



AALBORG UNIVERSITY
DENMARK

Aalborg Universitet

Innovating through collaborative business models

Generalizing business model innovation

Gjerding, Allan Næs; Kringelum, Louise Tina Brøns

Publication date:
2015

Document Version
Early version, also known as pre-print

[Link to publication from Aalborg University](#)

Citation for published version (APA):
Gjerding, A. N., & Kringelum, L. T. B. (2015). Innovating through collaborative business models: Generalizing business model innovation. Paper presented at DRUID15 Conference Rome on the Relevance of Innovation, Rome, Italy.

General rights

Copyright and moral rights for the publications made accessible in the public portal are retained by the authors and/or other copyright owners and it is a condition of accessing publications that users recognise and abide by the legal requirements associated with these rights.

- ? Users may download and print one copy of any publication from the public portal for the purpose of private study or research.
- ? You may not further distribute the material or use it for any profit-making activity or commercial gain
- ? You may freely distribute the URL identifying the publication in the public portal ?

Take down policy

If you believe that this document breaches copyright please contact us at vbn@aub.aau.dk providing details, and we will remove access to the work immediately and investigate your claim.

Paper prepared for the DRUID conference on
The Relevance of Innovation, Rome, June 15-17, 2015

Innovating through collaborative business models Generalizing business model innovation

Allan N. Gjerding

Louise B. Kringelum

ang@business.aau.dk

kringelum@business.aau.dk

Department of Business & Management, Aalborg University

Abstract

The present paper presents a novel generalization of business model innovation as an activity taking place across a development and an extension zone, where business model innovation occurs as minor, medium and major changes within both zones. The model explains the process of creating new activity networks by exploring within the extension zone and exploiting within the development zone. While exploration and exploitation take place within both zones, the predominant logic is one of exploitation within the development zone and exploration within the extension zone, if the two zones are considered as a coherent system. The generalization is explicated in terms of different dominant market logics in which collaborative efforts can be positioned. Underlying this presentation, the paper argues that business model innovation involves uncertainty to the degree that innovation is based on cooperative efforts, and that there exists a dialectical relationship between sources of selection and sources of survival, which tend to reinforce one another. This constitutes a new aspect of business model innovation.

Keywords: Business model innovation, Triple Helix, dominant logic, selection

Word count: 8,885.

1. The relevance of business model innovation

The research on business models has gained momentum during the last couple of decades, especially since the millennium turn (Osterwalder, Pigneur & Tucci, 2005; Zott, Amit & Massa, 2011). Two main lines of research seems to have become manifest so far. The first and dominant one is based on the idea that business models are the actual configuration by which organizations create value through interconnected activities (e.g. Timmers, 1998; Chesbrough & Rosenbloom, 2002; Morris et al., 2005; Zott & Amit, 2010). Within this tradition, the analysis of business models is mainly focused on identifying systemic relations within a system of activities that can be analyzed at various levels of aggregation. Since the unit of analysis is conceptualized as a set of activities, the analysis of business models may lend itself to the identification of one or more business models within the same organization, depending on the level of aggregation. The second and less dominant one is based on the idea that business models are cognitive representations applied by management and researchers in order to appreciate which type of causal links mold the activity systems by which the organization creates value (e.g. Magretta, 2002; Baden-Fuller & Morgan, 2010; Baden-Fuller & Mangematin, 2013; Kringelum, 2015). In this line of research, which is a relatively recent break with the dominant line of empirical inquiry within the field (Fielt, 2011), the cognitive representations lend themselves not only to inductive empirical analysis, but also to deductive universalism in the form of archetypes. While sharing the option of analyzing at different levels of aggregation, the latter approach is more likely to create general theories, while the former approach is more likely to create case-based exemplars.

Like most business economics research, business model research comprises not only a descriptive dimension, but involves a normative dimension as well. In most cases, business model research attempts to clarify how combined streams of activities are creating value in order to explain how these combinations can become more effective and value-adding. Thus, the aspect of innovation is an intrinsic property of business model research. Often, the question of how to innovate business models is researched in terms of e-business and other technology-driven trends, where especially newly established firms and entrepreneurs are of interest (Zott, Amit & Massa, 2011; Morris, Schindehutte & Allen, 2005). However, business model research is experiencing an increasing interest in business model innovation within established firms (Linder & Cantrell, 2000; Sosna, Trevinyo-Rodríguez & Velamuri, 2010), where the main line of inquiry is focusing on how new opportunities are identified and subsequently utilized, including barriers to implementation which are mainly related to resource commitment and cognitive barriers to change (Padgett & Mulvey, 2007; Chesbrough, 2010; Sosna, Trevinyo-Rodríguez & Velamuri, 2010).

What emanates from these studies is that business model innovation so far is a quite general concept where we by business model innovation mean the change of existing logic by creating new dynamic capabilities, i.e. in the form of new business model procedures, reconfiguration of value appropriation, changing relationships, and the adding

of new actors (Amit & Zott, 2001; Chesbrough, 2010, Adner, 2012). This implies that the concept of business model innovation covers instances of change along a continuum of minor and major changes. The common property of these instances is that by changing or breaking away from the existing logic of business, business model innovation, irrespective of the degree of change, involves the dilemma of transition from exploration to implementation. In effect, research on business model innovation needs to address the dialectical relationship between exploration and exploitation (March, 1991), and between stability and change (Zaltmann, Duncan & Holbek, 1973; Gjerding, 1996). The tensions involved in these relationships are challenging since business models transcends the boundaries of the firm (Zott & Amit, 2010) and most frequently appears in the form of hybrid combinations of integrated and outsourced activities (Teece, 2010).

There may be both microeconomic and macroeconomic reasons why business model innovation is becoming increasingly interesting. At the micro level (Prahalad, 2004; Kim & Mauborgne, 2005; Osterwalder & Pigneur, 2010; Teece, 2010), business model innovation represents an attempt to develop or arrive at new positions at the market which can enhance the profitability of economic activities. It may also indicate that new products or services warrant new ways of bringing value proposition to the market. Furthermore, it may reflect the recognition of performance gaps which management is trying to bridge or close. At the macro level, business model innovation reflects the emergence of a new logic of economic activities (Schumpeter, 1939, 1942; Perez, 1983, 2010; Chesbrough, 2006; Cantwell, Dunning & Lundan, 2010). While the new logic is a reflection of interconnected changes at the micro level, it is also a result of changes in the dynamic properties of the macro system, e.g. caused by the advent of new technological opportunities, consumer preferences, new streams of management concepts and techniques, or increased internationalization and globalization of value chains and value networks. These changes at the micro and macro levels reflect the advent of major societal trends which create strains external and internal to the firm, requiring new ways of organizing and providing new opportunities for economic and social activities (Piore & Sabel, 1984; Toftler, 1981, 2013).

The observation that business models most frequently appear in the form of hybrid combinations of integrated and outsourced activities (Teece, 2010) reflects that the dominant form of economic organization within industrialized economies is activity networks which compromise on the market-hierarchy dichotomy. Compromises on the market-hierarchy dichotomy are necessary, because there are costs involved in using the market (Coase, 1937), information loss accrues as part of market transaction (Lundvall, 1988), and economic activities are socially embedded (Powell, 1990). When the focal firm depends on hybrid combinations, it also finds itself in an arena of uncertainty in the sense that the combined outcome of inter-actor activities does not lend itself to complete foresight and prediction. This does not mean that “perfect” uncertainty (as distinguishable from risk) in a Knightian sense prevails (Knight, 1921), but that the focal firm has to deal with “wicked problems” (Rittel & Webber, 1973; Conklin, 2006) in the sense that

the rationalities of the different actors involved are not easily reconciled, and the tasks which have to be undertaken present problems which continuously have to be negotiated and renegotiated. This is a case of global rationality emerging out of a dynamic web of local rationalities, and, in consequence, the business model is always becoming ineffective or even obsolete, and reconfiguration has to take place. Even in the absence of major changes to the business model, changes will occur as the outcome of adjustments and incremental changes creating variation on an accumulative scale.

Summing up, business model innovation is an inherent feature of complex economic systems, and it occurs as an emergent phenomenon even in cases where it is not instigated by managerial intent. While this indicates that we are dealing with a continuum spanning from emerging to planned events, it also indicates that the content magnitude of business model innovation will vary from case to case, i.e. spanning from major to minor changes. Based on an ongoing case study, the article will elaborate on these continua, presenting a configuration of business modelling which leads to a novel generalization of business model innovation. In order to do so, the article presents two major sources of inspiration and inquiry which have spurred our study of business model innovation. The sources of inspiration are, respectively, a macroeconomic observation and an action-researched case which will be described in the following sections 2-3. Based on this combination of deductive and inductive reasoning, section 4 presents a configuration of business modelling lending itself to a generalization of business model innovation, which draws most heavily on the case inspiration. Finally, section 5 concludes on new avenues of research and implications for practitioners.

2. A macroeconomic argument for business model innovation

The first source of inspiration is the recognition that the effectiveness of value adding activities is decreasing throughout the industrialized economies, when viewed from a macro perspective. The effectiveness of value adding activities, measured in terms of labour productivity growth, has been declining during the after war period, and the tendency to a declining trend in growth rates seems difficult to counteract, irrespective of which combination of policy schemes are attempted. For instance, among the G7 countries, the tendency to a declining trend in productivity growth predates the current crisis, possibly with the US as an exception where productivity growth seems to take place at a more stable trend (OECD, 2013). This might reflect that the industrialized countries are settling down at a long term “natural” trend of productivity growth, e.g. as suggested by Piketty (2014) and evidenced by Maddison (1982) in previous historic analysis.

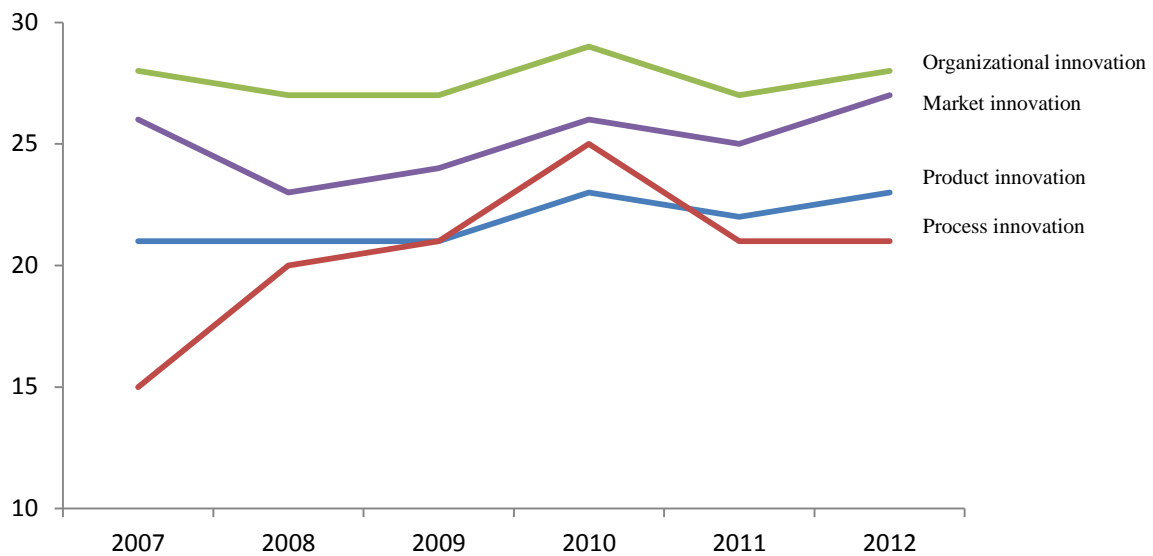
The Danish economy is a significant example of this long term development. During the after war period, the trend of productivity growth has been continuously declining, and the trend seems to jump to a new lower level each decade (Gjerding, 2012). This is essentially surprising, since the Danish economy is continuously performing comparative-

ly well in terms of international measures on competitiveness (Gertsen & Gjerding, 2014). Furthermore, the Danish economy is extensively involved in international economic exchange, evidenced by the fact that the shares of export and import in GDP have been steadily growing to the extent that the combined annual value of export and import has equalled GDP during recent years. From a purely theoretical point of view, extensive participation in the international division of labour would merit high and sustained rates of productivity growth (Wagner, 2011), which, however, is not the case in Denmark. There may be various explanations for this, e.g. that the internationally engaged Danish firms seem to generate more new jobs abroad than at the domestic scene as part of relocating economic activities, and that the composition of countries with which the Danish economy interacts has been relatively stable for several decades (Gjerding, 2012). However, these are phenomena which may also work in the opposite direction, i.e. stimulate productivity growth.

Since the improvement of value adding activities are driven by learning processes and incremental and radical improvements of economic activities, the extent to which innovation takes place among actors within the Danish economy may present itself as another avenue of explanation. However, nothing seems to indicate that innovation is becoming less important throughout the Danish economy. The share of R&D in GDP has increased by 50 % during the last couple of decades and accounts for 3 % of GDP today, and the number of man-years invested in R&D activities is steadily growing (Danmarks Statistik, 2012, 2013, 2014). The proportion of economic actors which engage in various types of innovation activities is, generally, stable, e.g. as shown in figure 1 which depicts the number of firms within the Danish private sector undertaking innovation (according to the Danish part of the CIS survey). So, in essence, if we are focusing on innovation as an explanation, we probably need to look at other types of innovative activities.

So far, the extent to which business model innovation, or rather the lack of business model innovation, can contribute to explain the “productivity mystery” has not been explored, and we may hypothesize that the continuous downsizing of productivity growth can partly be explained by ineffectiveness of existing business models to appropriate value. Surely, the way in which activities are organized, including the business model, determines total factor productivity and hence the growth of value added per working hour. Thus, business model innovation may enter the picture as part of the “measure of our ignorance” of the growth process, as Abramovitz (1956) termed the “Solow residual”, i.e. total factor productivity (Solow, 1957). In order to do so, the scientific community researching business models needs to become clearer on how to understand business model innovation.

Figure 1. Different types of innovation activities in the Danish private sector, % of firms which has undertaken the innovation in question



Source: Statistics Denmark (Danmarks Statistik, 2012, 2013, 2014)

3. A Triple Helix argument for business model innovation

The second source of inspiration is an ongoing case study on industrial development within a triple helix setting. The case study (see appendix), which is conducted as action research (French & Bell, 1990) involving multiple case studies (Yin, 2014), concerns the Aalborg Port Authority which is an economic actor consciously pursuing three roles: (1) The role as a *firm* which conducts inwards and outward bound logistics on a commercial basis. The purpose of this role is quite simply to earn profits for stakeholders and accumulating capital for future investments. (2) The role as *framework* condition for other firms operating within the spatial boundaries of the port. The purpose of this role is to contribute to profits, capital accumulation, and employment within the local and regional community. (3) The role as a *facilitator* for cooperation and clustering between firms, knowledge institutions, and authorities. The purpose of this role is to contribute to long term economic and social development not only at a local and regional level, but at the national level as well.

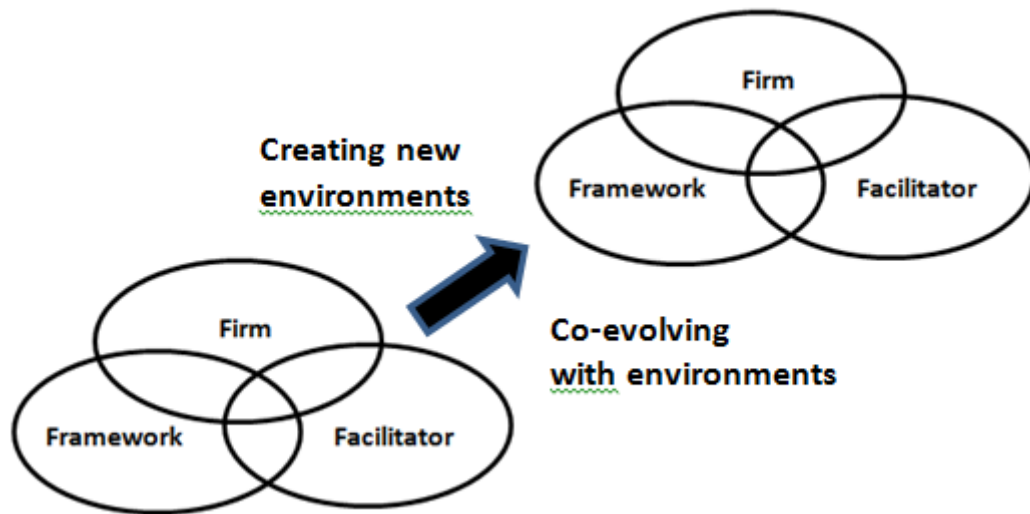
The first and second role is not new to the port. For centuries, the port has functioned as a profit-earning entity with obligations to invest in logistic infrastructure in order to serve the needs of the local community and the region of North Denmark. As part of these obligations, the second role has emerged where the port has extended the role of

land and property owner, which sell or rent locations and buildings to private firms, into more elaborate services like facility management and construction of specialized buildings for commercial activities. During recent years, the port has embarked on a number of projects in cooperation with knowledge institutions, notably the nearby Aalborg University, focusing on improving the logistic services of the port and the logistic operations of firms inhabiting the port facilities. In doing so, the port has entered the regionalization phase of contemporary industrialized ports, where the port transforms itself from a traditional port to a logistic hub based on inter-modality which creates spatial dispersion and logistic zones throughout the hinterland of the port (Nooteboom & Rodrigue, 2005; Petitt & Beresford, 2009). Simultaneously, and in some cases as part of the cooperative activities, the port has played an important role in establishing networks among private and public actors. While some of these networks are engaged in developing commercial activities, others have focused on long term industrial and social development of the regional society. In consequence, the third role as facilitator for industrial and social development has gradually emerged, primarily driven by a managerial ambition, and a political urge within local government, for creating industry-university partnerships, sometimes also involving local and regional government, i.e. creating industry-university-government partnerships.

Actively supported by local government, which is the main stakeholder of the Port of Aalborg, the evolution of port-related industrial roles reflects a deliberate managerial intent within the port of embarking on continuous improvement and change, for three reasons (Aalborg Havn, 2014; Krabbe & Holstein, 2015). *First*, whether or not the port succeeds in its role as a firm depends on the level and development of activities within the port facility. Improving the effectiveness of processes and procedures within the port as a firm is not enough to secure long term prosperity, unless the port is able to accommodate new requirements among its customers. In consequence, the port is continuously focusing on the need to co-evolve with the environments in which it operates (cf. figure 2).

Second, the success as a firm depends on the ability of the port to provide framework conditions. Regarding this requirement, the managerial intent of the port is to proactively seeking new opportunities which can enhance the role of the port as a framework for the activities of other actors. In effect, by seeking new opportunities which develops framework conditions, the port is not only creating new lines of revenue for its role as a firm, but also creating selection pressures on the activities of the “port firm”. Consequently, the relationships between the roles as a firm and as a framework become mutually reinforcing, involving not only the intricate balance between exploration and exploitation, but external selection pressures as well.

Figure 2. *The evolutionary approach of the Port of Aalborg to its industrial roles*



Third, the port is continuously focusing on attracting new actors and new economic activities in order to simultaneously develop economy of scale and scope. A vital focus for this line of managerial intent is to facilitate cooperation between actors which can attract new actors, new activities, and create *new* activities and actors. Thus, the port is actively seeking to create networks and interconnectedness among actors and activities, involving industry, government, and knowledge institutions. While this is in line with the contemporary tendency for ports to become organized as clusters based on various networks (Song & Panayides, 2008; McLaughlin & Fearon, 2013), the tendency is further strengthened in the present case due to a managerial intent to actively create clusters of national importance (Aalborg Havn, 2014). This ambition, which has entered as part of the key performance indicators employed in the port governance structure, reinforces the co-creation of selection pressures.

In the activities undertaken in order to stimulate the interplay between the three industrial roles of the port, there is a clear managerial ambition of contributing to the development of triple helix activities, including third mission activities of the local university (Krabbe & Holstein, 2015). Third mission activities refer to an extension of the task portfolio of universities where universities become responsible for economic and social development in addition to the two classic missions of education and research (Leydesdorff & Etzkowitz, 1996; Etzkowitz & Leydesdorff, 2000). This constitutes a “second academic revolution”, the first revolution being the inclusion of research “in addition to the traditional task of teaching” (Etzkowitz, 2003, p. 110). This development has been stimulated by government policy giving more priority to commercially oriented research, thus providing both a political and a financial impetus to activities bridging basic research and commercial endeavors. In effect, the academic world has witnessed

the advent of *academic capitalism* (Slaughter & Leslie, 1997) in terms of a growth of university activities and support structures aimed at generating new streams of revenues and changing the allocation of resources between basic and applied research. Concomitantly, large parts of the academic community have transcended from the Humboldt-inspired autonomous society characterized by governance structures based on the endorsement of democratic decision making among peers. Instead, increasingly universities find themselves in an institutional setting where external stake holders in terms of national and regional policy making, labour market and industrial interests exert influence, which is facilitated by intra-university centralized decision making informed by the notion of universities as service providers and knowledge generators (Olsen, 2005; Maassen & Olsen, 2007).

This new institutional position, which has been known as “the entrepreneurial university” (Slaughter & Leslie, 1997; Clark, 1998, 2004; Etzkowitz, 2003, 2004), has led to some controversy within research on higher education management. While the originators of the concept, Slaughter & Leslie (1997), are concerned for the autonomy of universities and call for an increase in public funding in order to reestablish university autonomy, Clark (1998, 2004), who in detail elaborates the concept of the entrepreneurial university, advocates a pathway based on bottom-up activities which channel the way in which external factors influence the directions of research and thus autonomy of the scientific community. In opposition to Slaughter & Leslie (1997), Clark (2004) argues that universities must embrace the increasing influence by external stake holders and use it as a pathway for university autonomy which can become a source of social and economic development. Elaborating on this position, it has been argued (Gjerding et al., 2006) that the new institutional position can become a source of university autonomy since activities at entrepreneurial universities often evolve in a bottom up fashion and thus involve an element of intrapreneurship which is important for the ability of large organizations to be entrepreneurial (Hitt, Ireland, Camp & Sexton, 2002). Furthermore, as universities handle complex environments by creating organizational differentiation, hybridization occurs in terms of context-specific organizational set-ups which exist in parallel (Etzkowitz, 2004; Clark, 2004). Consequently, hybridization is likely to imply that academia has some strongholds in maintaining autonomy because the capacity to differentiate endows universities with the capacity to act and change in complex circumstances (Etzkowitz, 2004; Gjerding et al., 2006).

While the phrasing of “triple helix” implies that innovation is stimulated by activity-based university-industry-government collaboration, the triple helix must not be confused with an innovation system in the sense of national or regional innovation systems (Lundvall, 1992; Nelson, 1993; Edquist, 2005). Rather, it must be understood as providing “a model of the structure and dynamics underlying the innovation system functioning at various levels” (Leydesdorff & Zawdie, 2010, p. 789), adding “to the meta-biological models of evolutionary economics, the sociological notion of meaning being exchanged among the institutional agents” (Leydesdorff & Zawdie, 2010, p. 798). This

implies that the parts of the triple helix are seen as “co-evolving sub-sets of social systems, which are distributed and unstable” (Etzkowitz & Ranga, 2010, p. 5), where meaning is created by negotiations and translations at the interfaces between the constituent parts. Inspired by Mohrman, Gibson & Mohrman (2001), it may be argued that this requires the ability of the actors to mutually taking perspective, e.g. by forming joint interpretative forums. In order for a triple helix to become effective in its pursuit of the third mission, Etzkowitz & Ranga (2010) stress the importance of establishing leadership in a way which respects the processes and motives of the collaborating institutional actors, implying “a mix of top-down and bottom up processes to create leadership through collaboration rather than diktat” (Etzkowitz & Ranga, 2010, p. 17). In their view, this requires the establishment of some neutral ground where the collaborating actors “can come together to generate and gain support for new ideas promoting economic and social development” (Etzkowitz & Ranga, 2010, p. 18). In effect, they suggest the formation of an institutional role as Innovation Organizer “who enunciates a vision for knowledge-based development and who has sufficient respect to exercise convening power to bring the leadership of the institutional spheres together to aggregate and commit resources to implement a project emanating from what becomes a shared vision if and when the process takes on momentum” (Etzkowitz & Ranga, 2010, p. 19).

The Port of Aalborg has to an important extent taken on the institutional role as Innovation Organizer in various ways, e.g. by initiating designed networks among actors within the port facility and across the hinterland of the port, financing or co-financing research including ph.d. students, and partly financing the establishment of a research center which collaborates with private and public firms and bodies in various logistic projects. Most recently, the port has exclusively financed the establishment of a Center for Logistics and Collaboration which in cooperation with local government and the local university is focused on development of the roles as framework and facilitator. Furthermore, the center is gradually acting as an independent consultancy which provides services not only to the port’s industrial role as a firm, but to other firms and actors within the port facility and across the hinterland as well. The aim is to create a neutral arena for commercial, network and cluster activities which can stimulate local and regional joint efforts of developing triple helix activities.

The main challenge of the Port of Aalborg is to secure a balance between ordinary commercial activities related to the roles as firm and framework, and development activities related to the role as facilitator and to the interplay between the three roles (Krabbe & Holstein, 2015). Currently, this balance is under pressure because the port management has embarked on a heavy load of projects and initiatives aimed at making the three roles both broader and more effective. This means that new sources of variation are created within the array of existing business models that the port employs. As new opportunities are increasingly being explored, the necessity to balance exploration and exploitation is growing, and the ensuing organizational strain is, furthermore, enhanced because the projects and initiatives contribute to creating an increasingly dy-

namic and complex environment. As the environment comes to encompass more and distant actors, the port will increasingly encounter wicked problems in the sense described earlier.

How to deal with these problems will be described in general theoretical terms, as we now move to our discussion of generalizing business model innovation.

4. Generalizing business model innovation

The selection pressures, which the Port of Aalborg is contributing to create, the strains on the balance between exploration and exploitation, and the increasing occurrence of wicked problems stress the importance of becoming an ambidextrous organization (O'Reilly & Tushman, 2004; Raisch et al., 2009), or in this case an ambidextrous port (Hollen, Van Den Bosch & Volberda, 2013) which can maintain a dual focus on the traditional landlord role, and entrepreneurial and clustering activities. In order to do so, the port management needs to consciously reflect on the challenges and pressures faced by existing business models, and especially the extent to which new initiatives require more radical business model innovations.

Figure 3. *Zones of business model innovation*

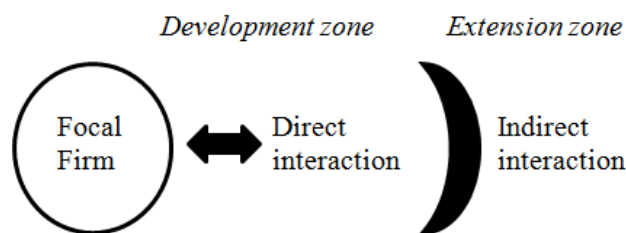


Figure 3 suggests a framework for contemplating on business model innovation in the current situation of the Port of Aalborg. The focal firm of the model, which represents the role as a firm, has direct interaction with a number of firms and actors within the port facility, i.e. representing the role as framework. These two roles are within the “development zone” where the port develops economies of scale and scope based on the classic port roles. The role as facilitator is represented by indirect interaction, meaning that although interaction obviously occurs, it is distantly related to the core business of port activities. Hence, we are dealing with an “extension zone” which comprises a set of

new opportunities that can be created or explored. When activities related to the role as facilitator result in economies of scale and scope within the port facility, the relationships among actors become part of the framework relationships, thus moving from the extension zone to the development zone. In effect, the development zone becomes gradually larger as the port succeeds in the extension zone.

The development zone can be regarded as an arena where firms and actors are familiar, and opportunities and problems are within range of being detected. The extension zone can be regarded as an arena where relationships, opportunities, and problems occur in less familiar contexts which in many cases have to be explored or even created. In this case, business model innovation is more uncertain and radical than in the case of the development zone. Of course, major changes of business models can occur in the development zone as well, but they will be exposed to less uncertainty than business models within the extension zone. Similarly, even though the dilemma of exploration and exploitation occurs in both zones, the two situations are qualitatively different since uncertainty is higher in the extension zone. Finally, since we assume that activities move from the extension zone to the development zone, we may argue that at a general system level the extension zone represents exploration, while the development zone represents exploitation. In effect, the exploration-exploitation dilemma in the extension zone is biased towards exploration while the exploration-exploitation dilemma in the development zone is biased towards exploitation.

The implications for business model innovation of these different kinds of logics in the two zones are depicted in figure 4.

Figure 4. *Business model innovation logics within two zones*

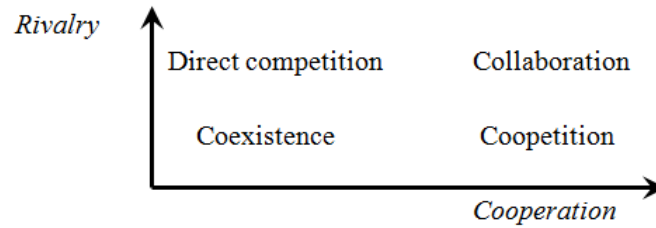
<i>Change</i>	<i>Development zone</i>	<i>Extension zone</i>
Minor	Fine-tuning existing activities	Exploiting opportunities, i.e. preparing them for being moved into the development zone
Medium	Changing activities inspired by the advent or creation of new opportunities	Exploring and exploiting opportunities which are discovered or created
Major	Exploiting opportunities moving in from the extension zone	Exploring opportunities which are discovered or created

The major implication of this line of thinking is that business model innovation involves bridging the existing business model and the value network to which the business model belongs. As emphasized by Amit & Zott (2008), business models are distinct from value nets (Brandenburg & Nalebuff, 1996) in the sense that the “players in the value net, such as competitors and certain complementors, may or may not be part of the business model because some of them may not transact with the focal firm” (Amit & Zott, 2008, note 3, pp. 3-4). However, what the generalization in question implies is that business model innovation causes the position of the business model within the value net to change by, respectively, reconfiguring the set of existing relationships within the value net, changing the set of relationships by moving relationships from the extension to the development zone, or creating new relationships which changes the value net configuration to which the business model belongs.

Innovation of the business model has, of course, to take into account the kind of competitive pressures which the innovating actor faces. Essentially, the relationship between competitive pressures and innovation of the business model is of a dialectical nature. On the one hand, competitive pressures reflect the dominant logic of the market which defines a decision space within which the innovating actor acts. On the other hand, innovation of the business model implies that the actor introduces variation into the dominant logic by creating new competitive advantages. In some cases the degree of variation may even become so large that the market is induced with a completely new kind of logic, as for instance is known from cases where blue ocean conditions occur (Kim & Mauborgne, 2005) or where changes are of a disruptive nature (Christensen, 2000; Adner, 2012). How the effects of the dialectical relationship between competitive pressures and business model innovation come about depends, in the end, on the kind of competitive relationship which the business model innovator has with its rivals. In general, it may be hypothesized that if the dominant logic of the market is one of direct competition among actors, business model innovation will increase the competitive pressures across the set of actors. If, however, the dominant logic is of a more collaborative nature, business model innovation may contribute to the mitigation of competitive pressures.

Inspired by McLaughlin & Fearon (2013) who draw on Easton & Araujo (1992) and Bengtsson & Kock (1999, 2000), the dominant logic of the market may be characterised in terms of competition, coexistence, cooperation and cooptation, cf. figure 5. While direct competition comprises a situation where the relationship between actors is one of strong rivalry, the case of coexistence signifies a situation of weak rivalry where actors occupy more or less secluded parts of the market, e.g. as in the case of niche markets. In the case of collaboration, rivalry may be high, but are in some instances offset by collaboration on specific projects and complementary activities. Finally, in the case of cooptation, rivalry is mitigated by actors who pursue economies of scale and scope by creating activity networks organized within hierarchical relationships, e.g. in the form of new organizational entities or by mergers and acquisitions.

Figure 5. *Types of dominant market logics*



While business model innovation may occur within all four kinds of dominant logic, the main focus of the Port of Aalborg, which as previously explained has assumed the role as Innovation Organizer (Etzkowitz & Ranga, 2010), must be on the logics of collaboration and coopetition, since the role of the Innovation Organizer is to facilitate joint activities among the actors who participate in triple helix development based on a shared vision of missions and goals to be achieved. In effect, extending or recreating the value network to which the business model belongs by exploring opportunities in the extension zone and make them ready for exploitation within the development zone means organizing new relationships among actors who can benefit from the economies of scale and scope that stem from the new opportunities. In order to bring the explored opportunities to at state of exploitation, the new relationships have to part of changing the business model, thus implying that the business model involves new avenues for cooperation. Consequently, business model innovation in this case implies the introduction of cooperative efforts. Whether the business model innovation becomes characterized by collaborative or coopetive activities will depend on the kind of new activities which form the basis of business model innovation. Business model innovation, which falls within the range of non-cooperative or coexisting logics, will occur only in the cases of minor or medium change of business models within the development zone (cf. figure 4).

The managerial intent of serving as an Innovation Organizer, which is the guiding principle for the reference case which we have used for generalizing business model innovation, implies that business model innovation will be subject to high degrees of uncertainty. This is especially the case, because cooperative efforts lend itself to the occurrence of wicked problems, as touched upon earlier. Wicked problems implies that several kinds of organizational rationalities and dominant logics enter the organization of new activities, where continuous disagreement on how to define and understand the problems at hand persist, and where decision making leads to new situations, where problem understanding and solving need to be agreed upon (Rittel & Webber, 1973; Conklin, 2006). In effect, wicked problems never stop (Rittel & Webber, 1973), but give rise to new opportunities which need to be explored and prepared for exploitation. Thus, the selection pressures, which the combination of the three roles as firm, frame-

work and facilitator creates, tend to be reinforced, as the three roles are combined through cooperative efforts.

5. Conclusion

The present paper has argued that business model innovation involves uncertainty to the degree that innovation is based on cooperative efforts. While cooperative efforts are often regarded as a way to mitigate uncertainty by organizing the market, it also create a meeting point for different organizational rationalities and dominant logics which have to be reconciled in order to achieve business model innovation. In effect, the attempt to deal with selective competitive pressures tends to induce variations into the system to which the business model belongs, thus reinforcing the process of selection which causes business models to change. However, while this is a source of uncertainty it is also a source of potential competitive advantage. The main theoretical implication is that there exists a dialectical relationship between sources of selection and sources of survival, which tend to reinforce one another.

This is a novel perspective as far as business model innovation is concerned. While research on business model innovation has predominantly focused on newly established firms and e-business opportunities and other technology-driven trends (Zott, Amit & Massa, 2011; Morris, Schindehutte & Allen, 2005), there is a growing interest in business model innovation within established firms (Linder & Cantrell, 2000; Sosna, Treviño-Rodríguez & Velamuri, 2010). However, this line of research has not focused on the dialectical relationship between sources of selection and sources of survival.

The argument has been put forward by focusing on the relevance of business model innovation, and presenting a macroeconomic and a Triple Helix based argument which led to focusing on cooperative efforts in innovating business models, phrased in terms of collaborative business models. The analysis of cooperative efforts was based on an in-depth case study involving action research and multiple case studies on the basis of which a generalization of business model innovation was put forward. The generalization presented a novel model of business model innovation as an activity taking place across a development and an extension zone, where business model innovation occurs as minor, medium and major changes within both zones. Furthermore, the model explains the process of creating new activity networks by exploring within the extension zone and exploiting within the development zone. While exploration and exploitation take place within both zones, the predominant logic is one of exploitation within the development zone and exploration within the extension zone, if the two zones are considered as a coherent system. Finally, the generalization was explicated in terms of different dominant market logics in which collaborative efforts can be positioned.

The argument of the present paper indicates new lines of research which can be pursued in further elaboration on collaborative business models and business model innovation. First, considering business model innovation in terms of interorganizational cooperative efforts implies that the reconciliation of different types of rationalities becomes important. This line of inquiry may be further pursued by considering processes of sense-making (Weick, 1995) and the importance of cognitive schemes in establishing industrial logic (Kaplan & Tripsas, 2008; Benner & Tripsas, 2012). Second, considering the relationship between collaborative business models and modes of market logic may be elaborated in terms of the dilemmas which occur at the interfaces between competition and cooperation, especially regarding the instances when cooperation may enter a transition phase towards either competition or hierarchical organization (Raza-Ullah, Bengtsson & Kock, 2014). Third, the generalization of business model innovation presented above may be further elaborated in terms of new organizational forms, the occurrence of ecosystems and activity systems, and the role of value chains, as also Zott & Amit (2013) have indicated as necessary for creating a theoretically robust construct for strategic analysis within business model research. Fourth, the case, which is a major inspiration of this paper, represents an instance of Triple Helix innovation which indicates that new insights into the working of industry-university-government may be derived by studying business model innovation. Finally the analysis of the case of the Port of Aalborg suggests that business model research may benefit from a more thorough application of evolutionary theorizing, especially when combined with the idea of wicked problems.

Regarding lessons for industrial practice, the present paper carries one important message in particular. Business model innovation is not solely a solution to existing competitive challenges, because it carries the seeds of variation which can be induced into the market system. In effect, business model innovation, while being a necessity in complex and changing environments, involves the challenging proposition of business model innovation to become even more warranted. In order to cope with this dialectical situation, organizations need to develop ambidextrous qualities.

References

- Aalborg Havn (2014), *Strategirapport 2014*, Aalborg: Aalborg Havn A/S.
- Abramovitz, M. (1956), "Resource and Output Trends in the United States since 1870," *American Economic Review*, Vol. 46, No. pp. 5-23.
- Adner, R. (2012), *The Wide Lens*, St. Ives: Penguin.
- Amit, C. & Zott, R. (2008), "The fit between product market strategy and business model: Implications for firm performance", *Strategic Management Journal*, Vol. 29, No. 1, pp. 1-26.
- Baden-Fuller, C. & Mangematin, V. (2013), "Business models: A challenging agenda", *Strategic Organization*, Vol.11, No.4, pp. 418-427.
- Baden-Fuller, C. & Morgan, M.S. (2010), "Business Models as Models", *Long Range Planning*, Vol. 43, No. 2-3, pp. 156-171.
- Bengtsson, M. & Kock, S. (1999), "Cooperation and Competition in Relationships between Competitors in Business Networks", *Journal of Business and Industrial Marketing*, Vol. 14, No. 3, pp. 178-194.
- Bengtsson, M. & Kock, S. (2000), "Coopetition in Business Networks – to Cooperate and Compete Simultaneously", *Industrial Marketing Management*, Vol. 29, No. 5, pp. 411-426.
- Benner, M.J. & Tripsas, M. (2012), "The influence of prior industry affiliation on framing in nascent industries: The evolution of digital cameras", *Strategic Management Journal*, Vol. 33, pp. 277-302.
- Brandenburger, A.M. & Nalebuff, B.J. (1996), *Co-opetition*, Doubleday: New York.
- Cantwell, J., Dunning, J.H. & Lundan, S.M. (2010), "An evolutionary approach to understanding international business activity: The co-evolution of MNEs and the institutional environment", *Journal of International Business Studies*, Vol. 41, No. 4, pp. 567-586.
- Chesbrough, H. (2006), *Open Business Models*, Boston, Mass.: Harvard Business School Press.
- Chesbrough, H. (2010), "Business Model Innovation: Opportunities and Barriers", *Long Range Planning*, Vol. 43, No. 2-3, pp. 354-363.
- Chesbrough, H.W. & Rosenbloom, R.S. (2002), "The role of business models in capturing value from innovation: evidence from Xerox Corporation's technology spinoff companies", *Industrial and Corporate Change*, Vol.11, No.3, pp. 529-555.
- Christensen, C.M. (2000), *The Innovator's Dilemma*, New York: Harper Business.
- Clark, B.R. (1998), *Creating Entrepreneurial Universities. Organisational Pathways of Transformation*, Oxford: Pergamon and Elsevier Science.

- Clark, B.R. (2004), *Sustaining Changes in Universities: Continuities in Case Studies and Concepts*, Maidenhead: Society for Research into Higher Education and Open University Press.
- Coase, R.H. (1937), "The Nature of the Firm", *Economica*, Vol. 4, No. 16, pp. 386-405.
- Conklin, J. (2006), *Dialogue Mapping: Building Shared Understanding of Wicked Problems*, Chichester: Wiley Publishing.
- COWI (2014), *Regionaløkonomiske effekter*, Aalborg: COWI.
- Danmarks Statistik (2012), *Innovation og Forskning 2012*, København: Danmarks Statistik.
- Danmarks Statistik (2013), *Innovation og Forskning 2013*, København: Danmarks Statistik.
- Danmarks Statistik (2014), *Innovation og Forskning 2014*, København: Danmarks Statistik.
- Easton, G. & Araujo, L. (1992), "Non-Economic Exchange in Industrial Networks", in Axelsson, B. & Easton, G. (eds.), *Industrial Networks: A New View of Reality*, London: Routledge.
- Edquist, C. (2005), "Systems of Innovations. Perspectives and Challenges", in Fagerberg, J., Mowery, D.C. & Nelson, R.R. (eds.), *The Oxford Handbook of Innovation*, Oxford: Oxford University Press.
- Etzkowitz, H. (2003), "Research Groups as 'Quasi-Firms': The Invention of the Entrepreneurial University", *Research Policy*, Vol. 32, No. 1, pp. 109-121.
- Etzkowitz, H. (2004), "The Evolution of the Entrepreneurial University", *International Journal of Technology and Globalization*, Vol.1, No. 1, pp. 64-77.
- Etzkowitz, H. & Leydesdorff, L. (2000), "The Dynamics of Innovation: From National Systems and 'Mode 2' to a Triple Helix of University-Industry-Government Relations", *Research Policy*, Vol. 29, No. 2, pp. 109-123.
- Etzkowitz, H. & Ranga, M. (2010), *A Triple Helix System for Knowledge-based Regional Development: From 'Spheres' to 'Spaces'*, Triple Helix International Conference, Triple Helix Association, Madrid, 20-22 October.
- Fielt, E. (2011), *Understanding business models*, Eveleigh: Smart Services CRC.
- French, W.L. & Bell, C.H. (1999), *Organization Development*, 6th ed., Upper Saddle River, N.J.: Prentice-Hall.
- Gertsen, F. & Gjerding, A.N. (2014), "Fremgang forudsætter fornyelse", in Jørgensen, B.R., von Scheel, H. & von Rosing, M. (eds.), *Danmarks fremtid*, Hinnerup: Forsknings Forlag.

- Gjerding, A.N. (1996), *Technical Innovation and Organisational Change. The Innovation Design Dilemma Revisited*, Aalborg: Aalborg University Press.
- Gjerding, A.N. (2012), "Globalt mindset som inspiration for indenlandsk opererende virksomheder", *Ledelse & Erhvervsøkonomi*, Vol. 77, No. 3, pp. 7-20.
- Gjerding, A.N., Wilderom, C.P.M., Cameron, S.P.B., Taylor, A. & Scheunert, K.-J. (2006), "Twenty Practices of an Entrepreneurial University", *Higher Education Management and Policy*, Vol. 18, No. 3, pp. 83-106.
- Hitt, M., Ireland, R.D., Camp, M. & Sexton, D., eds. (2002), *Strategic Entrepreneurship: Creating a New Mindset*, Oxford: Blackwell.
- Kaplan, S. & Tripsas, M. (2008), "Thinking about technology: Applying a cognitive lens to technical change", *Research Policy*, Vol.37, pp.709-805.
- Kim, W.C. & Mauborgne, R. (2005), *Blue Ocean Strategy: How to Create Uncontested Market Space and Make the Competition Irrelevant*, Boston: Harvard Business School Publishing.
- Knight, F.H. (1921), *Risk, Uncertainty, and Profit*, Boston: Houghton Mifflin Co.
- Krabbe, P. & Holstein, C. (2015), *Den intelligente havn – the intelligent port. En foranderlig havn – en havn i bevægelse*, Aalborg: Aalborg Havn A/S.
- Kringelum, L.B. (2015), *A cognitive perspective on the antecedents of business model innovation: The case of the Port of Aalborg Authority*, DRUID Academy Conference 2015.
- Leydesdorff, L. & Etzkowitz, H. (1996), "Emergence of a Triple Helix of University-Industry-Government Relations", *Science and Public Policy*, Vol. 23, No. 5, pp. 279-286.
- Leydesdorff, L. & Zawdie, G. (2010), "The triple helix perspective of innovation systems", *Technology Analysis & Strategic Management*, Vol. 22, No. 7, pp. 789-804.
- Linder, J.C. & Cantrell, S. (2000), *Changing business models*, Chicago: Institute for Strategic Change, Accenture.
- Lundvall, B.-Å. (1988), "Innovation as an interactive process: from user-producer interaction to the national system of innovation", in Dosi, G. et al. (eds.), *Technical Change and Economic Theory*, London: Pinter Publishers.
- Lundvall, B.-Å., ed. (1992), *National systems of innovation: toward a theory of innovation and interactive learning*, London: Pinter.
- MacLaughlin, H. & Fearon, C. (2013), "Understanding the development of port and regional relationship: a new cooperation/competition matrix", *Maritime Policy & Management*, Vol. 40, No. 3, pp. 278-294.

- Maddison, A. (1982), *Phases of Capitalist Development*, Oxford: Oxford University Press.
- Magretta, J. (2002), “Why Business Models Matter”, *Harvard Business Review*, Vol.80, No.5, pp. 86-92.
- March, J.G. (1991), “Exploration and Exploitation in Organizational Learning”, *Organization Science*, Vol. 2, No. 1, pp. 71-87.
- Maassen, P. & Olsen, J.P., eds. (2007), *University Dynamics and European Integration*, Dordrecht: Springer.
- Mohrman, S.A., Gibson, C.B. & Mohrman Jr., A.M. (2001), “Doing research that is useful to practice: A model and empirical exploration”, *Academy of Management Journal*, Vol. 44, No. 2, pp. 357-375.
- Morris, M., Schindehutte, M. & Allen, J. (2005), “The entrepreneur’s business model: toward a unified perspective”, *Journal of Business Research*, Vol. 58, No.6, pp. 726-735.
- Nelson, R.R., ed. (1993), *National Innovation Systems. A Comparative Analysis*, New York: Oxford University Press.
- Nooteboom, T.E. & Rodrigue, J.-P. (2005), “Port regionalization: towards a new phase of port development”, *Maritime Policy & Management*, Vol. 32, No. 3, pp. 297-313.
- OECD (2013), *OECD Compendium of Productivity Indicators 2013*, Paris: OECD Publishing.
- Olsen, J.P. (2005), *The institutional dynamics of the (European) University*, Working Paper No. 15, Oslo: Centre for European Studies, The University of Oslo.
- O’Reilly III, C.A. & Tushman, M.L. (2004), “The Ambidextrous Organization”, *Harvard Business Review*, Vol. 82, No. 4, pp. 74-81.
- Osterwalder, A. & Pigneur, Y. (2010), *Business Model Generation: A Handbook for Visionaries, Game Changers, and Challengers*, Chichester: John Wiley.
- Osterwalder, A., Pigneur, Y. & Tucci, C.L. (2005), “Clarifying Business Models: Origins, Present, and Future of the Concept”, *Communications of the Association for Information Systems*, Vol. 16, pp. 1-25.
- Padgett, D. & Mulvey, M.S. (2007), “Differentiation Via Technology: Strategic Positioning of Services Following the Introduction of Disruptive Technology”, *Journal of Retailing*, Vol. 83, No. 4, pp. 375–391.
- Perez, C. (1983), “Structural change and the assimilation of new technologies in the economic and social system”, *Futures*, Vol. 15, No. 5, pp. 357-375.
- Perez, C. (2010), “Technological revolutions and techno-economic paradigms”, *Cambridge Journal of Economics*, Vol. 34, No. 1, pp. 185-202.

- Petitt, S.J. & Beresford, A.K.C. (2009), "Port development: from gateways to logistic hubs", *Maritime Policy & Management*, Vol. 35, No. 3, pp. 253-267.
- Piketty, T. (2014), *Capital in the Twenty-First Century*, Cambridge: The Belknap Press of Harvard University Press.
- Piore, M.J. & Sabel, C.F. (1984), *The Second Industrial Divide*, New York: Basic Books.
- Powell, W.W (1990), "Neither Market nor Hierarchy: Network Forms of Organization." *Research in Organizational Behavior*, Vol. 12, pp. 295–336.
- Prahalad, C.K. (2004), "The Blinders of Dominant Logic", *Long Range Planning*, Vol. 37, No. 2, pp. 171-179.
- Raisch, S., Birkinshaw, J., Probst, G., Tushman, M.L. (2009), "Organizational Ambidexterity: Balancing Exploitation and Exploration for Sustained Performance", *Organization Science*, Vol. 20, No. 4, pp. 685–695.
- Raza-Ullah, T., Bengtsson, M. & Kock, S. (2014), "The coopetition paradox and tension in coopetition at multiple levels", *Industrial Marketing Management*, Vol. 43, pp. 189-198.
- Rittel, H.W. & Webber, M.M. (1973), "Dilemmas in a General Theory of Planning", *Policy Sciences*, Vol. 4, No. 2, pp. 155-169.
- Schumpeter, J.A. (1939), *Business Cycles: A Theoretical, Historical and Statistical Analysis of the Capitalist Process*, New York: McGraw-Hill.
- Schumpeter, J.A. (1942), *Capitalism, Socialism and Democracy*, New York: Harper & Row.
- Slaughter, S. & Leslie, L.L. (1997), *Academic Capitalism: Politics, Policies, and the Entrepreneurial University*, Baltimore: The John Hopkins University Press.
- Solow, R.M. (1957), "Technical Change and the Aggregate Production Function," *Review of Economics and Statistics*, Vol. 39 (august), pp. 312-320.
- Song, D.-W. & Panayides, P.M. (2008), "Global Supply Chain and Port/Terminal: Integration and Competitiveness", *Maritime Policy & Management*, Vol. 35, No. 1, pp. 73-87.
- Sosna, M., Trevinyo-Rodríguez, R.N. & Valamuri, S.R. (2010), "Business Model Innovation through Trial-and-Error Learning. The Naturhouse case", *Long Range Planning*, Vol. 43, No. 2-3, pp. 383-407.
- Teece, D.F. (2010), "Business Models, Business Strategy and Innovation", *Long Range Planning*, Vol. 43, No.2-3, pp. 172-194.
- Timmers, P. (1998), "Business models for electronic markets", *Electronic Markets*, Vol.2, No.2, pp. 3-8.

- Toffler, A. (1981), *The Third Wave*, London : Pan Books in association with Collins.
- Toffler, A. (2013), “Revolutionary Wealth”, *New Perspectives Quarterly*, Vol. 30, No. 4, pp. 122-130.
- Wagner, J. (2011), “Productivity and international firm activities: What do we know?”, *Nordic Economic Policy Review*, No. 2 / 2011, pp.137-161.
- Weick, K.E. (1995), *Sensemaking in Organizations*, Thousand Oaks: Sage.
- Yin, R.K. (2014), *Case Study Research: Design and Methods*, Los Angeles: Sage.
- Zaltman, G., Duncan, R. & Holbek, J. (1973), *Innovations and Organizations*, New York: John Wiley & Sons.
- Zott, C. & Amit, R. (2010), “Business Model Design: An Activity System Perspective”, *Long Range Planning*, Vol. 43, No.2-3, pp. 216-226.
- Zott, C. & Amit, R. (2013), “The business model: A theoretically anchored robust construct for strategic analysis”, *Strategic Organization*, Vol. 11, No. 4, pp. 403-411.
- Zott, C., Amit, R. & Massa, L. (2011), “The Business Model: Recent Developments and Future Research”, *Journal of Management*, Vol. 37, No. 4, pp. 1019-1042.

Appendix: Fact box on the Port of Aalborg

Port of Aalborg is an inland port located in Northern Jutland, and is currently the fifth largest port in Denmark. Until 2000, the Port of Aalborg operated as a self-governed municipality port and was managed by the city council of Aalborg municipality. However, with the presentation of the new Danish Port Law, which became effective by January 1st 2000, the Port of Aalborg was reorganized as a municipality-owned private limited company with multiple independent subsidiaries. The concern currently employs 70 employees (Aalborg Havn, 2014), a number which has been growing steadily since the reorganization.

Port of Aalborg is defined as a service company in the port- and transportation sector. As a result, the value creation of the concern can be divided into two fields which are strongly interlinked. First, the port handles activities concerning the transportation, handling, and storage of cargo. Second, the port handles area development, building rental, and general infrastructure around the port perimeter.

Being an inland port, it has been possible to build the infrastructure around the port perimeter with the aim of facilitating industrial development in the local and regional area. In 2012 the Port owned 4,200,000 m² of business areas including: 140,000 m² buildings, 42,000 m² warehouse capacity, and 85,000 m³ cold storage capacity (Aalborg Havn, 2014). Almost half of these business areas are yet to be developed, thus ensuring a significant area for growth.

Despite the growing area development, Port of Aalborg, along with most of the Danish ports, has experienced a decrease in cargo levels since 2008. However, Port of Aalborg has been able to increase the net revenue and in most years also the net income, cf. figure A1, through a shift in the allocation of revenue where ship- and cargo fees are decreasing in importance, while rental of areas and buildings along with other service business activities are becoming increasingly important. However, the decrease in cargo levels has not affected the level of container cargo which is steadily increasing in the Port of Aalborg. This is to an important extent related to the role of the Port of Aalborg as the sole European base port of Greenland.

Simultaneously with managing the activities of being a multi-modal transport center, the Port of Aalborg has established a range of different networks, including: Artic Business Network, consisting of 70 companies with a special interest in the Artic and North Atlantic Region; HubNorth, for companies belonging to and affiliated with the wind turbine industry; and Erhvervsnetværk 9220, focusing on developing synergies between companies and institutions in the local area.

As the network activities indicate, interacting with and creating optimum conditions for the 96 companies located in and around the port perimeter is pivotal for the development of the Port of Aalborg. However, the performance of the Port of Aalborg also has a significant effect on the surrounding society in general. Recent analysis (COWI, 2014) reveals significant direct, indirect and induced regional effects of the activities at the

Port of Aalborg, creating more than 9,000 jobs associated with a production value of DKR 13 billion, an income effect of DKR 5,7 billion, and tax revenues of DKR 1,7 billion.

Figure A1. Revenue and net income of the Port of Aalborg, 2002-2013

