models (p. 452)

This approach fits well with the present study since it describes the critical role of the gaining leadership unity in a critical situation. Doz & Kosonen (2010) specify that gaining perspective is a good thing, while the present study echo this advice to the extent that:

the opportunity for executives to take some distance from the day-to-day running of their core businesses and gain some perspective on their firm's past evolution and its future strategic trajectory ... [such perspective] allows a more holistic, rather than fragmentary picture to emerge [because we know that] Being able to stand 'outside' one's own organization allows one both to 'model' it and to begin to imagine a whole different system of activities and relationships (p. 374) ... [acknowledging that] abstracting one's business model to its conceptual essence without losing sight of its contextual dependency [can be a valuable] contribution to strategic agility and business model renewal (p. 375) [yet,] accelerating business model change and renewal [requires] a top team willing to venture into new models and (more difficult) abandon old ones (p. 376) ... [because] beyond the mechanism of aligning incentives lies the appeal of a compelling mission (p. 378)

The difficulties of replacing the old model based on old technology by a new model based on new technology requires the top team to abandon the existing model, which sounds like an obvious and straightforward task, but even though most people outside the corporation may see the obvious need for replacing the old system by a new and superior system is not an easy task. One explanation is that the transformation from an 'old' to a 'new' business model not only requires a top team to commit to

this shift; it often also requires substantial investment and access to finance. In other words, the transformation from an old model to a new model is suggested to be a highly political challenge that may put the jobs of the senior management at risk. Chesbrough (2010) supports this argument:

Knowing when to shift resources from the former to the latter is a delicate balancing act, and rife with possible career consequences for the managers involved. (p. 361)

To put this argument in perspective, Elkjær (2012) extends this reasoning by describing the need for adopting a tabula rasa mindset:

The [current] strategy is a hindrance to freethinking, at least for the grant portion of the innovation, but perhaps also for the development of new business models for existing services. We can also see that the risk picture becomes much more diffused in the disruptive innovation world because we [mostly] have no experience in these new areas. ... [Business-model] innovation requires a product or service in terms of tabula rasa, which mentally can be an almost insurmountable barrier in the innovation process. (p. 616)

The tabula rasa argument - the cognitive application of freethought - relates to the challenge of the mental barrier for the management of business-model innovation. Although cognitive complexity, integrative complexity, and behavioral complexity are not entirely new theoretical concepts, the mental barrier still seems to play a central role even for the advanced senior management. A problem is that the routine in the market place tends to be defended from multiple sources. Disrupting with the status quo is therefore assumed to be a central challenge that too often seems to be underestimated. Doz & Kosonen (2010) explain the management dilemma to the point:

many CEOs we met were in the very painful situation of knowing what the deficiencies of their business model were ... anticipating how these issues would ultimately turn into financial problems, and yet feeling powerless in being able to change course (p. 378)

Smith et al. (2010) describes the deeper motives related to the critical role of the same leadership challenge by citing the frustration of a top manager in a large company:

We are so focused on profitability ... if we wanted to set aside money for the innovation - I can't even imagine that right now (p. 452)

In such situation, the imagination of a new business model that changes the existing profit formula and competitive situation may work well as a starting point, but it requires maintaining an understanding of the contextual dependency.

The new point of interest is that the management's ability to reveal its deeper motivations for the considerations about the risks and challenges related to the objectives for the future may play a more important role than has until now been recognized. Making personal motives explicit, for example by surfacing and sharing assumptions that bring openness is therefore assumed to be of essential importance to clarify the position of the executives.

The problem is that lack of articulation of the deeper motives and concerns for the future in a situation of crisis will almost certainly result in a lock-in situation that cannot easily be solved before the management is replaced as the present study suggests.

Doz & Kosonen (2010) clarify that the revelation of personal motives and concerns for the future does not simply refer to the way the top managers think, but it rather refers to a necessary level of openness about the aspirations and fears, satisfactions or discomforts with a difficult or 'dangerous' situation. Reluctance to openness about the challenges related to the future objectives therefore has the capacity to foster a growing level of skepticism, unrest and dissatisfaction by the people surrounding the members of the senior management, while in fact the contrary would be needed in precisely such situation.

Doz & Kosonen (2010) describe how the cognitive biases of the top-level management affect the critical role of leadership unity in a difficult and demanding situation — and perhaps also in general — by focusing on the need for articulation of the basic assumptions and challenges for the

development of the current business model. It is not enough to make goals for the future, as the related challenges should also be articulated:

[The leadership challenge] includes not just the way [the members of top management] think - their particular cognitive biases - but other important motives: aspirations and fears, satisfactions or discomforts [which was surprisingly one] of the most critical differences we observed [in the study of successful and unsuccessful companies] (p. 377)

The present research seeks to further investigate this inherent management dilemma by drawing attention to the cognitive barriers and opportunities for the management of business-model innovation.

4.5.1.3 Business models and product development

Seven groups of authors emphasize the underlying importance of the product for the management of business-model innovation (Teece, 2010; Williamson, 2010; Dahan et. al., 2010; Smith et. al., 2010; Gambardella & McGahan, 2010; Dunford et. al., 2010; Hienerth et. al., 2011). Dunford et al. (2010) highlight the importance of the product in responding to contextual conditions where the product of a 'fleet of companies' must be adjusted to the local market circumstances in each country of operation in order to 'localize' the product into its context.

Dahan et al. (2010) agree that local knowledge can be critical for developing and testing new products, including testing of products in the market and incorporating customer feedback either by internalizing these activities or by coordinating with external partners. Williamson (2010) also centers on the supply chain aspect when describing the importance for improving the impact/cost ratio 'value-for-money products or services' by moving niche products into the mass market.

Smith et al. (2010) also put the product/service in the center of the strategy to compete in the market, while others specify that commercially viable products often depend on technological innovation as well as testing whether and how they work in practice (Gambardella & McGahan, 2010). Teece (2010) follows this line of argumentation to

classify three types of connections between business-model innovation and product:

At one end of the scale stands the integrated business model, in which an innovating firm bundles innovation and product together, and *assumes the responsibility for the entire value chain from A to Z* including design, manufacturing, and distribution. Clearly, companies that have the right assets already in place are well equipped to do this; but the framework also indicates when the internal development and commercialization strategy is a necessity. (p. 184, emphasis provided) ... The other extreme case is the outsourced (pure licensing) business approach, one that has been embraced by a number of companies ... With respect to licensing versus internal commercialisation by the innovator, the framework yields answers calibrated according to the strength of the appropriability/intellectual property regime. Thus one could license - and expect the licensing model to work - only if one had strong intellectual property rights: *without them the licensee might well be the one who captures value, at the expense of the innovator.* (p. 184, emphasis added) ... In between there are hybrid approaches involving a mixture of the two approaches (e.g. outsource manufacturing; provide company owned sales and support). *Hybrid approaches are the most common, but they also require strong selection and orchestration skills on the part of management.* (p. 184, emphasis added)

The old unsuccessful management of the Danish State Railways aimed to control the entire supply chain, while the new successful management has accepted that the profitability and competitiveness of its business model depends on the railway infrastructure manager and other critical stakeholders, such as, the ministry of transport and politicians to invest money in the infrastructure.

Hienert et al. (2011) follows this line of argumentation by describing why the product/service innovation should aim at developing the core business (rather than the peripheral business) with a rigorous focus on new product development, production, marketing, including the management of a complex interaction between the company and its customers.

The present study follows this silent, yet commonly accepted, assumption by explicitly exploring the relationships between the core product - transport from a to b - and the commercial marketing driven activities - value adding activities to support the core product - and get paid for doing so, which remains the core responsibility of the Danish

State Railways, by operationalizing the core-periphery theory (Thompson, 1967) to study this relationship.

4.5.1.4 *Business models and change management*

Eight groups of authors emphasize the underlying importance of changing the current business model (Demil & Lecocq, 2010; Williamson, 2010; Doz & Kosonen, 2010; Casadesus-Masanell & Ricart, 2010; Sosna et al., 2010; Svejenova et al., 2010; Wirtz et al. 2010; Hiennerth et al., 2011).

The majority of the authorships highlight the challenge of developing existing business models as an advanced leadership exercise for adapting to the competitive situation or leading the competition in the market, but the authors use different methods to highlight this point.

There is therefore a surprisingly clear underlying assumption that change is an important underlying feature for the management of business-model innovation. One of the more interesting views on the importance of change management is described by Svejenova et al. (2010), who claim that the main change mechanism of business models is anchored in a series of creative responses to a particular challenging situation:

The study revealed two groups of mechanisms - *change mechanisms*, associated with the transformation in activities, organizing, and strategic resources, and *value mechanisms*, related to the creation, capture and sharing of value. (pp. 419-420, original emphasis) ... The main change mechanism we uncovered was creative response [by] introducing changes beyond the existing range of accepted practices. ... Activities and their organizing are particularly relevant elements in a business model's dynamics because (as Jacobides et. al. [2006] note) '*changing the scope of the organization not only affects the extent to which it can capture the fruits of its innovative labor; but also the extent to which it can be innovative in the future*' [p. 1201]. Such changes can also lead to the creation of new strategic resources, opening up fresh opportunities for value creation. Changes in business model elements may exhibit different degrees of novelty - they could be new for the individual implementing them, yet established practice for their profession or industry, or may alternatively be novel for the ... industry itself. (pp. 422-423, original emphasis)... [We therefore conclude that] *Balancing core and periphery* as a change mechanism allows for pairing *coherence* and

novelty during the business model transformation. *Coherence* comes from a well-integrated core team that provides continuity, accumulation of knowledge and experience, and shared values. ... *Novelty* is provided from a periphery of diverse interns and other collaborators selected from around the globe, who change from year to year and bring in new approaches and ideas. Thus, the core allows the [manager] to sustain his distinctive style and freedom at times of transformation, while the periphery constitutes a continuous source of renewal - and their interaction sparks the much needed innovation. (pp. 421, original emphasis)

In fact, only a single authorship doesn't explicitly mention 'change' in their scholarly works, but the same authors argue very strongly in favor of *changing* or shifting the classic downstream view on new product development (innovation management) to license general-purpose technologies to capitalize on the opportunities created by upstream innovation, and vice versa (Gambardella & McGahan, 2010).

It is therefore argued that change remains a central challenge that has to be both recognized and carefully managed in order to strengthen the competitive and profitability situation of the company. It is therefore argued that change is a central component in any discussion of the management of business-model innovation, although it often seems to be silently assumed and infrequently explicitly verbalized by the key theorists. Teece (2010) puts this finding in perspective by reminding us that:

The business environment itself is a choice variable: firms can select a business environment or be selected by it: they can also shape it. (p. 191)

Williamson (2010) follows this line of reasoning as he claims — and describes how — a change in the mindset of the management has often proven to be an opportunity for business-model innovation.

As a final note it is interesting to notice that Demil & Lecocq (2010) claim to apply the term 'dynamic consistency' (dynamic decision-making) to describe the importance of 'business model evolution', but the meta-analysis specifies that these authors instead emphasize the importance

of change management for the development of existing business models over time.

4.5.5 *Business models and success factors*

Three groups of authors explicitly elaborate on the importance of the relationship between business-model innovation and success (Doz & Kosonen, 2010; Smith et al., 2010; Hienerth et al., 2011). The meta-analysis specified that success is a vital element in the scholarly works, while the contrary would also have been quite surprising since the motivation of the special issue was fueled by a desire to describe 'the why' and 'the how' companies have successfully created new business models or renewed and transformed established business models. For example, success is clearly a vital element for Doz & Kosonen (2010) who specify that:

Transforming the business model of a successful company is never easy, as inertia - from many sources - defends the status quo (p. 381) ... Fundamentally, the shift from the one-to-one relationships so characteristic of many companies ... that prevent the discovery and adoption of new business models ... to a collective process will raise the question: [What is the role of the top team? Do we agree?] ... When businesses are distinct, but highly interdependent, and pull in different directions ... the top team's agenda becomes self-evident: it is to make integrated decisions and optimise the company's choices between proprietariness and openness. Beyond this, it also needs to discover new business development opportunities that straddle organizational subunits to combine products, platforms and services in innovative ways. (p. 377) ... Initiating changes to business models internally is difficult (for reasons already discussed) and although business model transforming acquisitions are difficult too, many companies resort to them, some rather successfully. Grafting an acquisition with a very different business model onto existing operations becomes a stimulus for change. (p. 380) ... the most successful newly appointments are 'insiders', but from the periphery. Their career has flourished at a sufficient distance from the centre of the company for them to gain a thoughtful perspective on its workings, while at the same time knowing them well enough to be realistic and effective in changing them. (p. 374)

The corresponding authors thus argue in favor of defining 'a valuable common agenda that conditions success' as a deliberate method to build interdependencies. The problem is, the authors argue, that the success of traditional management rests on routine repetition, including adaptation

to a particular situation. The problem is that the adaptation even in a chaotic or critical situation aims to increase stability, while 'such stability' will most likely lead to an increasing rigidity of the existing business model leading to a situation of status quo, which will almost certainly limit the management's ability to renew and reform the company. In fact, increasing stability in a chaotic and critical situation has often only resulted in a modest development of peer-to-peer exchange, which has both surprised and disappointed the senior management in many companies. Doz & Kosonen (2010) conclude that:

many companies fail, not because they do something wrong or mediocre, but because they keep doing what used to be the right thing for too long, and [thus] fall victim to the rigidity of their business model. (p. 370)

Smith et al. (2010) further develop this idea by claiming that success of business-model innovation of large corporations depends on the management's ability to integrate and exploit paradoxical strategies associated with contradictory, yet integrated tensions:

Many leaders face such inherent tensions within their firms' business models. Scholars have traditionally argued that organizational success depends on taking an 'either/or' approach [by] choosing between such paradoxical agendas: leaders assess the external environment, decide which agenda to favor, and then build a business model to implement this single, focused strategy. According to this view, success depends on proper alignment, both of the business model's internal aspects, and between it and the external environment. (p. 449) ... [The problem is that] Long-term success depends [on the management's ability to incorporate and then manage and exploit] paradoxical strategies simultaneously. By strategy, we refer to a set of products/services and their means of competing in the marketplace, and we use the term paradoxical to refer to multiple strategies that are 'contradictory, yet interrelated'. (p. 450)

The authorship thus seeks to correct one of the common fallacies frequently observed in management academia. The same group of authors notes that the critical role of leadership for facilitating business-model innovation has been accepted as an important research theme across several articles in the special issue on business models:

The critical role of leadership in managing the tensions involved in complex business models is a theme across several articles ... We echo the critical role of leadership for the successful management of complex

business models, and focus on leadership strategies designed to both achieve integration and leadership unity, while at the same time retaining clear distinction and differentiation between contradictory business models. (p. 452)

Success is also clearly a vital element for Hienerth et al. (2011), who explore five success factors for implementing, and benefitting from, developing a 'user-centric' business model. The authors highlight the importance of 'continuous communication and feedback loops' as a success factor in order to attract and engage 'users' in core business processes. The authorship highlights the critical role of overcoming psychological barriers and internal resistance to change the status quo:

So far, only little is known about success factors for attracting and engaging users to this end, or about effective strategies to overcome internal resistance when established companies introduce user-centric business models: the identification of such factors and strategies is therefore a major contribution of this article ... The success factors presented here are important pillars of user-centric business models which involve ... methods, instruments and processes which facilitate the continuous integration of users into innovation and co-creation activities (p. 353) [In addition to our qualitative study] quantitative studies on factors which affect the success of [business-model innovation] are also needed. (p. 363)

Hienerth et al. (2011) concludes that quantitative studies on the cognitive factors that affect the success of business-model innovation are encouraged to further develop the existing qualitative studies. The present study follows this suggestion by following a quantitative research avenue to explore some of the cognitive barriers and opportunities for facilitating business-model innovation in the Danish railway sector.

4.5.2 Semi-peripheral concepts

One caveat should be explained to prevent misinterpretation of the semi-peripheral concepts (Category B). Three highlighted groups of authors potentially overemphasize the importance of the 'social factor' in relation to the management of business-model innovation. If these three groups of authors are removed from the sample data then the theoretical concept is ranked as a peripheral concept, which means that the majority

of the authors assume that this concept has a much lower degree of importance (i.e. removing the three cases reduces the average from 0.970 to 0.173).

4.5.2.1 Business models and social factors

Three groups of authors explicitly explore the relationship between 'social impact' and business-model innovation (Wirtz et al., 2010; Dahan et al., 2010; Yunus et al., 2010), while one authorship highlight the importance of the social factor in a 'system of work' with 'integrated tensions', potential conflicting interests between clearly different and distinguished business models (as described by Smith et al. 2010, see 4.5.1.2 Business models and strategic management' at page 127).

The present study follows the latter approach for the already described reasons. Note that this concept may be misplaced in its category (see previous page). Furthermore, the three groups of authors do not completely follow one coherent idea (See 'Competing social perspectives' in chapter 3).

4.5.2.2 Business models and experiments

Four groups of authors actively explore the relationship between experimentation and business-model innovation (Baden-Fuller & Morgan, 2010; Sosna et. al., 2010; McGrath, 2010; Chesbrough, 2010). Experimentation is clearly a vital element for these seven authors, who consistently describe the benefits and deeper motivations for conducting experiments to innovate both new and established business models.

Others argue that scientific investigations involve various forms of manipulation or experimentation both for economists and biologists, having in common that they both seek to find out how their object of study 'work', by checking if the results match the characteristics of the 'real world', ultimately to build new theory or to check if the results confirm or contradict old theories (Baden-Fuller & Morgan, 2010):

Economists experiment with mathematical models to learn about the behaviour of the made-up world represented in their model, to analyse its properties and to see what limitations it offers. They experiment by varying elements in the model in response to different 'what if' questions that come from their theories or from real world events ... and then reasoning mathematically with their model to come up with their answers. ... Similarly, biologists experiment with their model organisms to learn how they work, but here the experiments are 'real' laboratory experiments. By intensive study of a few kinds of organism (a worm, a fish, a plant, a yeast, a mammal, an insect, etc.) the community of biologists study how life is lived in these different forms. They learn what behaviour is specific to each form, and what is general and shared between them, which processes and elements can usefully be compared and which not, and what makes them special and what does not. ... For both groups of scientists, models are the place where they figure out how their particular kinds of 'things' of the world work. They check these model findings against their theories, and also against behaviour in the world, to see how far the findings match the characteristics of the real world that their models purport to represent. (p. 163)

The authorship claims that companies' business models are best practice examples to study just like model organisms are to biology in the life sciences, including the careful and thorough consideration of potential ways to change the way the current business model is organized (or competes) based on the assumption that a change in the existing model can work as a precondition for success. However, as the present study suggests, experimentation can also lead astray or even to failure.

The present study thus suggests that 'meaningful experiments' or 'simulations' represent a precarious avenue that is clearly problematic if such experiments are not focused on developing the core business. Experimentations with new business ventures have turned out to be highly problematic although they were 'meaningful experiments' to the former management of the Danish State Railways (Roldsgaard, 2012). To achieve a complete understanding of experimentation and its relationship with business-model innovation, references are drawn to the description of three kinds of experimentation outlined by Baden-Fuller & Morgan' (2010):

1. *Thought experiments by academics.* Academics conduct thought experiments for example to change internet firms' business models (Wirtz et al., 2010) or managers use pilot experiments before

launching new projects to develop established business models (Thompson & MacMillan, 2010) or ‘thought experiments by managers’ to renew and transform a firm’s existing business model (Doz & Kosonen, 2010).

2. *Random or unsystematic experiments by managers.* Managers conduct experiments that are fully planned, partly planned or by improvising (Chesbrough, 2010) or experiments with different collaborations to create new or develop existing business models (Dahan et al., 2010) or managers conduct experiments to benefit from balancing exploration and exploitation (Smith et al., 2010).
3. *Deliberate real experiments.* Managers experiment with new business models to change an established business (Sosna et al., 2010) or to embed new business models into the firm (McGrath, 2010) or the entrepreneur conducts deliberate experiments to invent a new business model (Svejenova et al., 2010).

Interestingly, the field study for achieving a better understanding of the economic disaster that occurred from expanding the railway operations into international markets ultimately provided a series of excellent examples of why experimentation in the market has not always resulted in positive outcomes (Roldsgaard, 2012). The former senior management of the Danish State Railways did not certainly hesitate to conduct ‘deliberate real experiments’ in the critical period leading up to the institutional crisis that was officially recognized in 2011. The widespread of different commercially driven projects ranged from Co-production of the Intercity Trains¹, DSB Talk², DSB First³, DSB Väst⁴,

¹ The railway operator agreed on a ‘settlement agreement’ in 2009 to assume co-responsibility of the train production of a multi-year delayed delivery of IC4 trains from an Italian train producer, AnsaldoBreda, but it later became clear that the agreement made it impossible to discontinue the project due to legal and judicial reasons.

² The minister of transport closed the mobile phone company after two days in operation, because he had not been informed about the project before it had been launched and because the state-owned company should not compete against private companies. The project had a total cost of about €100.000 in 2010.

³ Venture company established by DSB and the Scottish First Group to operate in Sweden and cross-border route between Denmark and Sweden, but it which resulted in a loss of € 100m. The contract was granted for the period 2009-2017, but it was discontinued in 2011.

⁴ One of six independent companies operating in Sweden. The contract was granted for the period 2011-2019, but it was interrupted due to profitability reasons in 2012.

Rejsekort⁵ to Mobile tickets⁶. Yet, of these six projects, only the development of new mobile tickets was successful. The problem was therefore not lack of commercially oriented projects, but rather an over-estimation of the benefits of conducting trial-and-error experiments in the market, which gradually led the focus away from the core task of transporting passengers. Yet, the trial-and-error approach remains popular in the literature on business models (e.g. Sosna et al., 2010). They have described the success story of an entrepreneur that succeeded in scaling up four outlets in a local market in Spain to 1,700 franchisees in foreign countries after a five-year period of experimentation (Sosna et al., 2010). Such studies are of course interesting because of the many potential lessons learned and the happy ending almost like in a popular American movie, but one should not forget that the great majority of entrepreneurs fail. The study draws attention to some interesting ideas that should also not be ignored, but the question is if such type of success story is representative of the many attempts to initiate a business? The problem begins when one more critically starts to assess the value of the successful entrepreneurship story when reaching the point where it is concluded that:

an individual or team can (simply) either decide to stop searching for opportunities and put an end to the experimentation process, or continue with it in a highly unfavorable or uncertain environment that is characterized by a situation 'faced with failure' (p. 391).

So, while this argumentation may work fine in the entrepreneurship literature, the same approach that strongly favors the trial-and-error learning approach is potentially misleading for the management of established companies. The problem is that this conclusion doesn't fit well with the outcome of experimentation in many large corporations. Unlike the entrepreneur, the senior executive manager is responsible not only for himself, which means that unsuccessful outcomes of experimentation will affect many people (both employees, customers

⁵ The purpose was to develop a universal travel card for all means of public transports in Denmark. The political decision was made in 1999. The travel card was expected to be fully implemented by 2009, but it was still not in operation in 2011 and it remains only partially implemented in 2014.

⁶ The development of mobile tickets was rather successful in order to move customers onto the digital platform to reduce the costs for the expensive human-run ticket outlets.

and partners). The entrepreneur is mostly only responsible for his own business, which do not necessarily affect other people in a greater system. Potentially tens of thousands of people (or more) who rely on the railway services on a day-to-day basis may get affected the unexpected and negative outcomes of unsuccessful large-scale projects.

[A] dynamic perspective [has emerged] that sees business model development as an initial experiment followed by constant fine-tuning based on trial-and-error learning. (p. 384) ... Analyzing this case, we found that when an established organization's business model faces the threat of obsolescence from unforeseen external changes, experimentation is critical. Baden-Fuller and Stopford note how 'Stagnating organizations need experiments, and to learn from them, if they are to succeed in rejuvenation.' Individual and organizational learning from constant adaptation and low cost experimentation must be encouraged, as well as knowledge diffusion and resilience to bear potential negative outcomes from mistakes. While 'change' may be initiated at the top, it must permeate all firm levels and activities for it to become a collectively shared view. [So, therefore] we argue that business model development through experimentation, evaluation and adaptation - in a trial-and-error learning approach involving all echelons of the firm - is an important organizational renewal mechanism. (p. 385) ... While this five-year experiment continued, the revenues from their mainstream wholesale business actually went down, but this only spurred them on to learn more and explore new ways of doing things, augmenting their knowledge of the business and of the industry ... [the case story thus describes how] being confronted with new or changing environments gave the entrepreneur and the top management team the chance to increase their repositories of knowledge: such threats or crises allow for 'phases of unlearning', which can prompt managers to reconceive situations beyond their previous cognitive structures, and this increased knowledge leads them to develop more complex cognitive schema to deal with their future decision-making. That was exactly what happened to Revuelta and his top management team. (p. 393) ... Managing an international network of many hundreds of franchisees (and over 1,700 by 2009) is quite a leap from running four 'own' stores in your domestic market. (p. 397)

The either-or approach to the description of a 'five-year phase of experiment and exploration followed by a high-growth exploitation phase when the firm outperformed its competitors by a wide margin and internationalized successfully' (p. 383) is also somewhat disputable since the tension between these to long-standing concepts (exploration-exploitation) needs to be managed simultaneous (e.g. March, 1991; Gupta et al., 2006; Smith et al., 2010; Argote & Miron-Spektor, 2011). At

the same time it is recognized that experiments are necessary to generate data to test the management's (or entrepreneur's) hypothesis. Based on this reasoning it seems intellectually robust to ask when experimentation is necessary? The answer is according to Chesbrough (2010):

when it is clear that the 'old' business model is no longer working - that business model experimentation becomes so important, but it is not at all clear what the eventual 'new' business model will turn out to be. Only experimentation can help identify it and create the data needed to justify it. (p. 357) ... The question is: why don't more organizations conduct such experiments, to probe for potential new business models before the time comes when external innovations render their traditional ones redundant? The immediate answer is that businesses face significant barriers to business model experimentation (p. 358) ... If managers want to strive to overcome these barriers and experiment with alternative business models, how can they construct these experiments? One promising approach is to construct maps of business models, to clarify the processes underlying them, which then allows them to become a source of experiments considering alternate combinations of the processes. One example of this mapping approach has come from Alex Osterwalder who ... has consulted and spoken widely on business models and business model innovation. His empirical focus utilizes a 9-point decomposition that characterizes a business model (p. 359) ... [The question remains: How to manage business-model innovation?] the way forward is via a commitment to experimentation [by conducting] tests to probe nascent markets with new potential configurations of the elements of a business model can allow a firm to learn ahead of the rest of the market, and to begin to generate the new data that can power its change process. However, as we will see, experiments alone are not enough. (p. 359) ... Important parameters [however remains] the cost of conducting the test, both in terms of the direct cost, and in the cost of failure if the experiment does not yield the hoped-for learning, the time required to obtain feedback from the experiment and the amount of information learned from the test ... [The] Discovery-driven planning enables the company [managers] to evaluate the key economic assumptions explicitly, which can then be updated as the results of further experiments become known. (p. 360) ... [We have to remember that] without action, no new data will be forthcoming. ... it is only through taking experimental actions that new data will be generated. Mapping tools [such as the business-model canvas] can again be quite helpful here ... Such tools can also assist in characterizing and communicating new *cognitive models* effectively to others (p. 361, emphasis added).

The present study seeks to examine the *cognitive models* of the managers working in the Danish railway sector as a model to study the underlying barriers and opportunities for facilitating a necessary business-model innovation in a time of crisis. In this context, it is

interesting that the role of experimentation has been significantly downplayed by one of the leading theorists (Baden-Fuller), who instead focus on the importance of technological innovation for facilitating business-model innovation (Baden-Fuller & Haefliger, 2013). The study of the Danish State Railways explores the basic assumptions and challenges for facilitating business-model innovation in a time of crisis with emphasis on the importance of technological innovation and cognitive leadership.

4.5.2.3 *Business models and resources*

Two groups of authors highlight the importance between business models and resources (Demil & Lecocq, 2010; Svejnova et. al., 2010). It was expected that the resource perspective would have received a higher level of attention, among others, because it has been strongly emphasized by the most cited article in the field of business models (Amit & Zott, 2001): and it was therefore expected that more authors would have highlighted the importance of (new) resource development at a higher, more consistent level than was observed in the meta-analysis. Interestingly, one of the two authorships that position their works to the resource concept claims to study something else, referred to as 'business-model evolution' (Demil & Lecocq, 2010).

The strong embedded focus on resources is underlined fourteen times in the quote below to document this claim:

We [apply] Penrose's *view* of the firm as bundle of resources (rather than of contracts or transactions as in other theories): her framework explaining the growth of the firm is suitable to our purposes, as it is at once dynamic, and based on the interaction between distinct core components. On one side, resources - mainly physical (plant, equipment, waste products, stocks.) and human (unskilled and skilled labour, clerical, financial, legal ...) - play a crucial role. They are not important per se, but their importance lies in the 'services of resources', (i.e. the productive services that a resource can yield), and here Penrose notes that '[the services] yielded by resources are a function of the way in which they are used ... in combination with different types or amounts of other resources' [Kor & Mahoney, 2000]. These resources can be bought, leased or produced internally - or hired in the labour market - and are acquired on the basis of the services they will notionally render to the organization. But, once incorporated in its operational activities, these

services gain a more specific, idiosyncratic status, from being bundled and associated with other kinds of internal resources. On another side, their final application - the bundle of possible services an organization's resources can produce - will depend on its management's capacity to extract value from their use, and to create more or less innovative combinations. Here Penrose distinguishes between the operational and entrepreneurial capacities of management. The first concerns the way such services support the organization's normal ongoing regime, and, importantly, involves improving the exploitation of organizational resources and the deepening of its accumulated knowledge. The second (entrepreneurial ability) results from managerial capacities - which are not confined to dedicated roles but could emanate from any position in the organization's hierarchy - and encompasses new combinations between the 'services of resources', the creation of opportunities to use the resources or the motivation to acquire and/or develop new ones. The resources accumulated over the organization's history will be continually reacting with each other, and with other constituent parts of the firm's structure and sharing the same path-dependency, in unique combinations that will vary within the firm, and which produce and determine the firm's idiosyncratic bundle of capabilities that differentiate it from others in its sector. Finally, the collection of accumulated resources, and the way they are articulated by the organization's management, can enable it to envisage new productive opportunities and to propose new products or services into its markets. The role of entrepreneurs is to build new value propositions in an organization, while the role of managerial services [depends on, and relates] to [the] implement[ation] [of] entrepreneurial ideas and proposals. Penrose argues that the firm's environment is more 'an "image" in the entrepreneur's mind' - and that they (and by extension the entire firm) interpret their environment based on the internal resources the firm possesses, so that its development is driven more by subjective ideas about potential productive opportunities than by an objective view of what the firm can accomplish at a given moment (pp. 230-231).

The authorship, thus, applies a 'Penrosian view' on the business-model construct to study the success case of Arsenal FC in relation to its rivals in Premier League, UEFA Europa League and Champions League. The case follows the logic of 'football as business', which represents an alternative to the traditional professional sports club structure. The authors study the success factors behind the evolution of the business model of the football club over time with emphasis on three 'core components': 1: Resources/Competences; 2: Organization; and, 3: Value proposition.

The study systematically reviews the three success factors with emphasis on management *choices* in relation to voluntary and emerging

changes in the environment. The authors describe the three core components of the business model in ‘the broadest sense’ possible to include multiple concepts such as revenues, royalties, rents, interests, subsidies, ‘assets handovers’ vis-à-vis the cost of acquiring, integrating, combining or developing resources that can ‘feed the stock’ of resources and competences, which ‘determines over time the sustainability of the business model’ (p. 232).

Other vital aspects are also mentioned in relation to the case study *from* diversifying revenue sources *to* expanding internationalization *onto* multiple sponsorships. Yet, the focus of the authors remains clearly centered on the development of (new) resources to claim that the changes in the three core components have, allegedly, enabled the football club to multiply revenues by almost 650% (to over £310m).

The authors thus seek to describe ‘a dramatically successful case’ based on a business model, which has become ‘widely respected’. Interestingly, the authors briefly mention ‘the largest (single) investor’ in Premier League, while this ‘component’ for some unknown reasons is not emphasized as a success factor (‘core component’), although one would expect the ability to raise capital to be a vital element or core component in order to realize and implement ‘promising ideas’ and plans for the future.

Furthermore, the authors argue that the development of business models should be driven by ‘subjective ideas’ about potential productive opportunities rather than by an ‘objective view’ of what the firm can accomplish at a given moment or when looking forward, which remains a rather controversial suggestion.

A longitudinal in-depth study of the Danish State Railways has described some of the disastrous consequences of following ‘subjective ideas’ about potential commercial opportunities based on ‘stomach feelings’ or ‘gut feelings’ rather than objective measures (Roldsgaard, 2012), not limited to commercial growth targets, but should also include objective targets

such as punctuality (timely trains), reliability (to measure if trains 'go' as planned or if they are cancelled), and travel time (e.g. faster trains).

Finally, the authors write about the importance of 'bundling resources', while the present study of the Danish State Railways shows that the top management challenge was rather to *unbundle* resources, not only to be able to subsequently bundle the resources in new ways, but also to 'dissociate resources' by adjusting the current ownership structure as well as negotiating the placement and authority to use of the resources.

The managers in the Danish State Railways support this claim, as will be clarified in Chapter 8: Cognitive leadership in a time of institutional crisis. The second authorship uses a 'critical case' to explore the extraordinarily successful of gastronomic innovator and chef, Ferran Adrià (in Spain) to describe the rationale behind the 'quest for creative freedom' (Svejenova et. al., 2010).

The authorship thus uses the case as a model to describe the 'ingredients' behind the massive success of an individual and his team's 'passion-motivated' (rather than profit-maximizing) logic of talent-driven, entrepreneurship and engagement in business activities to leverage resources. Baden-Fuller (2010) reflectively asks:

Do business models always have to be about firms or business units? Can an individual have one? This article starts from the premise that scientists, artists and other 'creatives' can - and do - and that their vision and drive provides direction and energy that give their careers a structure which can be defined as 'a business model'. And which individual do the authors take as their case: well - why not the Best Chef in the World? They recount the creative history of Ferran Adrià, whose cuisine was based - like his Michelin 3-Star restaurant elBulli - on the Mediterranean mid-way between Barcelona and France, but who has since developed to give the world 'spherification', cooking with liquid nitrogen and cookery books without recipes, and leveraged him to global celebrity status. The triggers and transformations in Adrià's business model are enumerated over four periods as his journey towards creative freedom sub-divides into quests to find his own 'authentic' style; to gain recognition for his developing culinary 'language'; and to broaden his influence into science and the arts. The authors unpack how the development of individual creativity, consolidated as a strategic resource via his creativity workshop, creates value which is appropriated by the chef himself, his immediate team and elBulli's diners, and beyond that by commercial collaborators and the haute cuisine and Spanish tourist

sectors, and in even broader circles of academia and society at larger - as well as how it 'slips' to be misappropriated by imitators. (pp. 154-155)

The authorship thus presents some interesting concepts such as 'creative response' to go beyond the existing range of accepted practices, alertness to opportunities to exploit new avenues of revenues, strategic intent via codification and 'decoupling as a change mechanism' to develop - and balance - core and periphery business activities by placing novelty at the core of business-model innovation.

Surprisingly, several of the concepts are suggested to be highly relevant to the study of the Danish railway. For example, the 'change mechanisms' referred to as 'decoupling' (i.e. unbundling or dissociating) of resources that involves the advanced management ability to separate 'strategic activities' in time and space to protect them and allow them to develop in their own space and pace. But, perhaps, especially, the idea of the 'creative response' seems an interesting idea in order to gradually introduce changes in the market place that go beyond the existing range of accepted practices.

4.5.2.4 Business models and process management

Two groups of authors explore the relationship between business-model innovation and process management (Sosna et al., 2010; Hienerth et al., 2011). For Hienerth et al. (2011) the implementation process of 'user-centric' business models is clearly a vital element for corporate success in a long-term perspective. This authorship attempts to establish a direct link between process management and success.

The business-model construct is placed in the background of the analysis; the authors choose instead to cast light on incorporating 'users' into the established 'core business' processes. The word 'core' is of central importance here since it is used to distinguish it from peripheral business activities that are assumed to be of secondary interest. That is to say, the authors provide a rather convincing data sample based on interviews, observations, and archival data to support their claim that the incorporation of the 'users' should not be reduced to a secondary

priority that is good to have; instead to place the incorporation of the 'users' into the management routines and established business processes.

Sosna et al. (2010) follow a different avenue to explore the importance of process management and its impact on constant development of the business model. They begin by quoting the famous saying by Chin-Ning Chun: 'Without the strength to endure the crisis, one will not see the opportunity within. It is in the process of endurance that opportunity reveals itself' (p. 383): to study the antecedents and drivers of business-model innovation in a Spanish dietary products business threatened by both economic recession and heightened competition as a result of liberalization of the sector.

Sosna et al. (2010) ask reflectively how an established organization has been able to lead the innovation of its business model over time by contributing with profits at a constant basis and at the same time avoided that its earning capacity was undermined by changes in the external environment? Sosna et al. (2010) provide an answer to this question by drawing attention to a set of key areas that are considered vital by the corresponding authors, by addressing the antecedents and *processes* by which business models change over time.

The authors provide an exemplary example of using an incompleteness problematization (Locke & Golden-Biddle, 1997) by specifying a gap in the extant literature that they seek to fill. Sosna et al. (2010) constructs an opportunity for scientific contribution by pin-pointing the works by a collection of well-known and established theorists related to the subject matter, referred to as the 'dynamic perspective' on business models:

Amit and Zott's [2001] widely cited definition of the business model concept notes that it is '*the design of transaction content, structure and governance so as to create value through the exploitation of business opportunities*'. Although scholars have dedicated significant attention to business models (focusing on initial attempts to define the term, to proposals on the dimensions of a business model, to detailed explanations of these dimensions, to propositions of meta-models or reference models), Osterwalder et al. [2005] point out that '*the relationship between business models and time is little discussed*', and

the dynamic perspective has only recently been incorporated into research on this topic. Chesbrough and Rosenbloom [2002] note that successful businesses alter the initial models created during their start-up phases, while Linder and Cantrell [2000] describe four different categories of 'change models' depending on the degree to which a firm's core logic changes, suggesting firms should adopt ... in pursuing business model changes. Rindova and Kotha [2001] explain the 'continuous morphing' of Yahoo's business model (compared to that of Excite) to show its importance and '*how the focal firms sought to regenerate their transient competitive advantage on the Internet*'. Similarly, Morris, Schindehutte and Allen [2005] envision '*a business model life cycle involving periods of specification, refinement, adaptation, revision, and reformulation. An initial period during which the model is fairly informal or implicit is followed by a process of trial-and-error, and a number of core decisions are made that delimit the directions in which the firm can evolve*' [pp. 732-733]. Baden-Fuller and Stopford [1994] find that making progress along a successful business rejuvenation path requires managers to experiment to discover what can work and what fails, and communicate and institutionalize learning mechanisms (incorporating new knowledge and skills) into systems, procedures and structures across all echelons of the organization. While dynamic business model evolution has been recognized by several scholars, it lacks theoretical grounding in the established literature which would allow us to understand its underlying mechanisms better and move the still shaky conceptual frameworks of business model development and innovation to more solid theoretical ground. This article aims to fill this gap and provide such a theoretical grounding to the dynamic view of business model evolution by drawing on the extant organizational learning literature to relate dynamic business model development to learning processes at multiple organizational levels (pp. 385-386, original emphasis).

Sosna et al. (2010) direct the attention of process management and business models in a 'dynamic perspective' by incorporating trial-and-error learning in the search for new opportunities by drawing on the long-standing works about single-loop and double-loop learning (Argyris, 1976), organizational learning (Levitt & March, 1988), cognitive maps and trial-and-error learning (Nelson, 2000), and cognitive learning and experiential search (Gavetti & Levinthal, 2000).

Testing assumptions in action is thus considered an important part of the search for new opportunities. Process management is thus implicitly linked to change management (and learning theory) by combining single and double-loop learning to question fundamental aspects of established business activities to promote deep changes in the ways it both the

organization behaves and performs as well as to optimize the established routines.

Process management is thus closely coupled to detecting and correcting errors in the existing management processes. Generating data about process management is therefore not limited to facilitate 'trial-and-error experimentation' or 'trial-and-error learning', but it includes advancing the current understanding or challenge of the beliefs and perceptions of the current situation (e.g. best use of resources) by reflecting on, questioning and testing the established routines — and it is in this context that it becomes relevant to shed light on the 'cognitive representations' (Gavetti & Levinthal, 2000) or 'cognitive maps' (Nelson, 2000) of the managers working inside the organization as argued by Sosna et al. (2010).

The cognitive representations of the managers relate to their perceptions of the environmental conditions (e.g. profitability and competitive situation) and their knowledge or memory about different events in the past and their understanding of the environmental conditions as well as their beliefs about the fundamental premises upon which the current business model rests, which is of relevance when looking forward.

Following this accepted line of reasoning, the present study aimed to generate data about the managers' cognitive representations about the unsatisfactory performance in the past in comparison to the managers' beliefs about the ideal conditions.

The present study thus combines the autobiographic backward looking knowledge about past practices with the cognitive knowledge about the ideal conditions and underlying challenges when looking forward as an innovative method to purposively explore gaps in the leadership agenda.

4.5.2.5 Business models and project management

One group of authors examines the relationship between successful business-model innovation and project management (Thompson &

MacMillan, 2010). The authors highlight the importance of preplanning 'a realistic approach to disengagement' by defining a set of minimally acceptable performance outcomes, rules of engagement and disqualifying conditions of the project outcomes.

The advice to explicitly defining minimally acceptable performance outcomes before the project is launched seem to be of very high relevance in general and specifically in the study of the Danish State Railways due to its many unsuccessful large-scale commercial projects (see page 125). Thompson & MacMillan (2010) specify that:

When a wealth of performance outcomes might be possible, another 'luxury' we have is to clearly specify a domain of plausible outcomes that are acceptable to us. In a world where there are manifold possible outcomes we are more likely to be wrong than right: we have learned that, in an uncertain market creation environment, an obsession with being right is dysfunctional. Rather, the appropriate mindset is to launch inexpensively and redirect as the business evolves e if the unfolding model appears not to be heading toward our preset 'acceptable outcomes' domain, we either redirect further efforts, or stop them while resource commitments are still minimal. (p. 296)

The authors thus draw a rather interesting connection between project management and the management of business-model innovation by highlighting the importance of anticipating unintended consequences. The authors thus remind us that projects can create adverse and unintended second-order outcomes, both negative and positive.

In addition to specifying minimally acceptable performance outcomes, the authors draw attention to the importance of determining rules of engagement with a strict focus on specifying a set of preliminary decision rules for the management of the project, including measurable impact metrics that go beyond simple profit and employment.

Examples of such measurable impact metrics include specifying provisions for future profit sharing that is subsequently nested into the proposed business model or specification of an amount of money from the operations when the project is finished is reserved for reinvestment

to increase the motivation of key partners and encourage the 'beneficiary participation' of the shareholders in addition to the financial returns.

Finally, the authors describe the importance of specifying disqualifying conditions as a critical attribute of the proposed business to be able to disqualify the entire project if needed. The principle of specifying disqualifying conditions is therefore a fruitful idea to 'to weed out many possible project opportunities and hone in on the plausible few that have significant potential' (p. 296).

Emergent disqualifying conditions that can be applied to projects include consideration and articulation of projects where 'the net revenues from activities are insufficient to cover replacement of assets' as well as project where 'a pilot business cannot be run at low cost, and/or where this pilot cannot then be scaled'. Using 'disqualifiers' as a filter is therefore a promising idea that allows the responsible persons to separate potential plausible opportunities from the array of possible opportunities.

It is therefore suggested that the connection between project management and business-model innovation is highly relevant: and that it remains unfinished.

4.5.3 Peripheral concepts

The reinterpretation of scholarly works shows that logics, routines, cultures, and failures have received a low degree of importance for the management of business-model innovation. Not a single author or authorship has positioned its scholarly works to surface the - yet unexpressed - importance of pursuing different innovation logics, routines, cultures, or learnings from project or corporate failures or near-failures. Each theoretical concept is nonetheless suggested to represent an avenue for future research.

The analytical summaries in the table below specify the level of attention that each author or authorship has devoted to five peripheral theoretical

concepts in relation to the core concept: the business model to complete the reinterpretation of scholarly works. Research related to a peripheral concept is expected to be relatively difficult to make relevant, but if successful then it may be considered of high importance for the development of the discipline of management of business-model innovation.

4.5.3.1 Business models and evolution

One group of authors focuses its attention to the relationship between business models and evolution. Demil & Lecocq (2010) describe the rationale of adopting a new dynamic perspective for the analysis of business models by positioning their idea in contrast to the 'static view' of the early literature on the topic.

The 'transformational perspective' is widely celebrated from the editorial introduction of the special issue (Baden-Fuller et al., 2010) to the executive summaries of the special issue (Baden-Fuller, 2010), it is downplayed in the next special issue (Baden-Fuller & Haefliger, 2013). In fact, a group of authors explicitly write that they apply a 'static perspective' to take a different avenue in order to elaborate on the competition between the football clubs in the Premier League (McNamara et al., 2013) as opposed to the single study of Arsenal Football Club (Demil & Lecocq, 2010).

It is furthermore interesting that Demil & Lecocq (2010) do not use an *inadequate* or *incommensurability* but an *incompleteness* problematization (Locke & Golden-Biddle, 1997) to describe the benefits of a 'new' perspective (i.e. instead of presenting a critique of the older literature or by rejecting it to replace it with a new theory). Demil & Lecocq (2010) do not reject 'the static view' in the early literature about 'electronic' business models as one could have expected, but instead present the perspective 'dynamic consistency' in a diplomatic language by describing the advantages of both perspectives:

Broadly, two different uses of the concept can be identified. The first refers to what we might call a static approach. Essentially, this insists

that the important word in the expression is 'model', and thus on the coherence between its core components. In this approach, a [business model] is ultimately a blueprint - even a recipe - that fulfil[s] important functions such as enabling description and classification ... This stream helps to describe how an organization functions and generates revenues - more precisely, it assists managers to conceptualise the different activities their company employs to generate value and its mechanisms for value creation. The second use of the concept represents a transformational approach, where the [business model] is considered as a concept or a tool to address change and focus on innovation, either in the organization, or in the [business model] itself. In particular, new [business models] have been acknowledged as radical innovations with the potential to shake whole industries ... In this approach, a sustainable [business model] is rarely found immediately, but requires progressive refinements to create internal consistency and/or to adapt to its environment - as Winter and Szulanski [2001] argue: "The formula or business model, far from being a quantum of information that is revealed in a flash, is typically a complex set of interdependent routines that is discovered, adjusted, and fine-tuned by 'doing'" [p. 731]. Each of these stances is interesting and has strengths - but also weaknesses. On the one hand, the static view allows us to build typologies and study the relationship between a given [business model] and performance. From the managerial point of view, it gives a consistent picture of the different [business-model] components and how they are arranged, which can then be communicated and understood (which can be particularly important for entrepreneurs aiming to win the confidence of investors) ... But static approaches are often unable to describe the process of [business-model] evolution since they do not aim to. On the other hand, the transformational view deals with this major managerial question, and thus can help managers reflect on how they can change their [business models]. But (as both Yip [2004] and Teece [2007] point out) it tends to mobilize the [business model] concept to discuss change rather than looking at how business models change them- selves: those (rare) articles dealing with this feature tend to focus on a given [business model] component - such as Raff [2000] on the evolution of the capabilities, Winter and Szulanski [2001] on the role of routines, and Johnson et al. on the change in value propositions - but to overlook the interactions between components which Tikkanen et al. [2005] note as the hallmark and usefulness of the static approach. (pp. 227-228)

The term 'dynamic consistency' fits well into the business-model literature, but the concept is far from new (e.g. Kydland & Prescott, 1977; Machina, 1989; Read et al., 1999), but learn only the positive things associated with it (as an alternative to a static perspective). Demil & Lecocq (2010), seem to forget to describe the associated risk of applying this concept.

The positive aspects of 'dynamic consistency' (Demil & Lecocq, 2010) need to be considered with the potential inconsistency in dynamic utility

maximization (Strotz, 1955), which has later been described as a ‘time inconsistency’ problem (Klein, 2009) when the decision-maker changes the basic preference over time.

The problem of time inconsistency is that the company managers’ basic preference at one point in time is inconsistent with the preference at another point in time. This was the situation in the Danish railway sector when the new chief executive manager launched his new plan labeled ‘Switching tracks’ (In Danish: Sporskifte) in 2008, which led to the economic disaster from expanding the railway operations in Sweden in 2011 (see Chapter 5: ‘Case presentation’ at page 173 for further details about the outcome of a time inconsistency problem). Time or dynamic inconsistency is therefore related to a dynamic choice problem, because it means that the preferences are not aligned. That is, the preferences become unreliable because the preferences point in different directions, which lead to confusion about the mission.

Now, if the business model remains in a ‘permanent state of transitory disequilibrium’ (Demil & Lecocq, 2010); this could also be highly problematic because the disequilibrium may lead to the problem of time inconsistency, which not only has the capacity to lead to unforeseen events, it also has the capacity to increase the uncertainty about the mission of the company. The Danish State Railways is worthwhile as a case of learning about the problem of ‘switching preferences’ or ‘switching tracks’, which happened when the executive senior management changed its preference for international expansion on the cost of the domestic market. The changed basic preference for launching commercial projects instead of focusing on the development of the core product (i.e. transport from a to b) ultimately turned out to be very problematic. In such a situation, having clarity of the mission is essential and a shift of the fundamental preferences may therefore prove to be highly problematic, which seems to be a completely overlooked element in the existing literature on business models. The example describes how the concept of ‘dynamic consistency’ may be considered fruitful as it adapts to different situations. Yet, dynamic consistency implies that the message of the top-level management is communicated in a consistent

direction, which is especially important in a time of crisis, where it becomes important to unite on a common mission (i.e. have a common goal for the future). It is in this context where it is relevant to decide if the Danish State Railways should focus on commercial growth through scaling of the business model or if the top management team should rather focus their attention on optimization and innovation of the operations in the market?

It seems that the authors (Demil & Lecocq, 2010) draw on a long-standing term without making it clear in the text. They also claim to explore business-model evolution, but the meta-analysis specifies that they instead elaborate on the importance of *change* management and the development of (new) *resources*. In summary, while it seems that Demil & Lecocq (2010) may have overrated the importance of business-model evolution, it is suggested that the concept of 'dynamic consistency' is highly relevant, not only for the study of the Danish State Railways.

This approach acknowledges that the same choice may be the right choice in one situation, but wrong in a different situation. Such an epiphany may be a relevant consideration if the company finds itself in a situation of crisis or if the competitive situation changes dramatically, for example, if a competitor disrupts the current best practice routine in the market either via technological innovation or business-model innovation — or a combination of both — or if a critical situation emerge due to both financial and operative problems. See 'Chapter 5: 'Presentation of the case company' at page 173.

4.5.3.2 *Business models and innovation logics*

It is widely known that different types of innovation exist, for example, incremental, distinctive, radical or disruptive innovation. The different innovation perspectives are based on clearly distinguished assumptions and goals (Roldsgaard, 2012). The different applications of business-model innovation therefore silently follow clearly distinct approaches and goals, which would be interesting to study in a multiple case study

using a variety of different companies to illustrate the different approaches and their advantages and disadvantages.

4.5.3.3 Business models and development or rejection of routines

The routine is placed at the center of any business model both in the internal and external environment. Mostly, the routine seems to be related to the processes and use and development of (new) management practices, but the routine in the market is nonetheless suggested to be the most interesting of the two because a change in the existing routines in the market has the greatest impact.

The development of established routines inside the organization follows more the incremental logic to optimize the existing management processes, where as the established routines in the market follows a disruptive logic that seeks to change the behavior in the market - typically through technological innovation that is mostly combined with a reconfiguration of the business model to capture the benefits of changing the delivery of products and services (e.g. Johnson et al., 2008).

Some authors have already focused on this underlying aspect of business-model innovation with emphasis on evolution theory (Nelson & Winter, 1982), replication (imitation) as a corporate strategy (Winter & Szulanski, 2001), reinvention of existing business models (Johnson et al., 2008), and trial-and-error learning (Nelson, 2000).

Yet, it is suggested that the importance of the retention, development or rejection of routines still remains under-developed for which reason further research is encouraged to explore different combinations of 'the why' and 'the how' companies have changed routines to innovate the existing business model across different industries to make the model more robust, competitive and profitable.

Other theorists have studied the same topic of challenge in a life cycle perspective with emphasis on technological innovation (e.g. Chesbrough & Rosenberg, 2002; Chesbrough, 2010), but the topic remains under-

developed and further research related to this topic of concern has been suggested as an avenue for strengthening and enriching the literature focus on business-model innovation (Baden-Fuller & Haefliger, 2013).

4.5.3.4 *Business models and organizational cultures*

Organizational cultures change over time. We know that the culture that resides inside the corporation is not static and that it affects the decisions taken in critical and not so critical situations.

We also know that there may be more than one culture - or dominant view - inside the corporation. For example, the study of the Danish State Railways indicates a systematic change in the culture about the importance of the core product. The study also suggests that a sub-culture co-exists inside the same business organization, which is focused on breakthrough innovation, whereas the dominant culture follow a more incremental logic to make smaller adjustments at a constant basis.

Interestingly, the two perspectives combined have the capacity to motivate breakthrough innovation over a long period that gradually replaces the existing services by new superior services based on more advanced technology. Interestingly, the former top-level management positioned 'winning culture' at the leadership agenda along with internationalization, efficiency and customer growth

in the 2018 strategy. Although the new management later rejected this strategy, the cultural aspect of business-model innovation is still assumed to be of high importance since it was place on the top-level management agenda. Finally, it has been argued that 'the positive effect of creative culture is confirmed' for business-model innovation, while partner dependency does not yield the same positive effect (Bock et al., 2012, p. 279).

The present study of the Danish State Railways does not provide an anti-thesis to this argument, but it details that top-level management creativity also has the capacity to lead astray if it remains focused on the development of peripheral activities instead of the core business

activities, but the principle of 'creative freedom' may lead to unexpected outcomes that seems to have disappointed many top managers in the past (Doz & Kosonen, 2010).

4.5.3.5 Business models and failures

A failure may lead to the complete replacement of the top-level management or it can serve as a worthwhile case of learning. Some key theorists have encourage managers to experiment with new technologies and business-model designs, knowing that such experimentation may lead to failure based on the argument that a failure can serve as an important lessons learned (Chesbrough, 2010; McGrath, 2010).

However, the consequence of a large-scale project or corporate failure seems to have been downplayed by the corresponding authors to an extent that is almost unconstructive. It is, therefore, argued that failure should not be reduced to an implicit assumption, but it should rather be debated explicitly. Or, as a minimum the management's basic assumptions about the challenges related to a necessary business-model innovation could benefit from a more rigorous examination (Hienerth et al., 2011; Aspara et al., 2013; Achtenhagen et al., 2013).

Hence, the link between creativity and business-model innovation with emphasis on the output (e.g. success or failure) could serve as an interesting avenue for future research.

4.6 Interpretation of the meta-analysis

A collection of first-class articles recently published on the topic (with currency) was gathered for a meta-analysis to systematically review fifteen theoretical concepts in relation to the creation of new business models and development of existing business models. A total of sixteen theoretical codes were then used to generate data based on the assumption that the information was already in the data, but that it just needed to be unfolded. The sixteen topics were then organized into a system with three categories, which were subsequently reviewed by

using dense quotations (a mosaic of quotations) to combine the quantitative data with qualitative data by highlighting the importance of each theoretical concept based on the authors exploration of the concept in the relation to the core concept 'business model'.

A rigid two-step method was used to eliminate invalid counts by removing instances (cases) outside the core text of the articles, while the number of pages was adjusted by counting the number of pages of core text. The procedures are perfectly reproducible, which adds to the reliability of the meta-analysis.

The adjusted number of counts of the individual theoretical code was divided by the adjusted number of pages of the individual article to generate perfectly comparable numbers, following the principle of constant comparison (Glaser, 1965, 1992, 2001, 2005).

The analytical scores were reviewed inside each individual article to draw connections between the underlying theoretical concepts, while the individual analytical scores (method: adjusted number of counts divided by the adjusted number of pages of the article) were used to systematically review the importance of fifteen theoretical concepts in relation to the core concept 'business model' as an innovative method to combine quantitative-qualitative methods as encouraged by Locke & Golden-Biddle (1997, p. 1060).

It is acknowledged that further theoretical concepts could have been included in the meta-analysis, such as, learning, crisis, and competition. Of these, learning could maybe be seen as the most relevant due to the emphasis on these concepts given by the authors in the special issue. It could also be argued that learning had already been included in the meta-analysis, for example, the benefits of experimentation (e.g. Chesbrough, 2010; McGrath, 2010; Sosna et al., 2010; Wirtz et al., 2010) and in the social influence on the business-model innovation, which highlighted the importance of the 'learning system' or 'system of work' that is behind, and responsible for, the renewal and transformation of the existing business model (Itami & Nishino, 2010). Finally, it was decided

not to include: *learning*, *crisis*, and *competition* as autonomous concepts in the meta-analysis since they had already been covered in the examination of related concepts. Figure 4.5 visualizes how the authors have positioned themselves in relation to four theoretical concepts. The positioning of the authors is interesting because it clarifies the authors' novelty claim in relation to a theoretical research concept. The theoretical concept 'resource management' has attracted attention at a consistent level across the divergent literatures in figure 4.5.

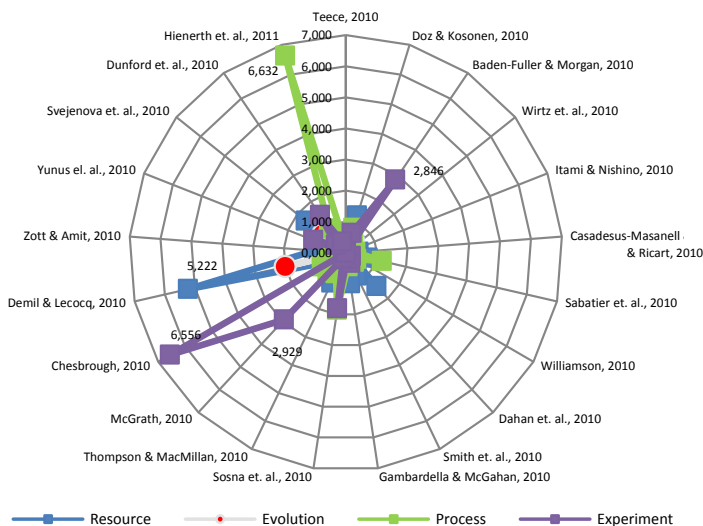


Figure 4.5: Mapping out the positions of the authors
Source: The Author

The theoretical concept 'business-model evolution' is visualized as a single dot because only a single authorship highlights the importance of this concept. A green line marks the theoretical concept 'Process innovation', while the theoretical concept of 'experimentation' is highlighted in purple. The exploratory search indicated that only two authorships did not position their scholarly works in relation to any of the fifteen theoretical concepts (Zott & Amit, 2010; Sabatier et al., 2010).

Zott & Amit (2010) develop a new 'NICE concept', while Sabatier et al (2010) explore the connections between business models and entrepreneurship.

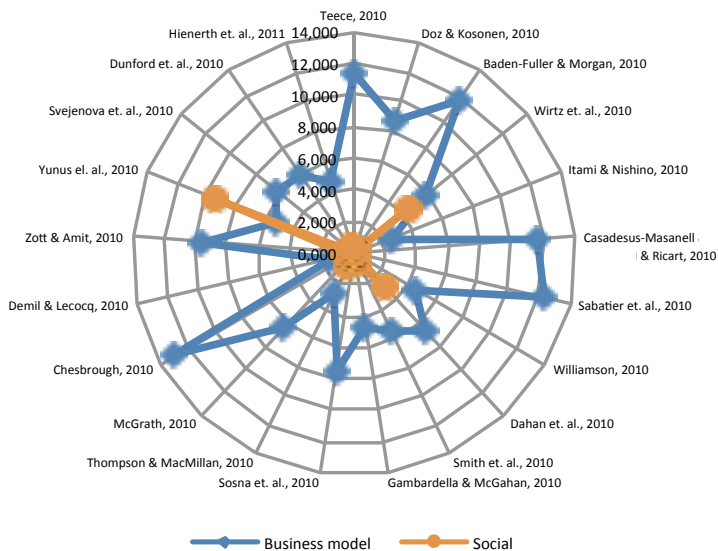


Figure 4.6: Mapping out the positions of the authors
Source: The Author

Figure 4.6 describes the results for the 'social perspectives' in relation to the core concept. The figure specifies that seven authorships seek to connect the business-model concept with one or more theoretical concepts (Teece, 2010; Doz & Kosonen, 2010; Casadesus-Masanell & Ricart, 2010; Sabatier et al., 2010; Chesbrough, 2010; Zott & Amit, 2010). For example, As it appears, three authorships explicitly attempt to establish a link between the management of business models and social influence. In fact, Yunus et al. (2010) write more about challenges for 'social development' than the management of business models. The core variable 'business model' is compared to 'social influence', while the

remaining figures compares the attention given to ten theoretical concepts.

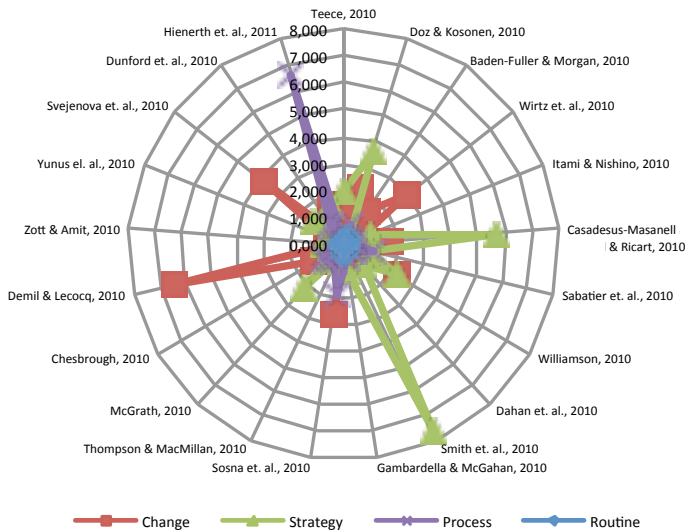


Figure 4.7: Mapping out the positions of the authors
Source: The Author

Figure 4.7 positions multiple authors according to multiple theoretical concepts (routine, change, strategy, process). The routine is almost completely non-visible to illustrate how little attention this theoretical concept has received in comparison with other theoretical concepts. The figure also describes the somewhat surprising high level of emphasis on change management, especially by five authorships (Wirtz et al., 2010; Williamson, 2010; Sosna et al., 2010; Demil & Lecocq, 2010; Svejenova et al., 2010). The figure furthermore describes the high emphasis on strategic management, especially by five authorships (Doz & Kosonen, 2010; Casadesus-Masanell & Ricart, 2010; Williamson, 2010; Smith et al., 2010; McGrath, 2010). The figure maps out how two groups of authors have positioned their work strongly according to strategic management (Casadesus-Masanell & Ricart, 2010; Smith et al., 2010). Likewise,

change management is considered a vital aspect for further development of established business models for Demil & Locoq (2010): and for the creation of new business models (Svajenova et al., 2010). Finally, Hienerth et al. (2011) believe that process management is of essential importance for the development of business models.

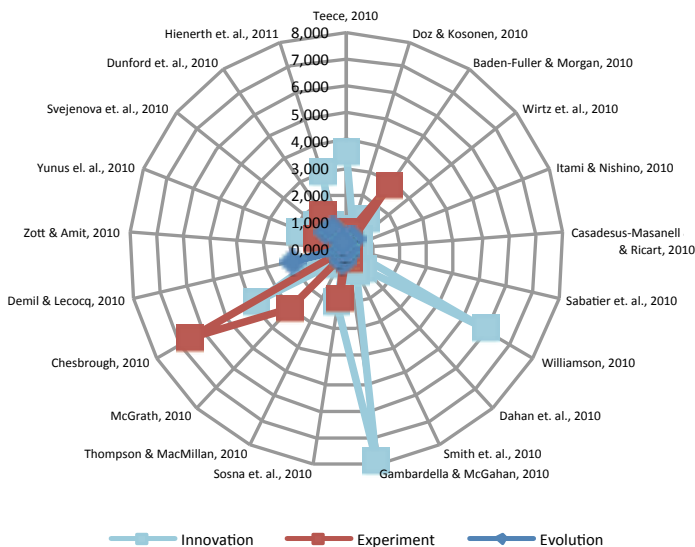


Figure 4.8: Mapping out the positions of the authors
Source: The Author

Figure 4.8 describes the positioning of multiple authors according to innovation, experiment and evolution. It is interesting to notice how much attention three authorships dedicate to innovation management (Teece, 2010; Williamson, 2010; Gambardella & McGahan, 2010): and that three authorships write equally much about innovation management and experiments (Sosna et al., 2010; McGrath, 2010; Chesbrough, 2010). Four authorships emphasize the importance of conducting experiments for the creation of new business models and the

further development of long-established business models (Baden-Fuller & Morgan, 2010; Sosna et al., 2010; McGrath, 2010; Chesbrough, 2010).



Figure 4.9: Mapping out the positions of the authors
Source: The Author

Figure 4.9 describes how three authorships have positioned themselves strongly to the exploration of the relationship between the management of business models and social influence (Wirtz et al., 2010; Dahan et al., 2010; Yunus et al., 2010). The figure furthermore describes the underlying consensus about the importance of resource management, although only a single authorship strongly emphasizes the importance of this theoretical concept for the management of business models (Demil & Lecocq, 2010). Finally the bottom-right figure describes how the organizational culture remains almost non-visible, which makes it intellectually robust to ask if the cultural element has been potentially overlooked or if it remains relatively unimportant for the management of business-model innovation.

4.8 Specifying the gap in the literature

The meta-analysis indicates that failure lays at heart of business-model theory, but that the cause of failure remains unexplored in the literature on the topic. Thus, the meta-analysis reveals that the relationship between the development of business models and failure remains an under-estimated category of research in the recent most advanced articles on the topic as specified in figure 4.10.

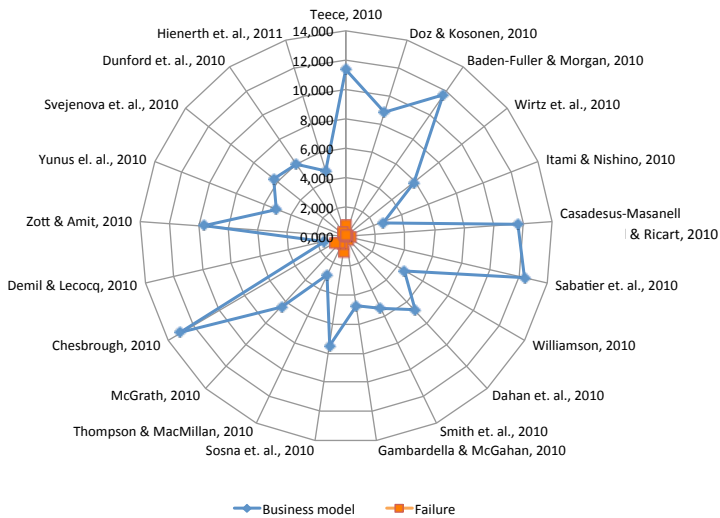


Figure 4.10: Gap in the literature

Source: The Author

However, the doctoral investigation was not designed as a study of a failure, but of the basic assumptions and challenges for facilitating a necessary business-model innovation in the Danish railway sector in a time of crisis. Thus, recognizing that the emergence of an institutional crisis could lead to one of two outcomes: a) failure or b) lead the company out of the crisis. In the latter case, 'a near failure' (crisis) has the power to function as the starting point of a new era of corporate

success. The doctoral investigation was designed to examine the barriers and opportunities for the development of the Danish railway operator's business model in a period of crisis. The purpose of the doctoral investigation was furthermore to explore importance of cognitive leadership in a time of crisis by studying the underlying assumptions and challenges for developing a long-established business model.

4.9 Learning from failures and mistakes

A previous study of the Danish railway operator's expansion in the Swedish railway sector has been described *both* as badly planned *and* unexpectedly loss-giving operations, for which reason it has been publically accepted that it was not only a mistake, but at the same time it was widely recognized as a failure (Roldsgaard, 2012). The present study does not follow Thomke's work (as described by Smith in the quote below) because it seems difficult to judge, distinguish and decide between a 'mistake' or 'failure'. Now: should one not try to learn from such an event? Probably it would be a good idea to avoid repeating such mistake or a similar mistake in the future? The question is: How to evaluate this? And: why not learn from a mistake? Is it not always an advantage to learn from mistakes, for example, to avoid a failure and vice versa? Can a failure not be a mistake? Sosna et al. (2010) explain why this is a relevant consideration:

Faced with failure and a highly unfavorable or uncertain environment, an individual or team can either decide to stop searching for opportunities and put an end to the experimentation process, or continue with it. Here, the psychological factors that make up the entrepreneur's [or top managers'] character definitely play a major role in deciding which path is followed. But resilience - the ability to look at the failure in a nuanced way [including] modest levels of failure can encourage entrepreneurs [and managers] to take further risks [which may be highly problematic or it can] foster the resilience to go on experimenting. Luthar et al. [2000] define resilience as "... a dynamic process encompassing positive adaptation within the context of significant adversity. Implicit within this notion are two critical conditions: (1) exposure to significant threat or severe adversity; and (2) the achievement of positive adaptation despite major assaults on the developmental process." ... Referring to Thomke's work [2003], Smith [2007] describes an important distinction between failure and mistakes: 'A failure is an experiment whose outcome is unexpected, which teaches you something. On the other hand, a mistake is a badly planned or

conducted experiment whose outcome you cannot interpret, which thus teaches you nothing [p. 88]. (p. 391-392, original emphasis)

Instead of following Thomke's work (as described by Smith in the quote above), the present study followed a line of reasoning that explicitly considers, and accepts, that the learning from the mistakes of the past may actually turn out to be rather fruitful. Svejnova et al. (2010) point out why such study may be of relevance to management academics:

[Academics] need to remain aware of the dynamic nature of business models, and the inherent need for them to be altered and fine-tuned over time to align with the changing needs of the venture, the priorities of key stakeholders and shifts in the environment, which can render previously successful business models obsolete and in need of urgent and major adaptation. [Academics] need also to understand what each element of the business model contributes to the whole, as well as how altering one element, or connection between elements, may have significant implications for the model's sustainability. In designing or transforming a business model, it is important to grasp and articulate the key triggers, interests and motivations, i.e. the 'why', the logic behind the model, as that is the engine that gives meaning and coherence to its elements. Lack of coherence in a business model is very likely to hamper its successful functioning and future viability. ... [Academics] need to understand how business model transformation processes can allow for and lead to the acquisition or development of distinctive competences and strategic resources, which, if sustained and leveraged over time, can bring opportunities for further business model development. ... Focusing on individual business models opens new paths for further exploration. First, given the wealth of motivations and interests pursued by individuals as well as the idiosyncrasies of certain occupations, it would be insightful to identify different types of individual business models. Second, as additional attention is needed to unraveling the ways in which individuals - entrepreneurs, scientists, artists and other professionals - shape their business models over time, process studies could offer insights into the mechanisms that drive or encourage their evolution. (p. 425)

The present study rests on a meta-analysis (multi-level analysis) of an individual business model by focusing attention to the underlying dissatisfactions, deeper motivations, and interests for engaging in business-model innovation in the Danish railway sector. To finish, we know quite a lot about why some companies have been successful in the past, but we know little about the underlying reasons that causes failure: and this is where the present study becomes relevant.

4.10 Final reflection of the reinterpretation of scholarly works

Altogether, the mapping out of the positions of the scholarly works thus provides a unique insight into progression of the discipline of the management of business-model innovation as a truly interdisciplinary discipline. For example, Hienerth et al. (2011) link five of the fifteen theoretical concepts with the management of business models. The authorship claims to explore the nature and implementation process of user-centric business models, while the meta-analysis specifies that this authorship implicitly seeks to connect the management of business-model innovation with strategy, change, product, process, and success. This finding has also been emphasized by Teece (2010), which by far remains the most cited article of the special issue.

In a cross comparison of the figures, it appears that Yunus et al. (2010) highlight the importance of the 'social' (i.e. societal) objectives on the development of new of business models based on lessons learned and practice experiences, while Hienerth et al. (2011) position process management at center stage. Smith et al. (2010) assign high importance to strategic management, while others assign high importance to innovation management for facilitating business-model innovation (e.g. Gambardella & McGahan, 2010). Yet another authorship suggests focusing the attention of business-model evolution to the implicit challenge of managing the development of resources over time as a way to facilitate change in the creation and further development of business models (Demil & Lecocq, 2010).

To conclude, the innovation of the routine practices in the organization or in the market is almost completely ignored in the first-class literature on the topic although innovation management is generally accepted as an irreplaceable aspect of the development of business models. A different sorting of the data enables yet more opportunities to understand and challenge the assumptions about the importance of the theoretical concepts as a final reflection. All authors write about innovation, strategy, product, and success (upper table), while change management is an important underlying concept (bottom table), which gives rise to a final

finishing thought. In conclusion, multiple opportunities for making new contributions exist when looking forward.

Ranked by article hits												
	Adjusted counts					Standardized results					Classification	
	Total	Min	Max	Average	Article hits	Mean	Min	Max	SD	Var	Highlighted articles	Category
Business model	2186	16	239	104	21	7,105	1,500	13,000	3,329	11,486	21	a
Innovation	517	1	76	25	21	1,810	0.067	7,889	2,013	4,021	7	a
Strategy	514	4	107	24	21	1,705	0.438	7,636	1,897	3,422	7	a
Product	452	3	58	22	21	1,498	0.200	3,412	0,961	0,899	7	a
Success	315	1	59	15	21	1,036	0.053	3,105	0,750	0,535	3	b
Change	502	0	115	24	20	1,476	0.000	6,389	1,585	2,401	8	b
Resource	276	0	94	13	19	0,856	0.000	5,222	1,118	1,218	2	c
Process	295	0	126	14	19	0,839	0.000	6,632	1,426	1,954	2	c
Failure	90	0	23	4	16	0,271	0.000	1,095	0,318	0,107	0	c
Culture	69	0	15	3	16	0,119	0.000	0,533	0,173	0,029	0	c
Social	315	0	150	15	14	0,970	0.000	9,375	2,267	4,917	3	c
Experiment	254	0	59	12	14	0,917	0.000	6,556	1,606	2,486	4	c
Project	159	0	81	8	14	0,509	0.000	5,400	1,199	1,379	1	c
Evolution	107	0	36	5	13	0,301	0.000	2,000	0,490	0,229	1	c
Logic	36	0	8	2	9	0,201	0.000	0,789	0,224	0,053	0	d
Routine	22	0	8	1	8	0,064	0.000	0,381	0,106	0,011	0	d
Total	305	6	21	15	21	-	-	-	-	-	-	-

Ranked by highlighted articles												
	Adjusted counts					Standardized results					Classification	
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Strategy	514	4	107	24	21	1,705	0.438	7,636	1,897	3,422	7	a
Product	452	3	58	22	21	1,498	0.200	3,412	0,961	0,899	7	a
Experiment	254	0	59	12	14	0,917	0.000	6,556	1,606	2,486	4	b
Success	315	1	59	15	21	1,036	0.053	3,105	0,750	0,535	3	b
Social	315	0	150	15	14	0,970	0.000	9,375	2,267	4,917	3	b
Resource	276	0	94	13	19	0,856	0.000	5,222	1,118	1,218	2	b
Process	295	0	126	14	19	0,839	0.000	6,632	1,426	1,954	2	b
Project	159	0	81	8	14	0,509	0.000	5,400	1,199	1,379	1	b
Evolution	107	0	36	5	13	0,301	0.000	2,000	0,490	0,229	1	b
Failure	90	0	23	4	16	0,271	0.000	1,095	0,318	0,107	0	c
Culture	69	0	15	3	16	0,119	0.000	0,533	0,173	0,029	0	c
Logic	36	0	8	2	9	0,201	0.000	0,789	0,224	0,053	0	c
Routine	22	0	8	1	8	0,064	0.000	0,381	0,106	0,011	0	c
Total	305	6	21	15	21	-	-	-	-	-	-	-

Table 4.6: Different sorting of the data

Source: The Author

Chapter 5

Case presentation

Denmark's Railway operator was selected as the study object for the doctoral investigation as a *critical case* due to profitability, political and operational problems (Yin, 1984, 2000, 2003, 2009, 2014). The study object is therefore representative of a large company that is challenged at many fronts as described in the study of Molina et al. (2012).

The case company is interesting to study because it loses its ability to earn money in a time of stable passenger growth, partially due to an aggressive international expansion of the railway services in Sweden. In other words, the plan to scale up the business model to benefit from economies of scale or scope (i.e. synergy effects) did not yield the expected result. It is acknowledged that the case company differs in important parameters such that it is a state-owned company and due to the monopoly situation on the railway lines. The competitive situation is therefore different from many business sectors, among others because of the absence of competition *in* the market (Molina et al., 2013). However, the uniqueness of the present case study is not seen as a weakness, but a strength because it offers a distinctive opportunity to better understand some of the complexities related to the management of a politically driven company in a crisis situation.

In this context, it seemed logical to conduct a rigid study of a monopoly company that assumes an important role in society (e.g. the transport,

energy or public safety sectors). The Scandinavian research cultures and traditions often tend to favor the comparison of multiple 'comparable' cases, which is possible by comparing smaller or medium-sized companies within or across industries. However, this tradition to some extent may contrast with the American, English and Spanish research traditions that encourage - and acknowledge the value of - critical and extreme cases (e.g. Yin, 1984, 2000, 2003, 2009, 2014).

If we assume that the multiple case studies would be superior to the singular case studies, then the that assumption may be challenged by the fact that there are only few options to compare giant corporations within or across nations and industries because there are much fewer in general and in each specific industry. Recognizing this limitation, few would argue that giant corporations should be excluded from a rigid analysis. This is not to suggest that *multiple* 'comparable' cases (e.g. Roldsgaard & Bajrovic, 2011) are unimportant, but simply to acknowledge that critical and extreme *individual* cases are also important to include in the analysis of successful and not so successful companies.

5.1 Study of an institutional crisis

The methodology to examine the institutional crisis is described in this section by reviewing the limitations of different case study methods. A limitation of the individual case study is that it is limited to the set of circumstances in a given situation (i.e. cross-sectional study) or the circumstances of the corporation over a long period of time (i.e. longitudinal study). Each approach has certain strengths and weaknesses. If we assume that the longitudinal study in general would be superior to the cross sectional study, then one has not to forget that a crisis per definition refers to a critical situation or a moment of unusual high tension and uncertainty. A crisis has been described as a point in time when a conflict reaches its highest tension and must be resolved (American Heritage Dictionary, 2006).

A crisis situation thus describes a decisive point in history, where the outcome of the response to the situation is critical (Baldick, 2008). It

therefore makes little sense to claim that a longitudinal study of an institutional crisis would be superior, unless it is used to describe the causes that led to the critical management situation, which needs to be analyzed in greater detail. The interesting point of research relates to the management's knowledge, assumptions and awareness of the crisis, rather than interviewing a few managers after the conclusion is known. The cross-sectional study is therefore assumed to be the best approach to study the complexities of a politically driven company in a crisis to gain an in-depth understanding of the situation.

The study of a company in a profound crisis (i.e. difficult situation) is per definition different from a longitudinal study. Crisis should per definition strictly refer to a moment in time or situation (i.e. a discontinued process) rather than a continuing process (Allen, 2008), which means that a deep understanding about the basic assumptions and challenges in the representative period became interesting to study when the crisis reached its highest point of tension in fall 2011.

The comprehensive management study of an institutional crisis *as it happens* therefore seems to be the ideal approach to study the managers' understanding of the critical situation that was observed in fall 2011. However, the longitudinal study remains the most common approach to study the success of individual companies, but it is not always the best approach to understand why a company failed or why it almost failed. However, the longitudinal study is still relevant because we know that many factors together lead to the crisis situation, while the outcome of a crisis develops mostly within a short time frame, which makes a business model in crisis interesting to study in greater detail particularly when the crisis reaches its critical stage.

Abnormality (i.e. difficult situation or 'crisis') is therefore a central 'ingredient' of the present study. In fact, many politically driven companies have in common that they either have been - or at some point of time will become - under an intensified 'abnormal' pressure from multiple fronts (Molina et al., 2012), which makes it interesting to study a politically driven company when the pressure reaches an abnormal or

unusual high level of critical attention. The complex management of a politically driven company when it reaches the highest peak of tension is therefore assumed to be of central importance within and across the management, business, and planning & development literatures.

A longitudinal study of critical events is described in this chapter to explain the development over time in order to describe the circumstances of the critical management situation. The purpose of this chapter is to describe the background for conducting the management survey in fall 2011.

5.2 Specifying the motivation

It would only be natural to assume that a company with a monopoly on multiple lines would be able to make money, but this was not the case when the doctoral investigation was conducted in fall 2011.

Furthermore, management studies in times of crisis are rare, but the literature remains incomplete without the study of individual or groups of companies that are challenged on multiple fronts to innovate their business model.

The causes of the crisis observed in the Scandinavian railway sector have until now not been studied from a management perspective based on an integrative study of the managers' own understanding of the factors that affect the management of a necessary innovation of a historic business model in crisis.

In fact, the management situation often becomes more complex, complicated or chaotic than it had to be because the recognition that a necessary change of the existing routine practices happens only when it is far too late due to denial of the crisis initially, as explained by McGrath (2011):

There's always very early evidence that a business model is in trouble, but it usually gets ignored or dismissed. That's because at most companies the people at the top got there because of their success with

the current model—so they have very few incentives to question its durability. So you get a denial reaction initially, followed by desperate attempts to eke just a little more time out of the existing model. (Podcast, retrieved on 2014-01-30)

This recognition provided motivation to investigate the causes of the crisis in greater detail. The present study aimed to identify some emerging areas of cognitive leadership (e.g. mental barriers) for facilitating a necessary business-model innovation in a difficult management situation.

The motivation was further strengthened by the fact that this challenge has until now not yet received sufficient attention in the literature on the topic, but the present study shows that the managers of the company believe that political leadership — articulation of threats for the future as well as known risks and the vulnerabilities related to the current leadership agenda — is critical for the survival of politically driven organizations and their continued or future success.

The purpose of the present study was therefore to explore the basic assumptions and underlying challenges for facilitating a necessary innovation of the Danish railway operator's business model in an unprecedented institutional crisis.

5.3 Theoretical relevance

Chesbrough (2010) suggests that more research (and management) attention to the underlying barriers to the development of existing business models is relevant and topical. The question remains, what are the greatest barriers and opportunities for the development of a business model in a profound crisis? The present study addresses this question through a comprehensive study of the Danish State Railways.

This is especially true when a long-established organization finds itself in a transition toward the development of a 'new' business model. Teece (2010) points out that there has been an over-use of the business-model in recent literatures, but the business model remains under-analyzed and

therefore poorly understood. Baden-Fuller & Morgen (2010) specify that there is a need for more studies of exemplars in terms of success and failure, which they refer to as 'real-life' studies. Others remind us that a discipline without exemplars is a poor one (Flyvbjerg, 2007) and argue against the common misperception that generalization cannot be done on the basis of a single case study (Flyvbjerg, 2004, 2006a, 2007).

The study of the Danish State Railways aims to contribute with new knowledge about what hinders and enables the cognitive leadership in a politically driven company. The Danish State Railways is conceptualized as a representative of the genre of politically driven organization to interpret the underlying challenges for leading the organization in a critical situation that is characterized by high tension and uncertainty. And, as we know that the leadership in such situation is critical for the survival and future success of the politically driven organization (Mumford, 2013). We also know that the absence of cognitive leadership in such situation is likely to lead to failure.

Today, there is an abundance of shorthand descriptions of exemplars about why some companies have been successful in the past in the recent first-class literature on business models, but there is a lack of empirical research studies on why companies have not been successful in the past as specified in the doctoral thesis.

The doctoral investigation thus seeks to answer some of the long-standing challenges, for example, Chesbrough (2010) asks when does a novel technology require a novel business model and when does the combination of the two lead to a competitive advantage?

Baden-Fuller & Haefliger (2013) raise a related question: What determines the direction of technology evolution? Is business-model innovation potentially more important than technological innovation or vice versa? The doctoral investigation aimed to answer these questions by examining the relationship between technological innovation and the innovation of the railway operator's business model. The doctoral investigation thus follows the encouragements by some of the leading

theorists within the field of business models in order to ‘unpick the interdependencies between business model choice, technological innovation, and success or failure’ (Baden-Fuller & Haefliger, 2013, p. 423).

The purpose was to identify the cognitive areas of leadership that are assumed to be critical for the survival of organizations during periods of an emergent crisis and its future success. In this context, it seems relevant to ask: What factors determine the outcome of a crisis situation of a political driven company or organization? What are the repercussions of leaving out this question?

The present study of the Danish State Railways is positioned as an alternative to the study of Nokia as an ‘extraordinary case of success’ at the beginning of the 2000s (Aspara et al., 2013) because most researchers outside Finland would probably describe the same company as an ‘extraordinary case of failure’, which is characterized by the absence of leadership at the beginning of the 2010s.

The present study of a similar political driven company in a profound crisis also differs fundamentally in terms of the methodology to study the crisis situation. Instead of drawing conclusions on a random review of some archival material of the past and conducting some interviews in hindsight with a few select managers (Aspara et al., 2013), the doctoral investigation aimed to contribute to the theoretical discourse on the topic by publishing the results of a comprehensive management survey with about 80% of the managers in the company participating in the study.

However, the researcher of the present study also conducted some interviews in hindsight with a few select managers and reviewed some archival material, but this knowledge was merely used as part of the preparation to make an original research investigation via a comprehensive management survey to explore the causes and underlying challenges related to the institutional crisis observed in fall 2011. The problem was that the crisis had not been studied from a

management perspective based on the managers' experience and understanding of the factors affecting the management of a necessary innovation of a historic business model in crisis.

Over 350 managers took part in this study, who have in common that they are experts specialized within specific fields of expertise in the railway sector. The present study identifies some emerging areas of cognitive leadership that have not yet received sufficient attention in the literature on business models, but nonetheless the company managers believe that the areas of cognitive leadership have a significant impact on the survival of the organization and its future success.

The research community in the field of business models can learn from the study as it directs the attention to a few critical areas of political leadership that are believed by the managers to have great importance for survival of organizations and their future success (Mumford, 2013).

5.4 Historic background

The first railway line in Denmark was established between Copenhagen and Roskilde in 1847. The first railways in Denmark were built and operated by private companies, while The Danish State Railways was established with the merger between two smaller railway companies in 1885. Since that, the Danish State Railways has been owned by the state via different ministerial departments. Since the 1970s,

The Danish State Railways has undergone extensive modernization and rationalization of all technical, equipment-related and product-related areas, including electrification of some of the main lines, new long-distance equipment and new regional stock; as well as Automatic Train Control on all major lines (Gyldendal, 2009).

The conditions of the Danish railways company change during the 1990s and 2000s. In 1991, the three-set intercity trains (IC3) trains came into use, initially as 'high speed trains' (lyntog) and later as standard intercity trains. In 1993, the ownership was transferred to the Ministry of

Transport department. DSB buses and DSB shipping company were separated as independent companies in 1995. The IC3 trains were innovative due to the rubber-framed ends, which allow for coupling and decoupling of multiple train sets. The Great Belt fixed link was opened for railway traffic in 1997.

The same year, the responsibilities were separated into infrastructure management (Today: Rail Net Denmark) and railway operations (i.e. Danish State Railways). In 1998, the plan 'Good Trains for All' was launched, which aimed to replace old and less comfortable trains within a decade. As a result of the political desire to liberalize the sector, the Danish State Railways was turned into an independent public state-owned company in 1999.

The transport of goods was sold in 2001 to the German railway operator (Today: DB Schenker Rail), which means that the Danish State Railways is responsible *only* for the passenger train operations, including the local commuter railway system (S-train) in the greater Copenhagen area. The Danish State Railways employs about 9,000 people since 2005 and it operates about 25% of the lines in Sweden in 2011. Today, the Danish State Railways remains the largest rail operator in the Nordic countries in terms of passengers although Denmark is geographically by far the smallest country in Northern Europe.

5.5 Previously successful company

The railway company has played a major role in the development of the Danish society we know today, precisely like Nokia played a major role in the development of the mobile phones that we know today. The Danish State Railways was also a pioneer when it successfully co-developed the Danish high-comfort distance IC3 trains with Swedish ABB Scandia (now: Bombardier Transportation).

The successful development of the IC3 trains set a new standard for punctual, reliable and comfortable trains, which were exported to other international operators. The Danish railways thus used to be a leading

European railway operator until the beginning of the 2000s, but then problems with punctuality, reliability and passenger dissatisfaction gradually grew due to historically poor performing train operations in 2006. However, the new management (2008) did not solve the problem of an unsatisfactory basic train service.

In addition to problems with punctuality (and reliability), the railway service on the distance railway lines remains slow (between 120-180 km/h). For comparison, the new electrified high-speed trains in Spain provide a railway service of over 300 km/h (since 2008).

Furthermore, the operation of diesel-driven trains is expensive and increases over time. Not only that - maintenance costs are also high because only the manufacturer (AnsaldoBreda) produces the spare parts for the IC4 trains. So, that is one reason why the multi-year delayed rolling stock project of IC4 trains could not be discontinued, while the other reason is due to the legislative issues of having assumed co-production of the trains in a settlement agreement in 2009.

Punctuality during the past 15 years:

2013: 92,9% - new CEO enters office
2012: 94,5% - new management enters office
2011: 90,6% - management is fired
2010: 89,7%
2009: 89,9%
2008: 91,8% - new management enters office
2007: 89,6% - new CEO enters office
2006: 83,5% - management is fired
2005: 87,2%
2004: 89,8%
2003: 91,2%
2002: 92,3%
2001: 91,9%
2000: 92,4%
1999: 94,5%

Note that the numbers have been adjusted, which explains the slightly higher numbers presented above. The railway service remained below the 90% minimum threshold in 2011. Note also that the numbers exclude the problematic cross-boarder operations between Denmark and Sweden, which are at a lower level, while the commuting trains (s-trains) in the Greater Copenhagen Area are higher. See Roldsgaard (2012) 'stability fallacy' for further details about the consequences of this misperception.

5.6 The rolling stock problem

The rolling stock problem is commonly known as the 'IC4 project', which has been an object of political debate during the past decade. The interesting part of the story is that the Danish State Railways was previously known as a technologically successful company in other European countries. The political debate about the implementation of superior electrified train technology reached a peak in 1999 when it was decided to postpone the electrification of the infrastructure due to the high cost of doing so. Instead, a political decision was made to outsource the production of the four-set intercity trains (IC4) to the Italian manufacturer AnsaldoBreda.

The goal was to replace the IC3 by IC4 trains to scale up the capacity of the trains in order to lower the cost per passenger per kilometer. The plan was to implement the IC4 trains in 2005, but multiple delays gradually turned the 'IC4 project' into a recurrent political issue, which attracted critical media attention. After 13 years, only 19 out of 83 IC4 train sets were in operation in March 2013.

In August 2013, a total of 23 IC4 trains were in operation, while 80 of 83 IC4 trains were delivered. During the same month, the traffic authority granted permission to operate IC4 trains at a maximum speed limit of 140 km/h in the leaf fall period (October-December 2013) due to breaking issues observed in fall 2011, but otherwise endorsed the maximum speed of 180 km/h of the intercity trains.

The multiple-year delayed 'IC4 project' has led to significant cost overruns, not only because of the unforeseen extra cost of producing the trains, but also in terms of paying an unnecessary (and unexpected) high rent for the extra licensing of expensive rolling stock from a German train supplier during several years, not to forget the cost of the lost revenues of a well-functioning railway system as well as the negative impact on the reputation of the company. See the 'vicious circle' in Roldsgaard, 2012 for further details about the self-reinforcing problem.

The rolling stock problem is described in further detail in figure 5.1.

The rolling stock problem, 1999-2012.

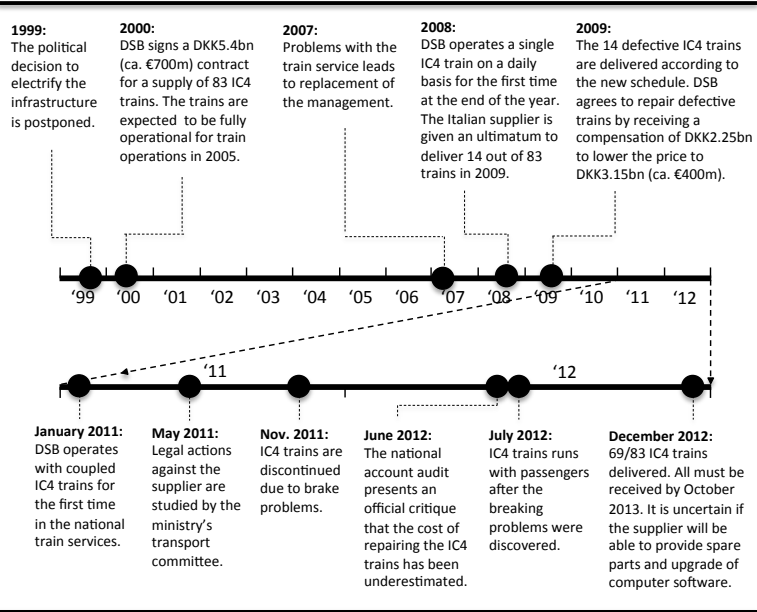


Figure 5.1: Rolling stock problem

Source: The Author

Recognizing the rolling stock problem, it was quite surprising in a positive sense that the Danish State Railways had been able to boost passenger growth in a time of global recession (Molina et al., 2011), but history later revealed that the over-appreciation of growth on the top-line (i.e. revenues, passenger growth) was a deceptive indicator that had led the political attention away from the core challenge of improving the railway operations (Roldsgaard, 2012). Roldsgaard (2011, 2012) studied the development of the Danish railway operator's business model in a longitudinal perspective to conclude that it was not only challenged in the short-term in terms of profitability and inter-modal competitiveness,

but also in the long-term because the railway service was based on an outdated infrastructure and aging fleet of rolling stock.

5.7 The unexpected outcome

Although this seems rational and logical, the railway service became a subpriority or subfocus for the former top management. The former management was very focus on the maintenance of the rolling stock (as opposed to finding new ways for renting 'new' rolling stock) as described in the introduction of the case presentation.

One reason may be due to the scarce selection (and range) of available old-diesel driven trains (which is the formal response) or because the ministry and former senior management had little or modest experience with the renting of 'new' rolling stock. Neither is there any tradition of renting rolling stock in Denmark due to the previously successful co-development of the IC3 trains at the end of the 1980s and beginning of the 1990s.

However, a compelling reason for focusing on the acquisition (renting or purchase) of rolling stock when looking forward is that new opportunities arise with the enrollment of a gradually electrified infrastructure (i.e. innovation of the present operations). The long-term capacity planning should therefore not only focus on having enough rolling stock for the operations although the capacity to carry the passengers (i.e. extension of today) clearly was a central challenge at the time when the doctoral investigation was performed in fall 2011.

The positioning of international growth on the top management agenda and thereby also the political agenda defined the strategic shift. The project was based on four official pillars: [1] more customers, [2] cost savings to the government, [3] boost internationalization, and [4] improved reputation index, which measures customer satisfaction. The ambition was to retake the 'second home market' in Sweden to boost sales via international expansion (Roldsgaard, 2012, "The sub-optimization of the business model").

The project ‘Sporskifte 2010’ was translated into ‘Change project 2010’ although the term has a metaphorical meaning in Danish, meaning that it could be translated into ‘a point’ (i.e. lead or turnout curve) when a railway track meets a point where it changes in a new direction as illustrated in figure 5.2.

The intention of the strategic change project may have been the best, but the accounting books were re-opened in spring 2011 for the first time to set aside an amount of 100 million euro to cover an expected loss for the fiscal year 2010 when reviewing the accounts the second time.

Contrary to expectations of the senior management, the lead curve didn’t connect with the expected best-case scenario, but instead led to an unexpected scenario resulting in an unprecedented economic loss. The new management launched an ambitious two-year project in 2008 called ‘Switching Track’ (In Danish: Sporskifte 2010).

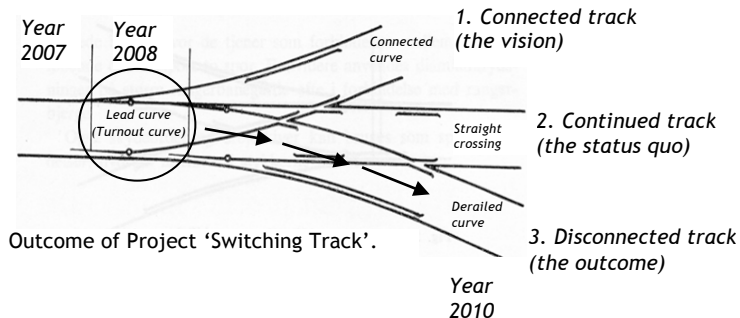


Figure 5.2: The unexpected outcome
Source: The Author

The unprecedented economic development of the Danish State Railways was surprising not only because the top management was replaced in 2006-07 due to problems with the basic railway service (Madelaire & Kronenberg, 2007), but especially because the emergence of a series of

large-scale projects had gradually turned the railway operations into a secondary focus, while one would expect this to be placed at the core of the top management agenda of any railway operator in the world.

The systematic under-estimation of the need to invest in the infrastructure to innovate the railway operations in terms of velocity, punctuality, reliability and train interior for over a decade was placed on top of the mal-investments in international operations in Sweden, which further complicated the management situation.

The accumulation of the distinct crises from railway operations to unsuccessful commercial projects ultimately led to the unprecedented institutional crisis in 2011.

The discourse of the management is in itself worth a study due to the consequent uses of expressions, such as 'customers' (contrary to passengers), 'boost sales' (contrary to railway operations), 'cost savings to the government' (contrary to cost of operations), 'international expansion' (contrary to improving the national railway operations), 'commercial growth' (contrary to bottom-line growth), 'reputation index' (contrary to the value-for-money ratio), but this was beyond the scope of the doctoral investigation.

5.8 The profitability curve

The profitability problem is explained in the figure below. What is the explanation of the development of the curve? Point A marks entry of the new management. Point B describes the effect of the systematic over-estimation of the value from the high risk commercial projects combined with a deliberate and political under-estimation of the cost (or disadvantages) from these projects in order to win the licenses to operate (Roldsgaard, 2012, 'The strategic misrepresentation to win licenses to operate'). Point C describes the accumulated effect of a mal-investment in international operations. Point D describes the accumulated effect of the international expansion, predominantly in the Swedish railway sector. Point E describes the best-case scenario when

looking forward. A six-month period in 2011 was therefore used as the ideal timeframe to study the gaps in the leadership agenda in order to obtain a better understanding of the cognitive leadership challenges that emerged in a period of profound institutional crisis.

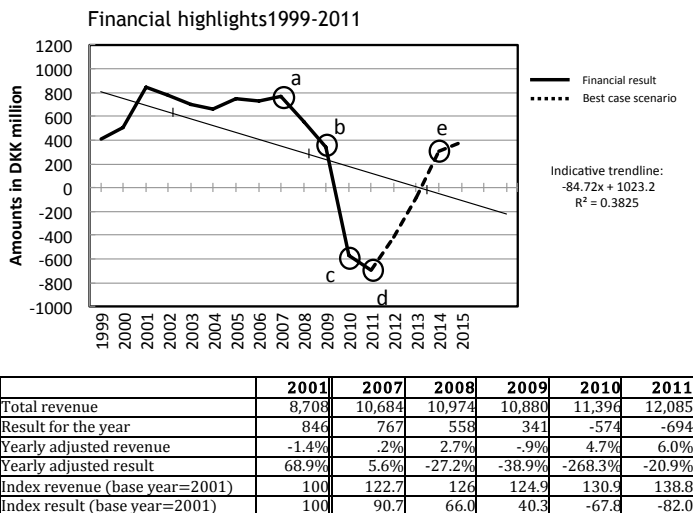


Figure 5.3: Profitability curve, 1999-2011
Source: DSB Annual Reports

5.9 Operationalizing the business model

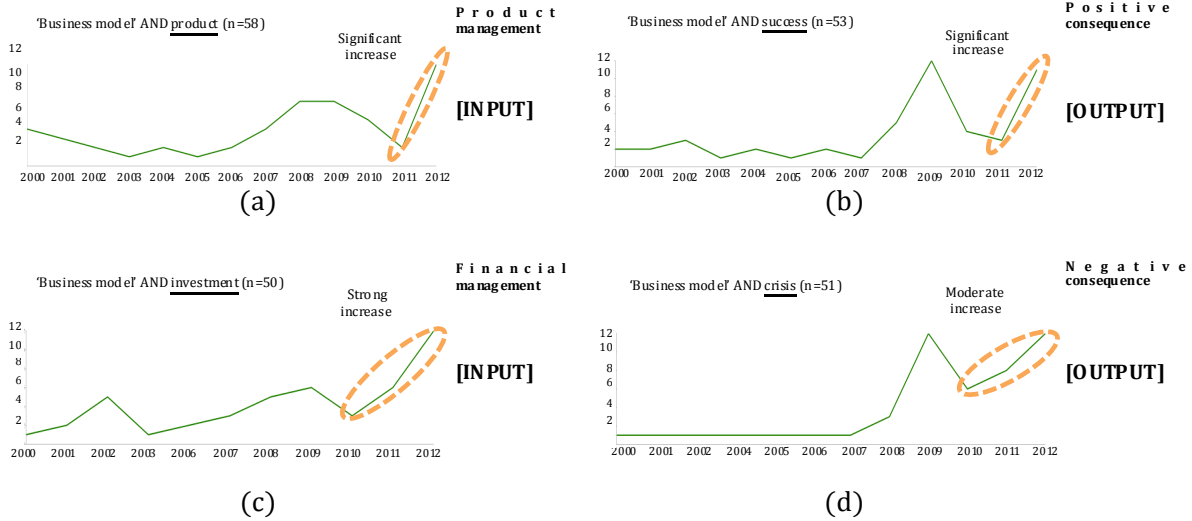
The term has to be clearly defined to bring conceptual clarity and to avoid confusion about the object of study. One of the simplest definitions of the business model has been provided by Afuah (2004), who describes the business model as a framework for making money. The purpose of data triangulation was not to disprove the old theory, but to develop well-known existing theory.

The triangulation of data results was as an alternative to triangulate theoretical conceptualizations to clarify the existing understanding of the

business model as an object of research analysis. The purpose was not to disprove old theory, but to further develop existing theory. The almost identical co-evolution between 'business model' and 'money' over more than 10 years furthermore showed a surprisingly clear relationship between these two variables. To be specific, 56% of the journalistic articles included both words ('forretningsmodel' & 'penge'). In fact, the term 'business model' was identified in about two hundred fifty journalistic articles (n = 259), while 'money' appeared in almost one hundred fifty of those journalistic articles (n = 145).

Despite the clear connection between business model and money, the figure below suggests that the definition of the business model as a framework for making money (Afuah, 2004) may be too narrow to gain a complete understanding of the business model construct. The second longitudinal analysis (performed in the Danish newspaper Information) develops the relationship between business model and money by specifying the co-existing dual challenge of the interdisciplinary management of business-model innovation in figure 5.4.

Figure 5.4: Two-sided platform



Source: The Author, based on information.dk

The four aspects have in common that they are relevant for both the start-up (i.e. creation) of new business models and the innovation of existing business models to improve profitability or competitiveness or both. Hence, the data does not refute the relationship between business models and profitability, but it identifies four central aspects related to the management of business-model innovation. The figure specifies a growing level of attention to 'product' (a: 'produkt') and 'success' (b: 'succes') in the public discourses on the topic in Denmark.

The figure then specifies a rather strong increased attention on 'investment' (c: 'investering') and a moderately increased level of attention on 'failure' (d: 'fiasko'). The two streams are equally important, but conceptually different. The finding simply suggests that different people have to manage both sides of the same coin (i.e. two-sided platform), which sometimes cause problems between the people in charge of these two distinct management disciplines. A common feature for most definitions of the 'business model' is that they describe:

- **STREAM 1. The product-service stream** describes how the 'customer value proposition' of the company's products and services is created and delivered from 'key partners', 'key activities', and 'key resources'; to: 'customer relationship' and 'channels' to deliver that value to different 'customer segments'.
- **STREAM 2. The financial stream** describes the relationship between cost and revenues. The 'cost structure' of the company is related to the outcome of the collaboration with key partners in addition to the operating cost of the key activities and key resources (i.e. people or machines). The 'revenue streams' of the company is related to the outcome of the delivering value to the different customer segments, while building or retaining a viable relationship with the customers.

The two streams are related to each other because the product-service stream depends on the investment in technology to obtain a long-term competitive advantage. Figure 5.5 clarifies how the Danish State Railways was challenged both in the short and long-term when the doctoral investigation was conducted in fall 2011. The figure is an adaption of Novo Nordisk's model for long-term economic sustainability (Campbell, 2011, p. 40).⁷The general integrative discipline of managing

⁷ Novo Nordisk is among the most successful medical firms in the world. The label 'patents' was replaced by 'services' to shift focus away from protection of value to delivery of value.

business-model innovation is therefore assumed to be affected by politics. In this context, political leadership refers to unifying potential different interests either between the different management groups in a large company or between the senior executive management and the owners of the company, rather than integrating tensions (e.g. Smith et al., 2010). The business-model concept clarifies that investment in the technological core (i.e. the railway service) is essential for the development of a competitively sustainable business model as described in figure 5.5.

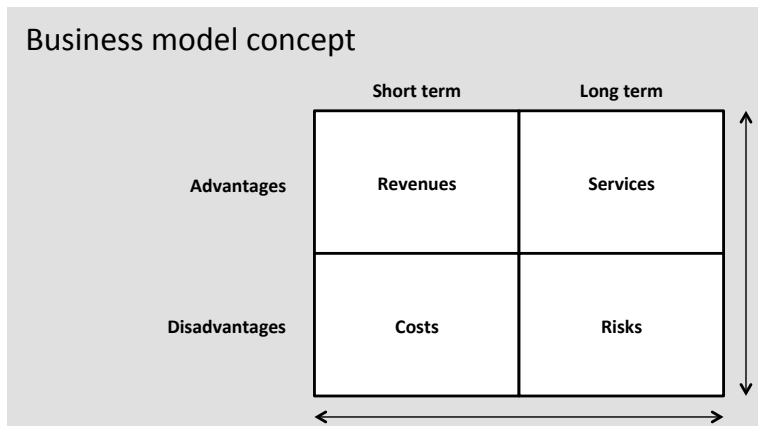


Figure 5.5: The business model construct

Source: The Author

The short-term challenge is to ensure profitability (i.e. costs-revenues), while the long-term challenge is to develop the core product/service offering (i.e. services-risks). In other words, the management of costs is important for profitability, while the management of risks (and investment) is important for the long-term viability of the business model. The arrows describe that the short-term and long-term challenges must be managed simultaneously (i.e. cause-and-effect relationship). The advantage of this conceptualization is that the business-model system can be evaluated in a cause and effect

relationship. The short-term challenge is to leverage the relationship between cost of operations and the revenue streams, while the long-term challenge is to develop the existing service in operation that must be managed at a day-to-day basis. In this context, it is important to remember that the existing business model of the railway operator should not be evaluated against how it might evolve, but against the current state of the business-model system (Tece, 2010).

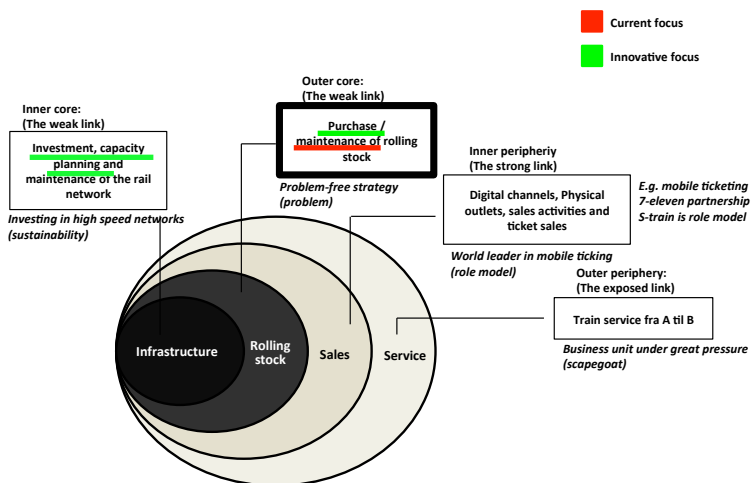


Figure 5.6: Core-periphery relationship

Source: The Author

Figure 5.6 describes that the railway operator's business model is dependent on the investment in the infrastructure and the rolling stock, while it also clarifies the focus of the former senior management on the development of 'digital channels' (i.e. ticket sales) and sales activities to boost revenues. Figure 5.6 thus explains why long-term capacity planning (and investment) lays of the core of the 'business model system' along with the daily maintenance of the rail network. Figure 5.7

specifies the basic assumption why the commercial end products remain important for profitability and for impacting multiple stakeholders. However, the development of new commercial end products is assumed to be contextually dependent on the core product (i.e. the quality of the transport of passengers from a to b).

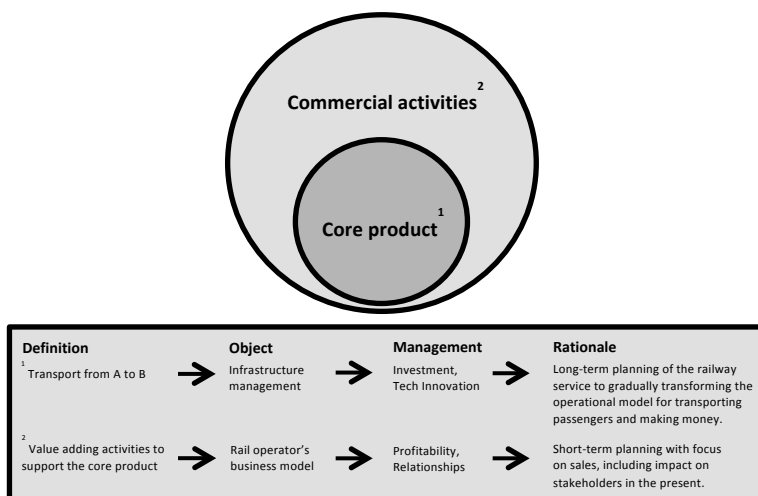


Figure 5.7: The basic relationship

Source: The Author

The basic relationship between the core product (i.e. technological innovation) and the commercial activities (i.e. the railway operator's business model), which will be examined in the empirical study. In this context, one has to remember that the business environment is a choice variable itself, where 'firms can select a business environment or be selected by it', but they can also shape it (Teece, 2010, p. 191).

Other key theorists in the field of business models have reached a similar result. Osterwalder et al. (2010) have intelligently combined the two

streams in the business model canvas, which consists of the nine building blocks highlighted in the description of the two streams of management. The business model canvas is the most well-known tool that exists to analyze business models. The business model canvas has contributed to the development of an accepted 'language', 'framework' or 'tool' for reviewing new and long-established business models. The business model canvas (Osterwalder et al., 2010) has been widely used by practitioners, but some key theorists have also endorsed the framework (e.g. Chesbrough, 2010; Baden-Fuller & Haefliger, 2013).

Despite the recognition of the business model canvas, it still has a few limitations that need to be outlined before operationalizing the business model construct. First, the business-model canvas ignores the competitive aspect, which is considered essential (Chesbrough & Rosenbloom, 2002; Chesbrough, 2010). Second, the business model canvas ignores the people who assume the responsibility for the development of the business model.

For example, some theorists in this field of research have emphasized the importance of the 'learning system' (Itami & Nishino, 2010), 'delivery system' (Roldsgaard, 2010) or 'business model system' (Baden-Fuller & Haefliger, 2013). Finally, the business model canvas ignores the short and long-term perspective, which seems too important to ignore.

For this reason, the two streams of the business-model canvas were developed in a simplified model to include the short-term and long-term challenges for the development of the rail operator, which provides a basis for classification to establish an analytical overview.

5.12 Summary

An institutional crisis has been observed in the Danish railway sector, but the causes have not been studied from a management perspective based on the managers' understanding of the factors affecting the innovation management of a business model in crisis. A comprehensive management survey was used to test the 'current belief system of the

company' (Baden-Fuller & Haefliger, 2013) to obtain a deep understanding of the possibilities within the current business-model system.

The change in the external environment means that management has to deal with a new situation, which is not an easy task. A new situation may require a new decision to be made, but it very rarely requires a change in the basic preferences. So, while the decision to follow an approach of trial-and-error experimentation may be ideal in a time with abundant success with little or no negative ramifications; in a time of crisis it can have serious consequences as a result of unforeseen events and unexpected outcomes with dire consequences as a result of conducting large-scale commercial projects.

It was a deliberate choice not to conduct a qualitative study based on a few interviews with a few select managers (e.g. Achtenhagen et al., 2011, 2013). The management survey was developed *after* conducting a few interviews with a few managers (over 20 in-depth and semi-structured interviews). Hence, the initial interviews were used as part of the preparation to scaled up the investigation to include the majority of the managers to study the causes of the crisis in greater detail.

Chapter 6

Design of the management survey

The guidelines for designing social science studies (Oppenheim, 1992) were followed when designing the survey from operationalizing theory into questions and statements to be tested in the management survey. The comprehensive management survey was designed to better understand the underlying assumptions and challenges for facilitating a necessary business-model innovation in the Danish railway sector in a time of an institutional crisis.

The management survey was based on three related studies. The first study of the basic relationship explores if technological innovation is potentially more important than the development of the railway operator's business model or vice versa. The second study explores the basic relationship in greater detail by examining the most important barriers and opportunities for developing the railway operator's business model in a time of crisis. The third study explores the importance of cognitive leadership in a time of crisis by comparing the importance of the individual variables of the leadership agenda (Doz & Kosonen, 2010) with the attention they were given by the top team in the six months leading up to the crisis.

The most important contribution of the management survey is the generation of data about the challenges for cognitive leadership during periods of crisis (about 75% of the data collected). The purpose was to

identify gaps in the leadership agenda to point out the most critical variables for political and senior executive management during periods of crisis. The data was collected with Scandinavia's most advanced survey management program SurveyXact.

The dataset contains 22,729 responses from 368 managers with an average of 15 years experience working in the Danish railway sector. The management survey was designed to examine the 'current belief system of the company' (Baden-Fuller & Haefliger, 2013) to better understand the underlying assumptions and challenges within the current business-model system.

The data collection strategy is considered perfectly consistent with the encouragement to investigate the management agenda of a large company by examining the 'mental models' of the people working in the organization (Baden-Fuller & Haefliger, 2013; Doz & Kosonen, 2010; Chesbrough, 2010).

The long-standing management literature has traditionally emphasized the importance of studying the 'mental models' (e.g. Daft & Weick, 1984; Fahey & Narayanan, 1989; Senge 1990), 'cognitive maps' (e.g. Dutton et al., 1983; Dutton & Jackson, 1987; Barr et al., 1992), 'internal pictures' (Senge 1990), 'boundary beliefs' (e.g. Reger & Huff, 1993; Pettigrew et al., 2006) and 'cognitive drivers' (Aspara et al., 2013) to understand the 'cognitive maps' of the managers on the strategic development and performance of the Danish State Railways. The diverse terms have in common that they are assumed to be:

deeply ingrained assumptions, generalizations, or even pictures and images that influence how we understand the world and how we take action ... The discipline of mental models starts with turning the mirror inward; learning to unearth our internal pictures of the world, to bring them to the surface and hold them rigorously to scrutiny (Senge, 1990, pp. 8-9).

The management survey was considered a superior method because it made it possible to scale up the investigation in order to gain in-depth insight (i.e. detail information) from multiple management groups as an

alternative to interview a few select managers, who represent a small percentile of the responsible managers as well as their opinions and beliefs. It was a deliberate choice to study the institutional crisis via a comprehensive management survey to get breadth (i.e. to be representative of all managers working the company) and to get an in-depth understanding of the underlying assumptions and challenges for facilitating a necessary business-model innovation in a time of crisis. There are several reasons for performing a comprehensive management survey.

- First, researchers can normally not get access to the railway managers (or other politically driven organizations), which means that the respondent-driven sampling method is considered the ideal for the study of hard-to-reach populations (Heckathorn, 1997, 2002).
- Second, the rationale is to investigate the challenges for cognitive leadership in an institutional crisis; by the means of a management survey, as an alternative to conduct a few semi-structured interviews (e.g. Aspara et al., 2011, 2013) in order to ground the conclusions on a representative sample with about 80% of the managers taking part in the doctoral investigation (using over 20 minutes in average).
- Third, the management survey is the preferred psychometric research method (Nunnally & Bernstein, 1994) and it has been widely applied in management research (Hinkin, 1998; Edwards, 2001).
- Fourth, the clinical method of randomized parallel group trials is used to describe the sampling methods used via diagrams to provide transparency about the sample representativeness; and to clarify the connection between the theories that were applied in the study, including the operationalization of these theories into nine trials.

By trials is meant, a formal examination of evidence provided by multiple managers to test the former top management's assumptions about the underlying relationships to be tested in the three studies each based on three trials. Fifth, the survey made it possible to examine the responses

across the seven management groups to test the reliability of the results (Moher et al., 2010).

6.1 Planning and execution of the management survey

The guidelines for writing good scale items were applied to produce valid scales via a common structure to minimize error when collecting the data to make stronger claims about the key findings (DeCoster, 2000).

The management survey was considered the best method to investigate the causes of the institutional crisis by including the managers working in the business sector, but also to understand the underlying assumptions about the current business model to avoid the emergence of an institutional crisis at its early stage before it reaches a critical point. The management survey explores the cognitive factors and other underlying psychological reactions to the escalating crisis that caused the dramatic development observed in the period from 2009 to 2011.

The use of modern technology thus made it possible to remedy one of the limitations of many qualitative studies, while a limitation of the present study is that about 25% of the data is difficult to generalize outside the railway sector. Yet, the study of the management agenda is suggested to be perfectly generalizable at a universal level since it was not limited to the railway sector. Scandinavia's leading management survey surveyxact was used to administer the entry of data.

The program enabled the researcher to assign a unique code to each participant to control the data collection. Another advantage of the web-based survey was that it enabled the managers to record the data directly in the database to eliminate any 'double entry' procedures in the conversion of the data from paper to computer.

Archival material was available and reviewed in parallel to the direct observations in a series of strategic meetings and workshops in a six-month period before launching the management survey. All documents

having in common that they described success cases of the past or tasks to be done when looking forward. The first six months were used to review archival material and to perform a series of interviews with about ten managers to gain an in-depth understanding of a near-capsized project ('rejsekort'). However, the interview-based approach was disrupted as a result of the emergence of the institutional crisis in 2011.

To be precise, the qualitative study could have been continued and completed, but the emergence of the greatest crisis of an important company for at least 20 years was a unique opportunity to collect rich data that is normally not accessible to outsiders such as management researchers.

The permission from the senior executive management to collect sensitive data from the company managers in a time of high uncertainty was essential. Without it the data could not have been collected to advance the existing knowledge about the most critical points of the top management agenda in a time of crisis.

The cognitive pretesting (Collins, 2003) was time consuming, but it improved the validity of the data because the statements and questions were anchored in the sector-specific context. The statements were reviewed by a selection of managers in a pre-study and in a pilot study before running the survey at a global level.

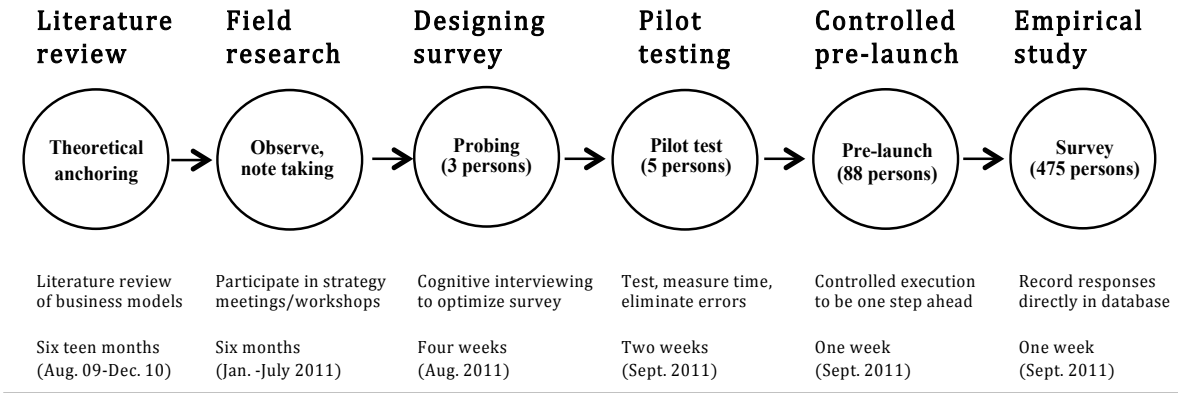
The pre-testing of collecting data of high quality *ex-ante* has been considered equally important as the information-processing of the data collected *ex-post* (Schaeffer & Presser, 2003). It was therefore decided to combine methods to benefit from flexible qualitative interviewing techniques and rigid quantitative techniques to collect data (Carr, 1994; DeCoster & Lichtenstein, 2007). For example, the qualitative think-aloud interview probing was important to test if the respondents had understood the questions and statements in the same way to minimize systematic error (Alwin & Krosnick, 1985).

The five pilot testers were invited to suggest moderations of the management survey, including rephrasing the questions and statements to be tested in the own words of the managers, which was an important step to improve the wording of 135 items of the management survey. The dialog-based interview probing with the managers led to several smaller improvements and one essential improvement. The statements were reviewed by a selection of managers in a pilot study before running the survey on a global level.

Then, a controlled pre-launch was used as an ahead group to minimize the risk that an error that could disrupt the data collection. Furthermore, the pre-launch was important in order to be one step ahead when collecting the data. The ahead-group did not report any error for which reason it was decided to launch the survey at a global level one week later, which means that the data was collected within a two-week timeframe in September 2011. The timeline of the doctoral investigation is described in figure 6.1.

Figure 6.1: Timeline of the doctoral investigation

From literature review to empirical study



The randomized respondent-driven sampling method (Heckathorn, 1997, 2002) was used to reach a hard-to-reach population. The respondent-driven sampling method is a development of the chain-referral sampling method (Erickson, 1979), which remedies two major deficits. First, only managers within the Danish state railways could answer the survey to avoid collecting answers from some random people (i.e. non eligible participants), which is an essential step in the generation of data with high validity (Johnston & Sabin, 2010).

Second, the respondent-driven sampling method eliminated the peer-to-peer recruitment bias of the snowball sampling method. The use of modern technology made it possible to scale up the doctoral investigation that is representative of an entire business sector.

The management survey made it possible to build a new understanding of the central challenges and conditions for facilitating business-model innovation through the participation a representative part of the managers working in the business sector. Every manager in the Danish state railways had the chance to submit his or her responses anywhere within a deadline of ten workdays.

The participation of about 80% of the managers resulted in a comprehensive study with over 22,000 responses, which was considerably higher than the expected 60% response rate. The managers used about 20 minutes in average to fill in the responses, which indicates a high level of relevance of the study.

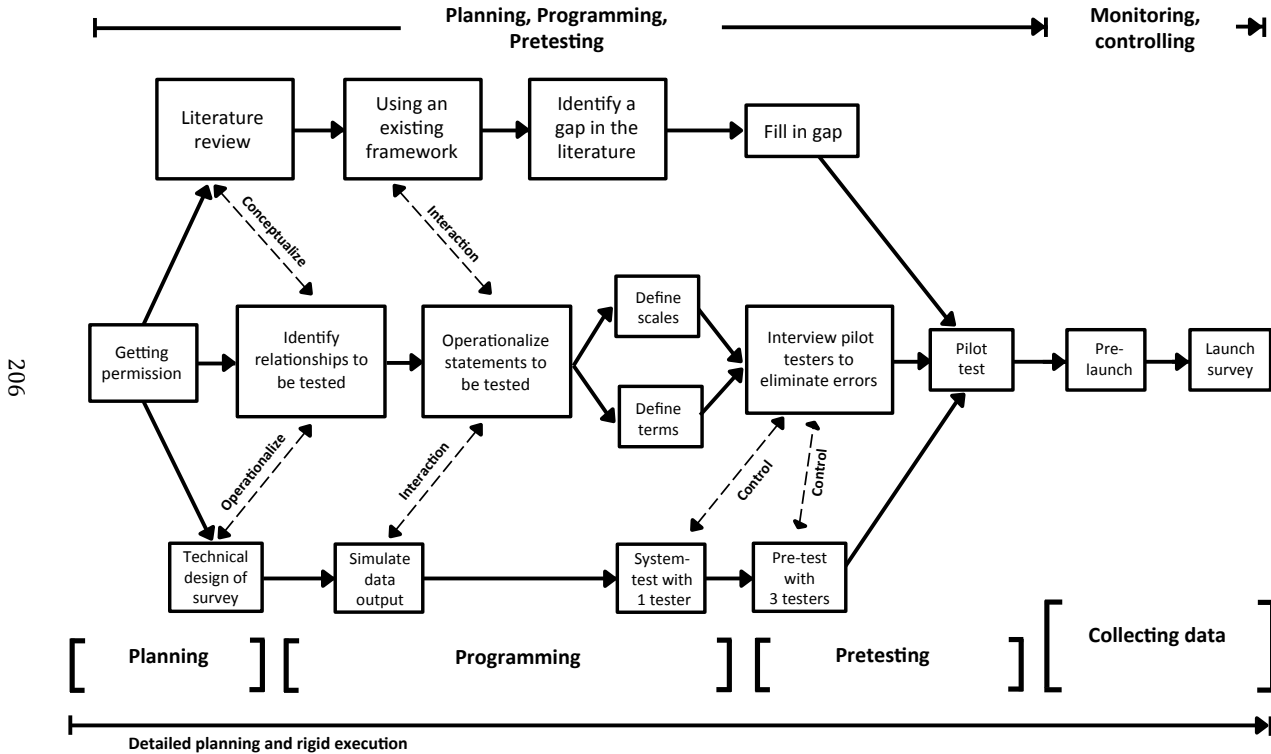
For comparison, the five test pilots used between 10-15 minutes to fill in the answers. The high amount of time that the managers used to fill in the responses indicate a strong underlying desire to participate in the study to contribute with their beliefs about the questions raised.

The comprehensive management survey made it possible to generate data from multiple management groups. The broad scope of the survey gave the opportunity to subsequently compare multiple perspectives

from multiple management groups, as opposed to just having one perspective from a single group of interviewees.

The strategy to collect the data may be considered more complete compared to the classical semi-structured interviews with the elite circle of top managers, representing only the tip of the iceberg or an incomplete representation of the managers working in the company. The operational procedure of the management survey is described in figure 6.2.

Figure 6.2: Operational procedure



6.2 Design of the management survey

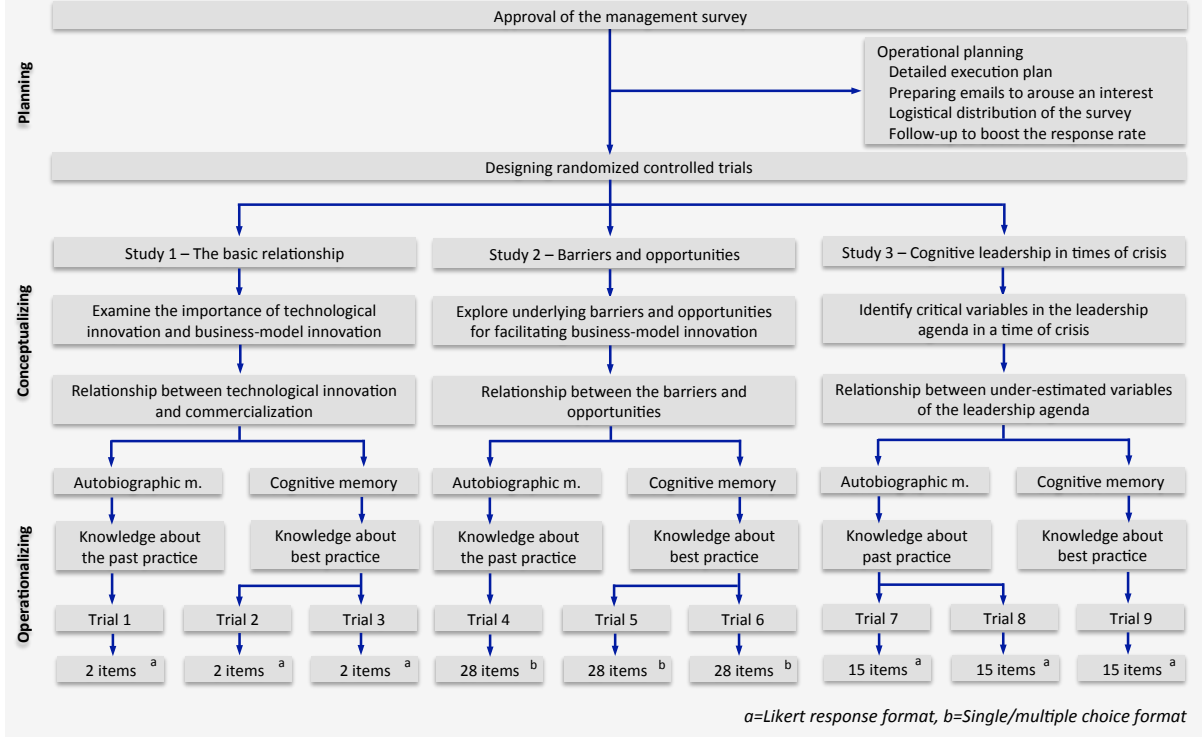
The guidelines for evaluating multiple direct measurements under uncertainty were used as a checklist (Cacuci, 2003). The outcome of item-values (i.e. averages of Likert-type measurements and observation of cases in the single-multiple choice tests) of the one-hundred thirty-five points of measurements were examined at macro level to avoid the common fallacy of evaluating the Likert-type measurements at individual level (Carifio & Perla, 2007).

The management survey was rigorously designed with the clear purpose to explore the underlying assumptions and challenges for facilitating a necessary business-model innovation when the crisis was at its peak in 2011. The first study operationalized the core-periphery theory (Thompson, 1967) to examine the relationship between technological innovation and business-model innovation, generating a total of 2,208 responses about the basic relationship between the importance of technological innovation and business-model innovation in the Danish railway sector, which corresponds to about 10% of the total data collected in the management survey.

The second study generated a total of 3,961 responses about the barriers and opportunities for facilitating business-model innovation in the Danish railway sector (about 15% of the data collected) to complement the first study. The second study operationalized the business-model innovation theory (Chesbrough, 2010) into three fourteen-scales with a total of eighty-four single-multiple choice options (i.e. three choice batteries) to specify the barriers and opportunities for facilitating business-model innovation in a time of crisis.

The third study operationalized the leadership agenda theory (Doz & Kosonen, 2010) into forty-five statements measured on a Likert seven-point scale to identify the most critical points of the leadership agenda in a time of crisis. The third study generated a total of 18,768 responses about the critical points of leadership in time of crisis, which corresponds to about 80% of the total data collected.

Figure 6.3: Flow chart of randomized controlled trials



6.3 Scale measurements

The fourteen industry-specific single-choice battery was replicated three times to collect a total of 3,961 responses based on 84 points of measurements. In addition, the classical seven-point Likert-type response format was used to collect a total of 18,768 responses based on 51 points of measurement. The Likert scale describes the direction of an attitude toward an object, including the density of the responses (Albaum, 1997).

The direction describes the orientation of responses, while density describes the strength of measurement. The optimal number of the Likert scale has been discussed for over 50 years (Carifio & Perla, 2008), while there seems to be some consensus that the optimal number of scale points used to produce meaningful data ranges between 2 and 11 response categories (Preston and Colman, 2000).

Other researchers have found that scales with less than 5 response categories tend to perform poorly and that the reliability decreases for scales with more than 10 response categories (Chang, 1997). Bass et al. (1974) finds that up to a maximum of nine points can be used effectively, while Alwin (1997) argues that scales with more response categories tend to be superior of those with fewer response possibilities. The 7-item scale is considered to be more reliable than scales with fewer or greater options (Chang, 1997). De Vaus (2002) agrees that the 7-point scale is superior to the 5-point scale. The seven-point scale was therefore selected for the Likert measurements to be consistent and to retain a common structure. The same literature has discussed the advantages and disadvantages of labeling every single item of the Likert-type scale or only the extreme ends with the conclusion that both works.

The standard approach of most survey programs is to use the extreme ends. In both cases, a conservative approach (Farmer et al., 2001) is recommended when selecting the label anchors. Three of the most well-tested response anchors were applied in the management survey (Vagias, 2006). The classic seven-point 'Level of Agreement' anchor

labels were used to evaluate the benefits of an intensified focus at the domestic railway market (2 items). For the remaining questions and statements, the classic seven-point 'Level of Acceptability' anchor labels were used for measuring the past practices to test the autobiographic memory of the managers, while the classic seven-point 'Level of Importance' anchor labels were used to examine the assumed best practices (49 items).

6.4 Sample representativeness

The doctoral investigation is based on the participation of 83% of the eligible members in the population group (78% after data cleaning). The managers who participated in the doctoral investigation are specialized experts in different areas of responsibility with an average seniority of 15 years. A total of 396 managers submitted their questionnaire of which 372 were complete. The number of valid questionnaires was reduced to 368 managers after four cases of systematic error were removed from the dataset (as encouraged by Rennie, 1982), which leads to a sample representation of 78%. In other words, a total of 74 managers did not participate in the study, while 24 managers did not complete questionnaires and 4 cases of systematic responses were excluded from the dataset. The four cases of 'systematic responding' were eliminated to avoid influencing the direction and intensity of the responses. The four cases of 'systematic responding' mean that the respondent selected only one point on the Likert scale for all statements (e.g. 1 or 7 scale point). This result in a total of three hundred sixty-eight valid questionnaires (n=368) corresponds to a sample representation of 78%.

The responses were provided by 73% male managers and 27% female managers. The average manager is 47 years old and he has been working in the company about 15 years. The managers were randomly distributed into the groups based on the position in the organization, according to the ID-number. Each manager was given an identification number activated when clicking the link to the survey, which eliminated the possibility of receiving multiple questionnaires from the same person. Software algorithms were used to match the data from the

survey to classify six types of information for each manager: 1=Group, 2=Gender, 3=Age, 4=Seniority, 5=Employees, 6=ID. The managers did not have to type in this data since the information was already available. This step is seldom mentioned in the statistics literature, but it was considered an important step to control that the identity of the manager is valid. The simple random sampling method was applied to distribute the managers into seven groups of managers. Each manager was assigned a unique ID-number, which eliminated the possibility of receiving multiple questionnaires from the same person or to receive questionnaires from non-eligible persons.

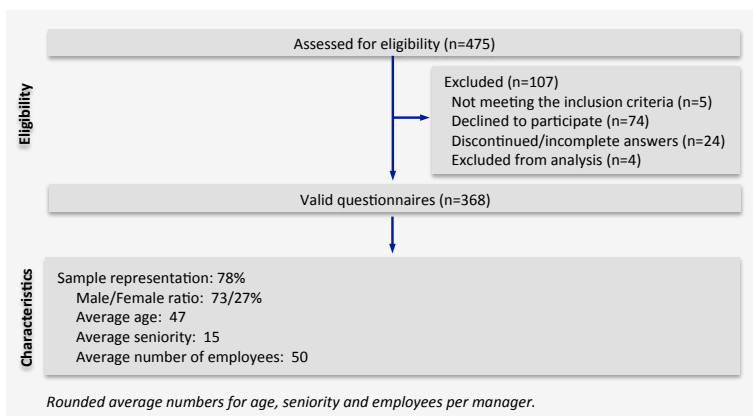
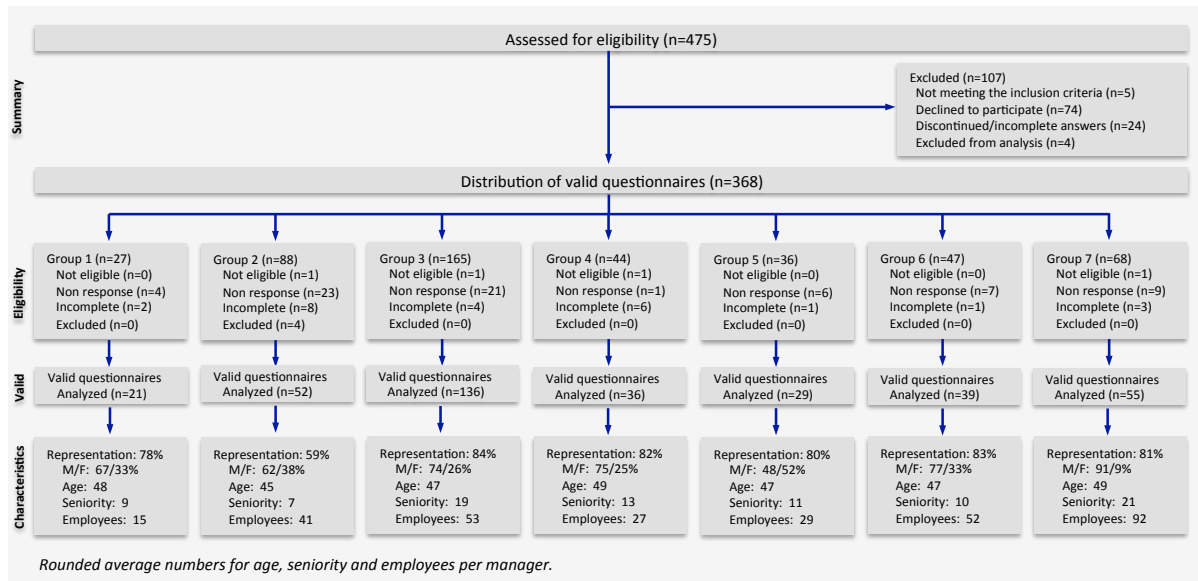


Figure 6.4: Representative sample.

Source: The Author

Seven management groups were operationalized as ‘parallel groups’ to cross-examine the consistency of the responses. The parallel groups were used to examine the consistency of the responses across different management groups in order to increase the reliability of the results. The five members of the top team were considered ‘non eligible’ because the purpose was to test the hypothesis of the former senior management of the Danish railways (i.e. inside view). The sample characteristics of the seven management groups are described in figure 6.5.

Figure 6.5: Parallel randomized study of seven groups



The responses were reviewed at an abstract meta-level to identify the most critical variables of the leadership agenda during a period of crisis. The principles for evaluating 'outcome pattern matching and program theory' (Trochim, 1989) were used to review the reliability of the results in a multi-level system of data. Program theory was thus operationalized as a system of multiple relationships to be tested in the management survey in the same study, while the outcome patterns across the seven management groups were designed to review the consistency of the responses in a multi-level system of data.

The survey was designed to measure the underlying attributes of the individual variables within a system of multiple relationships (Cacuci et al., 2005). Rigorous attention was given to the elimination of systematic and random error in the design of the management survey before collecting the data *ex ante*, but also when cleaning the data *ex post* in order to make stronger claims about the constructs being measured.

The guidelines for scientific reporting of randomized parallel-group trials (Moher et al., 2010) were followed to examine the reliability of the data across seven management groups before specifying the most critical variables of the leadership agenda (Doz & Kosonen, 2010) in a time of crisis.

The macro-level measurements were organized into independent scales (i.e. trials) with multiple items into a system of data to study the three relationships in isolation to follow the positivist tradition of keeping an objective distance to the data collection and subsequent data analysis. For example, the fifteen variables of the leadership agenda were measured three times and they were analyzed in a macro-level system (i.e. scale) with multiple variables.

6.5 Summary

The randomized respondent-driven sampling method (Heckathorn, 1997, 2002) was used to collect data from a hard-to-reach population in a time of crisis. The dialog-based think-aloud interview probing method

was used to test if the respondents would understand the questions and statements in the same way to minimize systematic error (Alwin & Krosnick, 1985). Subsequently, five pilot testers were invited to test the survey draft, including of rephrasing the questions and statements in the own words of the managers in order to improve the wording of 135 points of measurements.

The dialog-based interview probing with the managers led to several smaller improvements. Afterwards, the management survey was then tested in a pilot study, while an operational control group with 88 managers (i.e. ahead group) was used to collect data before sending the survey the remaining total of 395 managers to minimize the risk that an error in the management survey could disrupt the data collection.

Hence, the cognitive pretesting method (Collins, 2003) was used in a pre-study to collect data of high quality (Schaeffer & Presser, 2003), while the controlled pre-launch was used as an ahead group to minimize the risk that an error that could disrupt the data collection by being one step ahead when collecting the data when collecting the 22,729 responses (i.e. after data cleaning) within a two-week period in September 2011.

The comprehensive management survey analyzed three related relationships in parallel. The first two studies contain about 25% of the data collected, while the third study contains about 75% of the data collected. The results of the leadership agenda are foregrounded in the doctoral thesis because the data accounts for about 75% of the 22,729 responses provided by the 368 managers, while the results of the basic relationship between technological innovation and business-model innovation and the related underlying barriers and opportunities for facilitating business-model innovation in a time of crisis serve as background for comparison.

The leadership agenda (Doz & Kosonen, 2010) was used as a conceptually validated framework to investigate the 'mental models' or 'internal pictures' (Senge, 1990) of the managers working in the Danish railway sector with a seniority of over 15 years in average to specify the

most critical variables in a time of crisis. In other words, about 75% of the data collected to better understand the cognitive areas of leadership that are assumed to have great importance for the survival of organizations and their future success (Mumford, 2013).

The guidelines for the reporting of randomized parallel group trials (Moher et al., 2010) were used to describe the flow diagrams of the data collection and sample representativeness. The guidelines for the reporting of social-scientific clinical and medical method based on the participation with multiple patients randomized into parallel groups of observation (Moher et al., 2010) were used to cross-examine the data collected. The measurements were systematically examined across multiple management groups to validate the results in a time of high uncertainty.

Chapter 7

The basic relationship

The purpose of the first study is to examine the basic assumptions concerning the relationship between technological innovation and business-model innovation in the railway sector. The doctoral investigation aims to answer these questions by examining the responses provided by 368 managers who have, in average, a seniority of 15 years working in the railway sector.

The initial hypothesis was that the managers working in the Danish railway sector would consider technological innovation to be more important than business-model innovation. If this assumption would be confirmed then it would mean that business-model innovation would be assumed to be depended on investment in the infrastructure to run electrified and modern rolling stock - not only to achieve more timely and more reliable railway operations, but also to implement faster railway services. The operational hypothesis was that the managers working in the Danish railway sector would consider technological innovation 'very important' (>6.0 in average on the seven-point scale), while the importance of business-model innovation would be considered 'slightly important' (<4.00 on the seven-point scale).

The theory of the technical core and more flexible peripheral services (Thompson, 1967, 2003) was used to examine the underlying relationship between the 'core product' and the 'commercial end

products' in the railway sector. The core product is a well-known concept in the sector and it was defined as 'transport from a to b'. The commercial end products were described as commercial activities and defined as 'business driven activities to support the core product'.

7.1 Review of the results

The measurements confirm that the core product (i.e. technological innovation) is essential for long-term success, while the managers reject the hypothesis that business-model innovation is only of slight importance as described in figure 7.1.

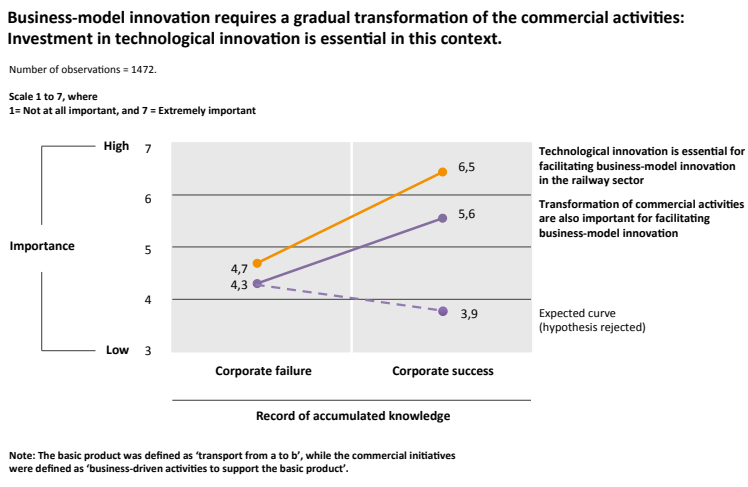


Figure 7.1: The basic relationship.

Source: The Author

The figure explains that business-model innovation requires a gradual transformation of the commercially-driven activities and that the investment in technological innovation is considered essential in this context. The left side of the figure describes the recipe of corporate failure

(i.e. mediocre railway service), while the right side describes the recipe of corporate success (i.e. superior railway service). The difference between the current situation and the desired state clarifies the importance of gradually replacing the 'old' mediocre railway service that we know today with a 'new' superior basic product offering (i.e. core product). This result is considered the key finding of the first study.

Chesbrough (2010) asks when does a novel technology require a novel business model and when does the combination of the two lead to a competitive advantage? The answer to this question is that business-model innovation requires a gradual transformation of the commercial activities, which are dependent on the investment in technological innovation.

Baden-Fuller & Haefliger (2013) ask if business-model innovation is potentially more important than technological innovation or vice versa? The answer to this question is that business-model innovation should not only be reduced to a more or less question, if technological innovation is more important and business-model innovation.

Instead, the results of the management survey strongly suggest that technological innovation is an underlying principle (i.e. premise) for facilitating a necessary business-model innovation in the railway sector. The results likewise suggests that the commercial activities of the railway operator needs to be transformed gradually both with and without technological innovation.

Baden-Fuller & Haefliger (2013) furthermore ask what determines the evolution of business-model innovation? The answer is that technological innovation determines the evolution of business-model innovation in the railway sector. Hence, sustainable business-model innovation seems unlikely without the investment in the railway infrastructure. In other words, technological innovation is understood as an essential part of facilitating business-model innovation in the Danish railway sector.

The four measurements are reviewed systematically before reviewing the importance of the core product (i.e. 'transport from a to b'). Table 7.1 details that the majority of the managers evaluated the current railway operations as 'slightly acceptable' (i.e. scale point 5). The table shows an underlying agreement between the male and female managers that the core product had been considered 'moderately important' and given 'moderate priority' (i.e. scale point 5) by the former management as described in table 7.1.

Table 7.2 details that the majority of the managers evaluated the basic product offering as 'extremely important' for facilitating business-model innovation. The table shows an underlying agreement between majority of the male and female managers that the core product is considered an 'essential priority' (i.e. scale point 7) for facilitating a necessary business-model innovation in the Danish railway sector.

Table 7.3 details that the majority of the managers evaluated the current commercial activities as 'slightly acceptable' (i.e. scale point 5). Hence, there is an underlying agreement that the core product had been considered only 'moderately important' and given 'moderate priority' (i.e. scale point 5) in the past (35.6%).

The table details that a large group of manager's consider the quality of the commercial activities can be improved (i.e. scale point 4). This is interesting because the commercial activities were given essential priority by the former top management in terms of initiating new business ventures in the period leading up to the institutional crisis, but the present study shows that little management attention was given to the development of business-driven activities to support the core product. Instead, the management was focused on scaling up the business model to achieve economies of scale and scope, based on the assumption that scaling up the railway operator's business model would lead to an increased level of profitability.

Table 7.1: Acceptability of the core product

Core product: Past practice		What is your assessment of the core product (i.e. basic railway service) in the past 6 months?								
		1	2	3	4	5	6	7	Total	
Gender	Male	1	8	28	64	100	64	2	267	
	% within Male	.4%	3.0%	10.5%	24.0%	37.5%	24.0%	.7%	100.0%	
	% within Gender	100.0%	100.0%	84.8%	68.8%	70.4%	76.2%	28.6%	72.6%	
	% of Total	.3%	2.2%	7.6%	17.4%	27.2%	17.4%	.5%	72.6%	
	Female	0	0	5	29	42	20	5	101	
	% within Female	.0%	.0%	5.0%	28.7%	41.6%	19.8%	5.0%	100.0%	
	% within Gender	.0%	.0%	15.2%	31.2%	29.6%	23.8%	71.4%	27.4%	
	% of Total	.0%	.0%	1.4%	7.9%	11.4%	5.4%	1.4%	27.4%	
	Total	Count	1	8	33	93	142	84	7	368
	% of Total	.3%	2.2%	9.0%	25.3%	38.6%	22.8%	1.9%	100.0%	

Source: The Author

Table 7.2: Importance of the core product**Core product: Best practice**

		How important is the core product (i.e. basic railway service) for developing DSB's business model?							
		1	2	3	4	5	6	7	Total
Gender	Male	2	0	2	1	10	92	160	267
	% within Male	.7%	0%	.7%	.4%	3.7%	34.5%	59.9%	100.0%
	% within Gender	100.0%	0%	100.0%	25.0%	83.3%	73.0%	72.1%	72.6%
	% of Total	.5%	0%	.5%	.3%	2.7%	25.0%	43.5%	72.6%
	Female	0	0	0	3	2	34	62	101
	% within Female	.0%	0%	.0%	3.0%	2.0%	33.7%	61.4%	100.0%
	% within Gender	.0%	0%	.0%	75.0%	16.7%	27.0%	27.9%	27.4%
	% of Total	.0%	0%	.0%	.8%	.5%	9.2%	16.8%	27.4%
Total	Count	2	0	2	4	12	126	222	368
	% of Total	.5%	0%	.5%	1.1%	3.3%	34.2%	60.3%	100.0%

Source: The Author

Table 7.3: Acceptability of the commercial activities**Commercial activities: Past practice**

		What is your assessment of DSB's commercial activities related to the core product in the past 6 months?								
		1	2	3	4	5	6	7	Total	
Gender	Male	3	16	52	69	92	31	4	267	
	% within Male	1.1%	6.0%	19.5%	25.8%	34.5%	11.6%	1.5%	100.0%	
	% within Gender	75.0%	84.2%	82.5%	69.0%	70.2%	67.4%	80.0%	72.6%	
	% of Total	.8%	4.3%	14.1%	18.8%	25.0%	8.4%	1.1%	72.6%	
	Female	1	3	11	31	39	15	1	101	
	% within Female	1.0%	3.0%	10.9%	30.7%	38.6%	14.9%	1.0%	100.0%	
	% within Gender	25.0%	15.8%	17.5%	31.0%	29.8%	32.6%	20.0%	27.4%	
	% of Total	.3%	.8%	3.0%	8.4%	10.6%	4.1%	.3%	27.4%	
	Total	Count	4	19	63	100	131	46	5	368
	% of Total	1.1%	5.2%	17.1%	27.2%	35.6%	12.5%	1.4%	100.0%	

Source: The Author

Table 7.4: Importance of the commercial activities**Commercial activities: Best practice**

		How important are the commercial activities for developing DSB's current business model?							
		1	2	3	4	5	6	7	Total
Gender	Male	0	2	11	28	71	99	56	267
	% within Male	0%	.7%	4.1%	10.5%	26.6%	37.1%	21.0%	100.0%
	% within Gender	0%	66.7%	78.6%	73.7%	74.7%	69.2%	74.7%	72.6%
	% of Total	0%	.5%	3.0%	7.6%	19.3%	26.9%	15.2%	72.6%
	Female	0	1	3	10	24	44	19	101
	% within Female	0%	1.0%	3.0%	9.9%	23.8%	43.6%	18.8%	100.0%
	% within Gender	0%	33.3%	21.4%	26.3%	25.3%	30.8%	25.3%	27.4%
	% of Total	0%	.3%	.8%	2.7%	6.5%	12.0%	5.2%	27.4%
Total	Count	0	3	14	38	95	143	75	368
	% of Total	0%	.8%	3.8%	10.3%	25.8%	38.9%	20.4%	100.0%

Source: The Author

Table 7.4 specifies that the majority of the managers consider the business-driven activities to support the basic product offering as 'very important' (point 6). It shows an underlying agreement that the business-driven activities that support the core product remain a 'high priority' (i.e. scale point 6) for the development of the Danish railway operator's business model (38.9%).

It also shows that a large group of manager's evaluated the current commercial activities as 'moderately important' (i.e. scale point 5). This group agrees that the business-driven activities that are supportive of the basic product offering are only 'moderately important' and that they should be given only 'moderate priority' (25.8%). It is also interesting to note that another large group of managers agree that the business-driven activities that are supportive of the core product should be given 'top priority' (20.4%). Still, the importance of the core product received the highest average across the fifty-one Likert-type measurements with a result of 6.49 out of 7.00. The measurement of this variable was both the most significant (i.e. highest score) and the most clear-cut result (i.e. highest degree of density) in the management survey.

The responses related to this measurement will be reviewed in greater detail in the next pages. First, the distribution of the responses is reviewed across the seven management groups. Second, the stability of the key result is analyzed across the seven distinct age groups to further increase the reliability of this result. Finally, the responses are reviewed across seven groups of seniority.

Table 7.5 shows that the great majority of the managers across all management groups believe that the core product is 'extremely important' (point 7). In fact, about 95% of the managers in the Danish railways believe that the core product is either 'very important' (point 6) or 'extremely important' (point 7) for facilitating business-model innovation in the Danish railway sector. Hence, only about 5% of the managers do not agree with this finding.

The table then specifies that the *financial managers* (Group 4) have the highest representation of selecting point seven (80.6%), while the

corporate managers (Group 1) agree with the *commuting train managers* (Group 6) in the operationally successful Copenhagen Commuting Company with 66.7% of the managers selected seven.

Not so surprisingly, only about 50% of the *commercial managers* (Group 2) selected the point seven, but it was surprising that only about 50% of the *rolling stock managers* with the responsibility of the acquisition and maintenance of rolling stock did not assign the highest importance. It was surprising because one would have expected the managers within this management group (Group 7) would have ranked it the highest. It was expected that rolling stock managers would not deviate from the norm in a negative sense.

Core product: Best practice		How important is the core product (i.e. basic railway service) for developing DSB's business model?							
		1	2	3	4	5	6	7	Total
Management									
	Group 1	0	0	0	0	0	7	14	21
	% within Group 1	.0%	.0%	.0%	.0%	.0%	33.3%	66.7%	100.0%
	% within Management	.0%	.0%	.0%	.0%	.0%	5.6%	6.3%	5.7%
	% of Total	.0%	.0%	.0%	.0%	.0%	1.9%	3.8%	5.7%
	Group 2	0	0	2	2	3	19	26	52
	% within Group 2	.0%	.0%	3.8%	3.8%	5.8%	36.5%	50.0%	100.0%
	% within Management	.0%	.0%	100.0%	50.0%	25.0%	15.1%	11.7%	14.1%
	% of Total	.0%	.0%	.5%	.5%	.8%	5.2%	7.1%	14.1%
	Group 3	1	0	0	1	5	47	82	136
	% within Group 3	.7%	.0%	.0%	.7%	3.7%	34.6%	60.3%	100.0%
	% within Management	50.0%	.0%	.0%	25.0%	41.7%	37.3%	36.9%	37.0%
	% of Total	.3%	.0%	.0%	.3%	1.4%	12.8%	22.3%	37.0%
	Group 4	1	0	0	0	1	5	29	36
	% within Group 4	2.8%	.0%	.0%	.0%	2.8%	13.9%	80.6%	100.0%
	% within Management	50.0%	.0%	.0%	.0%	8.3%	4.0%	13.1%	9.8%
	% of Total	.3%	.0%	.0%	.0%	.3%	1.4%	7.9%	9.8%
	Group 5	0	0	0	1	1	10	17	29
	% within Group 5	.0%	.0%	.0%	3.4%	3.4%	34.5%	58.6%	100.0%
	% within Management	.0%	.0%	.0%	25.0%	8.3%	7.9%	7.7%	7.9%
	% of Total	.0%	.0%	.0%	.3%	.3%	2.7%	4.6%	7.9%
	Group 6	0	0	0	0	0	13	26	39
	% within Group 6	.0%	.0%	.0%	.0%	.0%	33.3%	66.7%	100.0%
	% within Management	.0%	.0%	.0%	.0%	.0%	10.3%	11.7%	10.6%
	% of Total	.0%	.0%	.0%	.0%	.0%	3.5%	7.1%	10.6%
	Group 7	0	0	0	0	2	25	28	55
	% within Group 7	.0%	.0%	.0%	.0%	3.6%	45.5%	50.9%	100.0%
	% within Management	.0%	.0%	.0%	.0%	16.7%	19.8%	12.6%	14.9%
	% of Total	.0%	.0%	.0%	.0%	.5%	6.8%	7.6%	14.9%
Total	Count	2	0	2	4	12	126	222	368
	% of Total	.5%	.0%	.5%	1.1%	3.3%	34.2%	60.3%	100.0%

Table 7.5: Importance of technological innovation.

Source: The Author

The deviation of rolling stock managers (Group 7) is perhaps the most surprising finding in the management survey. The result could potentially be interpreted as a lack of understanding of the responsible managers (Group 7) that were responsible for the unsuccessful co-production of the IC4 trains multi-year delayed project, who did not raise a flag that the project was out of control. Instead, a settlement agreement was made in 2009, which made it impossible to discontinue the project due to judicial reasons in 2012.

The surprising result may qualify as a new information that provides a new interesting perspective to explain the historic mistake to co-assume the responsibility of the train production based on the assumption that the railway operator would be more qualified than the railway producer in producing trains (Roldsgaard, 2012).

The unexpected finding is coherent with the 'career perspective' that has been described as an underlying barrier for facilitating business-model innovation (e.g. Chesbrough, 2010), which occurs when the responsible managers prefer to continue with a risky or futile project due to the self-interest of the managers to defend the status quo in order to safeguard their own careers.

The human resource managers (Group 5) likewise have a slightly lower level of 58.6%, which is less than the norm of over 60% across the seven management groups within the seven scale-point category. This finding may be interpreted as critical because we know that the managers in the human resource department employ the new managers, which is also suggested to be part of the institutional crisis.

The next table describes a consequence of the former top management's attempt to conceptualize the core product as a sub-priority since it shows how the 'young' managers in the age group 30-34 consider the importance of the core product at a remarkably lower level than the more experienced managers in the company. Hence, the young managers seem to have entered in the railway company with a radically different (problematic) mindset, believing that the railway operations should not

be an absolute top priority for the development of the railway operator's business model.

The table also details that the representation of the managers in the age group 50-54 deviates from the norm of over 60% (across all age groups), but at the same time it appears that only 2.6% within this age group believe that the core product is 'moderately important', while 97.4% believe the core product is either 'very important' or 'extremely important' within the age group 50-54 for facilitating business-model innovation in the Danish railway sector as summarized in table 7.6.

Core product: Best practice		How important is the core product (I.e. basic railway service) for developing DSB's business model?							Total
Age		1	2	3	4	5	6	7	Total
	30-34 year	0	0	1	2	1	9	11	24
	% within Age 30-34	.0%	.0%	4.2%	8.3%	4.2%	37.5%	45.8%	100.0%
	% within Age	.0%	.0%	50.0%	50.0%	8.3%	7.1%	5.0%	6.5%
	% of Total	.0%	.0%	.3%	.5%	.3%	2.4%	3.0%	6.5%
	35-39 year	0	0	1	1	0	17	20	39
	% within Age 35-39	.0%	.0%	2.6%	2.6%	.0%	43.6%	51.3%	100.0%
	% within Age	.0%	.0%	50.0%	25.0%	.0%	13.5%	9.0%	10.6%
	% of Total	.0%	.0%	.3%	.3%	.0%	4.6%	5.4%	10.6%
	40-44 year	1	0	0	0	5	21	52	79
	% within Age 40-44	1.3%	.0%	.0%	.0%	6.3%	26.6%	65.8%	100.0%
	% within Age	50.0%	.0%	.0%	.0%	41.7%	16.7%	23.4%	21.5%
	% of Total	.3%	.0%	.0%	.0%	1.4%	5.7%	14.1%	21.5%
	45-49 year	0	0	0	1	2	26	57	86
	% within Age 45-49	.0%	.0%	.0%	1.2%	2.3%	30.2%	66.3%	100.0%
	% within Age	.0%	.0%	.0%	25.0%	16.7%	20.6%	25.7%	23.4%
	% of Total	.0%	.0%	.0%	.3%	.5%	7.1%	15.5%	23.4%
	50-54 year	0	0	0	0	2	33	42	77
	% within Age 50-54	.0%	.0%	.0%	.0%	2.6%	42.9%	54.5%	100.0%
	% within Age	.0%	.0%	.0%	.0%	16.7%	26.2%	18.9%	20.9%
	% of Total	.0%	.0%	.0%	.0%	.5%	9.0%	11.4%	20.9%
	55-59 year	0	0	0	0	1	14	24	39
	% within Age 55-59	.0%	.0%	.0%	.0%	2.6%	35.9%	61.5%	100.0%
	% within Age	.0%	.0%	.0%	.0%	8.3%	11.1%	10.8%	10.6%
	% of Total	.0%	.0%	.0%	.0%	.3%	3.8%	6.5%	10.6%
	60-64 year	1	0	0	0	1	16	26	24
	% within Age 60-64	4.2%	.0%	.0%	.0%	4.2%	25.0%	66.7%	100.0%
	% within Age	50.0%	.0%	.0%	.0%	8.3%	4.8%	7.2%	6.5%
	% of Total	.3%	.0%	.0%	.0%	.3%	1.6%	4.3%	6.5%
Total	Count	2	0	0	4	12	126	222	368
	% of Total	.5%	.0%	.0%	1.1%	3.3%	34.2%	60.3%	100.0%

Table 7.6: Importance of technological innovation.

Source: The Author

The final table describes a dividing line between the managers with less than ten years of seniority in the company. The managers with less than

10 years of experience have gradually developed a new, adapted culture that to some degree contrasts with the original culture that recognizes the importance of the railway operations. As it appears, the managers with less than 10 year experienced managers tend to assume that the basic railway services are less important for the development of the railway operator's business model compared to the managers with over 10 years of experience as summarized in table 7.7.

Core product: Best practice		How important is the core product (i.e. basic railway service) for developing DSB's business model?							
		1	2	3	4	5	6	7	Total
Seniority	0-2 year	0	0	1	1	2	18	29	51
	% within 0-2	.0%	.0%	2.0%	2.0%	3.9%	35.3%	56.9%	100.0%
	% within Seniority	.0%	.0%	50.0%	25.0%	16.7%	14.3%	13.1%	13.9%
	% of Total	.0%	.0%	.3%	.3%	.5%	4.9%	7.9%	13.9%
	3-4 year	0	0	1	2	0	17	36	56
	% within 3-4 years	.0%	.0%	1.8%	3.6%	.0%	30.4%	64.3%	100.0%
	% within Seniority	.0%	.0%	50.0%	50.0%	.0%	13.5%	16.2%	15.2%
	% of Total	.0%	.0%	.3%	.5%	.0%	4.6%	9.8%	15.2%
	5-9 year	1	0	0	1	4	24	38	68
	% within 5-9 years	1.5%	.0%	.0%	1.5%	5.9%	35.3%	55.9%	100.0%
	% within Seniority	50.0%	.0%	.0%	25.0%	33.3%	19.0%	17.1%	18.5%
	% of Total	.3%	.0%	.0%	.3%	1.1%	6.5%	10.3%	18.5%
	10-14 year	0	0	0	0	2	5	10	17
	% within 10-14 years	.0%	.0%	.0%	.0%	11.8%	29.4%	58.8%	100.0%
	% within Seniority	.0%	.0%	.0%	.0%	16.7%	4.0%	4.5%	4.6%
	% of Total	.0%	.0%	.0%	.0%	.5%	1.4%	2.7%	4.6%
15-19 year	0	0	0	0	0	13	30	43	
% within 15-19 years	.0%	.0%	.0%	.0%	.0%	30.2%	69.8%	100.0%	
% within Seniority	.0%	.0%	.0%	.0%	.0%	10.3%	13.5%	11.7%	
% of Total	.0%	.0%	.0%	.0%	.0%	3.5%	8.2%	11.7%	
20-24 year	0	0	0	0	2	14	30	46	
% within 20-24 years	.0%	.0%	.0%	.0%	4.3%	30.4%	65.2%	100.0%	
% within Seniority	.0%	.0%	.0%	.0%	16.7%	11.1%	13.5%	12.5%	
% of Total	.0%	.0%	.0%	.0%	.5%	3.8%	8.2%	12.5%	
25-29 year	1	0	0	0	0	12	19	32	
% within 25-29 years	3.1%	.0%	.0%	.0%	.0%	37.5%	59.4%	100.0%	
% within Seniority	50.0%	.0%	.0%	.0%	.0%	9.5%	8.6%	8.7%	
% of Total	.3%	.0%	.0%	.0%	.0%	3.3%	5.2%	8.7%	
Total	Count	2	0	0	4	12	126	222	368
	% of Total	.5%	.0%	.0%	1.1%	3.3%	34.2%	60.3%	100.0%

Table 7.7: Importance of technological innovation.

Source: The Author

A good explanation why the younger (and/or less experienced) managers may consider the rolling stock an old-fashioned and boring topic is because they have never experienced an innovation of the railway services (since the end of 1980s and beginning of the 1990s with the gradual implementation of the IC3 trains). The managers with less than

10 years of seniority have ‘grown up’ in a ‘lost decade’ with minimal or no innovation of the distance/regional railway service that we know today.

Still, this finding is a little bit surprising because 95% of the income is generated from transporting passengers. Furthermore, the former top management only aimed to uphold the absolute minimal performance targets (90% punctuality, 95% reliability) required by the ministry of transport (Roldsgaard, 2012).

Not surprisingly, mostly the managers with a seniority of over 10 years comment on the current situation with reference to the core product (defined as ‘transport from a to b’). A series of comments are described below to put the finding in perspective in the manager’s own words. For example, a manager with 20 years of experience describes the problem of the core product to the point:

The IC4 [project] has remained an unpredictable factor at all times because no consideration has been made [about the outcome of the project]. —
Manager 1

In this context, a manager explains that the core product should be prioritized over the commencement of new business ventures:

Gain control of the core products before [launching] new [business] ventures! —Manager 2

A manager details that:

The main condition for the core product is to have sufficient rolling stock to transport our customers. This is our greatest challenge today. When the production system cannot keep up [with the demand], then all sorts of secondary [commercial end] products do not help on customer satisfaction. What does the customer want? [...] We have failed in terms of timely planning because we have not ensured that we have enough rolling stock to carry [the passengers]. Therefore, cost control and management is selected as the greatest barrier for developing DSB’s business model the past two years [2009-2011]. —Manager 3

Another manager further details the problem that:

The core product is getting worse, and I think [the problem] is rooted in the [increased] uncertainty among the employees, thus resulting in lower quality. —Manager 4

Yet another manager agrees that some smart marketing terms and nice words are not sufficient if the core product is getting worse:

Everything revolves around the core product and the experience around it. As long as we offer the distance passengers a cattle truck with standing, sitting, and lying passengers all over the wagon and [at the same time] deliver poor punctuality then we can not simply settle with some smart marketing terms and great words!!! —Manager 5

The managers who provide these descriptions of the current situation agree that smart marketing vocabulary cannot replace the importance of timely and reliable trains. A manager suggests that the current strategy (i.e. long-term capacity planning) for the rolling stock may be need to be reconsidered as well as the strategy for the operational planning of personnel in the trains may also need to be reconsidered, while another manager does not even believe that there is a strategy for the development of core product:

I do not see that we have a long-term strategy for the core product. During the past many years, the strategy for the development of the core product is made every year. —Manager 6

A manager who shares this view realizes that:

Hey, we need 2 million seats this year [2011]. —Manager 7

Another manager questions the role of the commercial managers:

If the core product is our roadmap then I am not sure about the influence of the commercial department on the core product? —Manager 8

This question is representative of the uncertainty about the importance of the core product before the management survey was performed. Another manager explains the importance of focusing on the core product in the domestic market in a time of crisis before expanding the railway services to the surrounding countries:

The important thing is that we get focused on delivering a quality core product in Denmark. —Manager 9

A manager describes a solution to the problem related to the current railway operations:

We must innovate! Throw the damn tail away [IC4 trains]. —Manager 10

Following this line of reasoning, another manager describe the potential influence of the politicians (i.e. the decision-makers) on the uncertain situation:

The general conditions defined by the politicians can be perceived as very uncertain [or unclear]. There is a need for a very strong focus on the core product. There is only a solid platform for the commercial activities [...] when the core product is optimal. —Manager 11

In this context, a manager explains the importance of breaking the silence in a time of crisis:

It is very important to break the silence and mystery hanging over the company right now. The employees eagerly await a clear strategy announcement, so that we can land on both feet to build and strengthen the important winning culture attitude. —Manager 12

Finally, a manager simply concludes that:

The previous top management was working on an [economically and competitively] unsustainable business model. —Manager 13

This conclusion is the reason why it is important to learn from a critical case. The sustainability of the business model is reviewed via an extended study of the expected short and long-term benefits from switching the top management's focus away from expanding the railway services internationally; instead to the innovation and improvement of the domestic railway services.

Based on the review of the results of the management survey and the comments provided by the managers taking part in the study,

it seems reasonable to conclude that the Danish State Railways was conceptualized as a critical case.

7.2 Estimation of short and long-term benefits

A politically driven decision was announced shortly before performing the management survey to switch the focus of the Danish State Railways back to the domestic railway market. The two points of measurements were adequate in order to extend the study of the relationship between technological innovation and business-model innovation.

The inclusion of the time horizon was also considered relevant because we know that the measurements were conducted in a crisis situation, which made it interesting to view the results in a prospective view when looking forward. It was expected that the managers would appreciate the stronger focus on the domestic market, but it remained unclear if the managers would emphasize the short-term or long-term benefits.

	Short-term benefit	Long-term benefit
Yes (scale points: 5,6,7)	77%	59%
Undecided (Scale point: 4)	8%	24%
No (Scale points: 1,2,3)	15%	17%

Table 7.8: Estimated benefits.

Source: The Author

The results show that the benefits are estimated to be higher in the short-term than in the long-term, which confirms the expected importance of the management focus on the core product *and* on the core market, especially during a period of crisis.

Specifically, 77% of the managers answered that the intensified domestic focus would be beneficial in the short-term, while 59% of the managers also believe that this decision would be beneficial in the long-term. It is

worth noticing that the proportion of the ‘undecided’ managers shifts from 8% to 24% when estimating the long-term benefits of switching back the focus to the domestic market.

7.3 Reinterpretation of the six results

The six results of the first study are interpreted via a horizontal and vertical analysis in order to finish the review of the results of the first study. The two analyses both map out the positioning of the groups on the seven-point Likert-type scale to gain perspective.

The visualization is productive for the interpretation of the results. The positioning of the seven management groups in the first point of measurement (trial 1) is almost identical with the positioning of the seven management groups in the final point of measurement (trial 6) as described in figure 7.2.

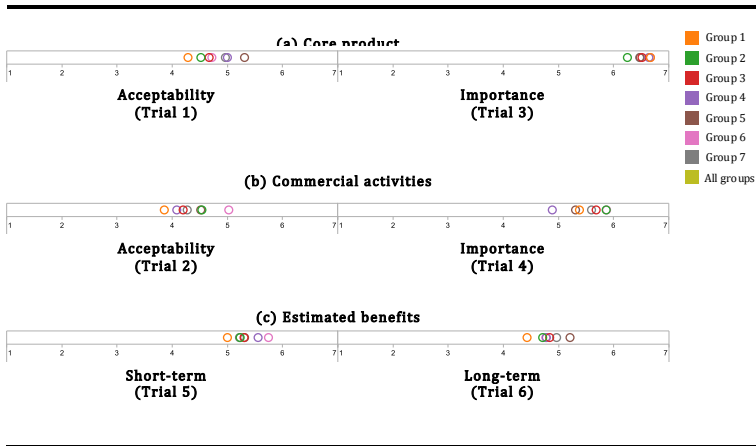


Figure 7.2: Horizontal analysis.

Source: The Author

The horizontal analysis details how the corporate managers (Group 1) disagree with the human resource managers (Group 5) about the

acceptability of the current railway operators, while there is an underlying consensus among the managers in the remaining management groups (trial 1). The high density of the responses indicates a remarkably strong underlying agreement about the importance of the core product across the seven management groups (trial 2).

The corporate managers (Group 1) disagree with the managers of the Copenhagen Commuting Services (Group 6) about the acceptability of the current commercial activities (trial 3), but maybe that is because they evaluate their own performance (i.e. successful unit of business). In any case, there is a strong underlying consensus about the quality of the current commercial activities among the managers in the other groups, who tend to agree with the corporate managers.

The financial managers (Group 4) disagree with the commercial managers (Group 2) about the importance of the commercial activities. The financial managers suggest that the value of the commercial activities is over-valued, while the remaining groups agree that the commercial activities are only 'moderately important' (trial 4) for facilitating business-model innovation.

The corporate managers (Group 1) disagree with managers in the Copenhagen Commuting Services (Group 6) about the benefits from the political turnaround with an increased focus on the railway services of the domestic railway distance and regional operations in the short-term (trial 5), while there is a strong underlying consensus about the benefits of the political turnaround among the managers in the other groups.

Yet, the successful executive managers in the Copenhagen Commuting Services (Group 6) are skeptical about the performance of the railway operations, but rather satisfied with the commercial activities, which describe the inherent management dilemma of the dependency on the commercially-driven railway operations.

Again, the corporate managers (Group 1) disagree with the human resource managers (Group 5) about the benefits from the political

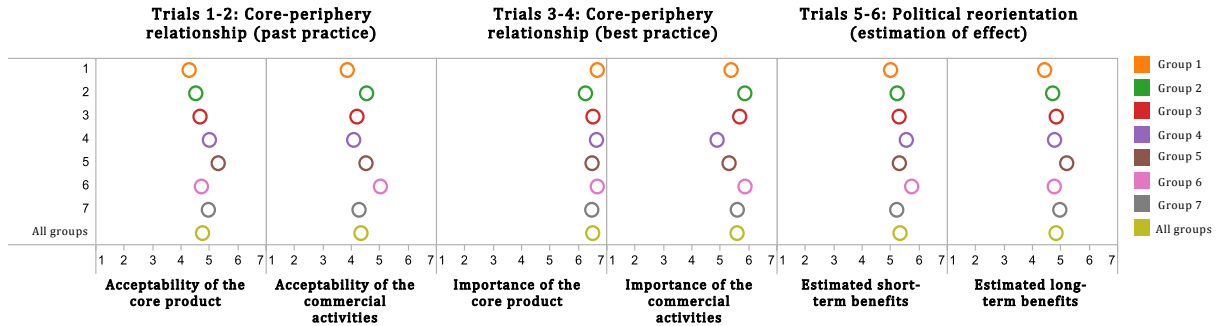
turnaround in the long-term (trial 6), while there is a remarkably strong underlying consensus about the benefits of the turnaround focus among the managers in the other groups.

Following this line of reasoning, the core product remains an underlying principle for facilitating business-model innovation with a long-range positive effect. However, the corporate managers (Group 1) instead suggest that the core product and commercial activities have been equally unsatisfactory in the past, while they strongly emphasize the importance of innovating the current railway operations by investing in a new core product when looking forward.

The financial managers (Group 4) agree with the corporate managers although they tend to be slightly more satisfied with the current railway operations.

The vertical analysis reviews the same six results. The vertical analysis enables the reader to cross-examine the positioning of the individual management groups across the six results of the management survey.

Figure 7.3: Vertical analysis



Source: The Author

7.4 Limitations

There are at least four limitations of the study. First, the results reflect a sector-specific challenge, which means that the results may be generalizable within the railway sector, but not necessarily in other business sectors.

Second, the case-specific situation (i.e. crisis situation) means that the results may be slightly more 'extreme' because the advantages and disadvantages of the current business model would be expected to become clearer in a critical situation. In a crisis situation, the critical points may gain a slightly stronger preference than in a situation with abundant success. However, this potential underlying preference is not seen as a weakness, but strength because it can be difficult to point out the critical points in a time of abundant success.

Third, the measurements have not yet been repeated in a series of follow-up studies over time, which could be considered as either a critical limitation or it could be seen as an opportunity to conduct a new study to test the hypothesis that the results related to the best practices would be reproduced if the study were repeated because the seven management groups independently repeated the result in the parallel trials of the importance of the core product and the related supportive business-driven activities to support the basic product offering.

Finally, it is assumed that the knowledge was available inside the large corporation and that it just need to be unfolded based on the assumption that the managers with an average seniority of over 15 years working in the Danish railway sector would have the answers.

7.5 Summary

The outcome of the study was suggested to be of relevance to the Danish Government because it became clear that an investment in the infrastructure was necessary. Management, Transport, and Law researchers can also learn from this study because it clarifies the essential

importance for facilitating business-model innovation via technological innovation.

Management researchers learn from the present study that the core product (i.e. basic product offering) is of essential importance for facilitating business-model innovation. They learn that focus on the technological core is critical in a time of crisis, where the focus needs to be shifted from expanding international (i.e. peripheral) activities to the development of the core activities in the domestic market. This finding is relevant because we know that the technological core gives direction to the development of the commercial end products that are accessible to the customers (i.e. passengers).

Transport managers learn that the railway operations should remain the core object of analysis. Law researchers learn that the development of the existing railway services should be given careful attention when liberalizing the European railways. The senior management of the Danish railways learns that it should retain a strict focus on the railway operations, which should be considered the top priority at a continuous level. The finding is industry specific, but generalizable across the different railway sectors in the European member states. The study of the Danish railways therefore provides a critical case of learning that is too important to ignore for multiple audiences.

The managers in the railway sector recognize the importance of investing in the infrastructure to enable a gradual improvement of the current railway operations. Simply put, the managers in the railway sector consider the core product essential for the railway operator's long-term success. Although this finding may seem only logical, it was far from clear before the management survey was conducted in fall 2011. The clear and convincing result was communicated to the transport ministry as scientific evidence that is of relevance at societal level, which is the core purpose of basic scientific research.

The results do not reject previous research, but it grounds a new theory that has been recognized at the highest management levels, including the

board of directors and the newly appointed management that has made a disruptive shift in their communications of the annual reports (see DSB Annual Reports 2012 and 2013 for further information). The railway operations are now placed on the top management agenda.

Chapter 8

Barriers and opportunities

The second study was designed to further detail what determines the evolution of business-model innovation (Baden-Fuller & Haefliger, 2013). The purpose of examining the barriers and opportunities in a multi-level analysis was to further examine the basic assumptions and challenges for facilitating a necessary business-model innovation in the Danish railway sector during a period of crisis. Understanding the essence of business models is important to gain a better understanding of the interdisciplinary nature of managing business-model innovation.

Teece (2010) emphasizes that business-model innovation at organizational level almost always involve a combination of two or more academic disciplines that are usually considered distinct. The meta-analysis of multiple scholarly works in present study supports this claim. The interdisciplinary approach to facilitate a long-term business-model innovation thus includes, or relates, to a variety of subjects including market or organizational behavior, innovation, strategy and competitive advantage. Teece (2010) calls for more research on the subject to develop an increased understanding of the essence of individual business models.

The Danish State Railways is a unique case to explore the mental-cognitive drivers of the managers that influence business-model innovation. The Danish State Railways in a period of stable passenger growth. The official explanation is that the loss-giving operations were a

result of an unsuccessful internationalization of the railway operations (Roldsgaard, 2012).

The Danish State Railways is therefore considered a good case for exploring the underlying assumptions and challenges for managing a necessary *business-model innovation*. The term refers to a development of the existing business-model system that enables the railway operator to increase its profitability in the short-run, while gradually strengthening the inter-modal competitiveness of the current railway operations in the long-run. The question remains: How important is the international expansion of the railway operations for the development of the Danish State Railways?

- The top management (i.e. **inside view**) articulated the necessity of the internationalization as a 'life or death' challenge to ensure the long-term existence and survival of the Danish State Railways in a liberalized single market of railway operations (with the German DB, British Arriva, and others). The life or death challenge was articulated when all 475 managers of the company were invited to the annual business meeting in Malmö (Sweden) in spring 2011, which in itself was an intriguing observation in a time of great uncertainty about the future.
- The managers working in the Danish railway sector not part of the top team (i.e. **outside view**) were expected to reject the top management's hypothesis about the assumed essential importance of expanding the railway operations into the surrounding railway sectors. If this hypothesis would be confirmed then what would be the greatest opportunity for facilitating a necessary business-model innovation in the Danish railway sector? And, likewise, what would be the greatest barrier? These questions are relevant not only for the management of the Danish State Railways, but also for the management of all European railway operators in general due to the planned liberalization of the European railway sector by 2020.

The hypothesis was that the managers working in the Danish railway sector would consider the core product (i.e. technological innovation) the

most important opportunity for facilitating business-model innovation in the railway sector, while political influence (or leadership) was expected to be the greatest underlying barrier for facilitating business-model innovation in the Danish railway sector.

A total of 3,961 responses were generated from the three trials. The first trial is comprised of 1,265 responses and examines the barriers for facilitating a necessary business-model innovation in the Danish railway sector in the period 2009-2011. The second trial is comprised of 1,263 responses and examines if the barriers would be repeated (i.e. expected to re-occur). The third trial is comprised of 1,433 responses and examines the greatest opportunities to test if the most important barriers would also be considered the most important opportunities for facilitating a necessary business-model innovation in the Danish railway sector.

The results presented are representative for the managers working in the Danish State Railways with ± 2.0 percent at a confidence level of 95% (i.e. the estimate is true with 95% probability within a range of ± 2.0) when the management survey was performed in fall 2011.

8.1 Barriers when looking backward

The first trial shows that a total of 78% of the managers in the Danish State Railways indicated *political influence* as a barrier for facilitating a necessary business-model innovation in the Danish railway sector in the period 2009-2011 (i.e. 288 of the 368 managers). Specifically, 39% of the managers selected *political influence* as the single most important underlying barrier (49% within its category) when reviewing the past two years, while 16% of the managers indicated the barrier as an important complementing barrier (51% within its category).

The trial furthermore shows that *Labor unions* are considered another important underlying barrier with a total of 58% managers indicating this option - either as the most important barrier (31% within its category) or as an important related barrier (69% within its category). It is interesting to note that *Labor unions* are considered the most

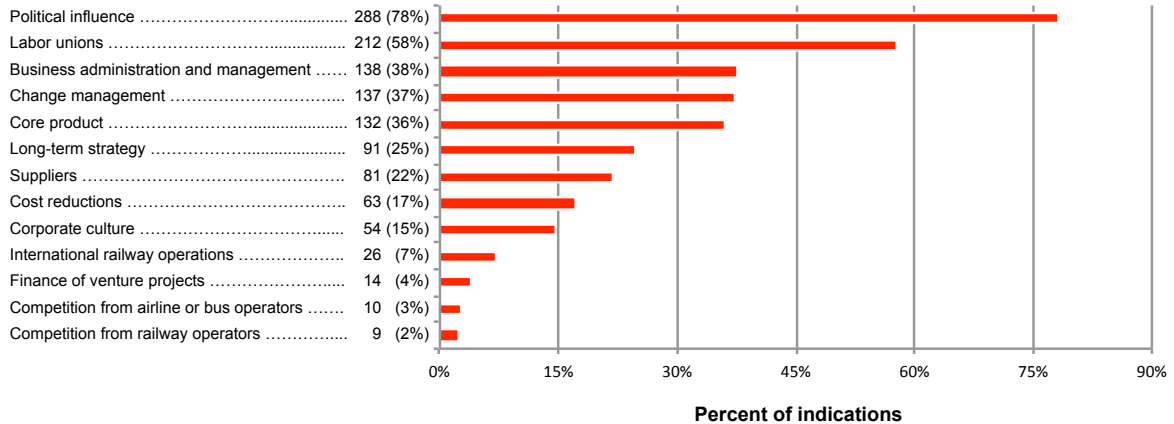
important related barrier with 146 counts as a complementing barrier as described in figure 8.1.

The first trial then shows that *Business administration and management* is considered another important underlying barrier with a total of 38% of the managers indicating this option when reviewing the past two years; 13% of the managers selected this option as the most important barrier (36% within its category), while 10% of the managers selected this option as a related important barrier (64% within its category). The first trial then shows that a total of 37% of the managers selected *Change management* as a barrier when looking back; 13% of the managers selected this option as the most important barrier (25% within its category), while 10% of the manager selected this option as a complementing barrier (75% within its category). Hence, *Business administration and management* is clearly considered a complementary barrier than the single most important barrier for facilitating a necessary business-model innovation in the two years leading up to the institutional crisis. The numbers of the remaining options are described in table 8.1.

Figure 8.1: Analysis of barriers.

Barriers for developing the business model during the period 2009-2011.

Percent of responses, n = 1265



Note: Other is not shown as it accounts for only 3% indications.

Table 8.1: Analysis of barriers.

Q: What has been the most important barrier for developing DSB's business model when you look back the past two years?

	Single choice (principle)				Multiple choice (complementary)				Global summary		
	Counts of single choices	Percent of total	Percent of category	Index	Counts of multiple choices	Percent of total	Percent of category	Index	Aggregated counts	Percent of total	Percent of indications
Political influence	142	39%	49%	100.00	146	16%	51%	102.82	288	23%	78%
Labor unions	66	18%	31%	100.00	146	16%	69%	221.21	212	17%	58%
Business administration and management	49	13%	36%	100.00	89	10%	64%	181.63	138	11%	38%
Change management	34	9%	25%	100.00	103	11%	75%	302.94	137	11%	37%
Core product	25	7%	19%	100.00	107	12%	81%	428.00	132	10%	36%
Long-term strategy	17	5%	19%	100.00	74	8%	81%	435.29	91	7%	25%
Suppliers	15	4%	19%	100.00	66	7%	81%	440.00	81	6%	22%
Cost reductions	5	1%	8%	100.00	58	6%	92%	1160.00	63	5%	17%
Corporate culture	8	2%	15%	100.00	46	5%	85%	575.00	54	4%	15%
International railway operations	2	1%	8%	100.00	24	3%	92%	1200.00	26	2%	7%
Finance of venture projects	1	0%	7%	100.00	13	1%	93%	1300.00	14	1%	4%
Other	4	1%	40%	100.00	6	1%	60%	150.00	10	1%	3%
Competition from airline or bus operators	0	0%	0%	100.00	10	1%	100%	1000.00	10	1%	3%
Competition from railway operators	0	0%	0%	100.00	9	1%	100%	900.00	9	1%	2%
Total	368	100%			897	100%			1265	100%	

It is interesting to note that *Change management* is ranked the fourth most significant barrier (137 total counts), while the *Core product* (i.e. the railway service) is ranked the fifth most significant barrier (132 total counts). In fact, only 7% of the managers selected the *Core product* (i.e. railway service) as the most important barrier in the period that led up to the institutional crisis. However, the *Core product* (i.e. railway service) is considered the third most important related barrier when reviewing the counts of complementary choices. Hence, the *Core product* (i.e. railway service) is clearly seen as a complementary barrier (81% within its category) rather than the single most important barrier (19% within its category) within the two-year timeframe.

The managers likewise consider the *long-term strategy* and *suppliers* (i.e. supplier related problems) as complementing barriers (81% within their categories) rather than the single most important barriers (19% within their categories). The first trial then shows that only a total of 17% of the managers selected *Cost reductions* as a barrier when looking back; only 1% of the managers selected this option as the most important barrier (8% within its category), while 10% of the manager selected this option as a complementing barrier (92% within its category). Hence, the managers clearly consider *Cost reductions* as a relatively unimportant factor for facilitating a necessary business-model innovation in the two-year period leading up to the institutional crisis. Interestingly, the total of 15% of the managers recognized *Corporate culture* as a barrier, while only a total of 7% indicated the *International railway operations* as a barrier when looking back, which contradict the official statement explaining the cause of the institutional crisis.

Finally, only 1% of the managers consider *Finance of venture projects*, *Competition or Other* as a barrier during the two years leading up to the institutional crisis. *Competing railway operator services* (i.e. intra-modal competition) and *Competing airline or bus services* (i.e. inter-modal competition) are considered irrelevant barriers for the emergence of the institutional crisis observed in fall 2011. The analysis of the greatest barriers is suggested to be complete because the railway managers (i.e. industry specialists) did not indicate these barriers as the greatest

problems for facilitating business-model innovation in the railway sector. Only one manager (0.27%) selected *Finance of venture projects* as the single most important problem when evaluating the barriers leading up to the institutional crisis, while none of the managers selected *Competition from other railway operators* (0%) as the single most important problem when evaluating the barriers leading up to the institutional crisis in fall 2011. The managers working in the sector do not believe that the railway operations in Sweden the underlying cause of the institutional crisis, but rather *Political influence*, unsuccessful negotiation with *Labor unions*, and the *Corporate culture* of the former top management. This is interesting because the official explanation of the crisis was due to loss-giving operations abroad in spring 2011.

8.2 Barriers when looking forward

The second trial reviews 1,263 responses to examine the greatest barriers when looking forward to test if the barriers would be repeated. Interestingly, the results were generally repeated, which adds to the reliability of the results. *Political influence* (#1) and *Labor unions* (#2) were confirmed as the most important barriers for facilitating a necessary business-model innovation in the Danish railway sector. Interestingly, the *Long-term strategy* shifts from being a moderately important barrier doing the past two years leading up to the institutional crisis (#6) to being considered the third most important barrier (#3) when looking forward.

The second trial then details that *Business administration and management* (#4), *Change management* (#5) and the *Core product* (#6) are generally confirmed. *Cost reductions* (#7) and *Corporate culture* (#8) are expected to be marginally more important when looking forward, while *Supplier-related problems* (#9) are expected to be a less important barrier when looking forward.

Interestingly, *Competition from airline or bus operators* (#10) or *Competing Railway operators* (#11) is expected to become more

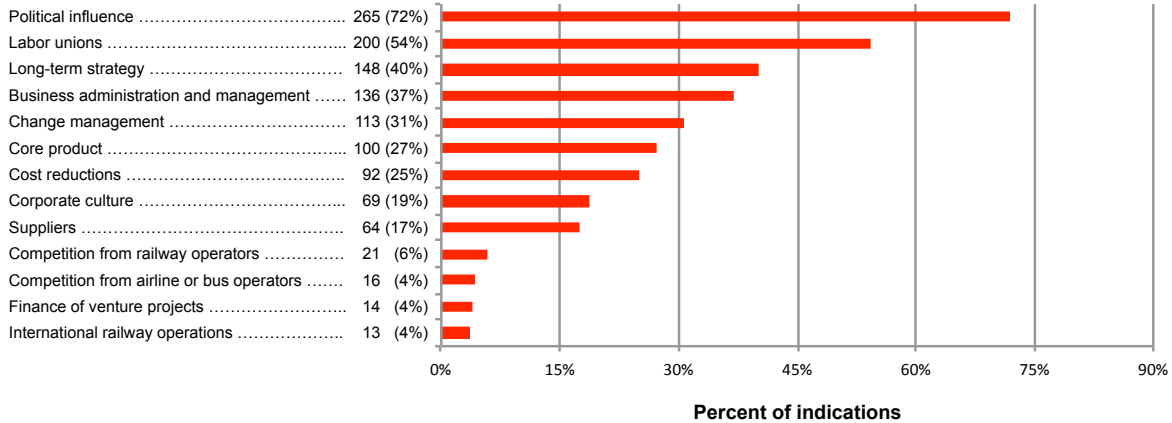
important. Finally, *Finance of venture projects* (#12) and *International railway operations* (#13) are considered an unimportant barrier, while *Other barriers* (#14) are confirmed as irrelevant when looking forward. The statistics as described in figure 8.2, while the numbers behind the figure are described in greater detail in table 8.2 on next page.

Figure 8.2: Analysis of barriers.

Barriers for developing the business model looking forward.

Percent of responses, n = 1263

250



Note: Other is not shown as it accounts for only 3% indications.

Table 8.2: Analysis of barriers.

Q: What is the most important barrier for developing DSB's business model when you look forward?

	Single choice (principle)				Multiple choice (complementary)				Global summary		
	Counts of single choices	Percent of total	Percent of category	Index	Counts of multiple choices	Percent of total	Percent of category	Index	Aggregated counts	Percent of total	Percent of indications
Political influence	118	32%	45%	100.00	147	16%	55%	124.58	265	21%	72%
Labor unions	65	18%	33%	100.00	135	15%	68%	207.69	200	16%	54%
Long-term strategy	47	13%	32%	100.00	101	11%	68%	214.89	148	12%	40%
Business administration and management	52	14%	38%	100.00	84	9%	62%	161.54	136	11%	37%
Change management	22	6%	19%	100.00	91	10%	81%	413.64	113	9%	31%
Core product	20	5%	20%	100.00	80	9%	80%	400.00	100	8%	27%
Cost reductions	17	5%	18%	100.00	75	8%	82%	441.18	92	7%	25%
Corporate culture	9	2%	13%	100.00	60	7%	87%	666.67	69	5%	19%
Suppliers	7	2%	11%	100.00	57	6%	89%	814.29	64	5%	17%
Competition from railway operators	1	0%	5%	100.00	20	2%	95%	2000.00	21	2%	6%
Competition from airline or bus operators	3	1%	19%	100.00	13	1%	81%	433.33	16	1%	4%
Finance of venture projects	1	0%	7%	100.00	13	1%	93%	1300.00	14	1%	4%
International railway operations	0	0%	0%	100.00	13	1%	100%	1300.00	13	1%	4%
Other	6	2%	50%	100.00	6	1%	50%	100.00	12	1%	3%
Total	368	100%			895	100%			1263	100%	

8.3 Opportunities when looking forward

The third trial reviews 1,433 responses to examine the most important opportunities to test if the greatest barriers would also be considered the greatest opportunities. However, the trial rejects that the most important barriers are the greatest opportunities for facilitating business-model innovation in the Danish railway sector.

Instead, the third trial identifies the *Core product* (i.e. railway service) as the most important opportunity, while it specifies that having a *Long-term strategy* for the development of the core product (i.e. railway service) is the second most important opportunity for facilitating a necessary business-model innovation in the Danish railway sector.

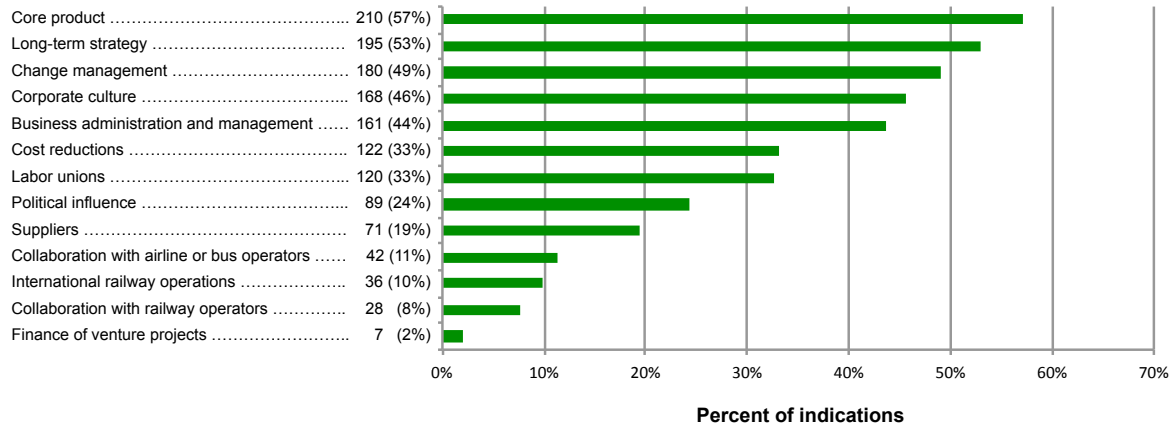
The third trial then explains that 57% of the managers consider the *Core product* (i.e. railway service) the most important opportunity, while 53% of the managers consider having a *Long-term strategy*. This result is interesting because it independently confirms the findings of the first study, which highlighted the importance of the *Core product* (i.e. technological innovation) as the top priority of the railway operator. The systematic review of the opportunities specifies that a *Long-term strategy* for the development of the *Core product* (i.e. railway service) is essential, which means that the managers in the railway sector recognize the need for investment in the infrastructure to facilitate modern electrified railway services.

The corroboration of the importance of the core product in two clearly different studies adds to the reliability of the core result of the doctoral investigation. The results are summarized in figure 8.3, while they are described in greater detail in table 8.3.

Figure 8.3: Analysis of opportunities.

Opportunities for developing the business model looking forward.

Percent of responses, n = 1433



Note: Other is not shown as it accounts for only 1% indications.

Table 8.3: Analysis of opportunities.

Q: What is the most important opportunity for developing DSB's business model when you look forward?

	Single choice (principle)				Multiple choice (complementary)				Global summary		
	Counts of single choices	Percent of total	Percent of category	Index	Counts of multiple choices	Percent of total	Percent of category	Index	Aggregated counts	Percent of total	Percent of indications
Core product	73	20%	35%	100.00	137	13%	65%	187.67	210	15%	57%
Long-term strategy	80	22%	41%	100.00	115	11%	59%	143.75	195	14%	53%
Change management	43	12%	24%	100.00	137	13%	76%	318.60	180	13%	49%
Corporate culture	51	14%	30%	100.00	117	11%	70%	229.41	168	12%	46%
Business administration and management	40	11%	25%	100.00	121	11%	75%	302.50	161	11%	44%
Cost reductions	24	7%	20%	100.00	98	9%	80%	408.33	122	9%	33%
Labor unions	18	5%	15%	100.00	102	10%	85%	566.67	120	8%	33%
Political influence	16	4%	18%	100.00	73	7%	82%	456.25	89	6%	24%
Suppliers	9	2%	13%	100.00	62	6%	87%	688.89	71	5%	19%
Collaboration with airline or bus operators	4	1%	10%	100.00	38	4%	90%	950.00	42	3%	11%
International railway operations	5	1%	14%	100.00	31	3%	86%	620.00	36	3%	10%
Collaboration with railway operators	3	1%	11%	100.00	25	2%	89%	833.33	28	2%	8%
Finance of venture projects	0	0%	0%	100.00	7	1%	100%	1300.00	7	0%	2%
Other	2	1%	50%	100.00	2	0%	50%	100.00	4	0%	1%
Total	368	101%			1065	100%			1433	100%	

8.4 Review across the trials

The cross comparison of the three trials then rejects the former management hypothesis about entering in *Alliances with railway operators* (or Airline or bus operators) as the most important opportunity for facilitating a necessary business-model innovation in the Danish railway sector.

In fact, the managers (i.e. industry experts) consider *Alliances with railway operators* (or Airline or bus operators) as unimportant opportunities and they don't see competition from railway operators (or Airline or bus operators) to be a serious threat in the future. This finding is interesting because it rejects the former top management's hypothesis about its assumed importance of expanding the railway operations into surrounding railway sectors as claimed at the annual business meeting in January 2011.

In fact, only 10% a total of the managers selected *International railway operations* as an opportunity, while 86% of the managers selected *International railway operations* as an important complementing opportunity for facilitating a necessary business-model innovation in the Danish railway sector in a time of crisis.

However, the most surprising result is that the managers working in the sector for over 15 years in average confirm that *Political influence* and *Labor unions* are the two greatest barriers for facilitating a necessary business-model innovation in the Danish railway sector; both in the period leading up to the institutional crisis and when looking forward.

However, the managers do not consider *Political influence* or *Labor unions* as the greatest opportunities for facilitating a necessary business-model innovation in the Danish railway sector. This finding describes a management dilemma because a great concern is widely present in the minds of the managers about these two variables in the broader external environment. In fact, more than three quarters of the managers selected *Political influence* as the greatest barrier in the period leading up to the

institutional crisis (78%), while less than a quarter (24%) of the managers consider *Political influence* as an opportunity when looking forward. This finding is interesting because *Political influence* is necessary for the development of the core product (i.e. railway service), which requires a substantial investment in the infrastructure. In other words, *Political influence* is necessary for financing the long-term strategy for the development of the core product (i.e. railway service).

Next, it is also interesting to note that *Cost reductions* are considered more as an opportunity (#6) than a barrier (#7) for facilitating a necessary business-model innovation in the Danish railway sector when looking forward or when looking backward (#8). Common for all three measurements is that *Cost reductions* are considered more of a complementary barrier when looking backward (92% within its category) and when looking forward (82% within its category) and as an opportunity when looking forward (within its category: 80%).

Furthermore, it is interesting to note that the managers in the Danish railway sector consider *Change management* another very important opportunity for facilitating a necessary business-model innovation in the Danish railway sector. In fact, 49% of the managers indicated *Change management* as an important opportunity, which is consistent with the claim that business-model innovation is necessary as repeatedly described in the doctoral thesis.

However, the managers working in the sector consider *Change management* more as an important complementary opportunity (76% within its category) rather than the single most important opportunity (24% within its category). Contrarily, the *Long-term strategy* for the development of the core product (i.e. railway service) is considered the most important opportunity (41% within its category) although many managers also indicated this option as a complementary opportunity (59% within its category).

Finally, only one manager considers *Finance of venture projects* as the most important opportunity for facilitating a necessary business-model

innovation in the Danish railway sector, while 2% of the managers indicated *Finance of venture projects* as an important opportunity for facilitating business-model innovation in the Danish railway sector.

Only 1% of the managers selected *Other* as the most important opportunity or barrier, which means that the indicators are perfect representatives of the basic assumptions and challenges for facilitating a necessary business-model innovation in the Danish railway sector in a time of crisis.

8.5 Review across the management groups

The results are examined across the seven management groups in order to compare the most important barriers and opportunities as a last exercise before summarizing the most important conclusions. The samples of the groups are relatively small, which means that the percentages are affected by smaller adjustments.

This is of course a clear limitation of the cross-comparison, but it remains interesting to see how the percentages are higher or lower for the management groups. For example, the importance of *Political influence* is notably lower than average for the human resource managers (Group 5) when looking backward (17%) (Global average: 23%) and especially when looking forward (3%) (Global average: 21%).

The human resource managers highlight the negotiation with *Labor unions* (31%) and *Business administration and management* (31%) as the greatest barriers in the period that led up to the institutional crisis and they confirm *Business administration and management* as the greatest barrier for facilitating a necessary business-model innovation in the Danish railway sector (41%), which they consider the single most important opportunity for facilitating a necessary business-model innovation in the Danish railway sector (28%).

This finding is perhaps not that surprising because it corresponds well to the formal area of responsibility and specialist knowledge of the human

resource managers. Another interesting example is that the commercial managers (Group 2) are among the strongest critics of the *Political influence* with a representation of 44% of the managers selecting this option when looking back, which is considerably higher than the global average of 23%.

Q: What is the most important barrier for developing DSB's business model when you look back the past two years?							
	Management groups						
	Group 1	Group 2	Group 3	Group 4	Group 5	Group 6	Group 7
Political influence	24%	44%	39%	25%	17%	44%	55%
Corporate culture	0%	6%	0%	6%	7%	3%	0%
Long-term strategy	19%	2%	3%	11%	7%	3%	2%
Change management	5%	15%	9%	3%	3%	10%	13%
Labor unions	14%	8%	20%	19%	31%	23%	13%
Finance of venture projects	0%	0%	1%	0%	0%	0%	0%
Cost reductions	0%	2%	1%	3%	0%	0%	4%
Business administration and management	29%	6%	9%	31%	31%	10%	7%
Suppliers	0%	4%	7%	0%	3%	0%	5%
Core product	10%	12%	11%	0%	0%	3%	2%
International railway operations	0%	2%	1%	0%	0%	0%	0%
Competition from airline or bus operators	0%	0%	0%	0%	0%	0%	0%
Competition from railway operators	0%	0%	0%	0%	0%	0%	0%
Other	0%	0%	1%	3%	0%	5%	0%
Total	100%	100%	100%	100%	100%	100%	100%

Q: What is the most important barrier for developing DSB's business model when you look forward?							
	Management groups						
	Group 1	Group 2	Group 3	Group 4	Group 5	Group 6	Group 7
Political influence	24%	37%	36%	28%	3%	33%	38%
Corporate culture	0%	4%	2%	6%	0%	0%	4%
Long-term strategy	29%	13%	7%	14%	17%	10%	20%
Change management	0%	6%	7%	3%	7%	8%	7%
Labor unions	19%	12%	21%	28%	17%	18%	9%
Finance of venture projects	0%	0%	0%	0%	3%	0%	0%
Cost reductions	5%	4%	4%	3%	3%	13%	4%
Business administration and management	19%	12%	10%	17%	45%	13%	9%
Suppliers	0%	0%	4%	0%	3%	0%	2%
Core product	5%	6%	10%	3%	0%	3%	2%
International railway operations	0%	0%	0%	0%	0%	0%	0%
Competition from airline or bus operators	0%	2%	1%	0%	0%	0%	2%
Competition from railway operators	0%	2%	0%	0%	0%	0%	0%
Other	0%	4%	1%	0%	0%	3%	4%
Total	100%	100%	100%	100%	100%	100%	100%

Q: What is the most important opportunity for developing DSB's business model when you look forward?							
	Management groups						
	Group 1	Group 2	Group 3	Group 4	Group 5	Group 6	Group 7
Political influence	10%	6%	4%	8%	0%	3%	2%
Corporate culture	5%	17%	17%	3%	10%	18%	13%
Long-term strategy	24%	25%	15%	31%	17%	23%	29%
Change management	24%	13%	10%	6%	10%	13%	15%
Labor unions	5%	2%	6%	6%	10%	5%	2%
Finance of venture projects	0%	0%	0%	0%	0%	0%	0%
Cost reductions	0%	12%	5%	6%	10%	8%	5%
Business administration and management	10%	8%	6%	22%	28%	8%	13%
Suppliers	0%	4%	1%	6%	0%	5%	4%
Core product	24%	13%	32%	11%	10%	13%	11%
International railway operations	0%	0%	2%	0%	0%	3%	2%
Collaboration with airline or bus operators	0%	0%	1%	0%	0%	3%	2%
Collaboration with railway operators	0%	0%	0%	0%	3%	0%	4%
Other	0%	0%	1%	3%	0%	0%	0%
Total	100%	100%	100%	100%	100%	100%	100%

Table 8.4: Single count summary.

Source: The Author

Only 6% of the commercial managers (Group 2) and 2% of the rolling stock managers (Group 7) view political influence as the greatest

opportunity for facilitating a necessary business-model innovation in the Danish railway sector. The results of the single choices are summarized in table 8.4. However, the rolling stock managers (Group 7) by far are the most critical about the *Political influence* on the development of the railway operator by an overwhelming percentage of 55% selected this option to explain the causes of the institutional crisis that observed in fall 2011. In fact, 37% of the commercial and 38% of the rolling stock managers confirm they skepticism about the *political influence* as the most important barrier for developing the railway operator's business model when looking forward.

8.6 Review of the comments

A commercial manager aged 50 with a seniority of 28 years reflects on the situation:

Who says we have to live on the income generated from the train operations? — Manager A

A commercial manager aged 44 with 16 years of experience responds:

Totally disagree. As long as we do not have the ambition to connect the train services closely with Oslo, Stockholm and Hamburg, then [I am afraid that] the national measures will only advance the number of customers a few percent, which is completely insufficient when we in the near future will become independent [without subsidies from the Danish government]. DSB should always work actively in relation to the political system. Work actively to couple Denmark to the European high-speed network. [This is especially relevant] in a world where the focus is on CO2 reduction ... All European cities, including Copenhagen, should - of course - be connected with an effective [and] modern high-speed trains. — Manager B

The two different viewpoints are provided by two members of the same management group, while a third member focuses on the many management competences inside the organization and the necessity of developing a common approach that the employees can follow:

There is certainly not a lack of management capabilities in DSB. Objectives, strategies, and plans are always ready. The challenge is to get them to fit together in a global approach, which the entire staff will be highly motivated to follow[.] There are both organizational and

cultural barriers [to be solved] ... But it requires a continuous effort and determination to break the professional and personal boundaries down if innovation is really going to move across [the organization]. — Manager C

A commercial manager aged 64 recommends that:

DSB needs a more proactive, strategy plan based on breakthrough thinking, involving visionary, innovative employees as well as external experts invited to workshops with users and politicians in order to provide a qualified opposition to political opponents of public transport[.] — Manager D

Some of the distance service managers (Group 3) point out that:

The opportunity around DSB's existence depends on the political agenda. It should not be a matter of principle that more railway [operators] should run on the Danish rails, but [only] the [operator] who can best accomplish the task [of transporting passengers]. — Manager E

Another manager aged 46 with 17 years of experience in the company expresses his frustrations with the former management:

Godfather, nonsense and bullshit ... Are you stupid? - This question is self-explanatory [i.e. the core product the most important opportunity] ... we lack 2 million seats [in the rolling stock] this year ... what leadership? [i.e. Business administration and management is the greatest barrier] There is an urgent need for more focus on the core product. Too many have been fired - we cannot solve the core task. — Manager F

Another manager with 28 years of experience in the Danish State Railways concludes that the management should focus on the optimization of the core product. In this context, the use of resources become a central challenge according to this operational distance train manager:

We should not spend time and resources on marginal [passengers], but instead we should concentrate on the major groups of commuters and distance travelers, including ensuring that the connections between the trains and other transport fit as well as possible with little or no downtime. The rolling stock and personnel strategy should perhaps also be reviewed or rethought. — Manager G

Many of the comments independently confirm each other. Several other comments could extend the long list of interesting comments, but it would be beyond the scope of the doctoral thesis to describe all of the 124 comments in greater detail.

8.7 Limitations

The major limitation is that the findings reflect a sector-based challenge. The barriers and opportunities are therefore not generalizable outside the transport sector, but the results are still valuable for several reasons. First, the former management's hypothesis about the assumed top priority of expanding the railway operations into the surrounding countries is rejected. Instead the focus should be on developing the core product in the domestic market before connecting the railway operations to the bigger cities in the surrounding countries. Second, the results detail that a long-term strategy is needed for giving direction to a necessary business-model innovation in the Danish railway sector. Third, the study describes how the competition or alliances with other transport operators is considered an almost irrelevant barrier and opportunity for facilitating business-model innovation in the railway sector; both in the past and the future respectively.

8.8 Summary

The outcome of the study has been suggested to have a strong potential for making an original contribution to the transport literature. The senior editors of the Spanish Journal of European Law and some of the members of the former national transport commission Optired have found the results relevant. The results of this study have been published in the Journal of Law of the European Union (Revista de Derecho de la Unión Europea) in a special issue on the liberalization of the railway transport (Roldsgaard & Molina, 2013).

The first trial shows that 78% of the managers consider *political influence* as a barrier in the past, while 72% of the managers view *political influence* as the most critical barrier for facilitating a necessary

business-model innovation in the Danish railway sector, while only 24% of the managers view *political influence* as an opportunity for facilitating a necessary business-model innovation in the Danish railway sector when looking forward. These findings are important because many politicians and economists to lead to better and more cost-effective railway services assume the liberalization of the single market for railway services, but the present study provides an anti-thesis. Instead it highlights the importance of having a clear long-term strategy for the development of a new core product (i.e. basic railway service) primarily in the domestic market. Specifically, the study suggests that the long-term strategy should be focused on transforming the current railway services in the domestic market, which is suggested to be a relevant finding for the majority of the European railway operators that have not yet connected to the European high-speed rail network.

An increased understanding of the basic assumptions and challenges for facilitating a necessary business-model innovation in the Danish railway sector is generated via the managers' knowledge and experience in the railway sector related to the current business model, including contributing with a more precise explanation of what caused the institutional crisis observed in the railway sector in fall 2011; as well as to improve decision-making at the top level; and thus take advantage of this knowledge generated via the doctoral investigation. The measurements confirm that the core product is essential for the long-term success as expected. It was assumed that the barriers and opportunities would be similar, but the most important opportunities are not considered the most important barriers, and vice versa.

Finally, political influence is highlighted as the most important underlying cause of the institutional crisis, which then seems to be a relevant finding for the majority of the railway operators in Europe.

Chapter 9

Leadership in times of crisis

The purpose of the third study was to examine the most critical points of leadership in a time of crisis. The leadership agenda (Doz & Kosonen, 2010) was operationalized into the empirical context to identify the cognitive areas of leadership that are assumed by the managers in the Danish railway sector to have great importance for the future success and for the survival of the Danish State Railways.

Cognitive leadership has been defined as a collection of approaches to leadership that emphasize how leaders and *followers* think and process information, which is distinct from transactional leadership based on rewards contingent on performance. Cognitive leadership has been considered a tool to understand and make sense of a given context (Avolio et al., 2009). In this arena of research, the idea of a scheme as an organizational framework that maps out the mental state of the people working inside organization has been considered an essential building block for the development of the cognitive leadership literature (Avolio et al., 2009).

The leadership agenda for managing business-model renewal and transformation (Doz & Kosonen, 2010) was used as a scheme to better understand the factors that impact the senior executive management during periods of crisis, following the works that take a cognitive science

approach (Wofford et al., 1998; Lord & Hall, 2005; Mumford et al., 2007; Avolio et al., 2009; Mumford, 2013).

The present study followed the works by some of the leading theorists within the field of business models to 'unpick the interdependencies between business model choice, technological innovation, and success or failure' (Baden-Fuller & Haefliger, 2013, p. 423).

The Danish State Railways was conceptualized as an example of how the 'cognitive drivers' (Baden-Fuller & Haefliger, 2013) affect the emergence and outcome of the senior executive leadership in a time of crisis. The analysis specifies the areas of cognitive leadership that play the most critical role in the leadership of politically driven organizations in times of crisis. Recent developments in the first-class psychological literature have pointed out two distinct types of cognitive leadership.

The first approach has examined the way shared thinking contributes to the leader's cognitive attributes or abilities (Lord & Hall, 2005), while the second approach has examined how interactions that occur between individuals affect cognitive leadership (Mumford et al., 2007). The second approach acknowledges that agreement or disagreement among the members in a collective system can influence firm performance and organizational development positively or negatively.

Following this reasoning, it is recognized that cognitive leadership has great importance for the survival and continued success of organizations (Mumford, 2013). For example in a situation where the careers of the responsible managers (or political leaders) are in play tend to work against the renewal and transformation of the current business model (Chesbrough, 2010) for which reason the status quo tend to be defended by multiple sources (Doz & Kosonen, 2010).

Others have described the risk of organizational inertia as a stagnate situation where the renewal and transformation of the current business model is required for the continued success of large companies (Hienerth et al., 2011), which means that the challenge of changing the current

business model becomes essential. A related problem in this context is that change is often not going to benefit all persons working in the organization (Velu & Stiles, 2013). The management dilemma is summarized as follows:

many CEOs we met were in the very painful situation of knowing what the deficiencies of their business model were ... anticipating how these issues would ultimately turn into financial problems, and yet feeling powerless in being able to change course (Doz & Kosonen, p. 378).

The present research seeks to further investigate this management dilemma in greater detail. The relationship between cognitive leadership and business-model innovation has thus been widely recognized (e.g. Baden-Fuller & Haefliger, 2013; Aspara et al., 2013; Doz & Kosonen, 2010; Chesbrough, 2010), but it remains an open question why some companies emerge stronger and better from a crisis, while others fail.

Until now, the 'cognitive frames' that shape the development and innovation of business models have been largely unexplored (Baden-Fuller & Haefliger, 2013), but it represents a novel challenge in the field of business models. It has been argued that the inability of the management to recognize the crisis at its early stages (Mitroff, 2005, p. 36), while others have recognized that there is currently a lack of studies on cognitive leadership and at the same time its great importance is recognized for the continued success and survival of organizations (Mumford, 2013).

The problem is that we still don't know what influences the cognitive leadership in times of an institutional crisis. It is therefore concluded that a longitudinal approach to observe the evolution of a company is not necessarily the best approach to study the cognitive forces in an institutional crisis.

9.1 Addressing a weakness in the present theory

The doctoral thesis presents an anti-thesis to the study of Nokia as a case of success (Aspara et al., 2013) for at least three reasons. First, the

conceptualization of Nokia as a success story poses a potential threat to the credibility of the literature on the topic for which reason it seems appropriate to correct this fallacy when in fact most researchers outside Finland would probably rather consider the same company as a best-case example of a company that has not been successful in managing a necessary innovation of its business model after Apple, Samsung, HTC, Google and others launched a series of superior mobile phones.

Second, we still don't know what caused the status quo situation because the researchers didn't have access to this information. Third, consideration of technological innovation is absent in this study. The doctorate investigation aims to explore the 'cognitive factors' (Aspara et al., 2013) in greater detail in order to specify the most critical areas of leadership in a time of crisis; not simply by conducting a few interviews with a few select managers and by reviewing some random archival material in hindsight after the conclusion is known.

Instead, the management survey generated over 22,000 responses from 368 managers (about 80% of the managers working in the Danish State Railways) of which over 18,000 responses were specifically dedicated to the study of cognitive leadership when the crisis was at its peak.

On the contrary, Nokia has been used as a best practice example of a company that seemed not to test and revise the management's hypotheses in order to position the present study in relation to previous research on the topic. In this context, it is important to clarify that the present study of the basic assumptions and challenges in a time of institutional crisis at its highest point of tension is per definition different from the longitudinal study of Nokia (Aspara et al. 2013).

The problem is that it remains unclear what impacts the decisions inside the company (i.e. cognitive leadership) during a period of crisis. It seems not sufficient simply to conclude that the top management must be cognizant of the mechanisms to manage conflicts in the strategic decision making process so as to be able to run new and existing business models in parallel when in fact change is often not going to benefit all persons

working in the organization (Velu & Styles, 2013). The labeling of Nokia as an extraordinary case success (Aspara et al., 2013) seems to contrast with the common understanding of the conclusion of the same company (e.g. Doz & Kosonen, 2008; Doz & Kosonen, 2011).

Rather, Nokia represents an iconic example of why being a pioneer and first mover is not always an advantage (Roldsgaard, 2010; Markides & Sosa, 2013). The company became 'passive' and continued in the same direction although the market has taken a disruptive shift in a new direction when Apple and Google launched their new superior mobile phones (Roldsgaard, 2011).

Using archival material and retrospective interviews with less than 15 managers seems to represent a rather fragile ground for deriving any reliable conclusion about the challenges for cognitive leadership in the critical situation. The illusion of constructing a laudatory or eulogistic picture of a previously successful company is unsustainable when it seems to be unaware of what had caused the success in the past (Roldsgaard, 2010), while it remains an open question what went wrong in the management of Nokia as it went from being the world's leader in mobile technology to being sold to save what was left from a previously successful company.

Conceptualizing Nokia as a 'success story' in the 2000s, while leaving out any serious discussion of the importance of technologic innovation in the 2010s poses a potential threat to the credibility of the literature on business models for which reason it seems appropriate to correct this fallacy. Furthermore, we know that a longitudinal study of a company crisis can be associated with a risk to drag inaccurate or erroneous conclusions from a distant analysis of the evolution over time if such studies are based on a few interviews and some random archival reviews of the past as in the study of Nokia (Aspara et al. 2013).

Understanding the development of general trends is of course important to understand the context, but it is not in itself sufficient to understanding the motives and deeper causes that triggered the crisis. As opposed to this

idea, the collective short-term memory of the former Nokia Management seems to provide an exemplary case of why a previously successful company failed, among others, because the responsible managers seemed to have forgotten that technological innovation was at the core of its success within mobile technology that started 15 years ago, but ended 5 years ago (Roldsgaard, 2010). This point is almost completely ignored in the same study of the alleged successful 'corporate business-model transformation'. The problem is that if the deeper causes of the crisis are not removed, it is probably only a matter of time before the same company will face a subsequent crisis that has the potential to spiral out of control.

The problem of this 'second-best approach' to study the underlying barriers and opportunities for business-model innovation in a time of crisis is that it potentially fails to recognize the basic assumption upon which the management decisions are made in critical situations, which not only affect customers but also the employees working in the company. It seems difficult to generate useful knowledge about which areas of cognitive leadership influence positively or negatively on the success of business-model renewal and transformation, simply by reviewing some archival documents as in the study of Aspara et al. (2013).

Aspara et al. (2013) describe empirical snapshots of particular firms' business model as something that should be avoided and instead suggest that longitudinal studies are the best way to understand how 'business model transforms over time' (p. 459), but this argument (i.e. transformational leadership) is controversial because a crisis calls for a cross-sectional study of the critical situation as it happens (i.e. cognitive leadership) rather than simply outlining the development over time in hindsight when the conclusion is known.

The doctoral thesis has for this reason presented a counter argument for the ideal study of organizational leadership in a time of crisis to study the problem when a previous successful company keeps doing what used to be the right thing for too long and thus falls victim to its own business

model (Doz & Kosonen, 2010). Doing the 'right thing' is therefore dependent on the situation in which the management finds itself. A similar problem has been observed when the management not only keeps doing what used to be the right thing for too long, but also neglects to invest money in the development of a new core product (Roldsgaard, 2011). Added to this, we know that the careers of the responsible managers are at play in such situation, which has been considered an underlying barrier for the management of business-model innovation (Chesbrough, 2010).

Scholars from the first-class psychology literature encourage more research about cognitive leadership (Mumford, 2013). The present study examines the pluralism of cognitive leadership in a collective system of shared or diverging beliefs concerning a necessary business-model innovation in the Danish railway sector in a time of institutional crisis. The Danish State Railways is used as a model to study the cognitive areas that are assumed to be important for the survival of organizations and the continued success during periods of an emergent crisis.

In fact, about 75% of the total data collected via the management survey was designed to explore the cognitive areas of leadership that have great importance for the survival of organizations and their continued success (Mumford, 2013). The doctoral investigation aimed to better understand the cognitive areas of leadership that affect the avoidance, emergence and outcome of an institutional or political crisis by examining a total of 18,768 responses concerning the critical points of leadership in time of crisis provided by 368 managers with an average of 15 years of experience working in the Danish railway sector (i.e. industry specialists).

The outcome of the study is considered to have a strong potential for making an original contribution to the literature on business model as it explores some cognitive areas of leadership that are assumed to have great importance by the managers working in the railway sector for the management of business-model innovation. Added to this, the outcome of the doctoral investigation may lead to a new understanding of the causes that led to the emergence of the crisis by systematically exploring the

basic assumptions and challenges in order to gain a new understanding of the critical factors that are assumed by the managers working the railway sector to avoid its emergences or to effect the outcome of an institutional crisis.

The initial hypothesis was that the managers would consider the five variables of the 'strategic sensitivity' factor of the highest importance, while the operational hypothesis was that the managers would consider 'strategic foresight' the most important element for gaining the necessary level of 'strategic agility' (Doz & Kosonen, 2010) for the renewal and transformation of a long-established and well-known business model in the Danish society.

9.2 Validity and reliability of the present study

The meta-analytical study of the 'cognitive maps' or 'mental models' of the three hundred and sixty-eight managers (n=368) taking part in the doctoral investigation were cross-examined systematically in order to explore the manager's assumptions concerning the most critical aspects of the leadership agenda (Doz & Kosonen, 2010) in a time of crisis.

The results were analyzed at meta-level in order to gain objective distance to the data to better understand the basic challenges during periods of crisis. Each point of the leadership agenda was measured three times to identify the challenges that are predicted to be of high importance for the management during periods of crisis. In terms of construct validity, the operation from theory to practical statements was given top priority to collect data of high quality.

A selection of managers was invited to propose adjustments or reformulations to improve the accuracy of the statements before collecting the data. The dialogue was quite time consuming ex ante, but worthwhile when the results had to be interpreted.

The statistical tests indicate that the scales measured the fifteen variables accurately. The internal validity (i.e. accuracy of the responses)

evaluates how well the items of the scale correlate (i.e. to test if the items 'tap' the same construct). The concepts measured are suggested to be well-founded. A coefficient above .80 provides a scientific basis to claim that the measurements of the leadership agenda accurately measured. The statistical tests confirm that the internal validity of the scales is well above the acceptable threshold of .70 in the social sciences (Nunnally, 1978; Santos, 1999).

Cronbach's alpha averages the inter-correlation between the items to measure how closely related the set of items are as a coherent construct. The Cronbach alpha (95% C.L.) values over .85, suggest that the items of the scale tap the same construct. The function 'Cronbach's Alpha if Item Deleted' was applied to test that the coefficient values would not increase when deleting individual items of the scale.

Then, the alpha values were divided into two halves to compute the Pearson r between the scores. The split-half test was then adjusted by the Spearman-Brown prophecy formula to estimate how much the test's reliability would increase with the length of the scale when adding parallel items (Trochim, 2006). The Spearman-Brown reliability test produces values between .81 and .91, which confirms the scales' validity and reliability (see table 9.1).

	Scale A	Scale B	Scale C
Cronbach's Alpha (95% C.L.)	.879	.877	.847
Split-Half Correlation (odd-even)	.771	.833	.686
Spearman-Brown Prophecy	.871	.909	.814

Table 9.1: Alpha coefficient values.

Source: The Author

Scale A measures the past practices of the six-month leading up to the peak of the institutional crisis (i.e. trial 7). Scale B measures the same variable as a re-test to replicate the results (i.e. trial 8). Scale C measures the best practices in terms of importance of the variables of the

leadership agenda (i.e. trial 9) in order to compare the level of attention that the top management had given to these variables in the past compared to the assumed importance of the same variables of the leadership agenda (Doz & Kosonen, 2010) for facilitating a necessary business-model innovation in the Danish railway sector.

A consistency test of the responses was then designed to examine the external validity of the results to go beyond the classic tests of internal validity to provide a simple, but efficient overview of the reliability of the data. The external validity test of the data examines the reliability (i.e. repeatability) of the 18,768 responses randomly distributed into the seven management groups as an objective method to evaluate the basis for making generalizations.

The items of the leadership agenda are reviewed as three individual composites as a method to look for underlying consensus across divergent groups of managers. The parallel group analysis shows that the responses generally follow the same patterns across different groups of managers in each trial (Group 1 is highlighted in bold).

The outcome of the consistency test adds to the reliability of the results. The consistency test shows that the responses have been consistently repeated across the seven management groups, which means that the underlying value of the scale constructs is generally the same across the different management groups. The consistency test generally confirm the uniformity of the responses across the scales, but two items of the final scale require further examination due to the deviation in the response patterns in Scale C (i.e. Trial 9).

These two items 'Caring' and 'Switching' were therefore analyzed in isolation to examine if the patterns would be inconsistent. The intergroup analysis of 'Caring' showed that the patterns did not overlap. However, the intergroup analysis of 'Switching' showed the contrary result (see page 275). The result of the consistency test is presented in figure 9.1, while the numbers behind the figure are described in table 9.2.

Figure 9.1: First consistency test

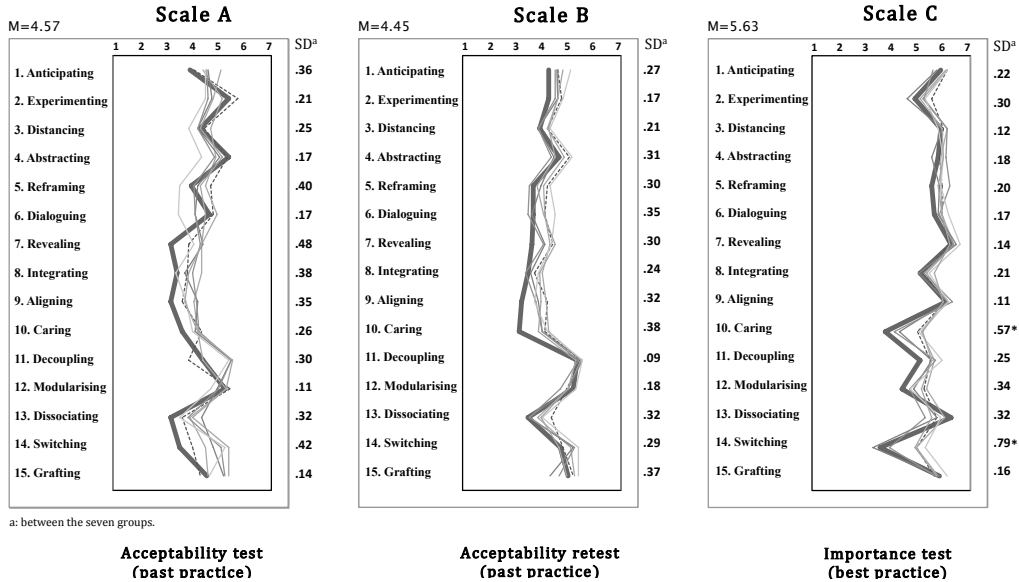


Table 9.2: Data behind the consistency tests

T-I	V 1	V 2	V 3	V 4	V 5	V 6	V 7	V 8	V 9	V 10	V 11	V 12	V 13	V 14	V 15	M.M.
G 1	3,904	5,380	4,333	5,380	3,952	4,666	3,190	3,428	3,190	3,619	4,428	5,238	3,190	3,523	4,571	4,133
G 2	4,750	5,730	4,519	5,269	5,153	4,884	4,538	4,500	4,115	4,269	4,711	5,480	4,096	4,807	4,211	4,735
G 3	4,698	5,485	4,683	5,308	4,933	5,139	4,198	4,264	4,117	4,397	4,639	5,514	4,051	4,352	4,477	4,684
G 4	4,055	5,722	4,444	5,333	4,694	4,805	3,888	3,833	3,611	4,361	3,861	5,416	3,611	4,027	4,305	4,398
G 5	3,965	5,310	3,965	5,172	4,827	4,931	3,620	3,724	3,620	4,137	4,103	5,310	3,793	4,000	4,344	4,321
G 6	4,615	5,538	4,538	5,128	4,974	5,153	4,358	4,025	3,974	4,102	4,487	5,512	3,974	3,948	4,410	4,582
G 7	4,418	5,145	4,709	4,890	4,527	4,963	4,381	4,345	4,072	4,236	4,418	5,290	3,909	4,490	4,581	4,558
M.M.	4,344	5,473	4,456	5,211	4,723	4,934	4,025	4,017	3,814	4,160	4,378	5,394	3,803	4,164	4,414	4,57*

T-II	V 1	V 2	V 3	V 4	V 5	V 6	V 7	V 8	V 9	V 10	V 11	V 12	V 13	V 14	V 15	M.M.
G 1	4,238	4,285	3,904	4,666	3,666	3,666	3,619	3,476	3,238	3,142	5,333	5,190	3,476	4,714	5,000	4,108
G 2	4,596	4,750	4,192	5,057	4,230	4,096	4,403	3,711	4,192	4,096	5,461	4,961	4,346	4,788	5,192	4,538
G 3	4,536	4,588	4,235	4,852	4,051	4,132	4,330	4,029	4,147	4,250	5,500	4,985	3,845	5,110	5,220	4,521
G 4	4,583	4,583	3,861	4,444	3,944	3,638	4,111	3,555	3,861	4,027	5,527	4,972	3,527	5,194	4,333	4,277
G 5	4,482	4,482	3,862	4,379	3,517	3,482	4,068	3,379	3,758	4,034	5,379	4,724	3,551	5,241	4,655	4,200
G 6	5,102	4,794	4,333	5,153	4,333	4,487	4,358	3,846	3,717	4,230	5,512	5,282	4,000	5,384	5,410	4,663
G 7	4,781	4,600	4,272	4,490	3,800	4,054	4,527	3,909	3,963	3,854	5,290	5,000	3,963	4,654	4,963	4,408
M.M.	4,617	4,583	4,094	4,720	3,934	3,936	4,202	3,701	3,839	3,948	5,429	5,016	3,815	5,012	4,968	4,45*

T-III	V 1	V 2	V 3	V 4	V 5	V 6	V 7	V 8	V 9	V 10	V 11	V 12	V 13	V 14	V 15	M.M.
G 1	5,857	4,904	5,857	5,761	5,523	5,619	6,285	5,095	6,047	3,761	5,095	4,428	6,285	3,571	5,809	5,326
G 2	6,134	5,538	5,961	5,807	5,942	5,942	6,192	5,230	6,019	5,019	5,480	5,250	5,750	4,961	5,615	5,656
G 3	6,125	5,176	6,102	5,897	5,882	5,926	6,382	5,338	6,117	5,132	5,639	5,352	6,000	4,941	5,801	5,721
G 4	5,750	4,611	5,944	5,527	5,805	5,777	6,444	5,027	6,111	4,333	5,527	4,833	5,722	3,305	5,805	5,368
G 5	5,586	5,241	6,103	6,068	6,206	5,827	6,379	5,241	6,310	4,137	5,689	4,689	5,275	3,931	5,689	5,491
G 6	6,102	5,282	5,769	5,948	5,897	6,179	6,589	5,435	6,153	5,025	5,923	4,717	5,897	5,307	6,128	5,757
G 7	6,054	5,090	5,909	5,963	5,800	5,945	6,236	5,654	5,963	5,181	5,545	5,145	5,545	4,890	5,745	5,644
M.M.	5,944	5,120	5,949	5,853	5,865	5,888	6,358	5,289	6,103	4,655	5,557	4,916	5,782	4,415	5,799	5,63*

T=trial, V=variable, G=group, M.M.=marginal mean, *absolute mean

9.2 Underlying intergroup disagreement

A unique instance of an intergroup disagreement was identified in the forty-five points of measurements across the three trials. The second consistency test specifies an intergroup dispute (and thereby an external validity issue) about the advantages of having multiple business models. The mean values of the management groups were multiplied by a billion to review the subtle distances in great detail in figure 9.2.

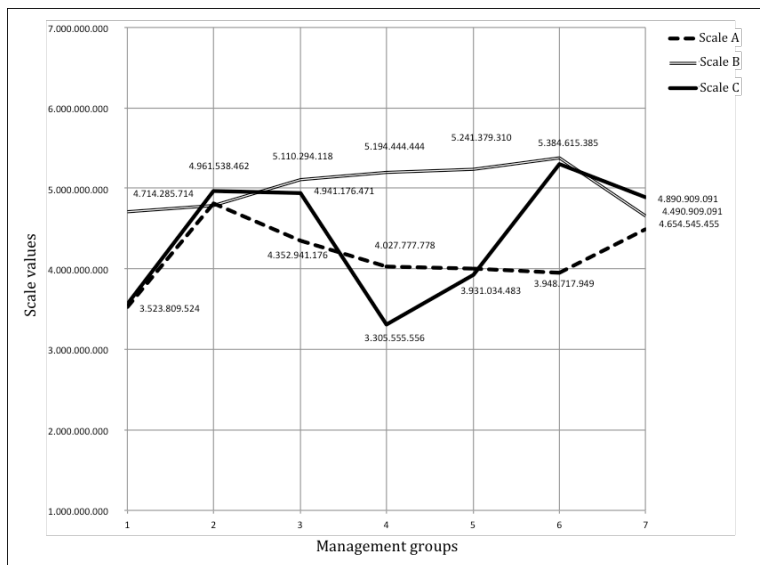


Figure 9.2: Second consistency test.

Source: The Author

The figure below describes the aggregated response patterns provided by the managers in the seven groups across the three measurements of the variable 'Switching' of the leadership agenda (i.e. advantages of operating with multiple business models). The response patterns concerning the past practices are only partially inconsistent (i.e. Scale A), while the retest shows a high level of consistency across the seven management groups (i.e. Scale B). However, the inconsistency about the

importance of having multiple business models is problematic (i.e. Scale C). The problem is not only that the response patterns deviate across the diverse management groups, but that they overlap and contradict each other across the three measurements of the same variable. The disagreement can be divided into two contradictory blocks of underlying consensus about the importance of having multiple business models.

- **BLOCK 1. Advocates/Supporters.** The commercial managers (Group 2) agree with the rolling stock maintenance managers (Group 7) that the current focus on developing multiple business models is ideal. The operational managers of the distance railway services (Group 3) agree that the importance of introducing new products, services and business initiatives independently in S-trains [Local commuting travels], DSB [Distance travels] and DSB International [International travels] corresponds to the importance of doing so (Scale A), but they furthermore underline that more has to be done to develop independent strategies and allocate resources for the different types of railway services (Scale B). The managers of the Copenhagen commuting railway services (Group 6) agree that developing multiple business models at organizational level is of high importance (Scale A) and they suggests that too little has been done to develop independent strategies for the diverse railway services, including allocating resources to support the decentralization or 'unbundling' process (Scale B) in the critical period leading up to the institutional crisis.
- **BLOCK 2. Opponents/Critics/Skeptics.** The corporate managers (Group 1), finance managers (Group 4) and Human resource managers (Group 5) disagree that having multiple business models is important. The corporate managers do not find it important to diversify products across different infrastructures and they believe that equally little was done to develop independent strategies for the different railway companies (i.e. business models at organizational level) and they likewise believe that too much was done in the past to introduce new products, services, and sales campaigns across the different railway companies (i.e. business models at product level). The financial managers (Group 4) believe that the value of operating with multiple business models simultaneously was significantly overrated in the period leading up to the institutional crisis. The financial managers furthermore believe that the benefit from decentralizing the management and allocating further resources to the different railway services does not correspond with the cost of doing so. The financial managers are the strongest proponents of investments in the development of a new core product to develop the distance railway services (see study 1), but they are also the strongest opponents of the decentralization of the different railway companies. The human resource managers (Group 5) agree that too much focus was devoted to the introduction of new products, services, and sales campaigns across the different railway services in the period leading up to the institutional crisis, but they do nonetheless believe that the limited focus on developing independent strategies for, and allocating further resources to, the different railway services correspond well to the relatively little importance of doing so.

The intergroup disagreement makes it necessary to express reservations on the assumed advantages and disadvantages of operating with

multiple business models, making it the only point of measurement that cannot be generalized. The variable is therefore 'neutralized' in the further analysis of the most critical areas of the leadership in a time of crisis, but the intergroup disagreement is not considered a threat to the general credibility of the study because the other 44 points of measurement follow the same underlying patterns, which means that the underlying values were confirmed across the seven management groups.

9.3 Exploring gaps in the leadership agenda

Transforming the business model of a previously successful company is not an easy task (Doz & Kosonen, 2010), but knowing the importance of the most critical points on the leadership agenda may help to direct the attention of the top management of politically driven organizations in a time of crisis. Previous research has shown that the strategic attention to scarce resources to grasp opportunities within existing business models is both a critical and underestimated aspect of organizational leadership (Roldsgaard, 2010, p. 73):

It's widely known that time is a scarce resource; while it remains less widely known that attention is another critical scarce resource. The limited awareness of attention as a scarce resource doesn't mean that attention [critical aspects of the leadership in a time of crisis] is unimportant.

Doz & Kosonen's (2010) leadership agenda was operationalized to study the most critical points of the leadership agenda in a time of crisis. The purpose was to examine the relationship between the assumed importance of the individual points of the leadership agenda and the former top management's attention given to these points in the critical period leading up to the institutional crisis. The three gaps in the leadership agenda are highlighted in table 9.3.

Table 9.3: Gaps in the leadership agenda

Indicators	Past practice	S.D.	Best practice	S.D.	Gap	Sig.	Sig. (0.5)
1. Anticipating — developments in the market	4.56	0.99	6.02	1.01	1.46	0.00	Significant
2. Experimenting — in the market	5.04	0.95	5.16	1.20	0.12	0.14	Not significant
3. Distancing — by getting an outside perspective	4.35	0.95	5.99	0.95	1.64	0.00	Significant
4. Abstracting — to develop new concepts	4.99	1.05	5.87	1.07	0.88	0.00	Significant
5. Reframing — by seeing the need for change	4.41	1.21	5.88	1.09	1.47	0.00	Significant
6. Dialoguing — to develop a common ground	4.51	1.18	5.92	1.07	1.40	0.00	Significant
7. Revealing — personal motives and ambitions	4.22	1.53	6.36	0.83	2.13	0.00	Significant
8. Integrating — by creating shared commitment	3.99	1.39	5.33	1.26	1.34	0.00	Significant
9. Aligning — around a common interest	3.96	1.20	6.10	0.92	2.13	0.00	Significant
10. Caring — by proving personal 'safety' to be playful	4.16	1.51	4.88	1.49	0.72	0.00	Significant
11. Decoupling — to gain flexibility	4.96	0.90	5.60	1.08	0.67	0.00	Significant
12. Modularizing — by standardizing infrastructures	5.22	0.96	5.08	1.32	0.14	0.11	Not significant
13. Dissociating — resources via negotiation	3.90	1.08	5.82	1.12	1.92	0.00	Significant
14. Switching — between multiple business models	4.65	1.06	4.66	1.61	0.00	0.98	Not significant
15. Grafting — to break with the status quo	4.74	1.14	5.79	1.09	1.05	0.00	Significant
16. Total	4.51	—	5.63	—	1.12	0.00	Significant

Note: The non-rejection of the null hypothesis does not suggest that the non-significant items have no effect, but simply that it wasn't rejected that they do not have an effect under the 95% assumption. The three items classified as "not significant" are treated as "neutral" at this initial stage, which means we cannot say anything about these items yet.

The present study specifies that the outcome of an institutional crisis is dependent on articulating assumptions and challenges for the future. Simply having goals for the future is not sufficient since the future challenges the also need to be articulated as described in figure 9.3.

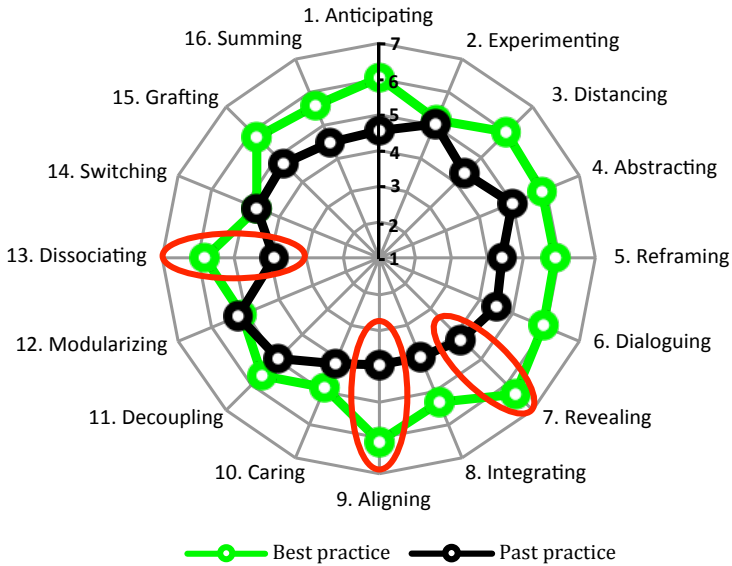


Figure 9.4: Gaps in the leadership agenda.
Source: The author.

Together, the three gaps generate a new theory about the most critical variables of the leadership agenda in a time of crisis. The first gap describes the importance of *revealing personal motives and ambitions* in a time of crisis (average value: 6.36 out of 7.00), which was the highest average value across all points of measurements of the leadership agenda. The second gap describes the importance of *aligning around a common interest* in a time of crisis (average value: 6.10 out of 7.00), which is the second highest average value. The third gap describes the importance of *dissociating resources via negotiation* in a time of crisis

(average value: 5.82 out of 7.00), which was the highest average value of the third factor 'resource fluidity'. The three gaps (average value: ± 2.00) across three hundred sixty-eight managers (n=368) are suggested to be the most critical variables for the senior executive leadership of politically driven organizations, especially in times of crisis.

- **Gap 1. Revealing personal motives and ambitions.** Lack of revelation of personal motives and ambitions reduces transparency and clarity, which makes it difficult to obtain the necessary mutual respect and trust to align interests. The former top management underestimated the importance of revealing personal motives and aspirations for the future (average value: 4.22 out of 7.00). A deficit of revelation of personal motives is therefore assumed to have a negative effect on the transparency and clarity. Lack of transparency about goals and challenges for the future makes it difficult to rally around a common interest, while a lack of clarity (i.e. understanding the positions of the managers) makes it increasingly difficult to achieve the necessary mutual respect and trust. Without mutual respect and trust it becomes difficult to break with the status quo, which is important in a time of crisis for the survival and future success of organizations.
- **Gap 2. Aligning around a common interest.** Aligning the interests of multiple groups of stakeholders is not an easy task. The former top management underestimated the importance of rallying around a common interest (average value: 3.96 out of 7.00), but aligning around a common interest plays a vital role in the outcome of a crisis. In fact, 'aligning interests is perhaps the most obvious mechanism - but one that is often [poorly] understood' (Doz & Kosonen, 2010, p. 376). The present study specifies that the use of trend curves, business exercises and inspiring stories are assumed to be an effective method to create collective commitments and to foster engagement across multiple groups of stakeholders. Another way to align interests is to clearly state the conditions for success both in the short-term long-term, while a third way to align interests is to implement the long-term strategy in a series of small steps to make it manageable.
- **Gap 3. Dissociating resources via negotiation.** Dissociating resources via negotiation is important because the alignment between the 'boundaries of a business' and 'the domain of responsibility of a senior executive' can be broken (Doz & Kosonen, 2010, p. 379), but the dissociation of resources is essential to avoid a company from becoming a victim of its own business model. The former top management underestimated the importance of dissociating resources (average value: 3.90 out of 7.00). In fact, this point of measurement was the lowest average value observed in the entire management survey. The managers evaluated the acceptability of the negotiation of resource access and allocation in delayed projects in the past, which underlines the essential importance of dissociating resources in times of crisis. This gap was almost twice as large as the second largest gap within the resource fluidity factor for which reason the result is suggested to be very robust.

The managers were distributed into two groups in terms of their underlying preference for the core product in order to evaluate the effects of the independent variables of the leadership agenda. Only a

small minority group (n=8) believes that the core product is unimportant, while the majority of the managers (n=360) believe that the core product plays an important role for facilitating business-model innovation in the Danish railway sector.

A multiple correlation analysis examines the multiple relationships between the dependent variable (core product) and the independent variables of the leadership agenda. The multiple coefficients of determination (r^2) measure the proportion of the total variation in the dependent variable; while the low p-values (sig. 2-tailed) indicate that the correlations are statistically significant for the highlighted variables (i.e. the results were not generated by chance).

The loadings significance at the .01 level means that it is 99% probable that the results were not generated by chance, while the indicators at the .05 level means that it can be rejected with 95% probability that the results were generated by chance. The proportions of impact as a percentage of the total of the loadings significant at the 99% confidence level are marked with a circle to highlight the most important variables of the leadership agenda. The independent variables of the leadership agenda were manipulated by calculating the multiple coefficients of determination (r^2) as a total share of 100% in order to evaluate the effects on the dependent variable:

- **Minority group (2%): reject the core issue to be solved.** The minority group of managers (n=8) rejects the core problem and they will therefore be unlikely to agree on any real change of the current situation, which is a problem because a crisis requires breaking with the current situation. The problem is that these individuals misinterpret the situation since they focus on peripheral issues. The multiple correlation analysis shows a surprisingly strong association between 'dialoguing' and the dependent variable for the minority group (i.e. linear relationship). Statistically, it is rejected with 99% probability that this result was caused by chance. The importance of exploring assumptions to develop a common ground is perhaps the single most interesting finding of the multiple correlation analysis because it indicates that these individuals do not understand the cause of the current problematic situation and the problem will be further complicated because these individuals will be the strongest opponents to any change because they see no need for a change in the current practices. They instead focus on the periphery issues that they find important, while neglecting the core problem of the crisis. Without dialoguing, these individuals will be unlikely to realize that a change in the existing practice is necessary and that the negotiation of resources may have an adverse effect without the direct and explicit articulation of the

underlying assumptions and hypotheses. It is unlikely that these managers will accept the need for the shift from periphery issues to the core challenge. The exploration of assumptions to develop a common ground is absolutely essential for the small minority group of individuals to create the necessary mutual respect, trust, and understanding of positions because these individuals reject the core problem without being aware of it. Surfacing and sharing assumptions is therefore considered essential for remedying the current situation. Simply stating the conclusion what must be done or changed is unlikely to have any impact on these individuals and any attempt to develop 'plug and play' functionality may have an adverse affect on the development of the current situation, while requiring these individuals to transform is likely to have a negative impact on the outcome of the crisis.

- **Majority group (98%): accept the core issue to be solved.** The majority group of managers (n=360) accepts the core problem and they will therefore be likely to agree on a change of the current situation, but it may require an outside-in perspective to get an objective distance to initiate the dialog about the goals and related challenges for the future. Revealing the personal motives and aspirations of the senior executive management, for example, by articulating the goals and challenges for the future is important for the majority of the managers in order to create a common interest for changing the current situation (i.e. aligning different interests of multiple management groups). Grafting to break with the status quo appears to yield the greatest impact on the dependent variable and thus the outcome of the crisis. Breaking with the status quo is forward looking in nature but anchored in the existing practice, which ultimately means that the underlying premise for facilitating a necessary business-model innovation is assumed by the vast majority of the managers to be dependent on the dissociation of resources. The advanced management skill of negotiating terms and conditions with a range of stakeholders, including the owners, employees and key partners becomes a deciding factor for the outcome of the crisis. Negotiating ownership and use of resources (e.g. developing the current contracts and formal relationships) is an advanced form for collaboration that is assumed to be the most important underlying aspect for the internal capability to reconfigure and redeploy resources rapidly in a time of crisis.

The correlation analysis indicates a combined effect of multiple variables rather than a cause-and-effect relationship between a single independent variable and the dependent variable. Getting an objective distance to the core problem has the power to yield a positive impact on the development of the current situation, especially if the 'outside view' (provided by knowledgeable individuals) will be able to challenge the taken-for-granted assumptions of the 'inside view' of the leadership team. Specifically, the importance of the dependent variable (i.e. core product) cannot be ignored when discussing the underlying assumptions and cognitive challenges for facilitating a necessary business-model innovation in the Danish railway sector because about 99% of the Danish railway operator's revenues are generated from the transportation of

passengers and because 98% of the managers working in the Danish State Railways (n=360) with an average seniority of 15 years recognize that the core product is important for facilitating a necessary business-model innovation in the Danish railway sector.

		Core product "not important" [code=1,2,3,4] (n=8)	Core product "important" [code=5,6,7] (n=360)	Total counts (n=368)	Proportion of impact as a percentage of the total (total share of 100%)		
1. Anticipating — predict developments in the market	Pearson r Sig. (2-tailed) N	.236 .574 8	.082 .118 360	.116* .026 368	34.04	9.78	7.68
2. Experimenting — get insight via probing in the market	Pearson r Sig. (2-tailed) N	.000 1.000 8	.052 .328 360	-.002 .964 368	-	6.14	-1.6
3. Distancing — get an outside-in perspective	Pearson r Sig. (2-tailed) N	.251 .548 8	.125* .018 360	.161** .002 368	36.29	14.83	10.66
4. Abstracting — develop new concepts	Pearson r Sig. (2-tailed) N	-.289 .488 8	.033 .538 360	.004 .937 368	-41.69	-34.25	.26
5. Reframing — see the need for change in a positive light	Pearson r Sig. (2-tailed) N	.000 1.000 8	.105* .048 360	.051 .334 368	-	12.46	3.34
6. Dialoguing — explore assumptions, not just conclusions	Pearson r Sig. (2-tailed) N	.838** .009 8	.125* .018 360	.170** .001 368	121.01	14.83	11.25
7. Revealing — describe goals and challenges for the future	Pearson r Sig. (2-tailed) N	.000 1.000 8	.149** .005 360	.176** .001 368	-	17.68	11.65
8. Integrating — create shared commitment and engagement	Pearson r Sig. (2-tailed) N	.650 .081 8	-.028 .601 360	.071 .171 368	93.79	-3.28	4.73
9. Aligning — create a common interest for change	Pearson r Sig. (2-tailed) N	.316 .445 8	.134* .011 360	.142** .006 368	45.66	15.90	9.40
10. Caring — provide personal safety to be playful	Pearson r Sig. (2-tailed) N	.000 1.000 8	-.061 .252 360	-.017 .745 368	-	-7.18	-1.13
11. Decoupling — reorganize to gain flexibility	Pearson r Sig. (2-tailed) N	.000 1.000 8	.087 .100 360	.127** .015 368	-	10.29	8.41
12. Modularizing — develop 'plug and play' infrastructures	Pearson r Sig. (2-tailed) N	-.615 .105 8	.080 .128 360	.086 .100 368	-88.74	9.54	5.68
13. Disassociating — negotiate resources	Pearson r Sig. (2-tailed) N	-.697 .054 8	.135* .010 360	.193** .000 368	-100.72	16.02	12.77
14. Switching — benefit from multiple business models	Pearson r Sig. (2-tailed) N	.309 .457 8	-.061 .251 360	.027 .599 368	44.56	-7.19	1.82
15. Grafting — break with the status quo	Pearson r Sig. (2-tailed) N	-.306 .461 8	.206** .000 360	.206** .000 368	-44.21	24.44	13.63

* Correlation significant at the 0.05 level (2-tailed).
** Correlation significant at the 0.01 level (2-tailed).

Table 9.4: Multiple correlation analysis.
Source: The Author

The relatively low degrees of linearity of the individual independent variables indicate that there is not a strong relationship between any single variable of the leadership agenda and the dependent variable for the majority of the individuals and this is the reason why the proportion of impact as a percentage of the total share of 100% becomes relevant in order to understand which variables have the highest effect on the dependent variable.

The negotiation of resource ownership, use, placement, and access is an advanced form of 'open collaboration' that until now has not received sufficient attention in the management literature, which is a problem because the dissociation of resources is assumed to be of essential importance for reconfiguring and redeploying resources in new ways, which is especially relevant in times of crisis. The successful dissociation of resources is linked to the ability of the senior executive leadership team to develop a vision for the future that stimulates and enables a collective commitment and engagement in the process of breaking with the status quo. For example, by developing a new core product, which may require abandoning the old core product, which is a highly political challenge that may put the careers' of the senior managers' at risk (Chesbrough, 2010).

The importance of dissociating contributes with a new understanding for achieving a high degree of structural flexibility during periods of crisis, but the dissociation of resources also has a potential flipside because the decision to unbundle resources is not just a decision taken by the top team. The development of a shared vision for the future goes beyond the classic profit-maximizing incentives of transformational leadership and it may require the top management to venture into new (Doz & Kosonen, 2010). An illustrative example of this is described in figure 9.4.

DSBFirst, IC4 trains, etc.

Fostering leadership unity

accelerating business model change and renewal [requires] a top team willing to venture into new models and (more difficult) abandon old ones

Commiment

... beyond the mechanism of aligning incentives lies the appeal of a compelling mission.

E.g. Very high speed train service
(developing a new platform)

E.g. develop new core product

Grafting – acquiring to transform oneself

Transforming the business model of a successful company is never easy... inertia from many sources defends the status quo strategic agility is most obviously a keystone

Dissociate

Companies can dissociate their organizational structure (roles and responsibilities) from their underlying business processes and strategy to allow greater structural flexibility.

E.g. reorganization around the
core product

Figure 9.5: Fostering leadership unity in a time of crisis.

Source: Based on Doz & Kosonen (2010)

The results of the doctoral investigation specifies a new cognitive barrier for business-model innovation by pointing out the importance of political influence in a broader perspective with multiple stakeholders in a politically driven organization; in order to extend the already known importance of the careers of the top executives (Chesbrough, 2010).

The doctoral investigation contributes with a new perspective that extends the theory of 'open innovation' (Chesbrough, 2003) by emphasizing the importance of openness about goals and challenges for the future. Collaboration with external corporate partners remains important for facilitating business-model innovation (Chesbrough, 2003, 2011), but dialoguing via exploring assumptions and clarifying the executive managers' personal motives and ambitions on critical issues is of special concern in a time of crisis. Fostering openness is essential to clarify the positions of the chief executives in order to create and align a common interest for changing the status quo in a time of crisis. The results of the doctoral investigation thus confirm the importance of engaging in an honest, open, and rich dialogue around strategic issues (Doz & Kosonen, 2010) in order to foster the necessary political unity to avoid the emergence or escalation of a crisis, but also to successfully exiting an unprecedented crisis.

9.4 Limitations

There are at least three major limitations. First, the responses were collected via a Likert-type scale, which means that the data is discrete (i.e. not continuous). Second, a synchronic questioning technique could not be applied to retest the managers' knowledge about the past practices in the social science study because the repetition of the same question (i.e. rephrasing the same statement) would have caused uncertainty about the questions being asked. There was a risk that the respondents would be confused by the repetition, which could cause unrest for some respondents and as a result the response rate would have been reduced dramatically. Recognizing this risk, a diachronic questioning technique was applied to test two different qualities of the

same variable of the leadership agenda. The double-testing of the past practices was important in order to ensure that the results of the study can be generalized. Third, it is necessary to express reservations about the advantages of having multiple business models, making it the only point of measurement that cannot be generalized, while the underlying values of the other 44 points of measurement were confirmed across the seven management groups, which adds to the reliability of the study.

9.5 Summary

The articulation of the challenges for the future in a situation of crisis has the power to better the outcome of a crisis, while a lack of articulation of the challenges for the future has the power to worsen the outcome of the crisis. In this context, the articulation of the assumptions about the basic conditions for success in the future becomes a critical aspect of cognitive leadership in a time of crisis. This finding suggests that cognitive leadership is dependent on providing directions for the future, which includes articulating the challenges for the future. Giving deeper meanings for enforcing a change in the current practice is therefore assumed to be a critical area of leadership in times of crisis in order to clarify the positions of the senior executives. The revelation of conclusions in itself will be unlikely to be sufficient to develop a common ground to unify underlying preferences. Finally, the dissociation of resources is essential in a time of crisis, but it has a potential flipside. The settlement agreement with the Italian train producer made it impossible to discontinue the IC4 project due to judicial issues, which means that the Danish State Railways became a victim of the rigidity of its own business model as a result of the negotiation of the terms and conditions. Not only that, it also diverted the political focus away from the development of the core product in the domestic market; onto the internationalization of the railway operations through the venture project (i.e. strategic alliance with the Scottish First Group) that failed.

Chapter 10

Conclusions, limitations and further research

The doctoral thesis presents an original contribution to theory through a study of the Danish State Railways to examine the cognitive areas of leadership that have been pointed out by the managers in the Danish railway sector to be of high priority for the organization's survival and future success. The doctoral investigation focused on some new areas of the management agenda, which until now have been either unknown or overlooked. The problem is that an underestimation of these areas of leadership has led to both the collapse of political negotiations or replacement of top management in large companies. The focus is on leadership in large corporations through its agenda for business-model renewal and transformation (Doz & Kosonen, 2010). The starting point is a comprehensive study of a historical crisis of a previously successful company. The study identifies three key points in the agenda management that are crucial for the leadership of politically driven organizations in times of crisis. The comprehensive doctoral investigation is based on a study of the underlying causes of a historical crisis of a previously successful company through an analysis of 22,729 responses from 368 managers with an average seniority of 15 years in the Danish railway sector. The objective was to examine the fundamental assumptions and challenges for a necessary business-model innovation in the Danish railway sector in a time of crisis. A business-model

innovation in this context refers to a renewal of the Danish State Railways' business model leading to an increased profitability in the short-term and increased competitiveness with other transport companies in the long-term. The doctoral investigation was structured into three independent, comprehensive studies to gain analytical depth, while the results were tested across seven management groups to achieve analytical breadth.

- **Study 1. Basic relationship.** The objective was to examine the relationship between technological innovation and business-model innovation in the railway sector (about 10% of the data collected); as recommended by some of the leading theorists within the field of business models (Baden-Fuller & Haeflinger, 2013). That is to say, the importance of investment in, the development and maintenance of, the railway infrastructure in contrast to the importance of the railway operator's business-driven core activities. The theory of the technical core and flexible peripheral services (Thompson, 1967, 2003) was used to examine the underlying relationship between the core product and commercial end-products in the railway sector. The core product is a well-known concept in the sector and it was defined as transport from A to B, while the commercial end products were defined as business-driven activities in support of the core product.
- **Study 2. Barriers and opportunities.** The objective was to further examine the basic assumptions and challenges for facilitating a necessary business-model innovation in the Danish railway sector in the midst of an institutional crisis through a multidimensional analysis of the barriers and opportunities for developing the railway operator's business model in the long term (about 15% of the data collected). The purpose was to examine what determines the development of business-model innovation in the railway sector; following the recommendation by some of the leading theorists within the field of business models (Chesbrough, 2010; Baden-Fuller & Haeflinger, 2013). The senior editor of the Spanish journal of European Law's special issue on transport liberalization has acknowledged the relevance of the results (See Roldsgaard & Molina, 2013).
- **Study 3. Leadership in times of crisis.** The objective was to study the importance of cognitive leadership in a time of crisis (about 75% of the data collected). The leadership agenda (Doz & Kosonen 2010) was used as an instrument to explore and identify the most important areas of leadership in times of crisis, which is an underdeveloped topic in literature (Mumford, 2013). The gap analysis suggests some new areas of cognitive leadership that plays a vital role in the management of politically driven organizations in times of crisis. There has in recent years been a growing recognition that cognitive leadership is a critical aspect of politically driven organizations' success, which is the reason why such studies are necessary in order to better understand some of the problems that senior executives face in a time of crisis (Mumford, 2013).

The three research objectives are derived from the literature on business models with the overall aim of providing theoretical contributions on the management of politically driven organizations in times of crisis. The

first two studies were designed to confirm or refute the former chief executives' hypothesis that the expansion of the Danish railway operator's core activities in the surrounding international markets would be crucial to its survival and future success in a liberalized European rail market.

The first two studies are relevant to the national transport policy (about 25% of the collected data), while the results of the third survey are considered to have the greatest potential to make an original contribution to the literature on business models or psychology because the cognitive areas of leadership are believed to be decisive for the successful management of a policy-driven organization in a crisis; and in order to prevent its occurrence (about 75% of collected data).

10.1 Original contribution

The doctoral thesis presents an original contribution to theory by using the Danish railway operator as a model to study the cognitive areas of leadership that are assumed to have great importance for the survival of organizations and continued success. The doctoral investigation followed the recommendation given by some of the leading theorists in the field of business models to explore the interdependence between business-model choice and technology innovation, and success or failure (Baden-Fuller & Haefliger 2013).

A meta-analysis of a collection of journal articles on business models supports the claim that business-model innovation is almost always a combination of two or more academic disciplines that are usually considered stand-alone concepts. The interdisciplinary approach to business models therefore comprises a wide range of theoretical disciplines, including management of organizational development and change, innovation, strategy, and competitive advantage.

Teece (2010) calls for more research in this area to gain a better understanding of the essence of individual companies' business models. In this context, Chesbrough (2010) asks when does a new technology

require a novel business model and when does the combination of the two lead to a competitive advantage? Baden-Fuller & Haefliger (2013) furthermore ask what determines the evolution of business-model innovation? And they finally raise the question: if business-model innovation is potentially more important than technological innovation, or vice versa?

The answer is that an innovation of the Danish railway operator's business model calls for the progressive development of the railway's core activities, which is not limited to punctuality and reliability, but it also includes higher velocity to strengthen the competitiveness of the railway services against other means of transport.

The managers in the Danish State Railways support a stronger focus on the domestic market as a result of a historic crisis of 2011 with *both* loss-giving railway operations in Sweden *and* difficulties in fulfilling the Ministry of Transport's minimum requirements for punctuality (90%) and reliability (95%) in the domestic market. The managers in the Danish railway sector consider investment in the infrastructure essential for achieving a competitive advantage in the long term.

A competitively sustainable innovation of the Danish railway operator's business model therefore seems unlikely without investment in the rail infrastructure, while the railway operator's earning capacity relies on a stronger focus on the core activities in the domestic market (i.e. transport of passengers from A to B) rather than launching commercial large-scale projects. The managers in the Danish State Railways therefore consider it essential to optimize the existing core business in the domestic market, while the extension of the railway's core activities in the surrounding foreign markets are considered only of secondary importance to its survival and future success, which rejects the chief executives' hypothesis.

The hallmark of a crisis is the emergence of an abnormal situation, which means that the basic assumptions and challenges become of special interest to understand and be aware of. We know that a crisis is usually

characterized by high intensity and uncertainty, which usually ends with one of two outcomes: failure or a turning point with a positive turn in a historical perspective. We know that crises occur and recur over time. In fact, the number of crises not only is growing rapidly but, of even greater concern, is the fact that the number of crises has exceeded that of any previous period in the last twenty years (Mitroff, 2005). The present study of the basic assumptions and challenges for the facilitation of a necessary business model innovation is therefore considered of special importance for the development of the management literature.

Roldsgaard (2010) has previously pointed out that attention is a scarce strategic resource. It is widely known that time is a scarce resource, but it is less known that attention is another critical scarce resource (Roldsgaard, 2010). The limited awareness of attention as a scarce resource does not mean that greater attention to the critical cognitive aspects of management in a time of crisis is unimportant. On the contrary, previous research has shown that a strategic focus on scarce resources is both a critical and undervalued aspect of organizational management (Roldsgaard, 2010).

The exploration of essential, unresolved issues, and general issues through analysis and interpretation of several factors identified five core challenges that require special attention in times of crisis. The current research study clarifies that the success of an institutional crisis depends on a direct and open articulation of the basic conditions and challenges for the future. It is not enough just to have goals for the future because the related challenges should also be taken into account.

The doctoral investigation shows that technological innovation provides the overall direction for the development of business-model innovation in the Danish railway sector, which means that the development of the railway operator's business model is dependent on investment in the railway infrastructure. The managers in the Danish railway sector believe that the basic relationship between technological innovation and business-model innovation should not be reduced a *more-or-less* relationship or *either-or* question, but rather be considered as a *both-*

and management challenge. Management researchers can learn from the study of the Danish State Railways in different ways.

For example, the research study clarifies the fundamental relationship between technological innovation and business-model innovation with the key barriers and opportunities to facilitate a long-term business-model innovation for a company in an unprecedented crisis. In addition, the research study identifies the key cognitive areas of management that are of great importance for the survival of politically driven organizations and their continued success.

10.2 Addressing a problem in present theory

An anti-thesis to the study of Nokia as an extraordinary success (Aspara et al., 2013) is presented in order to position the current study in comparison to a well-known company. What the Danish State Railways and Nokia have in common is that they were both a previously technologically successful company with a high degree of international recognition. The problem with describing Nokia as an exemplary business is that most researchers outside Finland would likely consider Nokia as a best-case example of a company that has gone from the world's number one in mobile technology to an unprecedented failure, but many wonder why it failed. This is a relevant issue that has been ignored in the literature on business models.

The long-standing management literature has described this problem as a 'Failure of foresight' (Wilensky, 1967) or 'Failure of perception' (Turner, 1976), while the current research study describes a failure of self-perception of the former top management of the Danish State Railways. The newer management literature has described the same problem as a result of excessive reliance on the 'inside-out' perspective (Kahneman, 2011). That is to say, the chief executives' self-image or error in reading a situation is expected to be directly related to the institutional crisis. In this context, recent literature on business models describes the problem when a previously successful company keeps doing what once was the right thing for too long and thus gradually being

a victim of its own business model (Doz & Kosonen, 2010). The problem escalates, if the top management also ignores or neglects to invest in a new competitive core product (Roldsgaard, 2011). This problem is related to *The Innovator's Dilemma* (Christensen, 1997), which occurs when a disruptive change in the market is ignored. The examples deal with the same general complex of problems that for too long had not been questioned.

The top management's assumptions or hypotheses about the fundamental factors for success are typically neither tested, nor revised, during the crucial period before the crisis reaches its peak. Nokia thus represents a company that did not seem to test and review the top management's assumptions, which was the motivation to position the study of the Danish State Railways in relation to this company.

Aspara et al. (2013) describe Nokia as a success in the late 1990s and early 2000s, but they neglect to explain why the company has had substantial complications transforming its business model in order to compete with Apple, HTC, and Samsung after they launched a series of innovative mobile phones in the late 2000s and early 2010s. The problem of the passive neglect of the shift in the market after Apple and Google launched a series of innovative mobile phones with superior operating systems (Roldsgaard, 2010) therefore seems to be one of the essential causes of the failure of a previously successful company. Classifying Nokia as an extraordinary example of success does not seem to be consistent with the general perception of the same company (Roldsgaard, 2011).

Nokia is rather an iconic example of why being a pioneer and first mover is not always an advantage (Markides & Sosa, 2013). A historical study without a follow-up study of the basic challenges that arise in a time of crisis represents a contradiction because the longitudinal analysis examines developments over time, while a crisis by definition refers to a moment, situation or a critical point in time. In this context, access to data collection in a time of crisis seems to be an underestimated challenge that has seldom been mentioned in the management literature.

The problem is that researchers are typically not given access to a comprehensive collection of data in a critical point of time characterized by high uncertainty. This is the reason why the current research study is considered highly valuable to the research community in business administration and management because the doctoral investigation was conducted precisely at the most critical time, which was marked by a 'crisis agenda', 'turbulent period' and 'leadership vacuum' in the managers' own words.

Aspara et al. (2013) furthermore claim to contribute with new insights into how the managers' cognitive processes and decisions affect the transition of Nokia's business model. Basing the main conclusions on a review of some archival material and a few retrospective interviews with a few select top executives presents a weak foundation. Instead of reviewing some archival material and conducting a few retrospective interviews with a few select top managers, the current research study followed an alternative approach with the objective of contributing to the theoretical discourse on business models through a comprehensive management survey based on 22,729 responses from about 80% of the managers in the Danish State Railways (n = 368).

The purpose was to examine the basic assumptions and challenges leading up to the peak of the institutional crisis. The current research study focuses on the critical aspects of management that are believed to be important for the survival of a politically driven organization and its continued success. Despite the criticism of Nokia as a success story (Aspara et al, 2013), the company is still useful as an example of why business-model innovation can be both important and difficult for a company that is known for its extraordinary success and its ability to develop the market for mobile phones.

Ironically, the risk of failure seems to be higher for a previously innovative company if it fails to adapt to a changed competitive situation (Achtenhagen et al, 2013) or if it neglects to invest in the development of a new core product. In this context, the Danish State Railways is an excellent example of why the development of a new core product is a

politically driven challenge that requires the company owners and key stakeholders to realize the importance of allocating resources to be invested in the development of a new core product.

Other key theorists have described how the chief executives' careers often have been a key barrier for facilitating a necessary business-model innovation, perhaps because they came out on top due to the success of the previous business model (Chesbrough, 2010). The current study contributes with a relevant and new knowledge about the political barrier, which means that the top managers' careers (individual perspective) is not the only critical factor, but the interaction with the owners and key stakeholders (collective perspective) is another key area that deserves more critical attention.

Until now, the railway sector has been overlooked in the literature on business models (Molina et al., 2012) and it is argued in this thesis that the railway operator deserves a level of attention that is more line with its role in modern society. The European rail market is characterized by both stagnation and technological development, but the basic challenges associated with the development in different countries have rarely been studied through the inclusion of managers' cognitive knowledge. The current research study was focused on learning from the managers' knowledge and awareness of the key barriers and opportunities.

The current research study shows that the revelation of the top managers' personal motives for the future is among one of the most crucial points of the management agenda. In this context, it is important to emphasize that the current research study was not designed as a study of a failure, but instead of the basic conditions and challenges for facilitating a necessary business-model innovation in the Danish railway sector in a period of institutional crisis, which could lead to one of two outcomes: failure or lead the company out of the crisis. The institutional crisis has the potential to mark the beginning of a new era of success and it is in this context that the research study's findings become relevant. The current research study was undertaken to obtain an analytical

insight into the basic assumptions and challenges for facilitating a necessary business model innovation in the Danish railway sector.

10.3 Ideal timing of the present study

The ideal timing of the study is considered essential in order to provide a valuable new knowledge about the cognitive challenges of politically driven organization's business model, which still seems to be only partially explored in the literature. Specifically, it seems that the particular challenges that arise in times of crisis remain absent in the literature on business models. The emergence of an institutional crisis led to a unique opportunity to investigate the most critical areas of leadership, which are assumed to be essential for the survival of organizations and their continued success (Mumford, 2013).

There are very few studies on the specific challenges for facilitating business-model innovation in a period of crisis, but the management literature remains incomplete without such studies.

The current study identifies the most critical areas of cognitive leadership based on a comprehensive survey with a representative participation of the managers in the Danish railway sector. The management survey collected a total of 22,729 responses from 368 managers with an average seniority of 15 years in order to explore the areas of leadership that are presumed to have the most significant impact on the development of the business model in times of crisis.

The current research study confirms that technological innovation is essential to facilitate a gradual business-model innovation in the Danish railway sector, while the hypothesis that business-model innovation (i.e. the development of the railway's core activities) is of little significance was rejected. The outcome of the two results mean that business model innovation in the Danish railway sector is dependent on (and requires) a gradual transformation of the railway operator's core activities; and investment in technological innovation is crucial in this context.

The current research study shows that a mediocre rail service is a recipe for failure, which means that the current rail service must be gradually replaced by a more competitive railway service. As a result, a new basic product must gradually replace the current basic product. Hence, a new business model requires a new technology; and we now know that the combination of these two leads to a competitive advantage in the long run. The combined results thus show that technological innovation is a fundamental prerequisite for facilitating a necessary business-model innovation in the railway sector, but we also know that the development of the railway operator's business model must gradually adapt with the evolving situation (e.g. a growing number of passengers).

The description of a business model in crisis led to the research question: What are the basic assumptions and challenges for facilitating a necessary business-model innovation in the Danish railway sector in times of crisis?

10.4 Barriers leading up to the crisis

Surprisingly, 78% of the managers in the Danish State Railways believe that political influence was the biggest barrier to business-model innovation in the Danish railway sector in the period 2009-2011 (288 out of 368 managers). Approximately 38% of the managers chose political influence as the main barrier in the critical period leading up to the crisis (142 out of 368 managers), while 40% of the managers answered that political influence was an important related barrier (146 out of 368 managers). The current research study also showed that 58% of the managers answered that labor unions were a barrier for facilitating a necessary business model innovation in the Danish railway sector in the 2009-2011 period (212 out of 368 managers). Specifically, 18% of the managers chose labor unions as the single most important barrier (142 out of 368 managers), while 40% of the managers chose labor unions as a related barrier (146 out of 368 managers).

The current research study then showed that about 75% of the managers believe that the management (of change) was a barrier in the period

2009-2011 (275 out of 368 managers). Specifically, 23% of the managers chose business administration and management or change management as the greatest barrier (83 out of 368 managers), while 52% of the managers believe that business administration and management or change management was a related barrier (192 out of 368 managers).

10.5 Barriers in a forward-looking perspective

The former top leadership's hypothesis that competition from competing rail, bus or plane companies is a barrier for facilitating a necessary business-model innovation in the Danish railway sector is rejected. Instead, the main barriers are confirmed in the retest. The results were generally repeated, increasing the reliability of the results. Political influence is confirmed by over 70% of the managers as a latent barrier (265 out of 368 managers).

Second, labor unions are confirmed by over 50% of the managers as a latent barrier (200 out of 368 managers), while management (of change) is confirmed by nearly 70% of the managers as a key barrier in a forward-looking perspective (249 out of 368 managers).

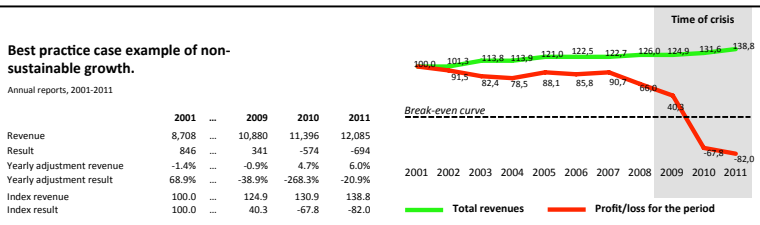
Third, 40% of the managers believe that uncertainty about the long-term strategy is another major latent barrier (148 out of 368 managers), while only 5% of the total responses (62 out of 1,263 responses) designate competition from rail operators, bus companies or airlines (4%) or international rail operations (1%) as a barrier.

10.6 Opportunities in a forward-looking perspective

Overall, nearly all managers in the Danish State Railways believe that the long-term strategy for the development of a new core product is the most important opportunity for facilitating a necessary business model innovation in the Danish railway sector (405 out of 368 managers). The reason why the total number of responses is greater than 100% is because the two variables were measured as independent choices. Specifically, 57% of the managers selected the core product as a key

opportunity (210 out of 368 managers), while 53% of the managers believe that long-term strategy represents a key opportunity (195 out of 368 managers). Next, it is remarkable that change management (180 out of 368 managers) and corporate culture (168 out of 368 managers) are considered more important than business administration and management (161 out of 368 managers) to enable necessary business model innovation in the Danish railway sector.

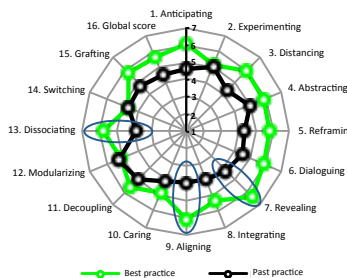
Finally, the rejection of the former top management's hypothesis about importance of the expansion of rail operations in neighboring countries through strategic alliances with other railway operators (i.e. venture projects) would increase the Danish railway operator's profitability and competitiveness. The rejection of the former chief executives' hypothesis in all three controlled trials thus increases the reliability of this result.



Gaps in the leadership agenda to explain the sustained crisis.

Number of responses, n = 16,560

	Best practice	Past practice	Gap
1. Ability to predict change in the market	6.02	4.56	1.462
2. Experiments with new technology in the market	5.16	5.04	0.117
3. Get distance through an outside-in perspective	5.99	4.35	1.635
4. Rethinking the business model	5.87	4.99	0.875
5. See the need for change	5.88	4.41	1.470
6. Explore assumptions and hypotheses	5.92	4.51	1.404
7. Clarify goals, highlight correlated challenges	6.36	4.22	2.132
8. Create shared engagement and commitment	5.33	3.99	1.344
9. Develop an agenda that unites	6.10	3.96	2.133
10. Creating trust, caring and motivating	4.88	4.16	0.717
11. Gain flexibility by reorganizing	5.60	4.96	0.636
12. Assembling and disassembling business systems	5.08	5.22	-0.136
13. Separate resource ownership from use, and renegotiate access to and location of resources	5.82	3.90	1.923
14. Using multiple business models	4.66	4.65	0.003
15. Break with the status quo	5.79	4.74	1.053
16. Global score	5.63	4.51	1.118



Barriers for developing the business model during the period 2009-2011.

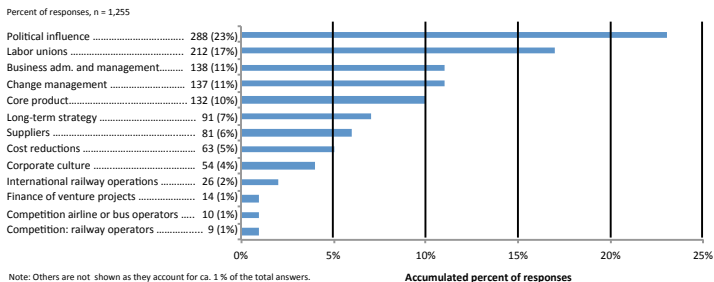


Figure 10.1: Summary of the research findings.

Source: The Author

10.7 Successful management during a crisis

Doz & Kosonen (2010) have developed an organizational scheme for understanding the renewal and transformation of companies' existing business models, but it is not yet known which points on the agenda leadership are the most important for the successful leadership during a time of crisis. The study identifies three critical gaps in the previous top management's agenda, which are assumed to be of paramount importance for the successful leadership in a crisis. The problem is that these points have so far been either unknown or overlooked in the literature on business models, but an underestimation of these points is believed to have led to both the collapse of political negotiations and the replacement of the top management of the Danish State Railways.

- **Gap 1. Revealing — personal motives and ambitions (Average: 4.22 out of 7.00).** Failure to reveal personal motives and ambitions makes it difficult to achieve the necessary mutual respect and trust that is needed to align interests across stakeholders. Lack of articulation of expectations and ambitions for the future expected to have a negative impact on the outcome of a crisis, reducing the likelihood of successful leadership in a crisis. Lack of transparency about goals and challenges for the future makes it difficult for the key players that have influence on the outcome of the crisis. Lack of clarity about expectations and ambitions for the future makes it difficult to develop an agenda that unites interests. Lack of openness about expectations and ambitions for the future makes it hard to rally around the top management's project, while lack of openness makes it difficult to understand the top managers' positions on crucial issues, which make it difficult to achieve the necessary mutual respect and trust. Without mutual respect and trust it will be difficult to break with the status quo, which is important in a time of crisis for survival and for achieving future success.
- **Gap 2. Aligning — around a common interest (Average: 3.96 out of 7.00).** The underestimation of developing an agenda that unites interests is particularly important in a politically driven organization in a time of crisis. Combining individual interests across many stakeholder groups is not an easy task, but this challenge plays a crucial role in the outcome of a crisis. Doz & Kosonen (2010) describe how rallying around a common interest is perhaps the most obvious play, but often the least understood task for the top management. The current research study confirms this claim; and it furthermore emphasizes the importance of using trend curves, business exercises, and inspiring stories as an effective method for creating a sense of collective engagement and commitment. Another way to align interests is to have clarity about the conditions for success. A third way to unite interests is to implement the long term strategy in a series of small steps that can provide a basis for a series of small wins, as an alternative to putting all eggs in one basket (all-in strategy).
- **Gap 3. Dissociating — resources via negotiation (Average: 3.90 out of 7.00).** It was quite surprising that this point was identified and confirmed as

the most critical point in the entire management survey (i.e. lowest average point). The managers expressed their dissatisfaction with the negotiation of ownership, use, allocation and access to resources in the period leading up to the crisis. The alignment of the top managers' responsibilities and the company's core tasks can evolve so there is no longer a harmony or balance between the two. At the same time, separation of resources (including responsibilities and specific tasks) is particularly important in a deadlock, which is characteristic of a crisis. The inability to separate and negotiate the company's responsibilities and its core tasks is considered almost twice as critical as the second largest cognitive barrier (i.e. gap) to break out of the deadlock. So the result is believed to be very robust. This means that the transformation of an existing business model becomes more difficult due to mismatch or discord between resource ownership, use, location, and access to resources. Until now, it has been largely unknown in the management literature that dissociating resources in different and smaller parts is a particularly important management challenge in a time of crisis, but the managers taking part in the study believe that this is vital in order to avoid a political driven organization gets caught and held in a deadlock, which is a basic problem in almost any crisis. In this context, the revelation of personal ambitions and concerns is essential for unifying hopes and aspirations; and thereby developing a common interest and shared commitments, and thus elicits genuine commitment among members of the organization to work towards a common goal.

The current research study further indicates that an outside-in perspective can be a valuable input for successful leadership in a crisis, but it requires that the contextual dependence is maintained. The managers express a direct and consistent need to have clear goals for the future and keeping a dialogue about the key challenges related to achieving new goals in the future.

10.8 Building new theory

The current research study contributes with a new theory about successful leadership in periods of crisis based on the original theory about the leadership agenda for the renewal and transformation of companies' business models (Doz & Kosonen, 2010).

The old theory represents a system of relationships, but the importance of the individual underlying components of the theory in different situations remain unspecified. The triangulation of empirical data follows the retroductive reasoning principle (Roldsgaard, 2010) by investigating what has happened in the past to test theory in its context

to build new theory. The new theory specifies the five most critical variables of the leadership agenda in times of crisis.

The meta-theory (i.e. theory about theory) is based on a collection of statements $S = \{s_1, s_2, \dots, s_{45}\}$ that were designed to measure a collection of objects $O = \{o_1, o_2, \dots, o_{45}\}$ in order to review a fixed set of relations $R = \{r_1, r_2, \dots, r_{15}\}$. A correlation analysis identifies a total of five important points on the leadership agenda, which are believed to be at the core of management in times of crisis.

Each latent component represents an important small portion of several interconnected challenges within a larger system of interrelationships. The five points represent basic but unique challenges that have in common that they represent different opportunities and threats for successful leadership in times of crisis. These five points are:

1. Distancing - critical distance through an outside-in perspective.
2. Dialoging - by exploring assumptions, not just conclusions.
3. Revealing - articulation of goals and challenges for the future.
4. Aligning - through an agenda that unites to develop a common basis.
5. Dissociating - resource ownership, use, location of, and access.

The designation of the five points of the leadership agenda contributes to a new theory on the most important issues in the management of politically driven organizations in a time of crisis.

The five points are considered essential for the successful leadership of organizational change of politically driven organizations, especially in times of crisis, but perhaps also in general. The current research study furthermore shows that a minority group of managers (2%) rejects the primary cause of the crisis. Statistically, it is rejected with 99% probability that this result was random.

The problem is that members of this minority group misinterpret the situation because they focus instead on the peripheral problems of the crisis. The need for dialogue and articulation of assumptions and

concerns are crucial in order to develop a common basis. This is important because we know that a crisis requires a rupture or break with the current situation.

It is therefore a special challenge to get these managers to shift their focus from the more peripheral issues of the crisis to fundamental issue of the crisis. It is a special challenge to get this minority group to realize why a change in the existing practice is required.

It is particularly important for the individuals in this minority group to feel that a special and active effort is made to create a common vision that they can support. The correlation analysis shows a rather surprisingly linear relationship between dialogue and the ability to solve the basic problem of the crisis.

The articulation of the assumptions and expectations is therefore essential for the small minority group of individuals in order to create the necessary mutual respect, trust and understanding of the positions. It is therefore a special challenge to maintain a dialogue with these managers in order to agree on a genuine change.

The current research study thus echoes that the transformation of a previous successful company's business model is not an easy task (Doz & Kosonen, 2010), but recognizing the most critical points on the leadership agenda will increase awareness and understanding of the basic prerequisites for the successful leadership of politically driven organizations in times of crisis.

10.9 Limitations and further research

The doctoral investigation is limited to the study of a single company to clarify the industry recipe for success or failure. The Danish State Railways is classified as a 'public independent company', which can be seen as a limitation because it is technically different from a private company. It can be argued that the results of the study do not necessarily reflect the challenges of private companies, but many experts do not see

any difference because the Danish State Railways assumes the character of being private because it is run on 'private capitalist verse feet', which means that the company must be profitable, while it retains a high degree of political attention (Vestereng, 2013).

Furthermore, the company is unique in that its business model is representative of an entire industry, which made it non-feasible to investigate how different companies differentiate themselves in the Danish railway sector. Despite this limitation, it still seems relevant to gain a thorough understanding of a company that has played a historic role in the development of modern society since the Industrial Revolution.

The study of many companies is important to obtain analytical breadth, while the study of individual companies is important for achieving an in-depth knowledge of different management challenges, for example, the specific challenges that arise in times of crisis. In this context, prominent researchers argue that studies on the essence of individual business models are needed to contribute to the continued development of the academic literature on business models (Teece, 2010).

Other prominent researchers have repeatedly reported that the study of exemplars is important in order to contribute to development of research disciplines and academic discourse (Yin, 1984, 2000, 2003, 2009, 2014). Yin (1984) has consistently argued that the case study is an ideal research method for the study of a contemporary phenomenon within its real-life context.

Yin (2009) claims that the case research method is eminently justifiable under certain conditions. One of the most important conditions is that the single-case study represents a critical test of theory, while other important conditions are that the case is critical, representative or revelatory (Yin, 2003).

The present study fulfills all these conditions. Selecting a critical case is especially relevant when it represents a platform for testing a well-

formulated theory (Yin, 2014). The propositions of the theory were clearly specified to enhance the ground to extend the existing theory, but the most important reason for selecting a single case is that the researcher had access to data that has been inaccessible to scientific scrutiny in the past.

In fact, Flyvbjerg (2007) claims that the social sciences are of high value precisely in the areas where the natural science is weak; that is, 'in reflexive analysis and deliberation about values and interests aimed at praxis, which are essential to social and economic development in society' (p. 38). Flyvbjerg (2004) claims that case studies are important to strengthen the research within the social sciences.

The force of example has been undervalued in the management literature, but the case study approach remains central to theory development within the social sciences as a complement to other research methods (Flyvbjerg, 2006a), such as the management survey which was applied in the doctoral investigation to examine the knowledge and experiences of the managers to draw conclusions that are representative and relevant to a larger population of interest. It is a common mistake that generalizations cannot be made based on studies of individual companies (Flyvbjerg, 2004, 2006a).

It could have been interesting to compare different railway operators in different countries in terms of objectively measurable variables, including cost per passenger, punctuality, reliability and speed, but in doing so it is important to note that the conditions are different for the national railway operators in the European countries due to different national geographic and populations sizes.

Additionally, the technical standards remain uneven, including rail breadth, signaling, and so forth, which has made it practically impossible for different European railway operators to operate throughout Europe. Furthermore, the amount of money that each country has invested in the national railway infrastructure is very different, which means that the conditions are unequal.

Despite these obvious limitations, some researchers have tried to develop future simulations to predict what effect the liberalization of the European rail market will have on the national railway operator profitability (Mizutani & Shoji, 2004; Mizutani & Uranishi, 2013).

The current research study was not designed to make prospective analysis of possible outcomes of different scenarios, and the goal was not to make calculations of possible business models, but to analyze the assumptions and limitations of current railway operator's business model. The purpose was instead to analyze a railway operator's business model in an era of crisis.

The aim of the current research study was to analyze which factors influence the outcome of an institutional crisis in relation to the existing practice. However, to obtain analytical breadth the idea of a historical study with several operators would be interesting, but the purpose of this study was the opposite: to obtain analytical depth through a systematic study of the challenges for developing a business model of a company that was in a historical crisis in order to gain a new understanding of the critical points on the leadership agenda in difficult, challenging and demanding situation.

Furthermore, the idea of comparing different rail operators across national borders is considered to be problematic unless a railway operator in another country would face a crisis on the scale as the Danish State Railways. The European Commission has announced the liberalization of the European rail market through standardization of technical standards and harmonization of statutory safety regulations in the various countries in the European Union by the end of 2020.

Liberal politicians argue that competition will result in better and more cost-effective operation of the railway, but there are no examples in practice to support this claim (Roldsgaard & Molina, 2013). This is not to reject that the liberalization of the European railway market could lead to such outcomes in the future, but it remains an open question if

harmonization of technical standards (and safety certificates) are enough?

On the contrary, there is evidence that the expansion of international rail operations has led to a stabilization in a negative sense (stagnation) as the local mediocre railway operations highest achieve minimal improvements and there is a risk of loss-making railway transport (Roldsgaard, 2012).

Other researchers have described how a stronger focus on the regulation of rail operations in domestic market has managed to improve operations without competition after studying trends in Switzerland, where it was also ascertain that it was possible to improve the national railway company performance without competition (Desmaris, 2013).

It seems very likely that this split of the market into smaller isolated lines can lead to short-term benefits in terms of optimization of individual levels (e.g. punctuality), but there is also a risk that only the most profitable paths will benefit from this silo division in the long term? And what about the speed of the railway services; is that an unimportant aspect of liberalization? What role has investment in this context? Who will finance the investment in the less populated areas?

These are some of the questions that arise in connection with the liberalization of the European rail market, which lays the foundation for further research. There is also a risk that the market may be fragmented if national rail markets are divided into separate railway lines (i.e. sub-markets) operated by different companies, which have not led to the expected benefits of liberalizing national rail markets (Roldsgaard, 2012). The question is whether it makes sense to liberalize national railway markets afterwards to divide a market in isolated parts?

Until now, the competition in the few liberalized national railways has been limited to competition for operating licenses (i.e. competition *for* the market), but the competition *in* the rail market is very limited and almost completely absent at this time. Competition in the market

requires two or more operators that provide competitive rail services simultaneously (Roldsgaard & Molina, 2013).

Looking ahead it would be interesting to examine the effects of the Italian high-speed rail because Italy is the only country (or one of the few countries) in Europe that has competition in the high-speed lines. The Danish government has taken the historic decision to invest 3.75 billion euros for the development of rail operations for faster trains, higher punctuality, more reliable and more comfortable rail services in Denmark by 2025. The investment is therefore intended to gradually transform the railway service, which creates new research opportunities. For example, it would be interesting to study the experiences from the electrification of the first railway lines. What is the role of project management for the development of new and established business models?

Finally, the core product is an interesting object for future research within and across different sectors. We know that the speed of technological development is accelerating and that product life cycles are getting shorter as a result. In this context, the study of the advantages and disadvantages of developing companies' business models through a series of projects is interesting for future research. Researchers are encouraged to further investigate the importance of political influence on business-model innovation.

Chapter 11

Conclusiones, limitaciones y futuras investigaciones

La tesis doctoral presenta una contribución original a la teoría, a través del estudio de los ferrocarriles daneses para examinar qué áreas cognitivas de liderazgo son asumidas por los gerentes en el sector ferroviario danés, siendo de gran importancia para la supervivencia de la organización y su futuro éxito. La investigación doctoral se centró en los temas de la agenda de gestión que hasta ahora han sido desconocidos u obviados. El problema es que la subestimación de estas áreas de liderazgo ha llevado tanto al colapso de las negociaciones políticas como al reemplazado de la alta dirección en las grandes empresas. La atención se centra en el liderazgo en las grandes empresas a través de su agenda de gestión para la renovación y la transformación del modelo de negocio (Doz y Kosonen, 2010). El punto de inicio es un estudio integral de la crisis histórica de una empresa que antes era eficaz. El estudio identifica tres puntos clave en la agenda de gestión que son cruciales para el liderazgo de las organizaciones impulsadas por la política en tiempos de crisis.

La investigación doctoral analiza 22.729 respuestas de 368 gerentes con una antigüedad media de 15 años en el sector ferroviario danés. El objetivo era examinar las hipótesis y desafíos fundamentales para una innovación necesaria del modelo de negocio de los ferrocarriles daneses en tiempos de crisis. La innovación del modelo de negocio se refiere a una renovación que conduzca a un mayor nivel de rentabilidad en el corto plazo y a un mayor nivel de competitividad con otras empresas de transporte a largo plazo. La investigación doctoral consiste en tres

estudios para obtener profundidad en el análisis, mientras que los resultados fueron evaluados a través de siete grupos de gestión para lograr amplitud analítica.

- **Estudio 1. Relación básica.** El objetivo era examinar la relación entre la innovación tecnológica y la innovación del modelo de negocio en el sector ferroviario (de acuerdo con el 10% de los datos recogidos), según lo recomendado por los teóricos líderes en el campo de los modelos de negocio (Baden-Fuller y Haeflinger, 2013). Es decir, la importancia de la inversión en el desarrollo y mantenimiento de la infraestructura ferroviaria en comparación con la importancia de las actividades principales del operador ferroviario.
- **Estudio 2. Barreras y oportunidades.** El objetivo era examinar más a fondo las hipótesis y desafíos básicos para facilitar una innovación necesaria del modelo de negocio de los ferrocarriles daneses en un tiempo de crisis institucional, a través de un análisis multidimensional de las barreras y oportunidades para el desarrollo de modelo de negocio del operador ferroviario a largo plazo (de acuerdo con el 15% de los datos recogidos). El propósito era examinar qué determina el desarrollo de los modelos de negocio de innovación en el sector ferroviario, a raíz de la recomendación de algunos de los principales teóricos en este campo (Chesbrough, 2010; Baden-Fuller y Haeflinger, 2013). Los editores de la Revista de Derecho de la Unión Europea sobre la Liberalización del Transporte han reconocido la importancia de estos resultados a través de la publicación de una parte de este análisis.
- **Estudio 3. El liderazgo en tiempos de crisis.** El objetivo fue estudiar la importancia del liderazgo cognitivo en una época de crisis (alrededor del 75% de los datos recogidos). La agenda de liderazgo (Doz y Kosonen, 2010) fue utilizada como instrumento para identificar las áreas más importantes del liderazgo en tiempos de crisis, que sigue siendo un tema poco desarrollado en la literatura a pesar de su evidente importancia (Mumford, 2013). El análisis de las lagunas señala algunas nuevas áreas de liderazgo cognitivo que juegan un papel vital en la alta dirección de las organizaciones impulsadas por la política. Los últimos años han sido caracterizados por un creciente reconocimiento de que el liderazgo cognitivo es un aspecto crítico en el éxito de organizaciones impulsadas por la política, lo cual es la razón la que el presente estudio es necesario para mejorar el conocimiento de los problemas a los que se enfrentan los altos ejecutivos durante tiempos de crisis.

Los tres objetivos de investigación se derivan de la literatura sobre los modelos de negocio con el objetivo general de proporcionar aportes teóricos sobre la administración y dirección de organizaciones impulsadas por la política durante tiempos de crisis. Los dos primeros estudios fueron diseñados para examinar la hipótesis de los ex presidentes ejecutivos, de que la expansión de las actividades del operador ferroviario danés en los mercados internacionales que rodean al país, sería crucial para la supervivencia y el éxito futuro de los ferrocarriles daneses en un mercado ferroviario europeo liberalizado. Los dos primeros estudios son relevantes para la política de transporte nacional (25% de los datos recogidos), mientras que los resultados del

tercer estudio tienen el mayor potencial para hacer una contribución original a la literatura sobre los modelos de negocio o la psicología organizacional, porque las áreas cognitivas de liderazgo se cree que son decisivas para el éxito de la administración y dirección de una organización histórica, con el fin de prevenir su aparición (de acuerdo con el 75% de los datos recogidos). Las principales conclusiones del estudio fueron presentadas al Ministerio de Transportes danés en noviembre de 2011 (Nº de referencia: 2011/3533) y para la alta dirección de los Ferrocarriles daneses en enero de 2012. Los resultados han tenido un impacto indirecto en la decisión política anunciada en marzo de 2013 para invertir alrededor de 4,000 millones de euros en el desarrollo de la infraestructura ferroviaria danesa, que finalmente fue aprobado por los partidos políticos en Dinamarca en enero de 2014.

11.1 Contribución original

La tesis doctoral presenta una contribución original a la teoría mediante el operador ferroviario danés como un modelo para estudiar las áreas cognitivas de liderazgo, las cuales se suponen que tienen gran importancia para la supervivencia de las organizaciones y el éxito continuo. La investigación doctoral siguió la recomendación dada por algunos de los teóricos principales en el campo de los modelos de negocio para explorar la interdependencia entre la elección del modelo de negocio y la innovación tecnológica, y el éxito o el fracaso (Baden-Fuller y Haefliger, 2013). Un meta-análisis de una colección de artículos de revistas sobre los modelos de negocio, apoyan la afirmación de que innovación del modelo de negocio es casi siempre una combinación de dos o más disciplinas académicas que suelen considerarse conceptos independientes. El enfoque interdisciplinario de los modelos de negocio, por lo tanto cuenta con un amplio abanico de disciplinas teóricas, incluyendo la gestión del desarrollo organizacional y el cambio, la innovación, la estrategia y la ventaja competitiva. Teece (2010) requiere más investigación en esta área para obtener una mejor comprensión de la esencia de los modelos de negocio de cada empresa. En este contexto, Chesbrough (2010) se pregunta cuándo una nueva tecnología requiere un modelo de negocio nuevo y cuándo se hace la combinación de los dos, para llevar a una ventaja competitiva. Baden-Fuller y Haefliger (2013), además, cuestionan lo que determina la evolución de la innovación de los negocios de modelo. Y, finalmente, plantean la cuestión de si en el modelo de negocio la innovación es potencialmente más importante que la innovación tecnológica, o viceversa.

La respuesta es que una innovación del modelo de negocio del operador ferroviario danés pide el desarrollo progresivo de las actividades básicas del ferrocarril, que no se limita a la puntualidad y fiabilidad, pero también incluye mayor velocidad para fortalecer la competitividad de los servicios de transporte ferroviario frente a otros medios de transporte. Los directivos de los Ferrocarriles del Estado Danés apoyan un enfoque más fuerte en el mercado nacional como resultado de una crisis histórica en 2011 con las dos operaciones ferroviarias deficitarias en Suecia y dificultades en el cumplimiento de la Secretaría de los requisitos mínimos de transporte para la puntualidad (90%) y fiabilidad (95%) en el mercado interno. Los gerentes en el sector ferroviario danés consideran la inversión en la infraestructura esencial para el logro de una ventaja competitiva a largo plazo. Una innovación competitiva sostenible del modelo de negocio del operador ferroviario danés, parece poco probable de este modo, sin inversión en la infraestructura ferroviaria, mientras que la capacidad de ingresos del operador ferroviario se basa en una mayor concentración en las actividades principales en el mercado interno (es decir, el transporte de pasajeros de A a B) en lugar de poner en marcha proyectos comerciales de gran escala. Los directivos de los Ferrocarriles del Estado danés, por tanto, consideran que es esencial para optimizar el negocio central existente en el mercado nacional, mientras que la ampliación de las actividades básicas del ferrocarril en los mercados extranjeros de los alrededores son considerados de importancia secundaria para su supervivencia y éxito en el futuro, lo cual rechaza la hipótesis de los altos directivos.

El sello distintivo de una crisis es la aparición de una situación anormal, lo que significa que los supuestos básicos y los desafíos han de ser de especial interés para entender y ser conscientes. Sabemos que una crisis se caracteriza generalmente por una alta intensidad e incertidumbre, que por lo general termina con uno de estos dos resultados: el fracaso o un giro positivo en una perspectiva histórica. Sabemos que las crisis ocurren y se repiten en el tiempo. De hecho, el número de crisis no sólo está creciendo rápidamente, pero, aún más preocupante, es el hecho de que el número de crisis ha superado la de cualquier otro período de los últimos veinte años (Mitroff, 2005). Por tanto, el presente estudio de las hipótesis básicas y los desafíos para la innovación de un modelo de negocio se considera de importancia especial para el desarrollo de la literatura de gestión.

La exploración de las cuestiones no resueltas, esenciales, y las cuestiones generales a través del análisis y la interpretación de varios factores,

identificó cinco desafíos principales que requieren atención especial en tiempos de crisis. El estudio de investigación actual aclara que el éxito de una crisis institucional depende de una articulación directa y abierta de las condiciones básicas y los desafíos para el futuro. No es suficiente con tener metas para el futuro, ya que los retos relacionados también deben tenerse en cuenta.

La investigación doctoral demuestra que la innovación tecnológica proporciona la dirección general para la innovación de los modelos de negocios en el sector ferroviario lo cuál significa que el desarrollo del modelo de negocio del operador ferroviario depende de la inversión en la infraestructura ferroviaria. Los gerentes en el sector ferroviario danés consideran que la relación básica entre la innovación tecnológica y la innovación del modelo de negocio de una organización grande no debe reducirse a la pregunta cuál es más importante, sino hay que reconocer que son interdependientes. Es decir, una innovación del ferrocarril de largo plazo es difícil sin inversiones en su infraestructura.

Entonces los investigadores dentro del marco de la administración y dirección de empresas pueden aprender del estudio de los ferrocarriles daneses, por al menos de dos maneras. Primero, el estudio de investigación aclara la relación fundamental entre la innovación tecnológica y la innovación del modelo de negocio del ferrocarril, incluyendo un estudio específico sobre las oportunidades y las barreras más importantes para facilitar una innovación necesaria del modelo de negocio de una empresa que se encuentran en una crisis institucional. Segundo, el estudio presente identifica cinco áreas fundamentales para la gestión de las organizaciones impulsadas por la política y su éxito continuo.

11.2 Abordar un problema en la literatura de los modelos de negocio

La tesis doctoral presenta una antítesis al estudio de Nokia como un éxito extraordinario (Aspara et al., 2013) para posicionar el presente estudio en comparación con una empresa conocida. Nokia tiene en común con los ferrocarriles daneses que era una compañía previamente reconocida internacionalmente por su éxito en la innovación tecnológica. El problema de describir Nokia entre los mejores casos de éxito es que la mayoría de los investigadores fuera de Finlandia consideraría Nokia como el mejor caso de una empresa que ha pasado de ser el número uno del mundo en la tecnología móvil a un fallo sin precedentes, pero muchos se preguntan por qué ha fallado. Esta pregunta es relevante, pero ha sido

ignorada en la literatura sobre los modelos de negocio. La literatura de gestión ha descrito anteriormente este problema como un "fallo de previsión" (Wilensky, 1967) o "fracaso de la percepción" (Turner, 1976), mientras que el presente estudio describe un fracaso de la auto-percepción del antiguo directivo de los ferrocarriles daneses. La literatura de gestión más reciente ha descrito el mismo problema como resultado de la excesiva dependencia de la perspectiva "adentro hacia afuera" (Kahneman, 2011). Es decir, la propia imagen de las capacidades o la sobreestimación de las capacidades de liderazgo de los altos ejecutivos combinado con un error en la lectura de una situación que llevó a la crisis, la cuál está directamente relacionada con la crisis institucional. En este contexto, la literatura reciente sobre los modelos de negocio describe el problema cuando los altos directivos de una empresa anteriormente exitosa siguen haciendo lo que antes era lo correcto por mucho tiempo y, por lo tanto, convirtiéndose gradualmente en una víctima de su propio modelo de negocio (Doz y Kosonen, 2010).

El problema se intensifica si la alta dirección también ignora o se niega a invertir en un nuevo producto de base competitiva (Roldsgaard, 2011). Este problema está relacionado con el dilema del innovador (Christensen, 1997), que ocurre cuando se ignora un cambio disruptivo en el mercado. Los ejemplos están relacionados con un conjunto complejo de problemas que no habían sido cuestionados. En otras palabras, las hipótesis de la alta dirección acerca de los factores fundamentales para el éxito, no suelen ser probadas ni revisadas durante el período crucial antes de que la crisis llegue a su punto máximo. Por tanto, Nokia representa una empresa que no parece poner a prueba y revisar las hipótesis de la alta dirección, lo cual fue la motivación para situar el estudio de los ferrocarriles daneses en relación con Nokia. Aspara et al. (2013) afirman contribuir con nuevas ideas sobre cómo los procesos y decisiones cognitivas de los directivos influyen en la transición del modelo de negocio de Nokia, pero basar las principales conclusiones en la revisión de algunos materiales de archivo y entrevistas retrospectivas con algunos altos ejecutivos, presenta una base débil. La negligencia pasiva del cambio en el mercado después de que Apple y Google lanzaron una serie de innovadores teléfonos móviles con sistemas operativos superiores (Roldsgaard, 2010), por tanto, parece ser una de las causas fundamentales del fracaso de una empresa que antes era eficaz. Sin embargo, Aspara et al. (2013) describen Nokia como un éxito a finales de 1990 y principios de 2000, pero se olvidan de explicar por qué la empresa ha tenido complicaciones en la transformación de su modelo de negocio con el fin de competir con Apple, HTC y Samsung

después de que lanzaron una serie de innovadores teléfonos móviles a finales de la década de 2000 y principios de la década de 2010.

La clasificación de Nokia como un ejemplo extraordinario de éxito no parece ser consistente con la percepción general de la misma empresa (Roldsgaard, 2011). Nokia es más bien un ejemplo icónico de que ser un pionero no siempre es una ventaja (Markides y Sosa, 2013). Sin un estudio de seguimiento de los retos fundamentales que se plantean en un momento de crisis existe una contradicción porque el análisis longitudinal examina la evolución en el tiempo, mientras que una crisis, por definición, se refiere a un momento, situación o un punto crítico en el tiempo. En este contexto, el acceso a la recopilación de datos en un tiempo de crisis parece ser un desafío subestimado, que pocas veces se ha mencionado en la literatura de gestión. El problema es que a los investigadores no se les suelen conceder el acceso a una amplia colección de datos en tiempos de crisis que se caracteriza por una elevada incertidumbre. Esta es la razón por la que el presente estudio se considera de gran valor para la comunidad de investigación en la administración y dirección de empresas porque se llevó a cabo precisamente en el tiempo más crítico, lo cual ha sido marcado por una agenda de crisis, periodo turbulento y vacío de liderazgo según las propias palabras de los gerentes.

En lugar de revisar algunos materiales de archivo y realizar algunas entrevistas retrospectivas con unos altos directivos seleccionados, el presente estudio siguió un método alternativo con el objetivo de contribuir al discurso teórico sobre los modelos de negocio a través de una encuesta de gestión integral basado en 22,729 respuestas de alrededor del 80% de los gerentes de los ferrocarriles daneses (n=368). El objetivo era examinar las hipótesis y desafíos que llevaron a la cima de la crisis institucional. El estudio actual se centra en los aspectos críticos de la gestión que los administradores creen que son importantes para la supervivencia de una organización impulsada por motivos políticos y su éxito continuo.

A pesar de la crítica de Nokia como un caso de éxito, la compañía sigue siendo útil como un ejemplo de por qué la innovación del modelo de negocio de una empresa conocida por su éxito anterior y su capacidad para desarrollar el mercado de los teléfonos móviles puede ser importante y difícil. Irónicamente, el riesgo de fracaso parece ser mayor para una empresa innovadora previamente si falla en adaptarse a una situación competitiva cambiada (Achtenhagen et al, 2013) o si se niega a

invertir en el desarrollo de un nuevo producto básico. En este contexto, los ferrocarriles daneses son un excelente ejemplo de por qué el desarrollo de un nuevo producto básico es un desafío impulsado por motivos políticos que requiere que los propietarios de la empresa y los principales interesados se den cuenta de la importancia de la asignación de recursos para ser invertidos en el desarrollo de un nuevo producto básico.

Otros teóricos han descrito que las carreras de los principales ejecutivos han sido a menudo una barrera clave para facilitar una innovación del modelo de negocio actual, a veces porque llegaron a la cima debido al éxito del modelo de negocio anterior (Chesbrough, 2010). El presente estudio contribuye con un conocimiento relevante y nuevo sobre la barrera política, lo que significa que las carreras de los principales ejecutivos (perspectiva individual) no es el único factor decisivo, pero que la interacción con los propietarios y los principales interesados (perspectiva colectiva) también puede ser una barrera clave que merece más atención crítica. En el presente estudio, casi el 80% de los gerentes creen que la influencia política era la barrera más importante para facilitar una innovación del modelo de negocio actual de los ferrocarriles daneses, en el período de dos años que llevaron a la crisis institucional, mientras que más del 70% de los gerentes creen que la influencia política sigue siendo la barrera más importante mirando hacia adelante.

Hasta ahora, el sector ferroviario ha sido ignorado en la literatura sobre los modelos de negocio (Molina et al., 2012) y se sostiene en la tesis doctoral que el operador ferroviario se merece un nivel de atención más acorde con su papel en la sociedad moderna. El mercado ferroviario europeo se caracteriza a la vez por el estancamiento y el desarrollo tecnológico en los diferentes países europeos, pero los desafíos fundamentales relacionados con el desarrollo en diferentes países rara vez han sido estudiados a través de la inclusión de las competencias cognitivas de los gerentes que trabajan en el sector. El estudio actual se centra en el aprendizaje de los conocimientos y la conciencia de los riesgos y oportunidades clave basados en las respuestas de los gerentes que trabajan en el sector ferroviario con una antigüedad promedio de 15 años.

El estudio muestra que la revelación de los motivos personales de los directores ejecutivos para el futuro se encuentra entre uno de los puntos más cruciales de la agenda de gestión. En este contexto, es importante destacar que el estudio actual no fue diseñado como un estudio de un

fracaso, pero las condiciones básicas y los desafíos para facilitar un innovación del modelo de negocio de los ferrocarriles daneses en un período de una crisis institucional podría conducir a dos resultados: el fracaso o llevar a la empresa fuera de la crisis. La crisis institucional entonces tiene el potencial de marcar el comienzo de una nueva era de éxito, y es en este contexto que las conclusiones del estudio actual son relevantes. La presente tesis se realizó para obtener una visión analítica en los supuestos básicos y desafíos para facilitar la necesaria innovación del modelo empresarial en el sector ferroviario danés.

11.3 Momento pertinente del presente estudio

El momento ideal del estudio se considera esencial para ofrecer un nuevo conocimiento valioso acerca de los desafíos cognitivos de una organización impulsada por motivos políticos, que todavía parece ser explorado sólo en parte en la literatura de los modelos de negocio. En concreto, parece que los problemas particulares que surgen en tiempos de crisis permanecen ausentes en la literatura. La aparición de una crisis institucional conllevó una oportunidad única para investigar las áreas más críticas del liderazgo, que se supone esencial para la supervivencia de las organizaciones y su éxito continuo (Mumford, 2013).

Hay pocos estudios sobre los desafíos específicos en facilitar una innovación del modelo de negocio necesario en un período de crisis, pero la literatura de gestión sigue siendo incompleta sin este tipo de estudios. Este estudio identifica las áreas más críticas de liderazgo cognitivo y confirma que la **innovación tecnológica** es esencial para facilitar una innovación gradual del modelo de negocio en el sector ferroviario danés, mientras que la hipótesis de que el desarrollo de **las actividades básicas del ferrocarril** es de poca importancia, fue rechazada. Ahora sabemos que la combinación de las dos lleva a una ventaja competitiva a largo plazo. El estudio actual además muestra que un servicio ferroviario mediocre es una receta para el fracaso, lo que significa que el servicio ferroviario actual debe ser sustituido gradualmente por un servicio ferroviario más competitivo. En consecuencia, un nuevo producto de base debe sustituir gradualmente el producto de base actual. Por lo tanto, un nuevo modelo de negocio requiere una nueva tecnología, lo cuál es un resultado interesante, ya que se invierte el enfoque de cuándo una nueva tecnología requiere un nuevo modelo de negocio (Chesbrough, 2010).

La descripción de una empresa durante la crisis nos presentó como pregunta de investigación: ¿Cuáles son las hipótesis y desafíos para

facilitar una innovación necesaria del modelo de negocio de los ferrocarriles daneses en tiempos de crisis?

11.4 Barreras que nos encaminaron a la crisis

Sorprendentemente, el 78% de los gerentes que trabajan en los ferrocarriles daneses creen que la influencia política fue la mayor causa de la ausencia de una innovación del modelo de negocio de los ferrocarriles daneses en el período 2009-2011 (288 de 368 gerentes). Aproximadamente el 38% de los gerentes escogió la influencia política como la principal causa en el período crítico que condujo a la crisis (142 de 368 gerentes), mientras que el 40% de los gerentes contestó que la influencia política era una causa relacionada (146 de 368 gerentes).

El estudio actual también mostró que el 58% de los gerentes respondió que los sindicatos eran una causa principal para no ser capaz de facilitar una necesaria innovación del modelo empresarial de los ferrocarriles daneses en el período 2009-2011 (212 de 368 gerentes). En concreto, el 18% de los gerentes eligieron los sindicatos como la causa más importante (142 de 368 gerentes), mientras que el 40% de los gerentes eligieron los sindicatos como una causa relacionada (146 de 368 gerentes).

El presente estudio mostró que alrededor del 75% de los gerentes creen que la gestión (la transición de cambio) era una barrera en el período 2009-2011 (275 de 368 gerentes). En concreto, el 23% de los gerentes eligieron la administración y dirección de empresas o la gestión del cambio como la mayor causa de la crisis (83 de 368 gerentes), mientras que el 52% de los gerentes creen que la administración y dirección de empresas o la gestión del cambio fue una causa relacionada (192 de 368 gerentes).

11.5 Obstáculos (nuevos desafíos)

Las principales barreras fueron confirmadas en el estudio repetido. Los resultados generalmente son consistentes, aumentando la fiabilidad de los resultados. Más del 70% de los gerentes confirmaron que la influencia política constituye una barrera central con vistas al futuro (265 de 368 gerentes).

Más del 50% de los gerentes confirmaron que los sindicatos son una barrera central con vistas al futuro (200 de 368 gerentes), mientras que

casi el 70% de los gerentes confirmaron que la administración y dirección de empresas, incluyendo la gestión del cambio como una barrera clave en una perspectiva de futuro (249 a de 368 gerentes).

Por último, cabe destacar que más del 40% de los gerentes cree que la incertidumbre sobre la estrategia a largo plazo es otra barrera importante (148 de los 368 gerentes), mientras que sólo el 5% del total de respuestas (62 de 1.263 respuestas) designaron la competencia con otros operadores ferroviarios, autobuses y compañías aéreas (4%), incluyendo las operaciones internacionales por ferrocarril (1%) con vistas al futuro.

En conclusión, los gerentes que trabajan en los ferrocarriles daneses con una antigüedad promedio de 15 años rechazan la hipótesis de la antigua dirigencia que la competencia de las empresas ferroviarias, de autobuses o líneas aéreas, es una amenaza para facilitar la necesaria innovación del modelo de negocio de los ferrocarriles daneses.

11.6 Vistas al futuro (nuevos horizontes)

En general, casi todos los gerentes en los ferrocarriles daneses creen que la estrategia a largo plazo para el desarrollo de un nuevo producto básico es la oportunidad más importante para facilitar la necesaria innovación del modelo empresarial de los ferrocarriles daneses (405 de 368 gerentes). La razón por la cual el número total de respuestas es mayor que 100% es debido a que las dos variables se midieron como opciones independientes.

En concreto, el 57% de los gerentes seleccionaron el producto básico como el instrumento fundamental (210 de 368 gestores), mientras que el 53% de los gerentes creen que la estrategia a largo plazo representa la oportunidad clave (195 de 368 gestores). A continuación, hay que destacar que la gestión del cambio (180 de 368 gerentes) y la cultura de las empresas (168 de 368 gerentes) son considerados más importantes que la administración y dirección de empresas (161 de 368 gerentes) para permitir la necesaria innovación del modelo empresarial de los ferrocarriles daneses.

Por último, los gerentes que trabajan en los ferrocarriles daneses con una antigüedad promedio de 15 años repiten el rechazo de la hipótesis del antiguo directivo sobre la importancia de la expansión de las operaciones ferroviarias en los países vecinos a través de alianzas estratégicas con

otros operadores ferroviarios (proyectos de riesgo) para aumentar la rentabilidad y la competitividad del operador ferroviario danés. En conclusión, el rechazo de la hipótesis de los ex directores generales en los tres ensayos controlados aumenta la fiabilidad de este resultado.

11.7 Liderazgo exitoso durante una crisis

Doz y Kosonen (2010) han desarrollado un esquema organizativo para la comprensión de la renovación y la transformación de los modelos de negocio de las empresas, pero aún no se sabe lo que apunta en la dirección del programa. No sabemos cuáles son los indicadores más importantes para el liderazgo exitoso en un momento de crisis. El estudio identifica tres deficiencias fundamentales en la agenda de la alta dirección anterior, que son de importancia esencial para el liderazgo exitoso en una crisis. El problema es que estos puntos han sido hasta ahora desconocidos o ignorados en la literatura sobre los modelos de negocio, pero los gerentes que trabajan en los ferrocarriles daneses creen que una subestimación de estos puntos ha llevado al colapso de las negociaciones políticas y al reemplazo de la antigua alta dirección de los ferrocarriles daneses.

- **Laguna 1. Revelando los motivos personales y las ambiciones de la alta dirección (media: 4,22 de 7,00).** El fallo en no mostrar los motivos personales y las ambiciones de la alta dirección hace que sea difícil lograr el respeto mutuo y la confianza que se necesita para alinear los intereses de múltiples partes interesadas. La falta de articulación de las expectativas y ambiciones para el futuro tiene un impacto negativo en el resultado de una crisis, lo que reduce la probabilidad de un liderazgo exitoso. La falta de transparencia y claridad sobre las metas y desafíos para el futuro hace que sea difícil para los actores clave que tienen influencia en el resultado de la crisis y para el desarrollo de una agenda que una los intereses. La falta de transparencia hace que sea difícil colaborar alrededor de la agenda de la alta dirección y entender las posiciones de los gerentes de alto nivel sobre cuestiones cruciales. Sin el respeto mutuo y la confianza será difícil romper con el status quo, lo cual es importante en un momento de crisis para la supervivencia y para lograr el futuro éxito.
- **Laguna 2. La alineación en torno a un interés común (media: 3,96 de 7,00).** La subestimación de formular una agenda que una los intereses es particularmente importante en una organización impulsada por motivos políticos en una época de crisis. Combinando los intereses individuales a través de muchos grupos de interés no es una tarea fácil, pero este desafío tiene un papel crucial en la salida de la crisis. Doz y Kosonen (2010) describen cómo agruparse en torno a un interés común es quizás la estrategia más obvia, pero a menudo es una tarea poco comprendida por la alta dirección. El estudio actual confirma esta afirmación y señala además la importancia de la utilización de curvas de tendencia, ejercicios de dirección e historias inspiradoras como un método para crear la sensación de compromiso colectivo. Un segundo método para alinear los intereses es tener claridad sobre las condiciones para el éxito. Un tercer método para unir los

intereses es poner en práctica la estrategia a largo plazo a través de una serie de pequeños pasos que pueden servir de base para una serie de pequeñas victorias.

- **Laguna 3. Disociar mediante la negociación de recursos (media: 3,90 de 7,00).** Fue bastante sorprendente que la disociación de los recursos se confirmó como el punto más crítico de toda la encuesta de gestión. Los gerentes expresaron su descontento con la negociación de la propiedad, el uso, la distribución y el acceso a los recursos en el período previo a la crisis. La alineación de las responsabilidades de los gerentes de alto nivel y de las tareas centrales de la compañía puede evolucionar de manera que ya no haya una armonía o equilibrio entre los dos. Al mismo tiempo, la separación de las responsabilidades y tareas específicas es particularmente importante en un callejón sin salida, que suele ser una principal característica de una crisis. La incapacidad de negociar las responsabilidades de la empresa y sus tareas fundamentales se repite y se considera casi dos veces más crítico como la segunda mayor barrera de recursos para salir de la crisis por lo que el resultado es robusto. Esto significa que la transformación de un modelo de negocio existente se hace más difícil debido a la falta de correspondencia o la discordia entre la propiedad de los recursos, el uso, la ubicación y el acceso a los recursos, lo cual es un nuevo hallazgo de interés para los estudiosos con interés en la administración y dirección de empresas.

El estudio actual indica además que la perspectiva de afuera hacia adentro puede ser un aporte valioso para un liderazgo exitoso en una crisis, pero se requiere que se mantenga la dependencia contextual. Los gerentes expresan una necesidad constante de tener metas claras para el futuro, y subrayan la importancia de mantener un diálogo sobre los principales desafíos relacionados con la consecución de nuevas metas en el futuro.

11.8 La construcción de la nueva teoría

El estudio de investigación aporta una nueva teoría sobre el liderazgo exitoso en los períodos de crisis basado en la teoría original sobre la agenda de liderazgo para la renovación y la transformación de los modelos de negocio de las empresas establecidas (Doz y Kosonen, 2010). La teoría de edad representa un sistema de relaciones, pero la importancia de los componentes subyacentes individuales de la teoría en diferentes situaciones permanece sin especificar. La triangulación de los datos empíricos sigue el principio de razonamiento retrospectivo (Roldsgaard, 2010) mediante la investigación de lo que ha sucedido en el pasado para poner a prueba la teoría en su contexto para construir una nueva teoría. La nueva teoría destaca las cinco variables críticas de la agenda de liderazgo en tiempos de crisis. La meta-teoría (es decir, la teoría acerca de la teoría) se basa en una colección de declaraciones $D = \{d1, d2, \dots, d45\}$ que fueron diseñados para medir una colección de objetos $O = \{o1, o2, \dots, o45\}$ a fin de examinar un conjunto fijo de relaciones $R = \{r1, r2, \dots, r15\}$. El análisis de correlación identifica un total de cinco puntos

importantes en la agenda de liderazgo, de los cuales los gestores de los ferrocarriles daneses creen que son esenciales para el liderazgo exitoso en tiempos de crisis. Cada componente representa una pequeña porción importante de varios desafíos interconectados de un sistema de interrelaciones. Los cinco puntos representan diferentes oportunidades y amenazas para un liderazgo exitoso en tiempos de crisis:

1. *Distancia*: Obtener una distancia crítica a través de una perspectiva de afuera hacia adentro.
2. *Dialogar* mediante la exploración de las hipótesis, no sólo de las conclusiones.
3. *Revelar* las metas y desafíos para el futuro.
4. *Alinear* a través de una agenda única para desarrollar una base común.
5. *Disociar* la propiedad, el uso, la ubicación y el acceso a los recursos.

La designación de los cinco puntos de la agenda de liderazgo contribuye a una nueva teoría sobre los temas más importantes en la administración de las organizaciones impulsadas por la política en una época de crisis. Los cinco puntos se consideran esenciales para el liderazgo exitoso y el cambio de gestión de las organizaciones impulsadas por la política, sobre todo en tiempos de crisis, pero tal vez también en general. El presente estudio muestra, además, que un grupo minoritario de los gerentes (2%) rechaza la principal causa de la crisis. Estadísticamente, se rechaza con 99% de probabilidad que este resultado fuese al azar.

Los miembros de este grupo minoritario malinterpretan la situación porque se centran más bien en los problemas periféricos de la crisis. La necesidad de diálogo y articulación de las hipótesis y preocupaciones son cruciales para el desarrollo de una base común. Esto es importante, porque sabemos que la crisis exige una ruptura con la situación actual. Por lo tanto, es un reto especial para que estos gerentes cambien su enfoque de los problemas más periféricos de la crisis a la raíz de la crisis. Es un desafío especial el apoyo a este grupo minoritario en entender por qué se requiere un cambio en la práctica actual. Es particularmente importante para las personas en este grupo minoritario que sienten que se haga un esfuerzo especial para crear una visión común que puedan apoyar. El análisis de correlación muestra sorprendentemente una relación lineal entre el diálogo y la capacidad de resolver el problema de la crisis de fondo. Por ello, la articulación de las hipótesis y las expectativas son esenciales para el grupo minoritario de personas con el

fin de crear el respeto mutuo necesario, la confianza y la comprensión de las posiciones. Por lo tanto, es un desafío especial mantener un diálogo con estos gerentes con el fin de acordar un cambio genuino en la situación actual.

El presente estudio confirma que la transformación del modelo de negocio de una empresa que antes era efectivo no es una tarea fácil (Doz y Kosonen, 2010), pero el reconocimiento de los puntos más críticos en la agenda de liderazgo aumentará el conocimiento y la comprensión de los requisitos básicos para el liderazgo exitoso de las organizaciones impulsada por motivos políticos en tiempos de crisis.

11.9 Limitaciones y futuras investigaciones

La investigación doctoral se limita al estudio de una sola empresa. Los ferrocarriles daneses se clasifican como una "compañía independiente pública" que puede ser considerada como una limitación, ya que es técnicamente diferente a una empresa privada. Siguiendo este razonamiento, se podría argumentar que los resultados del estudio no necesariamente reflejan los desafíos de las empresas privadas, pero muchos expertos no ven ninguna diferencia porque los ferrocarriles daneses asumen el carácter de ser privado, lo que significa que la empresa debe ser rentable y, al mismo tiempo, que se mantengan un alto grado de atención política (Vestereng, 2013). Además, la empresa es única, ya que su modelo de negocio es representativo de toda una industria, por lo que no ha sido posible investigar cómo diferentes empresas se diferencian en el mismo sector. A pesar de esta limitación, todavía parece relevante obtener un conocimiento profundo de una empresa que ha jugado un papel histórico desde la revolución industrial, y sigue desempeñando un papel importante en el desarrollo de la sociedad moderna.

En general, el estudio de muchas empresas sigue siendo importante para obtener la amplitud de análisis, mientras que el estudio de las empresas individuales sigue siendo importante para lograr un conocimiento en profundidad de los diferentes desafíos de la administración, por ejemplo, acerca de los problemas específicos que surgen en tiempos de crisis. En este contexto, los principales investigadores sostienen que se necesitan nuevos estudios sobre la esencia de las empresas individuales para contribuir a la continuación del desarrollo de la literatura académica sobre los modelos de negocio (Tece, 2010).

Otros investigadores ya refirieron que el estudio de los casos individuales y múltiples sigue siendo importante con el fin de contribuir al desarrollo de las disciplinas de investigación y los diferentes discursos académicos (Yin, 1984, 2000, 2003, 2009, 2014). Yin (1984) ha sostenido que el estudio de casos es un método de investigación ideal para el estudio de un fenómeno contemporáneo dentro de su contexto de vida real y confirma que el método de investigación de casos es justificable en ciertas condiciones (2009). Una de las condiciones más importantes es que el estudio de caso único representa una prueba crítica de la teoría, mientras que otras condiciones importantes son que el caso represente o revele los nuevos desafíos (Yin, 2003). El presente estudio cumple con todas estas condiciones. La selección de un caso crítico es especialmente relevante cuando se representa una plataforma para poner a prueba una teoría bien formulada (Yin, 2014).

Las proposiciones de la teoría se especificaron claramente para mejorar la teoría existente, pero la razón más importante para la selección de un solo caso es que el investigador tuvo acceso a los datos que han sido inaccesibles al escrutinio científico en el pasado. De hecho, Flyvbjerg (2007) afirma que las ciencias sociales son de alto valor, precisamente, en las áreas donde la ciencia natural es débil, es decir, "en el análisis reflexivo y la deliberación sobre los valores y los intereses dirigidos a práctica, que son esenciales al desarrollo social y el desarrollo económico de la sociedad" (p. 38). Flyvbjerg (2004) afirma que los estudios de casos son importantes para fortalecer la investigación en las ciencias sociales.

La fuerza del ejemplo se ha infravalorado en la literatura de gestión, pero el enfoque de estudio de casos sigue siendo fundamental para el desarrollo de teorías en las ciencias sociales como complemento de otros métodos de investigación (Flyvbjerg, 2006a). En concreto, la encuesta de gestión que se aplicó en la investigación doctoral para examinar los conocimientos y experiencias de los gerentes, para extraer conclusiones que sean representativas y relevantes para una mayor población de interés. Es un error común creer que las generalizaciones no se pueden hacer sobre la base de estudios de casos individuales (Flyvbjerg, 2004, 2006a).

La Comisión Europea ha anunciado la liberalización del mercado ferroviario europeo a través de la estandarización de las normas técnicas y la armonización de las normas de seguridad legales en los distintos países de la Unión Europea antes de finales de 2020. En este contexto,

podría haber sido interesante comparar los diferentes operadores ferroviarios en diferentes países de la Unión Europea en términos de variables objetivamente medibles, incluyendo el costo por pasajero, la puntualidad, la fiabilidad y la velocidad, sin embargo, al hacer esto, es importante tener en cuenta que las condiciones son diferentes para los operadores ferroviarios nacionales en los países europeos, debido a los diferentes tamaños geográficos y poblaciones nacionales. Además, las normas técnicas siguen siendo desiguales entre los países europeos, incluyendo la amplitud del ferrocarril, los sistemas de señalización y de los certificados de seguridad. En conjunto, los diferentes estándares hacen que sea prácticamente imposible que los diferentes operadores ferroviarios europeos operen en toda Europa (Roldsgaard y de-Miguel-Molina, 2013). Por otra parte, la cantidad de dinero que cada país ha invertido en la infraestructura ferroviaria nacional es muy diferente, lo que significa que las condiciones son desiguales. A pesar de estas limitaciones obvias, algunos investigadores han tratado de desarrollar futuras simulaciones para predecir el efecto que tendrá la liberalización del mercado ferroviario europeo sobre la rentabilidad y la competitividad de la operadora ferroviaria histórica (Mizutani y Uranishi, 2013).

El presente estudio no fue diseñado para hacer un análisis prospectivo de los posibles resultados de los diferentes escenarios, y el meta-análisis no tuvo como objetivo hacer cálculos sobre posibles futuros modelos de negocio, sino analizar la hipótesis y los desafíos del modelo de negocio actual del operador ferroviario danés en una época de crisis. El objetivo del presente estudio fue analizar los factores que influyen en el resultado de una crisis institucional en relación con la práctica actual. No obstante, un estudio histórico con varios operadores sería interesante para obtener la amplitud analítica de la idea. Pero nuestro propósito fue obtener la profundidad analítica a través de un estudio sistemático de los desafíos para la innovación del modelo de negocio de una operadora ferroviaria histórica a fin de obtener una nueva comprensión de los puntos críticos de la agenda de liderazgo en situaciones difíciles y exigentes. Asimismo, la idea de la comparación de diferentes operadores ferroviarios a través de fronteras nacionales seguiría siendo un problema a menos que un operador ferroviario en otro país se enfrentase a una crisis en la balanza como la de los ferrocarriles daneses.

Los políticos liberales argumentan que la competencia resultará en un mejor servicio ferroviario y de más operaciones ferroviarias rentables, pero no hay ejemplos en la práctica que apoyen esta afirmación (Roldsgaard y de-Miguel-Molina, 2013). Esto no significa que la

liberalización del mercado ferroviario europeo no podría dar lugar a esos resultados en el futuro, pero sigue siendo una pregunta si la armonización de normas técnicas y certificados de seguridad en sí mismo será suficiente para obtener los beneficios esperados de la liberalización del ferrocarril en el mercado de la Unión Europea.

Por el contrario, existe evidencia de que la expansión de las operaciones ferroviarias internacionales ha dado lugar a una estabilización en un sentido negativo (estancamiento) y hay un riesgo de pérdida de transporte ferroviario de decisiones (Roldsgaard, 2012). Otros investigadores han descrito cómo la regulación de las operaciones ferroviarias en el mercado nacional de Suiza ha logrado mejorar las operaciones sin la competencia y también han comprobado si es posible mejorar el rendimiento de la compañía ferroviaria nacional, incluso sin competencia (Desmaris, 2013).

Parece probable que esta fractura del mercado en líneas aisladas más pequeñas puede llevar beneficios a corto plazo en términos de optimización de los niveles individuales (por ejemplo de puntualidad), pero al mismo tiempo existe también un riesgo de que sólo las rutas más rentables se beneficiarán de esta fragmentación del mercado a largo plazo. También hay un riesgo de que el mercado puede ser fragmentado si los mercados ferroviarios nacionales se dividen en líneas ferroviarias separadas (sub-mercados) operadas por compañías diferentes, que no han dado lugar a los beneficios esperados de la liberalización de los mercados ferroviarios nacionales (Roldsgaard, 2012). La pregunta es si tiene sentido liberalizar los mercados nacionales de ferrocarril después de dividir un mercado en partes aisladas. En este contexto, ¿Es importante sólo la puntualidad de los trenes y los precios de los billetes? ¿Es la velocidad un aspecto poco importante en el marco de la liberalización? ¿Qué papel tiene la inversión en este contexto? ¿Quién va a financiar la inversión en las zonas menos pobladas sin subsidios gubernamentales? Estas son algunas de las preguntas que surgen en relación con la liberalización del mercado ferroviario europeo, el cuál se abre para futuras investigaciones.

Hasta ahora, la competencia en los pocos ferrocarriles nacionales liberados se circunscribe a la competencia para la obtención de licencias de operación (es decir, la competencia por el mercado), pero la competencia en el mercado ferroviario sigue siendo casi inexistente en este momento. La competencia en el mercado requiere dos o más operadores que presten servicios ferroviarios competitivos

simultáneamente (Roldsgaard y de-Miguel-Molina, 2013). De cara al futuro, sería interesante examinar los efectos de la alta velocidad ferroviaria italiana porque Italia es el único país (o uno de los pocos países) en Europa, que tiene competencia en las líneas de alta velocidad.

El gobierno danés ha tomado la decisión histórica de invertir cerca de 4.000 millones de euros para el desarrollo de las operaciones ferroviarias para conseguir los trenes más rápidos, más fiables de los servicios ferroviarios, una puntualidad superior, y más comodidad para las operaciones ferroviarias en Dinamarca. Por lo tanto, la inversión está destinada a transformar poco a poco el servicio ferroviario en 2025, lo que crea nuevas oportunidades de investigación. Por ejemplo, sería interesante estudiar las experiencias y aprendizajes de la electrificación de las primeras líneas de ferrocarril.

Finalmente, el producto principal es un objeto interesante para futuras investigaciones dentro de los distintos sectores. Sabemos que la velocidad del desarrollo tecnológico se está acelerando y, como resultado, los ciclos de vida de los productos son cada vez más cortos. En este contexto, el estudio de las ventajas y desventajas de desarrollar existentes o nuevos modelos de negocio a través de una serie de proyectos es también interesante para futuras investigaciones. Por último, se anima a los investigadores a investigar más a fondo la importancia de la influencia política en la innovación del modelo de negocio.

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Biography

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