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A cognitive perspective on the antecedents of business model innovation: The case of the Port of Aalborg Authority

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(First Draft Version)

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State-of-the-art: The research of business models has been developing and diffusing to every conceivable academic area during the last 10 years. In 2013 (Baden-Fuller, Mangematin 2013) added to the growing research through their conceptual article emphasizing a cognitive perspective on business models and the interesting opportunities accompanying this approach. However, the possible advantages of applying a cognitive perspective on the development of business models are still unexplored.

Research Gap: In this paper, I contribute to the research on the cognitive perspective of business model innovation by including a case study of the Port of Aalborg Authority. Including a Port Authority creates an interesting empirical frame as exemplified by (Hollen et al 2014) since this sector functions in a grey area of public and private interests concurrently with changing customer demands which to a great extent is creating new conditions for performing successfully. This is especially evident in the strategic change process taking place at the Port of Aalborg Authority where the top management team is currently in the process of defining their three roles of being: a profit-seeking company; a frame creating the ideal infrastructure to support the business activities at the port perimeter; and an integrator creating growth and development in the region. Therefore, the characteristics of the case are quite different from the traditional cases employed in cognitive research and is thereby creating an opportunity for furthering the existing research in the field.

Theoretical arguments: Cognitive research on organizational development and strategy became a distinguished research area in the 80s and 90s (Pralhad & Bettis 1986; Eden 1988; Meindl et al 1994; Huff 1997). Since then the

idea of cognitive frames and related concepts has been a research area of interest, both when analyzing competition (Porac et al 1989), innovation (Smith & Tushman 2005), and technological changes (Kaplan & Tripsas 2008). All of these perspectives are of interest when developing business models. Therefore, I found that the collocation of these two perspectives might create new insights to consider in the process of business model innovation.

Method: The case is presented empirically to describe the process of development in the Port of Aalborg Authority from 2000 until 2014. The initial analysis of the case is based on secondary data including a content analysis of the annual reports of the Port Authority encompassing the changing emphasis on operational and strategic activities as a result of the development the company has been undergoing. From this point of departure, the cognitive perspective is further advanced by including data from observing and interacting in the organization inspired by the approach of Van de Ven (2007) as well as semi structured interviews with the top management team.

Contributions: The paper has two contributions. First, I contribute by applying the existing cognitive research in relation to the literature on business model innovation in stating a more dynamic view on the traditionally stable cognitive perspective. Second, based on the empirical implications I advance a preliminary framework illustrating the possible interdependency of changing cognitive frames and developing business model innovation. In closing, I discuss the implications of applying the cognitive perspective to business model innovation and present the possibilities of future research on the subject.

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Introduction

In 2010 (Baden-Fuller, Morgan 2010) discussed the differing roles of business models both for researchers and practitioners. This perspective emphasized, in line with (Magretta 2002) applying a story telling view, how business models can be both empirically observed but also identified as abstract ideal types. This line of reasoning is representing a break with much of the traditional hands-on business model research which has primarily been focusing on tangible frameworks and configurations of business models (Fielt 2011).

As a response to the current critique of the applicability and value of business models (Baden-Fuller, Mangematin 2013) suggested understanding the business model as a configuration that is cognitively manipulable. Thus, they treat the business models as a cognitive instrument which encompasses the understanding of causal links between the company and the external settings. By applying this perspective the authors upon up towards a more organizational understanding of the drivers of business model innovation, the topic which I will be addressing in the current paper.

The research of the business model innovation is often based on the development of e-business and other technology-driven trends (Zott, Amit & Massa 2011). Therefore, newly established companies and business models for entrepreneurs are often highlighted as especially interesting (Morris, Schindehutte & Allen 2005). However, a stream of literature is increasingly focusing on the challenges of innovating business models in established companies (Sosna, Trevinyo-Rodríguez & Velamuri 2010; Linder, Cantrell 2000) as this context creates radically different preconditions for undergoing this process with a desirable result.

Inspired by the research of (Sosna, Trevinyo-Rodríguez & Velamuri 2010) who briefly touches upon the antecedents of business model innovation, my aim is to further this discussion by analyzing the antecedents of a business model innovation in an established company by analyzing the case of the Port of Aalborg Authority. Taking their analysis of the implications of organizational learning on business model innovation as my point of departure, I focus on the cognitive antecedents affecting the initiation of the change process – a perspective currently overlooked in the business model research.

Including the case of a Port Authority in the research of business model is inspired by (Hollen, Van Den Bosch & Volberda 2013). However, the case presented in this paper features significantly different conditions due to elements such as size, growth rate, and possibilities for development. Furthermore, by applying a cognitive perspective in an industry filled with tradition and quite

conservative roles and regulations, I found it possible to challenge the cognitive perspective which has often been deployed in more knowledge-intensive industries.

Business Model Innovation

As often stated, there exists no overriding definition of business models in the current literature. The business model as a theoretical concept has been applied in multiple different business contexts ranging from entrepreneurial to established companies, from traditional to highly technology depend industries, and for both profit and non-profit companies. (Fielt 2014) These characteristics and conditions naturally affect the development and change in the business models of the companies. As stated by (Sosna, Trevinyo-Rodríguez & Velamuri 2010), who applies an evolutionary lens to the development process, established companies are facing the recurring challenge of managing both the exploitative activities in the current business model concurrently with performing explorative activities ensuring a continued ability to create value, thus touching upon the perspectives of (March 1991). And as often seen in the literature on corporate and strategic entrepreneurship the inherent tension in these differing activities might create challenges both in the resource allocation and the organization structure when trying to create a balance between the opportunity- and advantage-seeking behaviors (Hitt et al. 2011)

Drivers and Barriers in Business Model Innovation

By looking briefly at the existing literature of business model innovation it is possible to identify different perspectives of both the drivers of and barriers to the innovation process.

Innovating a business model is said to be a way of continuing the development of competitive advantages (Mitchell, Coles 2003) which naturally makes the concept of interest for different industries. However, still little is known about how to innovate business models (Taran 2011).

Much of the current literature on business model innovation is centered on descriptive narratives of business models being challenged by new customer needs and other external factors which then lead to configuration of the business models by changing a few key elements (Chesbrough 2010). However, research in how established businesses might benefit from managing business model innovation and the appertaining problems is also an area with increased relevance as stated above (Markides, Charitou 2004; Govindarajan, Trimble 2005).

Generally, the innovation of business models is perceived as critical for the creation of sustainable advantages during the continuously changing expectations of customers and increasing intense competition (Sorescu et al. 2011). However, research has shown that even though external changes create a need for changing the business model, companies will naturally evolve business models

which increase the stability thereby diminishing the flexibility of the company (Doz, Kosonen 2010). Their research showed how strategic agility is a key determinant when analyzing the innovation of business models as the dependent variable.

But changing a business model is, as stated by (Chesbrough 2010), more difficult than merely changing a few key aspects of the business. There might be significant barriers to the business model innovation such as the continuous conflict of balancing the exploration of new technologies and the exploitation of existing ones.

Researching the innovation of business models in the retailing industry (Sorescu et al. 2011) emphasize a distinction of whether the business model innovation is intended to further the value creation or the value appropriation of the company. Often these perspectives will coexist in the intentions driving the innovation with the majority of initiatives focusing on one or the other.

They stated customer-centric orientation and an emphasis on innovation in general as important internal drivers of business model innovation in the retailing industry while changing customer values and technological developments are potential external drivers. Based on these drivers cognitive barriers to change (Chesbrough 2010) and resource commitment (Padgett and Mulvey 2007) are highlighted as the main barriers for business model innovation.

(Sosna, Trevinyo-Rodríguez & Velamuri 2010), emphasizing especially the organizational learning perspectives in business model innovation, divide the challenges of implementing business model changes in two phases: the exploratory stage and the implementation stage. In the exploratory phase they emphasize the limitations of developing a business model created by the mental models of the environment which are based on imperfect cognitive representations thus creating a “bounded rationality”. The next phase necessitates organizational realignment for ensuring an implementation of the new or changed business model. Quite in line with this, (Chesbrough 2010) identified a cognitive barrier to business model innovation referring to how the dominant logic of a company (Bettis, Prahalad 1995) might affect the information flow. Drawing on (Nelson, Winter 2009), (Sosna, Trevinyo-Rodríguez & Velamuri 2010) continuous the discussion by highlighting how environmental changes can appear ambiguous making the perception and interpretation of the management team important in adjusting the organization. This creates the threat of organizational routines and beliefs enhancing the rigidity of the behavioral patterns.

In general, the innovation of business models must be perceived as a new frontier in innovation as stated by (Koen, Bertels & Elsum 2011). When innovating a business model based on a tangible

product, the change seems clear-cut. In advance of the changes an innovation process has taken place. Following this, work processes will be changed and there might be a need for new technological equipment or other physical changes. However, when working with service companies innovating business models, where the value is created by individuals and thus dependent on the human resources actively conducting the activities of the new business model, the processes might be quite challenging.

Therefore, it is important, as stated by (Amit, Zott 2001), to understand the business model itself as a locus of innovation hereby moving beyond the traditional product based innovation. By applying this approach companies can consider other industries and juxtapose their business models which might inspire new approaches to modelling the current or new business thus creating a business model innovation (Osterwalder, Pigneur & Tucci 2005). But when established companies are preparing this process of innovation, they need also to factor in the challenges that might arise in their organization and culture. What might have been the crux of the business success in the past might be up for replacement which necessitates changes in the fundamental understanding of the business – both for employees and customers. A similar observation is emphasized by (Chesbrough 2010), who states the need for pinpointing internal leaders that can manage the results of the business model change process. If the company is shifting from an old to a new business model, the culture of the organization must be prepared to concurrently embrace the new and let go of the old business model. However, when implementing new business models alongside the existing ones other challenges might occur (Markides, Charitou 2004).

(Koen, Bertels & Elsum 2011) briefly touch upon the organizational challenges associated with different types of business model innovation. Therefore my aim is to further develop this perspective by including the cognitive perspective on business model innovation in the established company the Port of Aalborg Authority.

The Cognitive Perspectives

To relate the two perspectives of business models and cognitive perspectives, the existing trends of cognitive aspects in the organizational theory is briefly introduced including the main constructs presented in the perspective. As stated by (Kaplan, Tripsas 2008), researching managerial cognition is a longstanding tradition going back to March and Simon (1958) who stated that organizational members all bring a certain cognitive foundation to any management decision.

When looking at the area of strategy, (Mintzberg, Ahlstrand & Lampel 2005) include the general aspects of the cognitive school, stating that although the approaches integrated in this school are quite diverse, they all agree on the fact that an essential prerequisite for strategic cognition is the existence of mental structures to organize knowledge. Considering the often extensive discussion of the connection between business model and strategy (Seddon et al. 2004) the idea of mental structures as being included in the development of business models seems quite straight forward. (Mintzberg, Ahlstrand & Lampel 2005) emphasize, how strategies emerge as perspectives in the form of concepts, maps, schemas, and frames which together show how organizational members translate inputs from the environment.

Taking the research of (Prahalad, Bettis 1986; Bettis, Prahalad 1995) as my main point of departure, I focus on the dominant logic of an organization, since they emphasize the diverging interplay of individual and shared cognitive maps or schemas. Drawing on the research of both (Eden 1988; Eden 1992) and (Fiol, Huff 1992) cognitive maps are often understood as graphical representations and thus an artefact – a fact that is interesting when researching the secondary sources of empirical data produced within the organization. To balance out this focus of physical attributes, including the schemas of (Prahalad, Bettis 1986) creates a platform for also emphasizing the individual beliefs affecting the shared understanding which is also the main point of the description of cognitive frames by (Kaplan, Tripsas 2008) and (Smith, Tushman 2005). In general, (Smith, Tushman 2005) emphasize the need for distinguishing the cognitive frames as a stable context for understanding the environment and the cognitive processes encompassing the behavioral routines. The main constructs of the abovementioned researchers are stated in box 1 with the aim of aligning the cognitive perspective and thus emphasizing their mutual correlations.

Table 1 Central Construct	Researchers	Definition
Dominant Logic	(Prahalad, Bettis 1986, Bettis, Prahalad 1995)	A mind set or a world view or conceptualization of the business and the administrative tools to accomplish goals and make decisions in that business. It is stored as a shared cognitive map (or set of schemas) among the dominant coalition.
Cognitive Maps	(Eden 1988, Eden 1992) (Fiol, Huff 1992)	Cognitive maps can be seen as a picture or visual aid in comprehending the mappers' understanding of particular, and selective, elements of the thoughts (rather than thinking) of an individual, group or organization. Cognitive maps are graphic representations that locate people in relation to their information environments
Schemas	(Prahalad, Bettis 1986) inspired by (Norman 1976) and (Huff 1982), respectively.	these systems represent beliefs, theories and propositions that have developed over time based on the manager's personal experiences An organizational schema is primarily a product of managers' interpretations of experiences while operating within certain firms and industries.
Frame	(Kaplan, Tripsas 2008, Smith, Tushman 2005) inspired by (Goffman 1974) (Smith, Tushman 2005) inspired by Walsh (1995)	By frame, we mean the lens through which actors reduce the complexity of the environment in order to be able to focus on particular features, make context-specific interpretations, decide, and act Walsh (1995) defines a cognitive frame as "a mental template that individuals impose on an environment to give it form". These mental templates create a lens through which managers filter knowledge and direct action.

The constructs represent differing perspectives and applications in their connection to the cognitive theories and are therefore applied when appropriate throughout the paper.

In their research of technological change, (Kaplan, Tripsas 2008) applied a cognitive perspective to create understanding of the development process of technologies understood over a life cycle.

Inspired by their approach, I focus on how a cognitive perspective can be applied to create understanding of the antecedents of the business model innovation.

As stated by (Smith, Tushman 2005), cognitive frames of managers can be identified through their words and actions. Therefore, the empirical base of my research is constructed by observing and interacting with the top management team while also including secondary sources of data e.g. the annual reports and the strategy report of the Port Authority.

Much of the existing research focusing on the cognitive perspective is based on competition e.g. (Porac, Thomas & Baden-Fuller 1989) who analyze, how the structure of an industry is determined by but also determines the managerial understanding of the competitive environment thus emphasizing the always interesting dichotomy of structure and agency. Therefore, including an element of competitive development in the understanding of business model innovation is interesting, as this takes into account a possible change of the dominant logic of the sector as a whole in question.

Furthermore, when working in a cognitive perspective, it is continuously important to question the level of analysis applied in the research. As emphasized by (Meindl, Stubbart & Porac 1994), researchers need to consider whether the aggregated level, what (Prahalad, Bettis 1986) define as the dominant logic (which according to them is stored in schemas and might therefore be understood as a structure), is derived from the cognitive process of individual actors or whether the individual cognition is merely a reflection of the collective processes thus continuing along the lines of the abovementioned dichotomy.

Moreover, highlighting the fact that (Smith, Tushman 2005) describe the cognitive frame as a stable construct makes it all the more interesting to collocate with the innovation of business models. While the business model is also often perceived as merely a snapshot of the company at a given point in time, applying the cognitive perspective on the antecedents driving the change in business models creates a new dynamical approach for both perspectives. Thereby, this paper is contributing to the literature on the cognitive perspective by introducing a more process based development focus of the developing and changing cognitive frames and appertaining dominant logic and applying this as a view of the antecedents of business model innovation.

Business Models in a Cognitive Perspective

Applying the cognitive perspective as the underlying basis for understanding business models is by no means innovative. Multiple researchers include the perspectives in their analysis, and especially

the approaches by (Doz, Kosonen 2010) and (Baden-Fuller, Mangematin 2013) have inspired this paper. Having evolved since (Osterwalder, Pigneur & Tucci 2005) found the business model as being treated through the general assumption of merely presenting a description of a company at a specific point in time regarding it as a quite static picture, (Sosna, Trevinyo-Rodríguez & Velamuri 2010) now emphasize that the business model in recent research is being addressed as a dynamic entity undergoing change through the business development. Therefore, collocating this perspective with the often more static cognitive perspective is both interesting and necessary to highlight the potential connections.

The approach to understanding business models as cognitive structures is quite interestingly defined by (Doz, Kosonen 2010) by incorporating both an objective and subjective angle. Objectively, the business model can be understood as sets of structured and independent operational relationships between a firm and its customers, suppliers, complementors, partners and other stakeholders, and among its internal units and departments. These structures are made tangible through written procedures or contracts and further embedded in the company through tacit knowledge and routines. Concurrently, the subjectivity of the business model is distinguished by taking the management perspective and understanding the business model as a subjective representation of these mechanisms, delineating how it believes the firm relates to its environment.

In line with this, (Sosna, Trevinyo-Rodríguez & Velamuri 2010) highlight from an entrepreneurial perspective how the existing knowledge gained through previous experiences of the entrepreneur and the team in his organization is an important component of the cognitive maps which influences their strategic choices in establishing the company.

This is further discussed by (Chesbrough 2010) who identified a cognitive barrier to business model innovation referring to how the dominant logic of a company (Bettis, Prahalad 1995) might affect the information flow and thereby block the future development possibility.

Taking this cognitive stance in understanding the business model therefore unfolds new difficulties in achieving innovation.

In continuing along the merging of the two theoretical concepts of cognitive frames and business models, my research has been guided by adopting the approach of (Osterwalder, Pigneur & Tucci 2005) in defining the innovation of business models semantically by separating the concepts. Taking the cognitive perspective of the current paper as the point of departure, I have based my

research on the business model definition of (Doz, Kosonen 2010) since this definition highlight the interesting duality of physicality and cognition in understanding the business model construct.

Considering the different types of innovation classified by Schumpeter (Fagerberg 2004): new products, new methods of production, new sources of supply, exploitation of new markets and new ways to organize business, the innovation of business models can take different approaches from focusing on certain key elements, radically changing the existing business model or creating a new business model focusing on new opportunities. However, depending on the level of innovation, going through a strategic development necessitates unlearning the old dominant logic for creating the optimum circumstances for continuing the process (Bettis, Prahalad 1995). The assumption behind this paper is therefore, that the same is to be expected when changing or creating new business models since this is strongly linked to a strategic development process. This is especially important when viewing the dominant logic as a funnel and thus an unrecognized construct sorting out specific elements without the actors acknowledging this process.

Methodology

In examining which cognitive antecedents that might affect the process towards business model innovation, I am presenting the case of the Port of Aalborg Authority. Involving a Port Authority as a case is interesting due to the often traditional and labor-intensive activities taking place at the port perimeter. And as presented by (Pettit, Beresford 2009) the sector is generally undergoing a change in their role in the supply chain, having moved from being reactive businesses responding to changes in the market, to taking a more proactive role in delivering value adding services in a complex system of intermodal chains of logistics.

The case of the Port of Aalborg has been included for several reasons. The Port Authority has been undergoing a significant change process since it in 2000, as the first port in Denmark, was corporatized with the municipality of Aalborg being the major shareholder with 98,9 % of the shares. Since then the CEO has been replaced and the new CEO has initiated the concept of creating “The Intelligent Port of Denmark” as a way of articulating the business model development which has been taking place in the company. Given the exploratory approach of my research, the paper is based on a single case study, which, as stated by Yin, is appropriate when the case is extreme, unique or revelatory.

As presented by (Hollen, Van Den Bosch & Volberda 2014) the strategic research on port development is increasingly interesting due to the plurality of stakeholders affecting the organization. Therefore, this case is especially relevant since the strategic development process of the Port of Aalborg Authority has included defining three roles embodying the main focus areas for the port authority being: a profit-seeking company, a frame creating the ideal infrastructure to support the business activities at the port perimeter, and an integrator creating growth and development in the region (Port of Aalborg 2014). These roles will be highlighted throughout the presentation and discussion of the cognitive antecedents of the business model innovation.

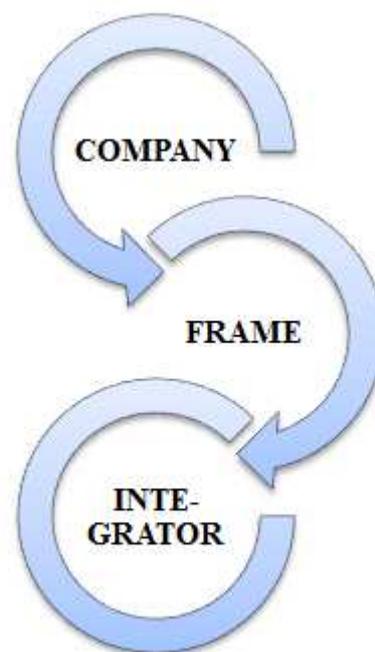


Figure 1: The 3 roles of Port Authority

Data Collection

The data constituting the empirical case was collected from multiple sources, and consists of both primary and secondary data. The collection of primary data has been inspired by the method of Engaged Scholarship as presented by (Van de Ven 2007) to highlight the participative nature of my enquiry. Therefore, the primary data has been collected through field work in the Port Authority from August 2013 until today. Field work entails being an active part of the entity being researched which can only be accomplished by performatively engaging in the company or department in question. Therefore, I have actively been participating in the area of research area by being employed as a scientific assistant at the Port Authority for a period of four months and hereafter continuously been included in department meetings, seminars and the like. For this reason, I have consistently been considering my daily activities as for example assessing when to take notes during meetings as this can affect the relation to the actors in the field (Hastrup 2010). This interaction with the case has enabled my access to understanding the everyday life and operation of the organization, a necessity when identifying the differences and convergences of the cognitive schemas of the individuals and the organizations as a whole.

The collected data has before and after the four month period been supplemented by semi-structured interviews with members of the top management team, especially the CEO, to gain insight into their

understandings and opinions. The interviews were conducted in different departments of the Port Authority, thus enabling an insight into the different frames of reference existing between the managers.

The secondary data consists of the annual reports presented by the Port Authority from 2000 until 2013. These data will be included in a content analysis of the management’s review to identify the expected changing weighing of essentially operational, tactical and strategic activities emerging throughout the period. This is of specific interest as (Prahalad, Bettis 1986) state that the dominant logic of a company can be established through a historical analysis.

The Case of the Port of Aalborg Authority

Being an inland terminal the Port of Aalborg Authority (hereafter Port Authority) has since the establishment been struggling with the exogenous factors of creating a consistent entry for and gaining competitive advantage with the aim of attracting freight. In the 20th century the development of the port gained momentum by deepening the channel and especially when becoming the base port of Greenland the port became a central actor in the Danish port sector. Since then the Port Authority has been operationally focusing on keeping the role as base port and generally developing the traffic of the inland terminal.

In 2000 the Port Authority was, as the first port in Denmark, converted from a self-governed municipality port to a municipality-owned private limited company. The restructuring was accomplished with the aim of being able to commercialize the development of the Port Authority and involved giving up certain economic advantages due to the entry in a more market-driven development.

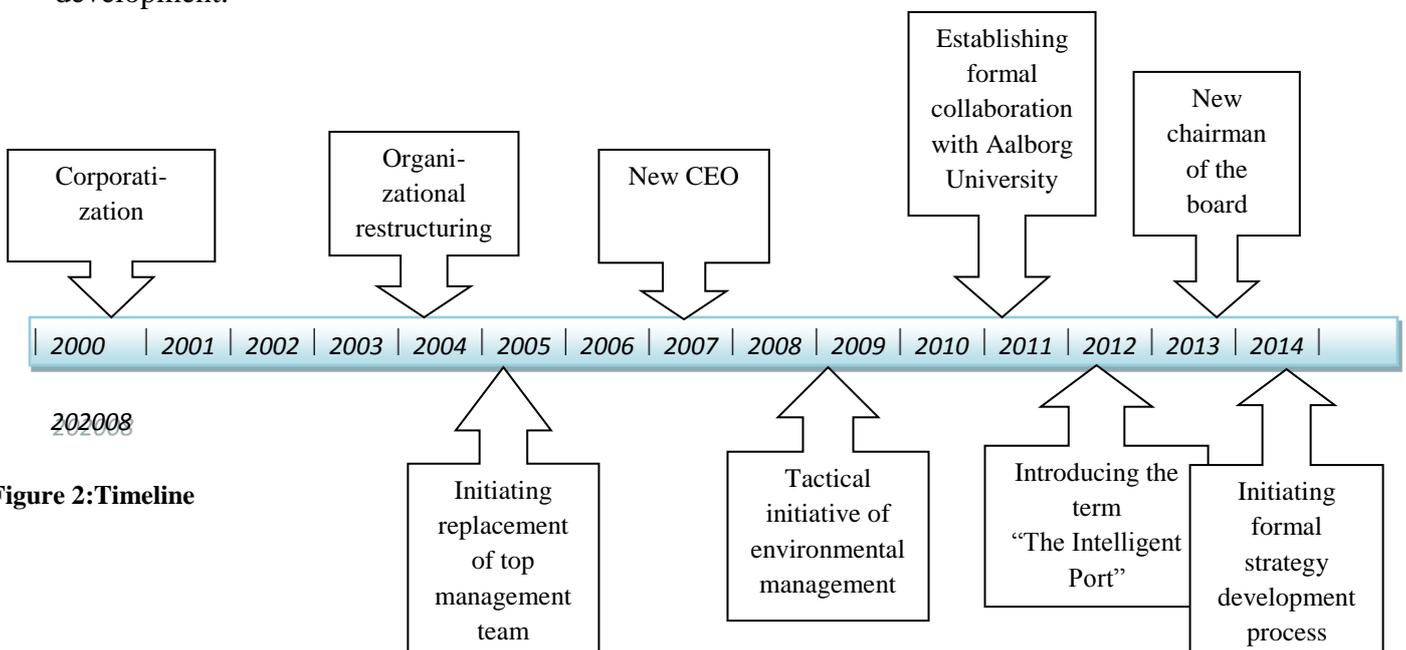


Figure 2: Timeline

Since 2000 the Port Authority has doubled their revenue, with earnings fluctuating quite a lot especially in the period of 2007-2011 mostly due to adjustments of accounts and the changing freight of goods in connection with the economic crisis. The economic development aside, the development of the Port of Aalborg has been affected by a multitude of exogenous factors. The ministry of transport and energy stated the following parameters affecting the general development of Danish ports:

- The authorization of the municipality
- The regulation of competition
- The tax condition of the port
- Environmental issues
- Piloting and ice-breaking
- Ports as a part of the Danish cultural heritage

Furthermore, as stated by (Hollen, Van Den Bosch & Volberda 2013) researching the development of the Port of Rotterdam Authority, the changing international environment affects the market-oriented Port Authority. These exogenous factors, some of which are quite unique for this particular case, are therefore not further accounted for in the advancement of the current framework since the aim is to a greater extent to focus on the internal cognitive triggers of business model development.

Organizationally, the Port Authority is structured around six major departments, two focusing on the development of the areas at the port perimeter and buildings, two support functions handling HR, finance and law, and the last two respectively managing the operational service and planning of incoming ships and the more commercial side of sales promotion in relation to shipping agencies, attracting new tenants, branding etc. The last department managing primarily sales and marketing was established in 2004. This department took over the sales contact formerly handled by the operational service and planning department, emphasizing an increased focus on proactiveness in the sales process.

Since 2005 there have been significant changes in the composition of the top management team. Four of the six department managers were employed in the period from 2005-2009 with a main focus on attracting managers with both strong theoretical and practical experience. In 2007 a new CEO was appointed which clearly stated a turn in the managerial experience with a business economist taking over from the former CEO, an engineer who had been employed at the Port Authority for 36 years.

The Intelligent Port of Denmark

Based on the secondary data presented in the annual report of the Port Authority from the period of 2000-2013 it is clearly stated, that the Port Authority defines its primary activities as the following (Port of Aalborg A/S 2000-2013):

- Activities regarding transportation, handling, and storage of cargo
- Rental of areas, buildings, equipment etc. for activities related to transportation
- Transport Center Activities

However, analyzing the annual reports of the Port Authority (Port of Aalborg A/S 2000-2013), specifically focusing on the management's review, clearly shows the changing areas of focus in the organization. From 2000-2009 the review primarily contains operational reviews in a short-term timeframe including the achieved cargo turnover, land development, and purchasing of equipment. The only section indicating a strategic aim is the future expectations in 2000 and 2001, where it is stated that:

.. the company will continue the work on creating new collaborations and strategic alliances that go beyond the current perimeter of the port

This statement is, however, not further elaborated.

The content of the management's review takes on a more tactical perspective in 2009 with the Port Authority describing the implementation of an environmental management program with the longer term aim of developing relevant competencies in the environmental area.

A more strategic change of focus can be distinguished in the 2011 review where three sections highlight a new direction consisting of:

- A range of newly initiated networks with the Port Authority as a main coordinator
- A knowledge collaboration established with Aalborg University emphasizing the aim of creating value and growth for both parties through competence development, research collaborations etc.
- A section called: Strong in logistics and collaboration where the transformation of the Port Authority is described stating that:

The Port of Aalborg A/S is in a continual transformation from being an infrastructure that services the industrial businesses to becoming a modern port that services a community where the value creation is based on knowledge in and around products and processes

In the 2012 review the achievements and investments in the environmental area are emphasized as strategic parameters in the operation of the port. And in 2013 the vision of creating The Intelligent Port as a concept for the further development of the port is presented.

When the CEO initially introduced the vision, he presented the concept as founded in the fact that the Port of Aalborg is limited by the inland location and depth of water making it unlikely to ever become the largest port of Denmark. The general saying therefore was: “when we cannot compete in size, we have to out smarten the others” (CEO). At first the term “intelligent” was loosely applied in articulating the overall vision primarily by the CEO, which led to the term being mostly applied by the employees when activities or processes were exactly the opposite of intelligent rendering the vision merely a poor discursive construct.

More than a year after the introduction of the term, the top management team comprising the CEO and the six heads of departments, two representatives of the university and an external consultant set out to define the strategy towards becoming the intelligent port of Denmark.

Considering the levers contributing to business model innovation presented by (Hollen, Van Den Bosch & Volberda 2013) consisting of: changes in the organization, changes in management, technological changes and co-creation with external parties, the development of the Port of Aalborg Authority has involved changes in all four levers with the technological changes having been the least dominant lever. However, due to the cognitive perspective inspiring the current paper, I find it interesting to look beyond the levers stating the business model innovation, and consider what might have had an influence on the cognitive frames and thus acted as antecedents of the business model innovation.

Cognitive Antecedents of Business Model Innovation

Based on the field observations and analysis of secondary empirical data figure 3 shows the conceptual framework for this article emphasizing the antecedents affecting the cognitive maps which are believed to have had an influence on the business model innovation taking place at the Port Authority.

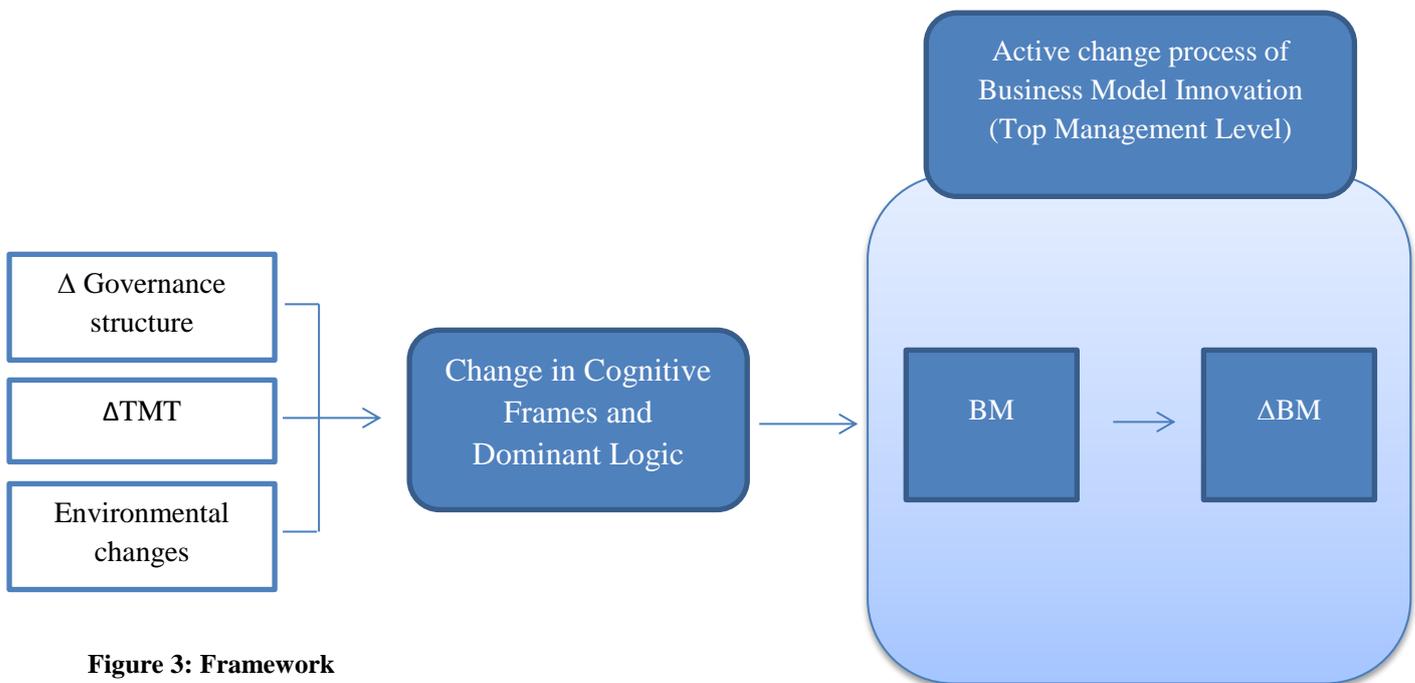


Figure 3: Framework

The framework presents the plausible antecedents of business models innovation understood as events affecting the cognitive frames and appertaining dominant logic of the top management team. In this way it sets forward a plausible idea of the events having an influence on the active change process of business model innovation.

Changes in the Governance Structure

First of all the change in governance structure is highlighted since this change stands as a cornerstone is the development process of the Port Authority. The change was supported by the board giving the Port Authority an opportunity to stretch the limits of the activities traditionally managed by port authorities.

However, changing the fundamental strategic objectives of an organization and thus changing the role of the organization in relation to many of the external stakeholders presupposes the ability of the organizational members to adjust their cognitive frames. Furthermore, this requires changing the

general dominant logic which functions as a shared cognitive map between the top management team (Prahalad, Bettis 1986; Bettis, Prahalad 1995). Having not been a part of the organization in the period of time, I was unfortunately not able to experience this change. However, when interviewing the former chairman of the board and enquiring how the change was experienced, he did experience changes in the subjects and discussion in the board room. But most importantly he explicated the changes in governance structure as necessary for emphasizing the political forces enabling the business model innovation of the Port Authority, stating that: “The city council made it possible, but Port of Aalborg accepted the challenge”.

Changes in the Top Management Team

The changes in the governance structure created, as stated above, a greater focus on commercialization. This change was accommodated by re-structuring the organization and including new members in the top management team. When initiating my research in the fall of 2013, the first point of my agenda was an introduction to the Port Authority by each head of department. Their significant differences in competencies clearly showed quite diverse foci in the value creation of the organization. Considering the cognitive theories it must be expected that each manager entered the organization with their own individual cognitive schema developed through their prior experience. However, a significant divergence of value creation foci approaching a form of conflict between some departments underlined the fact that while the managers had of course developed their cognitive schemas in the process of becoming a part of the organization, no shared organizational schema (Prahalad, Bettis 1986) or dominant logic (Bettis, Prahalad 1995) was distinct among the top management team.

This might have been a driving force for the CEO in presenting the vision of the Intelligent Port, as a concept for creating a dominant logic as a shared organizational schema among the new dominant coalition. As stated by the CEO in the introduction of the strategy report developed by the top management team:

“We need to protect what we have that is working for us. That is our daily business which must finance the business development that is the answer to our new challenges. Port of Aalborg has *acknowledged the consequence of the new realizations by developing “The Intelligent Port” as a strong concept for the further process*” (Port of Aalborg 2014)

This clearly states a need for creating a joint understanding with the aim of guiding the development.

When considering the cognitive definition of business models presented by (Doz, Kosonen 2010) this perspective is clearly focusing on the development of the subjective side, focusing on how the management understands the internal mechanisms and the relation to the external environment.

Of course the employment of a new CEO also constituted a part of the changing management team. As stated by the prior chairman of the board this change brought about a new dynamic in the organization but should not be seen as the most important trigger of the business model innovation. When the CEO started defining the port activities described in figure 1, he developed a cognitive frame for the port development. Considering this a cognitive frame is based on the definition of Goffman applied by (Kaplan, Tripsas 2008) and (Smith, Tushman 2005) since it is defined as a lens through which actors can reduce the complexity of the environment in order to be able to focus on particular features. The need for reducing the complexity might be due to the schemas of the CEO entering the port authority with a more commercially driven mindset as emphasized by (Prahalad, Bettis 1986) and proved useful for creating a common understanding between the top management team. This role division has been guiding for the abovementioned strategy development and thus for creating the dominant logic in the top management team.

Environmental Changes

As stated by (Sorescu et al. 2011) business model innovation becomes increasingly critical when expectations of customers are changing and the competition is increasing. As it became apparent at the yearly conference of Danish ports, the customers of the Danish ports in general, both when considering the needs expressed by trade organizations, shipping agencies and production companies at the port perimeter, have increased expectations for the Port Authorities taking on activities involving collaborations, new logistical solutions, developing the supply chain and creating an understanding for the changing markets (Danske Havne 2014).

The same trends are becoming apparent in the Port of Aalborg where companies are expressing needs for more areas, production facilities and service buildings (Abildgaard 2013). However, looking beyond the tangible needs of the customers, I find it interesting to consider the cognitive changes of the external stakeholders. Drawing on the definition of cognitive frames applied by (Smith, Tushman 2005) the abovementioned change might suggest that the customers have been

shifting the cognitive frame of understanding the Port Authority – which of course might create a divergence, if the Port Authorities are not aware of this change.

This points towards a need for changing the objective sides of the business model (Doz, Kosonen 2010) but also highlights interesting perspectives not previously considered, of how the subjective angle from the external environment might affect the internal understanding and cognitive frame.

Having discussed the three triggers being identified as antecedents of the business model innovation of the Port Authority by creating shifts in the cognitive frames and dominant logic, it is interesting to relate this to the acknowledged challenges which might arise when innovating business models in port authorities.

The Strategic Contradiction Business Model Innovation

Considering the experiences of (Hollen, Van Den Bosch & Volberda 2013) in analyzing the business model innovation of the Port of Rotterdam Authority, the Port of Aalborg Authority has been developing in the same direction. From primarily being structured around a Landlord Business Model, focusing on land exploitation and shipping with a reactive pattern of reaction to what might be categorized as an Extended Landlord Business Model (Hollen, Van Den Bosch & Volberda 2014). The extension includes investing not only in the traditional physical infrastructure but also investing in knowledge infrastructure thus taking on a facilitating or entrepreneurial role as a port authority – which (Verhoeven 2010) denominated a “Renaissance Port Authority” due to the new tasks. This includes the initial steps towards entrepreneurial driven co-creating collaborations with the private sector and the heightened focus on creating strategic value for the region. Thus moving towards creating a business model as a Port Developer, as experienced in the aforementioned case study.

“The working method is to create synergy between operation and innovation. This concerns Port of Aalborg as a company, as a frame for the business activities of other companies and as an active integrator in partnerships and collaborations.” (Port of Aalborg 2014)

As defined by (Smith, Tushman 2005) this represents a strategic contradiction by including both exploration and exploitation in the business model as also mentioned earlier. This is a general challenge for many organizations (Ireland, Webb 2007) but is often worth pursuing as the right balance of these concepts is said to increase value creation and thus wealth of the organizations (Hitt et al. 2011). Furthermore, prior research has shown that companies managing this dichotomy

in the mindset performs better in a dynamic environment (Van Den Bosch, Hollen & Volberda 2011) thereby obtaining the status of ambidextrous organizations. Therefore becoming an ambidextrous port authority (Hollen, Van Den Bosch & Volberda 2013) maintaining a dual focus on exploiting the activities connected to the traditional landlord role and exploring the new possibilities is of interest when keeping a continued focus on maintaining and developing the competitiveness. This seems to be the same process which has been driving the change of first the cognitive frame of the CEO, named “The Intelligent Port”, which has been a frame for structuring the process towards creating a shared cognitive schema between the top management team in the Port Authority in question. However, expecting managers and also lower level employees to understand and incorporate this dichotomy in their cognitive schemas might create an interesting challenge which is currently becoming apparent in the case of the Port of Aalborg Authority – which might point towards a further need for considering the dichotomy of structure and agency in analyzing the cognitive antecedents of business model innovation.

Concluding Remarks, Limitations and Future Research

The aim of the current papers has been to empirically discuss the possible cognitive antecedents affecting the innovation of business models. Analyzing the process towards initiating business model innovation in the Port Authority showed interesting internal events which might have affected the course of the change process which is still ongoing. I am not stating, that the three factors mentioned above: changes in the corporate structure, changes in the top management team and external changes, will necessarily lead every company towards business model innovation. But in this case, the significant changes in the cognitive frames lead by a new dominant coalition with new schemas being included, a new strategic aim for the organization being enabled, and changes in the cognitive frames of external stakeholders might have affected the initiating of the business model innovation in the Port Authority.

However, as stated by (Prahalad, Bettis 1986) changing the dominant logic of a top management team is an immense challenge which must be expected to take time. This is the process I am currently following in the Port Authority.

In future research I therefore expect to focus on, how the cognitive structures of the business model innovation has been created in the top management team and more importantly, how this is disintegrated to be applied in each department. This is increasing important as stated by (Doz, Kosonen 2010) who explicate that many companies takes the framing of a strategic change for granted or drives it by having only a partial perception of the existing business model. Furthermore,

by including other organizational levels it will be possible to include the gaps in the cognitive literature focusing on aggregated cognition in relation to individual cognition (Meindl et al 1994).

In assessing the limitations of my study I have been considering whether the term Business Model is interchangeable with Strategy in the framework being developed through out the current paper. Continuing along this line would be indicating that the cognitive antecedents I identified as initiating the business model innovation will be similar to the expected antecedents creating a strategy development. However, I find the case of the business model innovation of the Port of Aalborg Authority as containing much more than merely changing the strategy. Therefore, I am not certain that this kind of parallel would be of any value. However, considering the theoretical perspectives of strategy development as for instance indicated by (Mintzberg 1978), the focus on the emerging factors that might influence the process is undeniably interesting and a perspective that should be more enlightened in the innovation of business models.

Taking a strategic perspective rather than a cognitive perspective to analyzing the antecedents of business model innovation might therefore be interesting as this would entail including and emphasizing other strategically based theoretical constructs and thus possible other perspectives which might not have been taken into account due to the cognitive perspective applied in the current paper. An example might be the effects of competitiveness between ports and other complementary industries which would be a significant construct to include when applying a porterian approach to strategy which has not been included in this more endogenous cognitive approach. This could possibly be in line with developing a more institutional approach to considering the cognitive perspectives as being parts of the structure in the organization.

However, emphasizing the possibilities of including a clearer notion of the social constructivism in the cognitive perspective could be of interest to further the understanding of the processes included in changing and creating individual or shared cognitive schemas.

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