NEW APPROACHES OF COST MANAGEMENT IN RAIL TRANSPORT

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Introduction

Cost management will be more and more important in the case of rail companies as they need reliable information on the efficiency of their services. The currently used cost calculation procedures, however, don't meet the requirements of up-to-date management principles as they rely mainly on arbitrary allocation practices. New costing methods for rail transport shall be found to overcome these problems resulting in distorted information. A possible solution can be the adaptation of activity based costing methodology to rail specific management processes. This paper identifies the shortcomings of current rail costing practices, proposes an activity costing based approach as an alternative to the traditional calculation procedures and draws conclusions on the applicability of the recommended model.

Shortcomings of current rail costing practices

The continuous business process reorganization has improved the management information systems of rail transport companies. At the same time their current business planning and reporting practices are still determined by top-down approaches. It means that the starting points of cost and performance evaluations are in general aggregated values. The main methodological shortcoming of the controlling systems is the lack of detailed profit object calculations. The rail "products" are evaluated from the point of view of cost effectiveness in aggregated levels only (e.g. product groups by types or market segments). No information on the real cost of elementary rail services (like a freight transport task or a passenger journey) is available yet, although this information would be necessary for pricing purposes in business contracts.

So it can be concluded that simple averaging is more general in rail cost management practice instead of using cause-effect based overhead allocations. It is also usual that the exploitation of technology data in cost calculations is very limited while this could improve the effectiveness of costing techniques significantly.

Identifying new costing methods for rail transport

The basic idea of improving rail transport costing is to include technology parameters into the calculations. Thus indirect costs can be allocated to profit objects through using technology performance flows instead of ad-hoc distribution keys. When applying the activity based costing (ABC) approach, cost elements which can not be allocated to profit objects directly shall be assigned to activities taking part in the production of elementary rail services. Technology systems deliver performance indicators for each activity, which enables a more exact distribution of these costs among elementary services as profit objects.

ABC is used mainly in manufacturing industries for improving cost management practices. It is applicable where the ratio of indirect costs is considerably high. Several applications can be found in service sectors as well. Nevertheless, transport or logistics related implementations are relatively rare [1].

Figure 1 illustrates the comprehensive operation mechanism of ABC model. It relies on the general methodology but shall be adapted to the specific management and technology characteristics of rail transport/service companies [2].

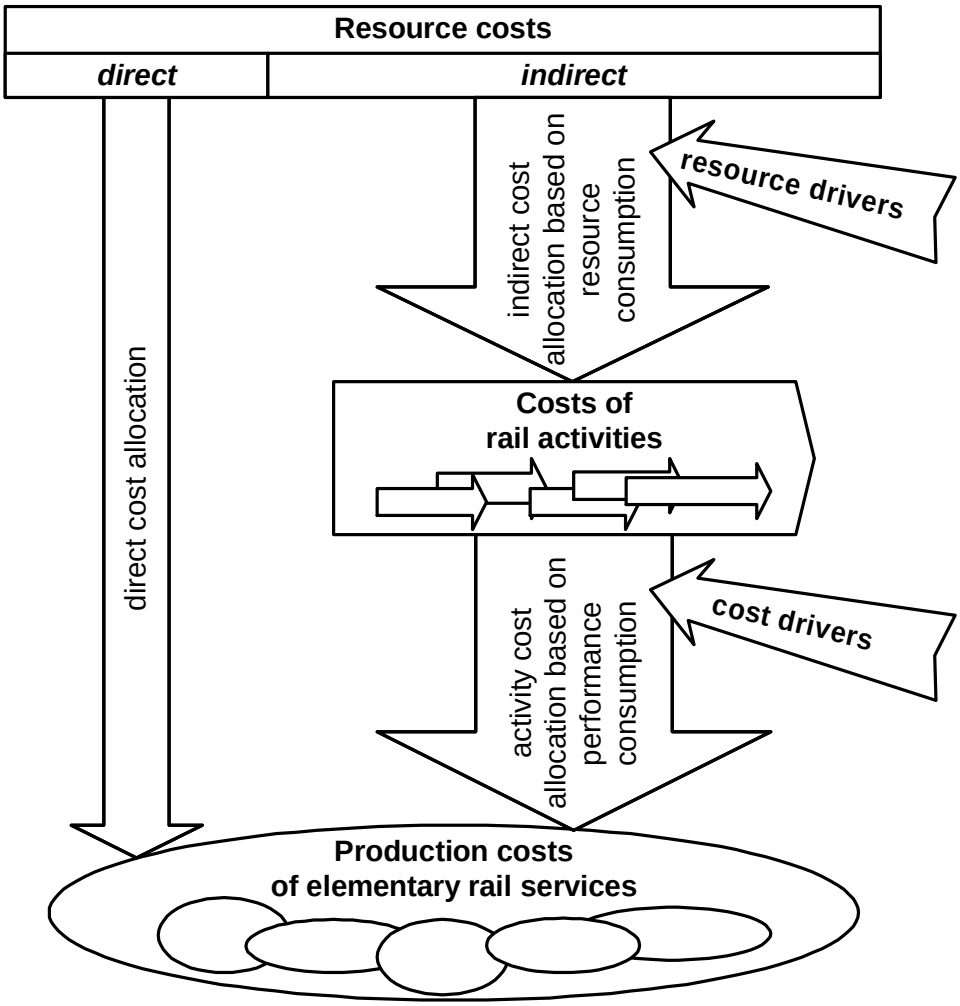

Fig. 1: Activity based costing model for rail transport

The first step of setting up the ABC model is to collect and classify resource costs. It can be based on the general ledger of the examined rail company. These costs shall be divided into direct and indirect parts according to their relations to rail services (or "products"). Direct cost elements can be allocated to (elementary) rails services directly. Indirect cost elements (or the resources behind them) are consumed by multiple rail services so they can be allocated only by using a specific cost distribution procedure.

The classification of cost items requires the definition of service/product structure. Possible elementary rail services (as profit objects) can be – according to the activity areas of the analysed company – for example a freight transport task, a passenger train, a traction service, a maintenance task or a train path (infrastructure use). The level of sophistication in case of selecting profit objects depends on several factors like the information demand, the financial resources available for controlling system improvements and the data processing practices (providing input data).

If a passenger or a freight train is regarded as an elementary profit object direct cost items can be for example tractions costs or infrastructure user charges. If a passenger journey or a freight transport task is selected as profit object the ratio of direct costs will be much lower. Anyway, a considerable part of production costs in the railway sector is rather

indirect, which explains the relevance of improved – cause-effect based – cost allocation methods like activity based costing.

Indirect costs shall be allocated to activities (constituting the value chain of the given rail activity area and consisting of physical and disposition operations) at first according to their resource consumption. The measurement of resource consumption can be carried out by using so called resource drivers. These are certain technology parameters describing the relations between activity intensity and resource demand. Resource drivers can be even ignored when resource costs are recorded by using activity codes. Doing so resource costs are classified according to activity types, too, which enables a well established first level cost allocation (this is the case in the accounting system of Hungarian incumbent railway company – see later).

After the first step cost allocation rail activity costs can be calculated. Furthermore, each activity shall be described by a performance indicator (measured in tonnes, kilometres, hours, pieces, etc.) as well. These indicators are the so called cost drivers as they are used to distribute activity costs among profit objects (elementary rail services). Of course it needs that performances consumed by the profit objects shall be measured or at least estimated correctly.

After completing the procedure described before the production cost of each elementary rail service (or "product") are become calculable exactly. If revenue data are also available the margins or the cost coverage ratios of profit objects (e.g. trains, train paths, etc.) will turn out, too. Allocating revenue data to rail products may be difficult particularly in rail passenger transport. Here the transactional information systems are often not able to provide revenue data in the examined product levels. In case of other rail services (freight, traction, infrastructure, maintenance) revenue data are in general more reliable even in the lower levels of product hierarchy.

Feasibility analysis of proposed methodology

The management information system produced by the implementation of activity based costing in rail transport transforms the huge data volumes collected by accounting and technology systems into useful information. So ABC can contribute to evaluate the cost and performance efficiency of rail activities or companies in a more exact way. It makes the management practices more transparent, too.

The main (anticipated) positive results of the ABC introduction are the followings:

- the production costs and margins of rail services or products can be calculated not only in aggregated but in more detailed levels, which makes profit and loss generators more visible;
- key activities determining the success or failure of rail services can be identified by analysing activity costs and performances;
- measures aiming to enhance cost effectiveness in rail businesses can be better established, e.g. in case of business process reengineering (BPR) projects.

At the same time the implementation of ABC in rail transport needs to meet several methodological and technical requirements. The followings shall be ensured before launching the costing improvement:

- appraisal and systematisation of rail activities and operations (depending on the activity areas of the examined rail company);
- definition of rail based service/product structure;
- realisation of (basic) cost and revenue data collections and separations in the accounting system;
- recording or estimating technology parameters describing rail processes;
- introduction of a dedicated information technology tool (software) applicable to depict and operate the costing model;
- scalable and powerful hardware background and communication network for supporting data processing tasks;

- integration of the ABC solution into the complex management information system by reaching widespread commitment in the organisation of rail company.

The practical implementation of the ABC model is to be realised by using the data warehousing technology. Here technology and accounting oriented data bases can be combined and structured according to the criteria of cost controlling methodology. Dedicated business intelligence tools may be then operated for supporting analyses by using and exploiting the integrated information stored in the data warehouse. Here the use of additional methods, like CRM (customer relationship management) is also reasonable. CRM delivers complementary information to ABC mainly regarding the revenue side of rail services [3].

Activity based costing is a management tool which can be extended to more co-operating rail companies, too. For example a freight operator and its service providers (like traction and maintenance companies) can make advantages by using the same cost calculation methodology. It requires of course the standardisation of information exchange between the interested parties. Data sharing solutions – i.e. process portals – are here particularly applicable as they ensure a transparent and at the same time well controlled business data flows [4].

Practical experience

A dedicated R&D project in 2006 aimed at improving infrastructure cost calculations in the case of Hungarian rail sector. It was a favourable opportunity to test costing methods combining technology and management information. Considering the anticipated benefits activity based costing had been chosen as the basic approach of examinations.

During the project input cost data had been made available by the general ledger. Activity codes used by the accounting system helped identify the relevant items. The examination of activity codes resulted that about 700 out of 1600 activities are totally or at least partially related to infrastructure management. A directed query to the selected activity codes resulted in a moderate size set of cost data for five years. This had been fed into the calculation model as a basis input. Transactional (like freight forwarding management or traction management) systems delivered the desired performance database. A transferable set of data supported cost driver calculations and the detachment of fixed and variable cost parts. Cost drivers came from the dataset of performance indicators. Finding the most appropriate cost driver to each activity was carried out by an extensive regression analysis. In the end cost functions had been elaborated for dedicated activity groups. These functions made it possible to calculate marginal as well as average cost values for the main elements of rail infrastructure services [5].

Conclusion

As a summary of the study it can be stated that the adaptation of the ABC methodology to rail specific business procedures is a possible solution to make management related decision making practices more reliable in the case of rail companies. After having a clear picture of the activities and the performance flows in the rail company cost allocations can be carried out in a transparent and exact way. Moreover, accounting and calculation procedures between different companies operating in rail business are also more transparent by extending the improved costing methodology to inter-company relationships.

The first experiences have showed that the use of activity based costing approaches and their information technology realisations may be effective supplementary tools of current management information systems in rail business. They contribute to the better exploitation of data collected in technology and accounting transactional systems.

However, before starting the ABC project it is reasonable to consider the expected costs and benefits, furthermore the conditions of the development and decide on the scope and the schedule of the implementation.

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