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## Business Model Implications of Industry Path Dependency

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### Abstract

Business model research often reflects an assumption of unlimited flexibility in how firms can expand or renew their business. We present a multiple case study of 21 companies in the Danish container sea freight sector to show how firms embedded in highly integrated supply chains experience business model lock-in due to industry path dependency.

Keywords: Business models; path dependency; lock-in;

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## Introduction

While innovation of business models has been an increasingly popular topic in business model research and practice, discussions of the inherent challenges are often limited to internal barriers affecting the process of business model innovation (Das et al., 2018; Mason and Spring, 2011). Business models cannot, however, be regarded as entities controlled by only one focal firm (Berglund and Sandström, 2013). Rather, the business model is a “system of interdependent activities that transcends the focal firm and spans its boundaries” (Zott and Amit, 2010: 216). Due to the intricate ties of resource dependency across both supply chains and value networks, firms do not have full control over their business models (Berglund and Sandström, 2013). Consequently, a focal firm’s freedom to innovate its business model can be restricted. This paper explores how business model interdependencies can affect the process of business model innovation (Foss and Saebi, 2017). We illustrate how supply chain positioning impacts freedom to innovate for firms positioned “unfavorably” within their supply chains. The aim is to stimulate discussion on whether firms can innovate their business models at will or whether this is constrained by supply chain positioning.

The following section presents a review of the research on business model interdependence, founded on existing theoretical perspectives of path dependency and lock-in (David, 1985; Arthur, 1989). Following the review, the case study methodology and settings are introduced. The case studies are all within the Danish container sea freight sector, a sector characterized by fierce competition, overcapacity, and rapid technological development that creates new potentials for interconnection throughout the supply chain (DanishShipping, 2017). This setting offers an opportunity to explore the connections between different actors in a supply chain and the challenges faced by the focal firm regarding business model innovation within that context.

## Business Model Interdependence

Due to the intra-firm focus of most business model research, interdependence has mostly been addressed as the interplay between components in

business model frameworks (Johnson, Christensen and Kagermann, 2008), such as content, structure, and governance (Amit and Zott, 2012), or value creation, delivery, and capture (Foss and Saebi, 2017). Maintaining an intra-firm focus on business models is problematic as a change in business model depends on actors outside the focal firm, and thus beyond the firm’s control (Sandstrom and Osborne, 2011).

The most elaborate notion of business model interdependence is presented by Casadesus-Masanell and Ricart (2010). They argue that changes to the business model of a focal firm which affect the functioning of the business models of other stakeholders should be regarded as strategic interactions between business models. In making this argument, they emphasize the indirect effects of changing policies, assets, and governance structures, including the potential to increase the intensity of interdependence. Sánchez and Ricart (2010: 140) offer an operational definition of business model interdependence: “Two different business models are interdependent if they are connected (i.e., they share some of their consequences). In this case, the firm’s performance not only depends on its own actions, but also on the actions performed by some other organization”. Based on this definition, they argue that firms can change their degree of interdependence and work to mitigate negative interdependencies and foster positive ones as a process of changing their competitive positioning (Sánchez and Ricart, 2010). However, the intensity of interdependence is a result of the collective business model choices of all actors in the industry (Casadesus-Masanell and Ricart, 2010).

While interdependence vis-à-vis specific stakeholders can be reconfigured, the collective effect of business model interdependence in a supply chain exists as an exogenous variable for the focal firm. As a result, as firms strive to mitigate the uncertainty of the environments in which their business models function, interdependence will govern the change process of business model innovation. The interdependence of business models in the supply chain thus creates challenges for business model innovation as the underlying path-dependent nature of

supply chains can impede changes in the business model of the focal firm (Håkansson & Ford, 2002; Sandstrom and Osborne, 2011).

This type of path dependency, as well as the micro-foundations of *why* such effects occur, are largely unexplored in the extant literature. To address this, the following section introduces the concepts of business model path dependency and lock-in in highly integrated supply chains. In the context of business model innovation, a highly integrated supply chain is one that in many instances can act as “one large organization” in scale and scope as well as in knowledge, as firms operate together to increase the speed and geographical coverage of global transport networks (Hertz, 2001)

### **Business Model Path Dependency and Lock-in**

The effect of path dependency on business model change and innovation has received increasing attention in recent years (Saebi, Lien and Foss, 2016). This has especially been emphasized by Laudien and Daxböck (2015), who transferred the concept of path dependency from the organizational level of analysis (cf. Sydow, Schreyögg and Koch 2009) to the business model level.

Business model lock-in has generally been explored from a demand-side perspective, focusing on the competitive advantage of creating lock-in by configuring activity systems to “*keep third parties attracted as business model participants*” (Zott & Amit 2010: 221). In this framework, lock-in can occur due to the existence of switching costs or network externalities. However, when the bargaining power of the customer supersedes the supply-side business model, the lock-in can be reversed towards the focal firm and its existing business model, thus making business model innovation necessary.

Laudien and Daxböck’s (2015) multiple case study explains that business model innovation can be triggered by path-breaking mechanisms. However, when an organization finds itself in a lock-in phase, endogenous changes to the business model are difficult to accomplish due to managerial limitations (Laudien and Daxböck, 2015). This suggests that path dependence is created endogenously as his-

toricity and managerial logic shape the business model trajectory, which, when the lock-in phase is reached, can often only be dissolved by exogenous shocks. However, extant research does not address the question of whether differences in *where* a company is located in the supply chain can enable path-breaking mechanisms. Concurrently, the microfoundations of path-breaking mechanisms in business model innovation are still under-researched.

We contribute to filling this gap by challenging the conventional notion that path dependency should be understood endogenously as a process created through technological competencies and managerial constraints. We argue that business model lock-in occurs because business model interdependence exists across organizational units. This is an alternative position which we aim to detail by exploring what happens between interlinked business models in a highly integrated supply chain. This approach can help determine if some firms are more favorably positioned than others to innovate their business models.

### **Approach**

An exploratory multiple case study was conducted in the Danish container sea freight sector. The study included interviews with employees and managers at three types of companies in the supply chain: end customers, shipping agents, and main line operators. In total, 24 informants from 21 companies were interviewed between May 2015 and March 2016. All interviews were recorded and transcribed. Subsequently, the research team analyzed the data to identify the business model of each company, the existing shipping solutions in use, and the parameters for selecting those solutions. The data were validated through two half-day seminars with industry experts and representatives from the companies included in the study.

### **Key insights**

In interviews, informants estimated that approximately 85% of freight orders were “controlled” by shipping agents; that is, information transactions concerning the needs and planning of the end cus-

tomers' goods transportation were handled by shipping agents. Shipping agents use internet portals and competing offers on behalf of end customers to find the lowest rates for sea freight, resulting in heavy price competition and the commoditization of main line operators. This is the result of a two-decade trend of decreasing levels of direct contact between end customers and main line operators.

As explained by the managing director of a main line operator:

*"To spread out in the supply chain again is not possible, as the 'value added services' on the whole delivery was lost to the shipping agents 15 years ago. The big shipping agents do all that now. The main line operators did not manage to follow the development at that time, and you won't come back to that again. If you would try that, the shipping agents would 'freeze you out'. Two decades ago, we [as a main line operator] had 80% [of shipment contracts] through end customers and 20% through shipping agents. Today, it is 85% shipping agents and 15% end*

*customers. And this is normal for the entire business. If you sit with the goods (information, ed.), you have the power. The shipping agents have been good at this."*

An exemplification of this microfoundation of the interdependence between the actors in the supply chain in the Danish sea freight sector is illustrated in Figure 1 below.

As illustrated, end customers, shipping agents, and main line operators have quite diverse business models in this supply chain context. In many cases, information flow is exclusively between an end customer and the shipping agent. Similarly, the flow of physical goods is seen between trucking companies (which are sometimes owned by shipping agents) and main line operators, as well as between trucking companies and end customers. In the majority of cases, main line operators and end customers will never have any interaction. It can be argued that this is the result of the constant commoditization and increased efficiency of the industry over the last two decades, which has resulted in the lock-in of main line operators.

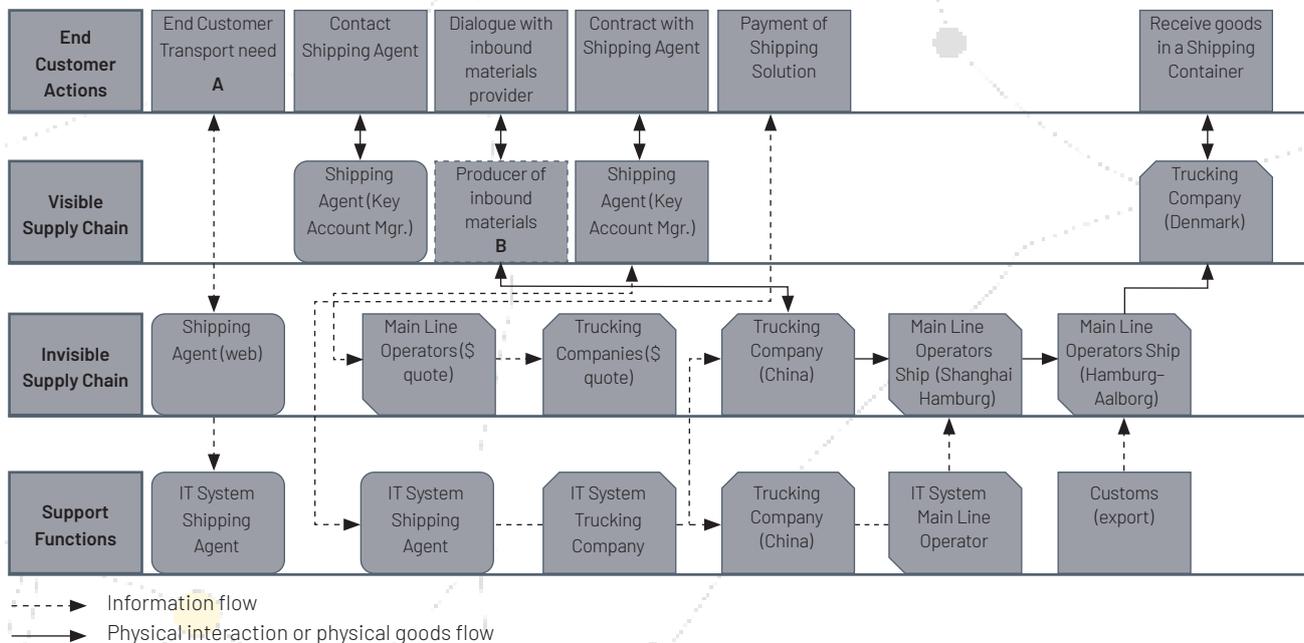


Figure 1: Example of import of goods through Shanghai, China to Aalborg, Denmark. Example is with Shipping Agents controlling Information flow (85%). It display information flows and physical flow between End Customers (EC), Shipping Agents (SA) and Main Line Operators (MLO) as well as Trucking Companies (not that some SAs have own trucks, others make partnerships with discrete trucking companies). Payment terms would vary depending on contract terms.

Table 1.

	Customer Relationship	Key partners	Key resources	Channels
End customers (B-2-B)	(e.g. other businesses, wholesalers, retailers, consumers)	(e.g. inbound logistics)	<b>Shipping agents</b>	(B-2-B, own shops, wholesalers, other retailers)
Shipping agents	End customers	(e.g. customs, port authorities)	<b>Main line operators, trucking companies</b>	<b>Main line operators, trucking companies</b>
Main line operators	<b>Shipping agents</b>	(e.g. traffic handlers and port authorities)	(e.g. ship fleet)	(ports)

Business Model Interdependence flow (final pull comes from consumer) ↑

Supply Chain Visibility for End customers (B-2-B) ↓

Table 1: Key differences in business model configuration for the highly integrated supply chain of the sea freight sector. Emphasis put on features that concern logistics of enabling the value delivery. Example of shipping agents controlling the goods.

Table 1 below emphasizes these differences (with the context of supply chain goods delivery as a focal point).

The arrow on the left side of Table 1 indicates that the business model interdependence found in the current research is generated by a demand which ultimately comes from consumers (who are, in turn, served by, e.g., other businesses, wholesalers or retailers). It is this demand which has shaped the formation of the supply chain over the years to serve exactly the end customers' need for access to products from all over the world, in an inexpensive and fast manner, allowing for flexibility in terms of delivery. These benefits are realized by end customers in their use of shipping agents as a key resource serving their logistics needs. Shipping agents build relationships with end customers in order to maintain

their business. These relationships are, in turn, driven by the price, flexibility, and delivery time required by the end customers. Shipping agents thus activate their resource bases – that is, their infrastructural network of transportation providers, including main line operators. Main line operators thus become a key resource for delivering shipping agents' freight solutions to end customers, and can simultaneously be the channel through which the service that freight forwarders provide becomes physical (i.e., transportation of goods). The main line operators try to establish customer relationships with shipping agents as these have control over the information from end customers regarding goods transportation, directly affecting main line operators' volume of business.

This example demonstrates four core tendencies which establish the potential for business model

lock-in in such a highly integrated supply chain, particularly for main line operators:

1. The ultimate demand for transport solutions comes from consumers; end customers in the transportation supply chain or other businesses served by those end customers provide the interface between this demand and the transport supply chain. The main line operators are at the farthest distance from the ultimate demand.
2. There is a lack of supply chain visibility. As our informant noted in the interview excerpt above, in the majority of cases, there is no flow of information flow, physical contact or goods between the end customers and the main line operators. This provides little to no insight for main line operators in understanding end customers to provide differentiated services.
3. Main line operators have very high capital expenses tied into their current value delivery. They balance high volumes with very low margins and continuously try to optimize operational expenses, to maintain a profitable business. This results in incredibly high switching costs for main line operators in the industry.
4. The market for container sea freight is highly commoditized, and our informants emphasized that supply supersedes demand in the industry<sup>1</sup>. It is surprisingly easy for agents or end customers to switch main line operators to serve the same purpose. Should a main line operator attempt to "creep" into the supply chain by trying to expand their business into other levels of the supply chain, they can very easily be frozen out by the shipping agents. As main line operators are operating in a very high volume, low margin business with frequent turnaround, losing business, even in the short term, could have disastrous effects.

<sup>1</sup> This is sometimes countered by main line operators making their ships "idle" to lower the overall supply. However, this has to be collectively agreed between different alliances in the industry and rarely leads to long-term price increases. Price increases can, however, happen due to consolidations in the industry, which is an increasing trend.

## Discussion and Conclusions

This research explains the impact of the highly integrated supply chain that has formed in the Danish container shipping industry over several decades. As a result of this integration, main line operators in particular have lost bargaining power in the supply chain. This is coupled with high capital expenses and a high volume, low margin business that has been commoditized over time. Main line operators have in many instances lost both the information and the physical connection to end customers (B-2-B), and this has put them in a situation where shipping agents can "pick" main line operators based on price and delivery conditions at will, without main line operators knowing the details of the end customers' business needs. This, coupled with overcapacity in the market, has put main line operators in a very unfavorable position over time.

This context and case example adds an additional dimension to the extant business model innovation literature (see, e.g., Wirtz and Daiser, 2017). As seen throughout the case study, the strategic interaction between firms affects the functioning of the business models of other stakeholders, creating business model interdependence (Casadesus-Masanell and Ricart, 2010). For this reason, the concept of path dependency should not just be considered on an organizational level but must increasingly be discussed in terms of the business model construct within and between firms (Laudien and Daxböck, 2015; Saebi, Lien and Foss, 2016).

Understanding the potential interdependence of business models is pivotal when undertaking business model innovation (Casadesus-Masanell and Ricart, 2010) as it underlines how firms, due to resource dependency across both supply chains and value networks, do not have full control of the innovation process (Berglund and Sandström, 2013; Wirtz and Daiser, 2018). When the locus of value creation transcends organizational boundaries, reconfigurations create changes in the firm's value network (Kringelum and Gjerding, 2018), and thus the process of business model innovation cannot be regarded as an isolated event unfolding in a single firm. In turn, this also means that a focal firm's freedom to innovate its

business model can be restricted due to the structures inherent in the supply chain. Disregarding the impact of and on external stakeholders – e.g., supply chain actors – constitutes an oversimplification that can potentially undermine the innovation process.

While this study represents some aspects of business model path-dependency and lock-in in a specific context, there is still a need for more research to provide a detailed understanding of the micro-foundations of what business model lock-in is and why it occurs. This presents an interesting avenue for future business model research.

### Implications

Business model research and practice have left many company managers with the impression that they have significant freedom to innovate their companies' business models. In this study, we have shown that supply chains that are highly integrated may create lock-in in part of the sector. In the context of our case study, large and powerful organizations (main line operators) have been put in an unfavorable position due to their limited access to end customers. This type of lock-in is reinforced if there is a dominant logic of key competitive aspects in the industry (such as price, which commoditizes the service). Our findings clearly indicate that companies must understand their position in a supply chain when introducing new products or services, and be aware of the risk of lock-in due to price competition over time. The implication for practice is that firms must continuously question their position in the supply chain and the connections between their business models and those of other supply chain actors. This is especially relevant in sectors with changing flows of, e.g., information and goods as this can, as evident in the case of the Danish container sea freight sector, create lock-in.

### Limitations

This case study reflects the context of the Danish container sea freight sector, an industry challenged by changing parameters of competition, technology, and sustainability. The identification of mechanisms

affecting the current status of business model path dependency and lock-in is specific to this context and this moment in time. However, it provides significant analytical generalizations based on the exploration of an empirical phenomenon (Frederiksen and Kringelum, 2020), and offers a point of departure for future studies of business model interdependence in other contexts to identify the effects for business model innovation both intra- and inter-organizationally. In addition, the extensive technology advances made in the sector following the data collection process, e.g. the introduction of the TradeLens Blockchain (Jensen, Hedman and Henningsson, 2019), highlight the challenges of business model lock-in even further. Future research on both the Danish sea freight sector and business model innovation should address these aspects further.

### Conclusions

This is one of the few studies critically addressing the notion of business model innovation. It examines a highly integrated supply chain and emphasizes how business model path dependency influences firms' journeys to business model lock-in over time. Using a multiple case study of 21 firms across three layers in a highly integrated supply chain, we show the microfoundation of how path dependency in an industry can ultimately "push" firms in the supply chain into unfavorable positions that are almost irreversible.

In effect, this study adds new context and information to the literature on business model innovation which is relevant to understanding the microfoundations of business models in highly integrated supply chains. It also poses the question of whether all firms in a given supply chain have the same degree of freedom in terms of innovating their business model. The implication is that firms must carefully deliberate on their supply chain positions when they launch new products or services, as their choices in the context of their positions in the supply chain can have major impacts on their ability to innovate in their business models.

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