BUSINESS MODELS FOR SHIPPER-OPERATED INTERMODAL TRANSPORT SOLUTIONS

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ABSTRACT

Objective

One of the main difficulties in developing new intermodal road-rail freight transport solutions is finding the right business model, i.e. the set of activities which a firm performs, how it performs them, and when it performs them to earn a profit. Though business models have received limited attention in the existing intermodal research, several authors have pointed out the importance of business models in the intermodal context.

Existing intermodal literature discusses several types of different business models that can be seen in practice. The current study takes an in-depth look at *The Own-Account Model*, where companies with sufficient transport volumes operate their own intermodal transport services. This can be seen as an alternative business model to the more common case, where the intermodal operator or forwarder acts as channel leader. The study explores the strengths and weaknesses of such a business model through two empirical examples.

The paper investigates these models by analysing the business model in practice, e.g. which actors are involved, the roles and responsibilities of these actors, how risks are distributed, what the contracts are, etc.

Data/Methodology

Research is conducted using a qualitative approach: multiple case studies. Empirical data is mainly obtained through in-depth semi-structured interviews. Osterwalder's (2004) framework for business models is applied to analyse the empirical cases and evaluate the strengths and weaknesses of the Own-Account Model.

Results/Findings

The roles and responsibilities of the actors are described. For the parties to be willing to "invest into" the new intermodal solution, long-term contracts are required. The shipper controls the channel, but has to rely heavily on the transport operators for their expertise and resources. Thus, a long-term partnership is formed between the main actors, separating this model from traditional intermodal transport.

The analysis has found that the Own-Account Model can be used to avoid many of the difficulties in setting up a new intermodal solution, such as insuring the base volume of freight or having the overall control over the intermodal chain.

Implications for Research/Policy

Better understanding of this type of business model allows authorities to better support the development of intermodal transport through policy measures. The results obtained also have research implications in improving the understanding of how intermodal transport is performed in practice.

Keywords: intermodal transport, case study, business model, freight transport, rail

INTRODUCTION

The intermodal road-rail industry in Europe has undergone an important change in recent years. Traditionally, there has been a clear division between road transport companies and rail transport companies. The rail transport companies have acted as subcontractors to the road transport industry. The deregulation of the European rail industry has caused this structure to change. New intermodal transport companies have emerged with new business models (BM) and the intermodal market has become more fragmented with a large number of companies offering different services. As a consequence, some transport customers have taken on a larger role in the intermodal system. Shippers with large goods volumes have taken the initiative to arrange and manage their own intermodal systems. This innovative procedure has challenged the conventional intermodal companies and has opened up new potential markets for intermodal transport. These shippers have acted in different ways, some have become rail operators and operate their own trains, while others act in a similar way to a 3PL system, and subcontract the physical transport operations to outside transport service providers, but maintain the control and management of the system.

This is particularly visible in the Swedish market, with Sweden being one of the first countries to deregulate the rail sector in 1996. As a result the Swedish market is one of the most developed rail markets in Europe, with an increasing number of operators and consequently increasing competition in the market (Vierth, 2012). The market has gone from two intermodal operators in 1996 to more than 10 today. However, this does not include the increasing number of own-account intermodal systems being developed where the control remains with the shipper.

Studying these new business models is important to understand the future potential of intermodal transport. Intermodal transport by nature calls for cooperation between multiple actors, which makes the development of a successful BM challenging, but essential for commercially viable set-ups. This paper investigates how these new BMs have been developed in practice by studying two real-world cases. The BM concept is described using a 9-level typology and the studied BM's strengths and weaknesses are analysed through the typology. Getting a better understanding of these new BMs allows authorities to better support the development of intermodal transport through policy measures. The results obtained also have research implications in improving the understanding of how intermodal transport is performed in practice and practical implications for shippers considering starting their own intermodal services.

A multiple qualitative case study has been performed during 2011 of two major Swedish shippers that have been involved in developing intermodal transport solutions and are currently managing their own intermodal transport solutions. The selection of cases has been based on their relevance and the possibility to get access to the empirical data. In both cases, at least one end-point of the intermodal solution is situated in Sweden, thus being at least partly exposed to similar institutional environments. Since examining the BM requires understanding of the internal rationale of companies and their actions, the case study is

found to be a suitable methodology. Moreover, to avoid excessive focus on aspects that are contextual rather than generic, a multiple case study methodology is chosen. Empirical data has been obtained through in-depth semi-structured interviews with staff involved in the development/management of the studied intermodal solutions. Six interviews have been performed.

BUSINESS MODELS

The term business model has become commonly used in recent years, although it is most often used as a "buzz word" and some vague reference to how a company does business (Osterwalder, Pigneur, & Tucci, 2005). The term has been used as a "loose conception of how a company does business and generates revenue" and has been criticised as "murky at best" (Porter, 2001, p. 73). BMs are often confused with individual parts of the complete business model, e.g. pricing model, revenue model, channel model, commerce process model, Internet-enabled commerce relationships, organisation form, and value proposition (Linder & Cantrell, 2000).

However, business models are the firm's framework for making money through the building of its resources and the transformation of those resources into products or services that customers want. It can be defined as the set of activities, which a firm performs, how it performs them, and when it performs them to earn a profit (Afuah, 2004). It thus takes a holistic view on the companies' operations. The concept of business models can be used to describe, develop, and analyse how the organisation creates, delivers, and captures value. By describing a company's business in a structured way it can be used to describe and classify businesses or to identify options for future development.

Though BM definition has been focusing on a single company, in todays' supply chains products and services are commonly formed in cooperation with multiple firms, thus encompassing a firm's boundaries. Therefore the BM concept is applicable to product/service production by a single firm or in a chain/network of companies and activities.

Several attempts have been made to define and formalise the concept, as a need for a formal definition exists (Margretta, 2002). Shafer, Smith, & Linder (2005) identified 12 different definitions in a literature review with a total of 42 different components in the definitions. Other reviews have been made by e.g. Osterwalder, Pigneur, & Tucci (2005), Schweizer (2005), Osterwalder (2004), Pateli & Giaglis (2004), Voelpel, Leibold, & Tekie (2004), and Pateli (2002).

One of the most-used frameworks is Osterwalder's (2004). This divides the business model into four pillars and nine building blocks. See Table 2. Note that "Infrastructure" in Osterwalder's model, refers to firm infrastructure and not transport infrastructure, while the term "Distribution Channel" is defined as means of getting in touch with the customers (similar to marketing channel), rather than as a logistics term (how products are physically distributed).

Table 1 The nine business model building blocks (Osterwalder, 2004, p. 43)

Pillar	Building Block of Business Model	Description
Product	Value Proposition	A Value Proposition is an overall view of a company's bundle of products and services that are of value to the customer.
Customer Interface	Target Customer	The Target Customer is a segment of customers a company wants to offer value to.
	Distribution Channel	A Distribution Channel is a means of getting in touch with the customer.
	Relationship	The Relationship describes the kind of link a company establishes between itself and the customer.
Infrastructure Management	Value Configuration	The Value Configuration describes the arrangement of activities and resources that are necessary to create value for the customer.
	Capability	A capability is the ability to execute a repeatable pattern of actions that are necessary in order to create value for the customer.
	Partnership	A Partnership is a voluntarily initiated cooperative agreement between two or more companies in order to create value for the customer.
Financial Aspects	Cost Structure	The Cost Structure is the representation in money of all the means employed in the business model.
	Revenue Model	The Revenue Model describes the way a company makes money through a variety of revenue flows.

Business models in intermodal transport

The term business model is seldom used in intermodal research. BM models cover all aspects of running an intermodal business. Although studies have been made that describe the market and its actors (Woxenius, 1994a, b; Woxenius & Bärthel, 2002, 2008; Flodén 2009b), they have not been put into a business model framework. Other studies exist that focus on specific parts of the intermodal system, for example drayage operations (Spasovic & Morlok, 1993); rail haul (Horn, 1981; Yan et al., 1995); and door-to-door service (Tsai et al. 1994) but they focus on specific parts of the operations and do not take in the full BM perspective. The term BM is used in three studies: REORIENT (2007); DIOMIS (2009) and Flodén (2009a). The REORIENT project studied potential business models for a transport corridor between Scandinavia and Greece (REORIENT, 2007). Four business models were identified with the focus on which actor controls the transport chain and who makes the transport agreement with the customer. The models developed did not meet the full definition of a business model as defined by Afuah (2004). The DIOMIS project described European and US business models for intermodal transport. The description comes close to meeting the definition, but is limited to only describing one general model for each continent. Flodén (2009) uses the framework by Osterwalder to describe four general models for intermodal transport and is the only study that meets the definition by Afuah (2004). The *subcontractor model* shows the traditional intermodal business model where the intermodal actor is a rail operator who acts as subcontractor to the road transport/forwarder actors. They are the target customers of the intermodal actor. The road transport/forwarder actors are channel leaders with the end customer contact. The *complete transport company* model shows a model where the intermodal actor takes on the role as channel leader and directly approaches the end customers as the target customer. The offer includes a complete

transport service including rail transport and road haulage to and from the terminals. The *local cooperation* model is a model where intermodal transport is organised by one or several local actors in cooperation, often with support from local authorities. This cooperative model is based on local needs and operated by the local industry in cooperation, often on a single small destination that is too small to attract interest from the large commercial actors. The *own-account transport* model describes a situation where an actor with large transport volumes uses intermodal transport in a closed system for own-account transport. This model is of particular interest, as it most closely resembles the BM in the studied cases.

In the *Own-Account Transport Model*, a large company or forwarder with large volumes of freight starts operating their own intermodal transport services, where the company itself controls and coordinates the intermodal transport, e.g. setting the requirements and most likely subcontracting the actual transport operations. Author explains that such business models are applied because it enables better control, offers the company opportunity to be the channel leader, gives more possibilities to adapt the system to specific needs, and often helps to realize lower costs by excluding intermediaries. The system is considered closed to other shippers, however as acknowledged by the author, the model can be mixed with other business models by selling out the excess capacity to outside customers. An important risk connected to this model is that the company does not have transport as part of their core business and thus may lack necessary experience in intermodal transport.

Table 2 The Own-account transport model

Pillar	Building Block of Business Model	Description
Product	Value proposition	Rail transport and terminal handling of intermodal transport units, offering lower cost and reduced environmental impact compared to all road transport. Road haulage to and from the terminal is offered. The system is closed to outside customers.
Customer interface	Target Customer	The own company. The system is closed to outside customers.
	Distribution Channel	Internal.
	Relationship	A close internal relationship.
Infrastructure Management	Value configuration	Performing intermodal road-rail transport.
	Capability	Being able to perform intermodal road-rail transport as an intermodal transport company.
	Partnership	Rail haulage and terminal handling could be subcontracted. Sometimes rental of equipment, wagons, etc.
Financial Aspects	Cost structure	Main cost on rail haulage, road haulage, and terminal handling
	Revenue model	The revenue comes from fees paid for the transport. Fees are the operating cost without profit.

Business model challenges

Traditionally, the intermodal operator has taken on the role as a subcontractor to a forwarder/haulier. The new deregulated rail market and changes in customer requirements have opened the opportunity for intermodal actors to explore new business models and for new actors to enter the intermodal market. A number of challenges facing these new business models can be identified. The organisation and underlying business model in which the involved parties cooperate and define responsibilities is essential for the success of an intermodal transport system, including a fair share of costs, benefits, and risks (PROMIT,

2009). One can note that these challenges are rather similar to the challenges in supply chain management: why should benefits be redistributed, how power affects set-ups, how risk exposure of different actors differs, etc.

Several authors (e.g. PROMIT, 2009) have noted the lack of attention towards economic integration and coordination of intermodal transport chains. Moreover, the existing research body has shown the importance of intra-organisational and business strategic issues for the success of new systems (Bärthel & Woxenius, 2004). Organisation or governance structure should basically explain the organisation structure of an intermodal transport chain in the sense of which actors are involved, how chain is managed, how roles and responsibilities are distributed, how decision-making and change processes are organised, etc. However, within this topic, one can distinguish two important points: from one side, there is a definite *need for some sort of coordination in the intermodal chain*; from another side, the successful arrangements can differ from case to case. The latter means that despite the need for coordination and clarity in the structure, *different business models may exist* on how the actual management, cash flows, etc. in the chain are arranged. Choosing the right business model is important for the competitiveness and success of the intermodal transport (Flodén, 2009a).

Furthermore, as highlighted by Zomer (2009), horizontal cooperation and various consolidation models increase complexity of the business model. Thus, a certain degree of simplicity in the set-up is one factor of successful business models.

High cost for initial investments (Woxenius & Bärthel 2008) and poor profitability (PROMIT, 2007) of intermodal set-ups have been pointed out as major barriers for increasing the use of intermodal transport. Irrespective of other benefits that intermodal transport can provide (environment, quality, etc.), intermodal solutions need to be financially competitive to survive.

Finally, finding a base volume and balance in cargo flows in the intermodal setup is another commonly discussed challenge. Irrespective of where the initiative for a new development originates, a solution should have some sort of base volume to get operationalized. Keeping the utilisation high is an on-going effort and one that is largely dependent on the ability to attract target customers. Different BMs have different target customers and thus will have to build up relationships and distribution channels in various ways.

EMPIRICAL OBSERVATIONS

The empirical study is based on case studies of two Swedish companies: Volvo and Coop. Through rather different companies in terms of size, industry, transport needs, etc. both have chosen to develop and manage their own intermodal transport solutions. The selection of cases has been based on their relevance and the possibility to get access to the empirical data. The cases represent successful and well-established implementations of shipper-operated intermodal transport and have received a lot of attention from the transport industry. While other examples can be found in the Swedish context (e.g. Stora Enso Baseport System, ScandFibre Rail 11, Stena Recycling, Ikea Rail), the two cases are rather recent

and thus allow opportunity for contact with people involved in both setting up the concept and running the operations. Moreover, though both Swedish companies, one of the studied cases is a domestic solution, while the other cross-border, thus allowing capture of diverse complexities.

Volvo Group is one of the world's leading manufacturers of trucks, buses, construction equipment, drive systems for marine and industrial applications, and aerospace components. Volvo Logistics that was in practice responsible for the whole development and management of the intermodal solution was at the time an internal business unit in the Volvo Group. Though mainly oriented on serving internal customers, Volvo Logistics has a few external customers as well - all from the automotive industry – and other than to these customers, services are not sold to the market.

Coop is the second largest grocery retail chain in Sweden with more than 760 retail stores and three warehouses. Coop accounts for 21.5 per cent of the entire Swedish grocery retail sector. The company is owned by a Swedish consumer cooperative with more than 3 million members and has its origins in the consumer cooperative federation from 1899 (Coop 2012). The development and management of the intermodal solution has been the responsibility of the logistics unit: Coop Logistics.
Table 3 gives an overview of the basic characteristics of the two cases.

Table 3 Basic characteristics of the cases

	Volvo	**Coop**
Industry	Automotive	Retail
Geographical coverage	Sweden-Germany	Domestic Sweden
Transport distance	900 km	600 km
Previous solution	Road	Road, partly conventional wagon load
Cargo	Components, packaging material	Non-food; chilled; frozen foods; fruits
Part of supply chain	Inbound: from components suppliers to assembly plant	Inbound and outbound: from suppliers and importers to central warehouses and from warehouses to stores and cross-docking facilities
Load unit	Trailer	Trailer

In the whole development process of the new solutions, the key issue has been finding a suitable business model. The following section will give an overview of some general observations regarding the business models in the studied cases as well as present an overview of the business models applied using the four main pillars of Osterwalder's BM framework (product, customer interface, infrastructure management, and financial aspects).

Pillar 1: Product

The Coop intermodal service runs between Helsingborg, Sweden and Stockholm, Sweden every day and consists of 36 trailers of groceries from the suppliers and importers in South of Sweden through a terminal in Helsingborg to the 3 main warehouses in the Stockholm area (Bro, Västerås, Enköping). Return flows are shipments to the stores (directly or through cross-docking facilities) in the south of Sweden. Road haulage from warehouse to rail terminal is present in both ends of the chain. The service was initiated in 2008 by an initiative

from the Coop top management and became operational in 2009. The service is intended to offer an efficient and cost-effective transport solution that goes in line with Coop's strategy to appear as an environmentally aware and "green" grocery store. It was started as a part of a major rationalisation program that included restructuring of Coop's distribution network.

The Volvo intermodal service includes inbound transport from component suppliers in Germany to the assembly plants for Volvo Trucks and Volvo Cars in the Gothenburg area, Sweden. The train capacity is 36 mega-trailers (2 trailers per wagon). Hannover, Germany is used as a rail hub where single wagon flows from Kornwestheim and Herne are consolidated into a block train destined for Gothenburg. The train has 5 departures per week. Pre- and post-haulage to the rail terminals are done by truck. Return flows include packaging material for Volvo and other goods from the road hauliers. The development work was initiated in 2006 as a pre-study and operationalized in 2008. Similarly to Coop, both Volvo Group and Volvo logistics in particular have the environment as one of the core values and development of the new solution was a direct response to new quantitative emission reduction goals set for Volvo Logistics. Intermodal transport solutions have been developed and used previously in various domestic and cross-border transports.

Both Coop and Volvo fulfil the role as the intermodal operator and are responsible for the overall management and coordination of the intermodal transport. They also bear the commercial risk.

Pillar 2: Customer interface

Coop and Volvo have chosen to approach the commercial openness of their intermodal systems differently. Commercial Openness (CO) relates to what extent all actors have equal access to transport goods in the system without any time or price discrimination. The openness can range from completely closed to various degrees of openness (Sjöstedt et al., 1994). Commercial openness can be subject to changes after the system is implemented.

In the case of Coop the solution is kept completely closed to other users, though free capacity exists - especially at the terminal. Coop has considered selling out the existing unutilised capacity, however, due to the unwillingness to engage themselves in other businesses, lack of market knowledge, and necessary network to sell out the free capacity to external actors – the capacity is kept underutilised.

Similarly, Volvo wanted to keep the set-up simple and not engage other shippers. Exception was made during the financial crisis in 2009 when cooperation was initiated with another shipper that had a similar intermodal set-up in terms of geography. During the crises volumes dropt and to utilise the existing capacity on rail – cooperation was a necessity. Despite the success, a solution based exclusively on Volvo cargo was desired. Consolidation of flows with another shipper was seen as a complication both in coordination and operations.

However, in the case of Volvo the material flows in their supply chain could not provide necessary volumes in the southbound direction. Though part of the southbound capacity on

rail is used to transport packaging material, 2/3 of the capacity is sold to the road hauliers that are responsible for the pre- and post-haulage in the intermodal set-up. Note that the system is open only for the hauliers already involved in road haulage within the system. The idea again has been not to engage with the market, but try to keep the set-up simple. Hauliers are charged a fee per trailer transported.

However, the systems have a large technical openness (TO) (Sjöstedt et al. 1994). TO refers to the restriction in technical acceptance of different unit loads, lorries, transfer equipment, and rail wagons. The systems today only transport trailers, but use standard handling equipment and rail cars and could technically be used to transport all common types of load units. A large TO can often result in control problems for the operators (Sjöstedt et al. 1994), but this is avoided in the current cases due to the use of multipurpose standard equipment and limited CO.

While CO of the system can be changed throughout the operations, TO should be defined as early as possible during system design (Sjöstedt et al. 1994). Both systems have selected a large TO, giving them a freedom to start using other unit loads if necessary.

For example, Coop considered opening their system for ISO containers, but realised that most containerised cargo arrived through the Port of Gothenburg and not Helsingborg or other ports in southwest Sweden. Although they have decided to not utilise this option for the time being, this shows that designing the system with a large TO increases flexibility.

Both Volvo and Coop are their own “customers” in the intermodal transport, which results in a number of internal issues within the customer organisation. Though they can appear as one single actor, there are complex organisations that stand behind this single actor. Top management approved the new concept and supported it throughout development, while the logistics unit was responsible for the overall coordination and management. In the case of Volvo, some internal convincing had to be done to overcome certain scepticism and resistance that was mainly based on the fact that a company whose core business is trucks (and thus road transport) is engaging itself heavily in intermodal transport involving a large share of rail transport. In both cases it was important to communicate properly to the internal actors the change and its implications

In Volvo the intermodal solution also had to fit the fixed service requirements that existed for the transport between suppliers and assembly plants. While in the case of Coop the change in the transport solution was accompanied by a major change to the warehousing network to enable consolidation. Previously, the Coop suppliers had been responsible for the transport to Coop, but now Coop took control over all inbound transports and started buying Ex works. This included a complex renegotiation of all contracts with product suppliers, who were in general positive to the change of transport solution. However, several larger suppliers expressed interest in being a more visible part in the intermodal solution, but Coop preferred to keep it as an exclusively Coop initiative. Moreover, in the case of Coop, store delivery requirements had been kept unchanged and the logistics department had to make sure the new solution would be able to meet those requirements.

Pillar 3: Infrastructure management

Intermodal set-ups, irrespective of the business model behind them, involve a multitude of actors. Though the number and types of actors may vary from case to case, the typical actors include: shippers; terminal operators; transport operators (different modes- road, rail, sea, intermodal, etc.); equipment-leasing companies; forwarders; government authorities, etc. (Woxenius and Bärthel 2004).

Both Volvo and Coop rely heavily on partnerships and outsourced operations in their intermodal services, as they do not have the relevant in-house capabilities or resources. They remain as the coordinating actor and channel leader, but all physical transport is outsourced. The terminals in Stockholm and Gothenburg are located close to the Coop warehouse and the Volvo factory, respectively. Coop and Volvo own these terminals, and Volvo also operates their own terminal. The Volvo terminal is the only example in studied cases where the company is directly involved in the physical movement of the goods.

An interesting aspect is the small number of contractual relations compared to the actual number of actors involved in preparations/planning and operations. As mentioned, simplicity is an important aspect of a business model, especially in the case of Volvo where the intermodal solution includes international rail operations. As can be seen from the table below, Volvo's rail operations are in practice performed by several rail companies: Green Cargo, Schenker Automotive RailNet, and Railion DK. Despite the multiple actors involved, mainly due to the fact that the rail link involves cross-border operations, Volvo has only one contract signed with DB Schenker. However, in practice, non-contractual relations have been built with other rail sub-contractors to gain visibility in the rail chain, work with improvement of quality of the service, and when necessary plan for back-up solutions.

In the case of Coop, 1-year contracts were signed with road hauliers and a 3-year contract was signed with the rail operator. In the case of Volvo, the rail contract was signed for 3 years and the contract with road hauliers for 2 years. The contracts signed with rail operators were longer in both cases than the contracts signed with road hauliers and terminal operators. Finding interested road hauliers was slightly problematic, as many perceive intermodal set-ups as a competing business. However, the contracts could still be made short due to the stiff competition in the industry with many road hauliers to choose from that easily could be substituted. Price was a key issue in the sense that the intermodal solution was required to provide a certain cost advantage, but it was not the only deciding factor. Rail contracts had to be made longer since there are only a few rail operators to choose from, but also to compensate for the effort it takes to set-up the rail part of the intermodal solution. The decision had to be made as a weighed decision of multiple factors, not just price. The deregulated rail market has allowed Coop and Volvo to have several rail and terminal actors to choose from, which increases the chance to find a suitable partner. This also gives them improved bargaining power compared to only having one potential partner.

Table 4 Actors and roles (activities based on Flodén 2009b)

Activities and Responsibilities	Coop	Volvo
Overall management and coordination of the intermodal transport	Coop Logistics unit	Volvo Logistics unit
Selection of the business model	Coop Logistics unit	Volvo Logistics unit
Rail transport	Subcontracted to rail operator Green Cargo	Subcontracted to rail operator DB Schenker (+other subcontractors of DB Schenker)
Road transport	Subcontracted to Road Hauliers (Alwex, GDL, Västberga, ACT)	Subcontracted to Road Hauliers (Renus & Ewalds).
Terminal operations	Helsingborg: Existing terminal by Port of Helsingborg Stockholm: Coop terminal. Operations subcontracted to Baneservice AS	Germany: Existing terminal by DB Schenker Gothenburg: Volvo terminal
Marketing and sale of the intermodal transport service	Service only for internal use	Extra capacity on the train is sold exclusively to the hauliers performing pre- and post-haulage

Pillar 4: Financial aspects

An important characteristic of a BM is how financial risk is allocated. In the two empirical cases studied the set-up has been rather different. In the case of Coop, it was mainly the shipper company that made the initial required investments: investing in trailers and their own terminal in Bro. In the case of Volvo, the company did invest in their own terminal, as there were no other services available/suitable, but other investments were made by contracted partners: a rail operator has invested in 200 wagons and hauliers have invested in mega trailers against 2-year contracts. One explanation to this is that in the case of Volvo, the rail contract was made with a major rail operator, which did not see the value of the resources required as a major investment in comparison to their other operations.

The cost structure for Volvo and Coop for the operations is fairly simple, as most operations are outsourced. They are only to a limited extent tied up in long-term investments. The investment risks are born by the subcontracts. It can be assumed that the case companies, as in any outsourcing operation, pay a premium to their subcontractors for them to accept these risks. On the other hand, the subcontractors can balance these risks between different assignments, for example by taking on several clients or moving unused equipment to another client in need for extra capacity, or by employing their own subcontractors. The cost structure is similar to what can be found in a company that has outsourced to a 3PL. For Coop and Volvo to take the role as the intermodal operator also removes a middleman (the external intermodal operator) that would charge a profit margin for their services.

BUSINESS MODELS APPLIED

The case descriptions can be applied to Osterwalder's BM framework. This structures and gives a clearer description of the models, which facilitates further analysis. As can be seen, the business models are fairly similar. Both have an internal customer and rely heavily on outsourcing. The Volvo system is also open for external customers (but limited to those with whom they have contractual relations already), while the Coop system is strictly internal.

Table 5 Volvo Intermodal Business Model

Pillar	Building Block of Business Model	Description
Product	Value proposition	Intermodal transport of trailers from Germany to Gothenburg, offering lower cost and reduced environmental impact compared to all road transport. Having their own system, based largely on their own volumes, allows for better control and integration of their specific service requirements into the design of the setup.
Customer Interface	Target Customer	Primary- Volvo Trucks and Volvo Cars. Extra capacity is sold to already-subcontracted road hauliers. Other than that, system is closed to external customers.
	Distribution Channel	Internal within Volvo.
	Relationship	Close internal within Volvo.
Infrastructure Management	Value Configuration	Traditional road-rail intermodal transport including road haulage, terminal handling, and rail transport.
	Capability	Being able to perform road haulage, terminal handling, and rail transport.
	Partnership	Rail operations, terminal operations in Germany, and road haulage - subcontracted. Longer contracts with rail and terminal operator and shorter contracts with other subcontractors. Informal partnership with other rail operators, who act as subcontractors to their contract partner
Financial Aspects	Cost Structure	Few fixed costs for Volvo. Main cost on rail haulage, followed by road haulage and last terminal handling.
	Revenue Model	Internal payments within Volvo. Payments from sold extra capacity. Cost savings compared to traditional road transport.

Table 6 Coop Intermodal Business Model

Pillar	Building Block of Business Model	Description
Product	Value Proposition	Intermodal transport of trailers from Helsingborg to Stockholm, offering lower cost and reduced environmental impact compared to all road transport. Having a closed system also allows for better control over the intermodal transport set-up and integration of their specific service requirements into the design of the set-up
Customer Interface	Target Customer	Coop
	Distribution Channel	Internal within Coop.
	Relationship	Close internal within Coop.
Infrastructure Management	Value Configuration	Traditional road-rail intermodal transport including road haulage, terminal handling and rail transport.
	Capability	Being able to perform road haulage, terminal handling, and rail transport.
	Partnership	Rail operations, road haulage, and terminal operations subcontracted. Longer contract with rail and terminal operator and shorter contracts with other subcontractors.
Financial Aspects	Cost Structure	Few fixed costs for Coop. Main cost on rail haulage, followed by road haulage and last terminal handling.
	Revenue Model	Internal payments within Coop.

These business models can be compared to the four type models created by Flodén (2009) and it is clear that both models closely resemble the Own-Account Transport model. The Volvo model has also been combined with the Subcontractor model, as excess rail capacity is sold to external customers. Volvo acts here as a subcontractor to the road hauliers.

ANALYSIS

The models selected by Coop and Volvo position them as channel leaders. The companies perform the role as an intermodal service provider. This means that they control the system and can adapt it to their needs. A common risk in this model is that the companies are not experienced in managing an intermodal solution, which created a lot of internal work. In particular, for Volvo to use an intermodal solution based on mega-trailers technology was for them new and not tested. Moreover, both companies have great logistical expertise from conventional road transport, while it must be noted that rail operations are significantly different and require special expertise. The companies have solved this by outsourcing the transport operations to experienced actors and selecting a conventional design of the intermodal system (in load units, rail cars, terminal handling, etc.). The risk that comes with this is that they also become dependent on those actors, which reduces their flexibility. The companies have also experienced problems in changing outsourcing partners when the contracts expired, as old partners refuse to cooperate with the new partners for the transition. The relatively small number of contracted partners used also means that many of them in turn outsource parts of their operations to other companies. This gives rise to a need to establish informal contracts with partners also outside the formal contracts to ensure control over the system and the quality of the transport service.

The high degree of outsourcing also reduces the financial risks for Volvo and Coop as they can end the relatively short contracts, if the intermodal service becomes less successful. Naturally, this risk is transferred to the subcontractors who will charge a premium cost for it. At the same time, Volvo and Coop also absorb the commercial risk of the operations, e.g. in filling the train. This reduces the risk for the subcontractors, as they are guaranteed payment according to contract. For instance in the case of Volvo, where hauliers invested in the trailers, 2-year contracts were signed compared to the Coop case, where Coop had bought the necessary trailers and hauliers were awarded with 1-year contracts.

The decision by Volvo to also open the system for “outside customers” highlights the challenge with the large transport volumes required to make intermodal transport cost effective. There are not many companies with large enough volumes to run a full train with only their own goods. This interacts with another challenge for intermodal transport, namely the low flexibility. Volvo actively tried to avoid opening up their system for outsiders to be able to maintain a system tailor-made for their operations and not to complicate it. Outside customers with their own agendas and transport requirements can be challenging to meet in a system tailor-made for one customer. In addition required coordination in operations makes the system more vulnerable to disturbances and creates additional work.

The internal “politics” within Volvo and Coop also affected the development of the BMs. Although it might appear simple to not have to consider external customers, there are also internal challenges within all large organisations and between departments. These can be just as difficult as those stemming from external customers. Although all departments and employees within the same organisation share a common goal of doing what is best for the company, the notion of what this is can be very different. However, many aspects, such as

personal contacts, access to sensitive data, conflict resolution, etc., is simplified within the same organisation. In addition, in both cases the new solutions received approval from the top management of the companies, which meant implementation was highly prioritised and supported throughout the development and implementation.

Strengths and weaknesses of the Coop/Volvo Own-Account Business Model

The following section summarises the weaknesses and the strengths of the Own-Account Transport Model based on the empirical case studies. The identified weaknesses and strengths point out that The Own-Account Transport Model simplifies the set-up by having an actor responsible for the overall system management and limited amount of contractual relations. Moreover, as a result of direct engagement of the shipper, base volumes are assured. A major weakness, as such is the lost flexibility from the shipper's point of view and the commercial risk for the full train that is completely shifted to the shipper. Finally, the fact that the shipper engages in non-core business activities, i.e. transport, creates exposure to new types of risks and limits the options for high utilisation of the intermodal system, unless the shipper somehow engages external users.

Table 7 Strength and weaknesses of the Own-Account Business Model

Pillar	Building Blocks of Business Model	Weaknesses	Strengths
Product	Value Proposition	Intermodal transport is less flexible than traditional road transport and requires large volumes. Potential disturbances in the set-up have major impacts as large volumes of cargo become affected.	Intermodal transport offers cost and environmental benefits
Customer Interface	Target Customer	Dependent on one "customer". If internal volumes go down, then system must be opened for outside customers or closed. Company has no experience in selling transport services to outside customers.	Allows system to be tailor-made to company's needs. Internal customer guarantees volumes and eliminates marketing costs.
	Distribution Channel	Roles as "buyer" and "seller" might be blurred, complicating the setting of requirements, etc.	Internal contact gives low costs.
	Relationship	Sensitive for internal "politics" within the organisation.	Close internal relationship simplifies contacts and planning.
Infrastructure Management	Value Configuration	Complicated by lack of experience in intermodal transport/ management of intermodal transport set-up	The good general logistics experience commonly found in large companies simplifies the design of the system and operations.
	Capability	Dependent on outsourcing and external partners.	A conventional design of the intermodal transport allows transport to be performed according to well-established procedures.

	Partnership	Dependence on external partners and need for close communication. Need to establish informal relations with the subcontractor's subcontractors and other partners to ensure control of the system.	The large degree of outsourcing gives access to important expertise. A limited number of contractual relationships are easy to manage.
Financial Aspects	Cost Structure	Must accept the business risk for the intermodal system (filling the train, etc.). Transference of financial risk for most investments (rail cars, etc.) to subcontractor gives a higher cost for their services. Remaining initial investments call for long-term commitment to ensure payback.	Low fixed costs and short contracts give large flexibility.
	Revenue Model	Internal transfer of money does not allow the intermodal system to charge a profit margin that could be used as a future buffer.	Simple and guaranteed to get paid.

CONCLUSIONS

A business model is essential for any sort of commercial undertakings and though the meaning of the concept has to some extent been abused by popular use, the importance of business models and research in this context are still relevant. Moreover, even though intermodal transport literature has shown limited interest towards the theme, empirical evidence exists that different and clearly distinguishable business models are applied in intermodal set-ups. The empirical study conducted confirms that finding the right business model is essential for the viability of the new solutions.

From the existing research on business models in the intermodal context, this paper chose to investigate in-depth the Own-Account Transport Model, which is a rather new and special case of intermodal set-ups. Having applied the Osterwalder model for describing a business model (as done previously by Flodén), two empirical cases have been analysed to illustrate the viability of this business model in practice, but also to evaluate the weaknesses and strengths related to application of this particular business model. The business model framework has been used to structure and facilitate the analysis.

The empirical research has revealed that The Own-Account Transport Model, as other intermodal set-ups, requires multiple actors to coordinate and sort out roles and responsibilities in order to make the business model functional. An important aspect of the business model is distribution of risks between actors. Though the commercial risk for the full train is born by the shipper, financial risks regarding the necessary initial investments have been more distributed between contractual partners. For the other parties to be willing to "invest into" the new intermodal solution, long-term contracts are required. The shipper controls the channel, but has to rely heavily on the transport operators for their expertise and resources. Thus, a long-term partnership is formed between the main actors, and this is what separates this model from traditional intermodal transport.

Moreover, the Own-Account Transport Model is associated with both strengths and weaknesses that largely differ from other business models in intermodal transport. The major strength of the model is that the shipper controls the intermodal system and can adapt it to their needs. Heavy outsourcing ensures access to expertise and limits long-term risk. Transport volumes are guaranteed. The major drawbacks are that the shippers must bear the business risk of the intermodal system and are faced with managing a type of system with which they previously have no or limited experience.

A policy maker interested in own-account promoting intermodal transport can target to simplify the possibility for relationships and contracts between the actors, as outsourcing is a key factor. The studied cases show that the deregulated rail market has been a facilitating factor for these systems to evolve.

It can be concluded that an actor interested in starting an own-account intermodal system must first ensure the necessary volumes are able to run the system without outside customers, thus keeping it less complicated. An intermodal system using standard technical solutions further simplifies the operations and management. The actor must also decide on the level of outsourcing, where it can be seen that a high level of outsourcing and transference of financial risks increases the flexibility at the expense of higher cost. Most importantly, the complexity in developing and running an intermodal system should not be underestimated.

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