EVALUATION OF BUSINESS MODELS IN RAIL FREIGHT TRANSPORT UNDER CONSIDERATION OF MULTIMODAL ASPECTS

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Abstract
Within the field of cargo transport and mono- and multimodal transport in general and in particular the rail processes have so far contributed rather insignificantly to the reduction of road traffic volume. This is the result of limited capacities concerning terminals, the necessity of special reloading devices entailing high investment costs and time losses handling the cargo, as well as wide-spread scepticism regarding adherence to delivery dates, traceability of consignments and flexibility of intermodal transport. In short, to solve these problems innovative and market-oriented solutions are needed. One possible approach is using the business model as an analysis-tool. There is the need of systematic and scientific exploration which potentials and advantages innovative business model solutions provide. Compared to monomodal chains on the road the mono- and multimodal processes in rail freight transport are much more complex and risky. Therefore it is a difficult challenge for organizations to design and implement the complex construct of business model correctly and thus successfully. The research project is based on the assumption, that successful business model innovations in sustainable transport provide positive effects on the modal split and contribute significantly to the sustainable optimization of the overall traffic system.

INITIAL STATUS AND PROBLEM
On a close examination there is a wide difference between the actual development and the political guidelines and objectives regarding the Modal-shift. One of the key transport policy objectives of the European Commission is to shift to more environmentally friendly modes. Despite the combined efforts of the decision makers in the EU and the expected considerable growth rates of goods traffic in the upcoming decades, from the present perspective for example the railway will not gain a significant share of the modal split, but will more likely stagnate at today's level or lose even more ground.

Efficient transport systems are the basic condition for every successful economic area. The functioning can only be guaranteed by high effectiveness of the individual carriers and a
close co-operation between the different modes [1]. Parallel to the economic dynamics the needs concerning the traffic system are constantly changing. The accurate management of the changing requirements is difficult because of the continuous growth of the goods traffic and the various resulting problems.

Several internal and external traffic-related changes in the decision structures of the goods traffic substantially affected the modal split in the past decades. These changes can be categorized as structural, logistics, integration and interface effect and are the main factors for the disproportional development of the modes [2]. The ability of innovation as well as the flexibility can be named as reasons for the domination of road transport. In this context the mode-specific system characteristics are of extreme importance [3].

The system properties of truck transports in particular matches today's requirements of the shipping and receiving economy. The interactional effect of the different influencing variables yields clear market advantages for road transport. Unsurprisingly the statistic data in Europe verifies that the majority of the goods is (and will be) transported by truck. Without any effective counteractive measures this development will dominate the future progress as well [4].

A principal reason for this is because rail transport does not meet the requirements of the logistic concepts (JIT, JIS, etc.) of the production industry. Additionally, transport decisions of the shipping economy are taken against the background of available quantities and qualities of the individual mode of transport and the associated traffic network [2]. Within these market areas, rail transport, independent of the system properties like schedule-fixation, mass transport capacity, etc. [5], has clear disadvantages in many aspects compared to road transport. In reference to the market, rail transport does not only suffer from the effects of the changing requirements of the transportation market [6] but also from not reacting timely and adequately to these changes. From the perspective of the overall traffic system the potential for improvement remains unexplored.

In order to obtain sustainable modal shift movements in favour of mono- and multimodal rail freight transport processes, new fundamental solutions are required. In short, innovative and market-oriented services are needed.

EVALUATION AND ANALYSIS

Because of the initial status innovative transportation solutions and business models are needed, which can offer an alternative to truck transport to the shipping enterprises and make thus a contribution for the discharge of the carrier road. Although the history of the freight transport is affected by important innovations the intensity of innovation in this industry is far behind other disciplines nowadays. One major reason is the missing evaluation possibility of business models in order to draw conclusions on the success of innovative models and to be able to identify room of improvement within the existing models. In the course of an evaluation and analysis (process benchmarking, KPIs) the existing business models in rail freight transport are evaluated. Multimodal rail freight transportation is a complex procedure, in which all the components should be seamlessly linked and efficiently coordinated. Disparities in economic development, transport policies, infrastructure across nations and modes of transport make the integration of mono- and multimodal processes a challenging task for all parties involved. This implies additional and so far uninvestigated challenges for the business model conception. To shape and improve multimodal product solutions it is very important to close this gap.

Benchmarking the existing successful business models in rail freight transport and as a consequence to find competitive solutions and support the design of innovative business models.
BUSINESS MODEL ANALYSIS OF SELECTED RAILWAY UNDERTAKER IN AUSTRIA

Stähler defines a business model as an already existing and applied business concept with the main components (1) value, (2) production of goods and services and (3) earnings. In the course of this paper we will focus on component (2), the production of goods and services, in other words the value added. This component is based on the question how the service is configurated and developed for each customer [7].

The production of goods and services is again divided in three components:

1. The product-/market sketch defines which product respectively service is placed on which market in which configuration.
2. The internal architecture defines the resource management, the level of value chain and the arrangement between internal and external service.
3. The external architecture covers two main topics, the interface to the customer and the external value adding partner which are necessary to fulfill the customer needs.

As a consequence the mission of the business model is to configure the three above listed components successfully and therefore to generate the preached value [7]. We will focus on the component product-/market sketch.

Waibel has adapted the model of Stähler with the objective to analyze business models in rail freight transport. For this purpose Waibel constructed and defined a meta-business model to classify the types of business models used by railway undertakers (RU). This model will serve as the basis for the following analysis [8].

As stated above, the product-/market sketch is highly relevant for the transport performance of a railway undertaking. The transport performance covers a physical transport part (primary benefit), ergo the transport of goods from A to B, enhanced with logistical and forwarding services (organization of multimodal transport processes, turnover etc.). The core of the provided performance is the transport process. Within the framework of a transport process, the different products consist of three different distinguishing features (see figure 1):

1. Mode of production (block train, full-load traffic etc.),
2. Operating distance (regional, national, international),
3. Type of transported good.

![Figure 1: Composition of transport performance in rail freight transport [8].](image)

For analyzing business models Osterwalder and Pigneur describes two different approaches, the „value/customer-oriented approach“ and the „activity/role-related approach“. „From a company perspective, the former approach [value/customer] is more outward looking, while the latter [activity/role] is more inward looking.“ Thus the first mentioned approach has a strong market orientation, the second approach is resource based [9].
Hence, using the „value/customer-oriented approach“ answered the question for an optimal marketable product-/market sketch. Based on this line of argument, this work will focus on the implementation level, more precisely on the business processes of railway undertaker. This perception has the main goal to create and develop the demanded customer value. Waibel describes this as follows: „The core of the performance of railway undertaker is the transport process. Therefore the three different distinguishing features of a transport process are the basis to identify the different types of business models“\(^1\).

According to the three components of a transport process the decisive parameters for the typification of the business models are (1) the number of the different offered connections (Connection type), (2) the number of the different offered production types as well as (3) the number of the different transported types of goods (possible additional attribute). Based on the parameters, Waibel defined four different fundamental business models (see also figure 2):

1. **Minimalist**: few connection and production types.
2. **Connection type specialist**: many production types but only few connection types.
3. **Production type specialist**: many connection types but only few production types.
4. **Allrounder**: wide spectrum of production and connection types [8].

![Figure 2: Business model portfolio based on the transport performance [8].](image)

As basic findings of the analysis the following selected facts can be named:

1. most of the railway undertakers are regional, national and international oriented, whereabouts the international connections vary between one and 12 countries,
2. more than 90% of the transports are planned in the long term,
3. all companies own a different quantity of rolling stock (wagons and locomotives), the most important capital equipment is the bogie flat wagon,
4. the (international) competitive strategies of the companies are mainly based on all three sub-strategies cost leadership, concentration on core competencies and differentiation.

\(^1\) Note: For the purpose of this paper we focus exclusively on the transport process. For the holistic analysis of the transport performance we refer to Waibel (2008).
Regarding the types of business models, the Austrian RU-land can be divided in the types „Minimalist“ and „Allrounder“ nearly equally.

**PROCESS BENCHMARKING – THE ADDED VALUE PROCESS MANAGING TRANSPORT**

Following the argumentation of the previous chapter we will focus on the implementation level. So this chapter takes a closer look on the business processes of railway undertaker. Business processes have a different level of influence on the customer value and company’s success. For the purpose of this paper we will focus on the core processes (primary business processes) which perform services for external customers. Within the primary business processes the original added value occurs, in other words the preparation and commercialization of products and/or services for external customers [10] [11].

The instrument of (business) process benchmarking is well applicable for detecting optimization potentials and defining measures for improvements on the process level as well as to reformulate the entire organization of the company on the basis of the primary operations. Aim of the benchmarking was a comparative analysis and as a result the optimization and reorientation of selected working processes. The priority objective was to define process benchmarks [12].

The below shown selected benchmark added value process “managing transport” is based on a survey and analysis of the leading private railway undertakers in Austria.

![Figure 3: Defined benchmark of the added value process – managing transport for railway undertaker](image)

**PROCESS BENCHMARKING – IDENTIFIED KEY PERFORMANCE INDICATORS OF MANAGING TRANSPORT**

Key Performance Indicators (KPI) helps an organization to define and measure progress toward defined organizational goals. Once an organization has analyzed its mission, identified all its stakeholders, and defined its strategic goals, it needs a way to measure progress toward those goals. Key Performance Indicators are the needed instrument to measure. In concrete terms KPIs are quantifiable and qualifiable measurements, agreed to beforehand, that reflect the critical success factors of an organization. Performance indicators can be seen as the operationalisation of quality and service capability [13] [14].

KPIs are the precondition to measure the quality and success of the different transport processes, ergo products, of a railway undertaker. In the course of analyzing the companies
various different indicators were identified. Based on the results the most important, because critical to the business success “managing transport” of railway undertaker, and common KPIs were defined:

- Delayed trains
- Development of sales
- Production costs / turnover
- Availability of wagons
- Availability of locomotives
- Number of complaints / damages.

REFERENCES