Business Process of MÁV Co's Infrastructure Specialised on the Services and Charging System

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Abstract: The paper will present the current situation of Hungarian infrastructure service system and charging policy. The paper introduces handling of train path requests to performance accounting business process of the offering services, service packages of the infrastructure manager, strategy and structure of charging system.

Keywords: railway, infrastructure services, business process, charging system

1. Introduction and background - MAV Co.

The Hungarian State Railways (MAV Co.) – the incumbent national railway company – has experienced a vast transformation with regards to its organisational, administrational tasks and its legal environment. In the last two years, the dynamics of the changes have accelerated (see Table 1).

Table 1. A brief overview of MAV Co.'s history

Year	Event
1992	MAV Co. is established: separation from the state, introduction of corporate accounting
2000	"Internal" separation of accounts of the business segments (freight transport, passenger transport, traction, infrastructure, real estate). Organisational entities are developed (within the corporation) according to the main segments.
2003	The first edition of the Hungarian Network Statement, with access rules and charges.
2004	Establishment of the independent Rail Capacity Allocation Body (RCAB) – as the MAV Co. and the Raaberbahn (GYSEV) are still integrated companies. Start of the first private freight railways (4 companies are operating by the end of the year).
2006	Outsourcing of the freight transport business: establishment of the separate company MAV Cargo Co. Start-up of the Hungarian Railway Authority (HRA) to control and supervise the fair behaviour of the incumbent companies and new market entrants.
2007	Outsourcing of the passenger transport business: establishment of the separate company MAV Start Co.
2008	Outsourcing of the traction and rolling stock maintenance business: establishment of the separate company MAV Trakció Co. and MÁV Gépészet co.

The Infrastructure Business Unit of MÁV Co. operates and maintains MÁV Co's more than 7500 km long railway network, the main characteristics of which were the following between 2004 and 2008.

Table 2. The Characteristics of the MÁV Co's Railway Network (2004-2008)

MÁV Co.	2004	2005	2006	2007	2008
Built length of railway network (km)	7650	7650	7650	7596	7511
Built length of double track railway lines (km)	1146	1146	1146	1173	1173
Rate of double track railway lines (%)	14,98	14,98	14,98	15,44	15,62
Rate of electrified railway lines (%)	33,55	33,55	33,55	33,79	34,17
Run freight train (number/year)	212 827	216 405	237 497	221 976	195 644
Run passenger train (number/year)	1 112 448	1 020 344	1 044 186	1 078 066	1 076 229
Kilometres by freight trains (trainkm)	16 498 213	16 894 000	18 963 648	18 836 132	18 276 716
Kilometres by passenger trains (trainkm)	80 237 372	75 396 595	77 238 250	84 527 403	83 447 780
Punctuality of passenger trains (%)	94,78	94,14	92,89	93,39	92,60
IM's staff (people)	19 918	17 878	18 565	17 575	17 272

2. Handling of train path requests to performance accounting, business process of infrastructure manager and service packages

2.1. Handling of train path (and services) requests to performance accounting

Fig. 1. illustrates the whole process (in the case of minimum access package, track access to services facilities and supply of services and additional services) from handling of train path (and services) requests of train operator companies (railway undertakings, RUs) to performance accounting. In the case of ancillary services requests and orders go directly to the Infrastructure Manager from RUs.

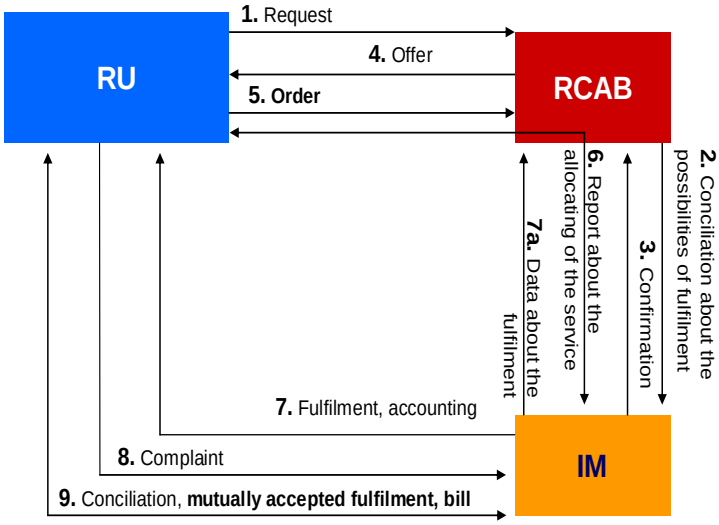

Figure 1. Whole process from handling of train path requests of train operator companies to performance accounting

Activities of RCAB are needed for the harmonisation of 2001/14/EC Directive. RCAB grants the train paths and open access infrastructure services for RUs. IM and RU take access contract (based on Network Statement regulations) on infrastructure services.

2.2. Business process of infrastructure manager

As the first step of the business process – shown in Fig. 2. - it is necessary to ensure the appropriate inland and outland environment, and make research on customer needs. The main elements of this process can be the market research and analysis of competitors, benchmark and analysis about service and charging systems, research on customer needs and developing methods for meeting the customer needs, etc.

The second step is to determine (according to the customer demands and international experiences) the service elements and to develop the service system from the service elements, which contains the processes like introducing new service elements, developing the service system, introducing service packages, determining and developing the quality of the provided services (making station and line categories from different service point of views), making capacity-analysis, determining charging principles.

Before introducing the new service system is necessary to prepare/modify the concerned regulations (Networks Statement, instructions) and to inform and train the members of the IM and RUs as well, about the content of different services.

To get the opportunity to introduce a service system is only possible after developing the frame of the system. After providing the service, the next step is conducting researches for customer needs.

The cycle of business process framed and influenced by the sales and marketing strategy which increases competitiveness and helps to optimize capacity and human resource allocation. The marketing communication about the developed service packages to the market regarding segments is also a part of the marketing strategy.

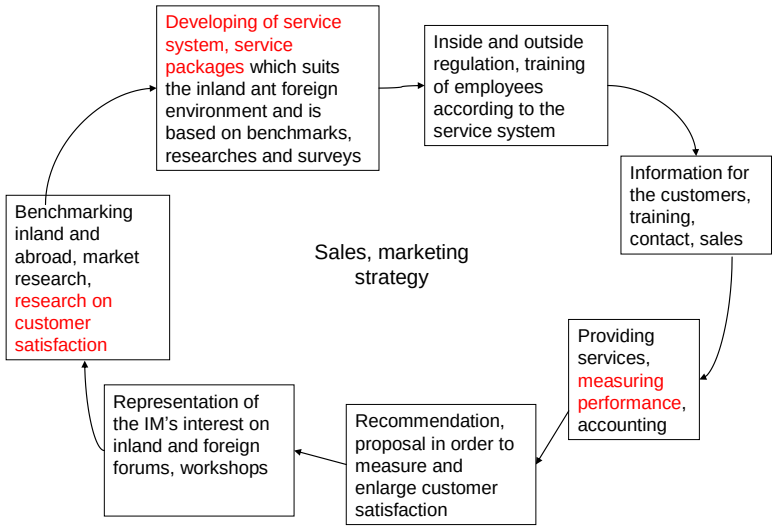

Figure 2. Sales and marketing process of Infrastructure Manager

2.3. Service packages of infrastructure manager

2.3.1. Introduction of the Common „RNE" Structure of the Network Statement, what kind of service groups RNE recommend for IMs to use

The RNE recommendation follows the principles of the Directive 2001/14/EC, so it distinguishes 4 different service categories:

1. The minimum access package, which is obligatory to provide by the IM and RU has to make use of it.
2. Track access to services facilities and supply of services, which is obligatory to provide by the IM but RU can decide whether to make use of it or not.
3. In case of Additional services IM can decide whether to provide and publish the service or not. If the IM publishes the service in NS, IM has to provide for RUs. The RUs can decide whether to use it or not.
4. Ancillary services are not obligatory to provide (deliver) and not obligatory to make use of them, both IM both RU can decide whether to provide and whether to make use of them.

Table 3: Service categories

Service category	For IM to provide the services	For RU to make use
Minimum access package	Obligatory	Obligatory
Track access to services facilities and supply of services	Obligatory	Not compulsory
Additional services	If publishing than obligatory	Not compulsory
Ancillary services	Not compulsory	Not compulsory

The content of the different service categories mentioned above is the following:

The first service group is the **minimum access package**. Here NS has to contain the List and Description of the services obligatory delivered by IM according to Directive 2001/14/EC, Annex II, point 1.

Under **Track access to services facilities and supply of services** NS has to detail the services described in Directive 2001/14/EC, Annex II, point 2 – including track access conditions and usage conditions for each of the services listed, also stating if services are delivered by IM, or by other suppliers, who may be referred to.

If RU is interested in information on location, it can find them in chapter 3 of NS ”Infrastructure”.

For information on charges of the listed services, refer to chapter 6 ”Charges”. This information can not be found in chapter 5.

Under **Additional services** NS has to define products listed in Directive 2001/14/EC, Annex II, point 3 – including usage conditions for each of the services listed, also stating if services are delivered by IM, or by other suppliers, who may be referred to.

If the IM provides other additional services than listed in the previous numbers (5.4.1-5.4.5), these additional services are to be listed here with separate sub numbers. – we will see examples for this case in the paper.

Under **Ancillary services** NS has to contain product definition of services listed in Directive 2001/14/EC, Annex II, point 4 – including usage conditions for each of the services listed, also stating if services are delivered by IM, or by other suppliers, who may be referred to.

2.3.2. The infrastructure service system of Hungarian State Railways

In the introduction, the regulations are listed which have been considered during the Development of the Network Statement. These are:

- Directive 2001/14/EC of the European Parliament and of the Council on the allocation of railway infrastructure capacity and the levying of charges for the use of railway infrastructure and safety certification;
- Hungarian Act CLXXXIII of 2005 on the Railways (Hungarian Railway Act);

The infrastructure services are regulated by the 54th Paragraph (§) and are listed in the 3rd Annex of the Railway Act.

Due to MÁV and GYSEV are integrated companies, in Hungary there is an independent capacity allocation body, the RCAB, who allocates capacity for RUs in order to ensure non-discriminatory. NS is published on the internet by the Hungarian RCAB, named VPE.

3. Determining of access charges

3.1. IM strategy in relation to access charges

The IM of MAV Co has its own balance sheet following the internal separation. It accounts for access charges for users since 2003. This was the time when prices appeared in the Network Statement.

Basic strategic issues with access charges for the IM:

1. The IM wants to achieve full cost recovery without profit. Current access charges are provided according to a full cost allocation method, where all cost components of the IM are coupled to services and "flow" into the prices of these (more details in section 3 below).
2. The law 66/2003 GKM-PM determines that services of the minimum access package (path allocation and train running) are not allowed to cover central management costs. This means, that after the proper allocation of central management costs to all services, the part that should be carried by the services of the minimum access package are not included in the prices, but are subject to the railway–state contract. These costs are approximately 12% of the total costs of the IM.
3. The state is willing to sign the appropriate contract with the IM to cover the part of central management costs that should be allocated to the services of the minimum access package. With this contract the IM would achieve full cost recovery: 12% from the state and 88% from railway users.
4. Direct costs, or those cost elements that are subject to allocation procedures, are "only" those cost items that are booked in the accounts of the IM. Other railway costs (e.g. traction fuel, real estate maintenance used by the traction business unit, etc.) do not appear in the books of the IM and are therefore not part of the basis for cost calculations and charges. The term "full cost recovery" addressed under point 3 above means only the full costs of the IM.
5. There are no external costs or taxes, no environmental overcharges or subsidies included in the prices although these are partly allowed by the Hungarian Railway Act.

6. The cost calculation – the basis for the price determination – is done by the IM, but prices are calculated and negotiated by the RCAB. Prices do not change every year. The available history shows, that price re-engineering has been started every two years, but this has resulted only in a slight change in the price structure, not in a change in price levels of the various market segments.

Although the price structure had several smaller changes in the last years, the nominal values of rail access prices did not change since the first Network Statement. This means two directions of real price changes:

1. As the production price index increased about 5% yearly from 2003-2007, this means approximately a 28% real value discount compared to the 2003 initial price (for all types of trains).
2. The passenger transport business unit introduced integrated cyclic timetable (ITF – Integrierter Taktfahrplan) for some parts of the network. This is why the performance of passenger trains improved in 2006, even though unit prices did not change. Therefore, the passenger transport business unit (later the MAV-START Co.) has nominally an approximately 22% higher expenditure on charges than before.

The pricing principle itself (full cost basis) is rarely discussed, but the level of charges is continuously under heavy negotiations. The decision depends primarily on the Ministry of Finance, and the available state budget for rail infrastructure operation and investments.

3.2. Structure of the current access charges

The current charging system is the slightly developed version of the first one, introduced in 2003. In that year it was only used within the integrated company MAV Co., but later (2004) it appeared also in the Network Statement of the IM. One of the very first questions that had to be answered by the price calculation process is the one of the selected variables. Under this group of problems, the following main questions had to be answered:

1. How detailed should the price system be? Naturally, the easiest would be to divide all costs by the number of trains or the train kilometres, but this "solution" might not be accepted by the market. In Hungary, the price system uses about 5-8 variables that are available independently from each other.
2. Which variables describe the service item accurately? E.g. the shunting service can be more or less independent from the axle kilometre, but may better co-relate with the number of shunted wagons or the real shunting time.
3. Which data is actually measured in real time by the IM (which data is available from own sources)? It is no use to select gross tonne kilometre for train movements as a price basis if the IM only has train kilometres available.

Table 4. Variables and differentiation of the IM's services (based on the Network Statement)

Name of the service	***Variables***	***Differentiation***
Minimum access package		
path allocation	number of paths	type of trains[1)], long term vs. short term orders
train running	train kilometres	type of trains[1)], line category[2)]
Access to service facilities		
use of overhead catenaries	electric train km	type of trains[1)]
passenger train stops	number of stopping	station category[2)]
passenger train departures/destinations	number of departures/destinations	station category[2)]
freight train start/interim/ destination usage	number of cases (usage)	station category[2)]
freight wagon access to loading/unloading tracks (station usage for serving)	number of wagons	station category[2)]
rail vehicle storage	number of wagons	long term vs. short term orders, vehicle technical features
access to weighting facilities	number of wagons	none
additional personnel	person hours	long term vs. short term orders
train registration (outside)	number of cases	none
Additional services		
shunting of freight wagons (marshalling and shunting)	number of wagons	owner of shunting engine
consignment of freight wagons	number of wagons	owner of consigning engine
forwarding of dangerous and outsized goods	number of cases	type of goods / desired allowances
weighting	number of wagons	none
change of axles (normal to wide and vice versa)	number of wagons	type of goods regarding danger code
usage of normal gauge boogies	hours	none
Ancillary services		
education and examination of RU's personnel	number of cases	type of education / examination

[1)] type of trains: long distance passenger trains, local passenger trains, empty passenger trains, freight trains, maintenance trains, single engines.

[2)] lines and stations are classified into 3 categories according to the technical factors (e.g. signalling systems), limitations (number of tracks, axle load) and level of offered services (e.g. opening times, number of shunting locomotives). It can happen that upgrading the line for passenger traffic (e.g. raising the speed from 100 km/h to 140 km/h) causes rising prices for freight trains as well.

The IM now has very limited directly measured, factual data available on passenger transport trains. Naturally, the IM has a proper database about the orders and the planned timetable, and can manage its task according to these data, but the logging system on stations, that could "measure" the differences between the orders and the actual services is missing for passenger transportation (it is already available for freight transportation). The real-time logging of the infrastructure services in the context of the running of passenger- and locomotive trains will be realized in 2010 by the operation of the PASS2 system. This demand on data instigated and motivated the development of the station-logging system that covers all trains, and will provide basic, electronic

information about all types of trains by the end of 2008. Services offered by the IM, their variables and the differentiation basis are shown in Table 4.

3.3. Structure of the current cost accounting system

The strict relation of charges to costs requires a well detailed cost database. Without a proper accounting system, the adequate cost and charge calculation will not be possible. Preparation for this new cost accounting system started already in 1995, but the full and live use of the new Accounting Management System (AMS) started only in 2001.

Apart from the technical hierarchy (access to all accounting data via a Web-based application, relatively short answer time of the system, prepared queries according to main controlling and management issues, etc.) the structure of the database is of primary importance.

All accounting data can be split to corporation code, accounting code, activity code, organisational code and track section code.

Since pre-defined and flexible queries can be made according to different instances, the charge calculation is supported by the accounting system.

In their relation to booking entities, costs can be classified into several groups. Each group might have a different allocation procedure. These groups are centrally booked costs, costs booked to open line track sections (captured by track section codes), costs booked to station track sections (captured by track section codes and activity codes).

4. Evolutions, trends and recommendations

The service system is the result of the business process cycle on Fig. 1. with monitoring and following the changes in the international environment, RU demands, IM skills, parameters and legal regulations. It means that the service system is not a stable system, is changes as often the elements which have effect on it are modified. The change of the service system means the all the processes of the cycle on Fig. 1. are under continuously change and development, which results in providing the service elements what the market needs.

The Sales Department of MÁV Hungarian State Railways Company Infrastructure Business Unit (IBU) has conducted Customer Satisfaction Studies since 2005. The personal in-depth interviews concern all the railway undertakings having network access contracts. The research covers the contracting, invoicing, servicing and staff (in headquarters and in the regional centers) area. According to the summary about the results of the last research contracting is on an acceptable level. Our customers evaluated the invoicing performance of the IBU (Infrastructure Business Unit) on very good level with relatively lots of excellent values and perspectived an improving tendency. On the whole our customers considered the performance of IBU on acceptable level.

The main areas, which have to be intervened are following:

- Changing our ‘way of thinking’: FROM ‘Why cannot we do it?’ TO ‘How can we do it?’

- Revising our administrative systems: simplification, modernisation
- Development of IT supporting: efficiency, further electronisation
- Improving the inside cooperation of different professional departments: efficiency, reduction of time factor
- Development of railway network: quality and safeguarding
- Advancing in the questions of warranty
- Diminishing of service influencing effect of human factor

The current cost and charge calculation at the MAV Co. is the refined version of the first one introduced in 2003. As many important questions are not decided even at European level (e.g. the Marginal Cost vs. Full Cost debates), there might be changes in the short and in the long run as well. On the other hand, it is not only the European legislation that influences the market prices and costing behaviour of the IM, but users and the road competition are of high importance. There are some changes that are already foreseeable for the Hungarian infrastructure pricing scheme.

1. The IM now has a relatively low-quality dataset about the actual traffic performances. Real time measurement of the performance is only available in case of services for the freight trains. This is why the IM started an ICT project to obtain actual, real time measured data from all segments of the railway transportation. The system is based on electronic log booking of station events. The second step will be the automation of data input from signalling systems from 2010.
2. The price system should be based more heavily on gross tonne kilometres, as this is the best indicator for track wear and tear. Research is already started to clarify the changes to the current system.
3. The network graph has to be detailed. Now the owner of industrial tracks is not indicated in the accounting system. If a shipper or any third party maintains an industrial track, different prices should apply for consignment and marshalling.
4. Shunting technologies differ from station to station. The current prices do not cover differences in the shunting technology. The reason is the missing details of cost data.
5. Border crossing procedures differ from border station to border station. The differences (similarly to shunting) are not represented by prices because of missing cost data.
6. The Network Statement does not contain anything about the warranty obligations of the IM. Users want the IM to introduce refund in case of delayed trains and to provide different levels of guaranteed paths. The cost structures behind these expectations have to be elaborated in the short run.

Most of the practical debates around railway pricing are definitely *not* about the charging principles, but about the actual level of charges. Users are less interested in econometric research at this field, but they pay attention to the total amount that they

have to pay for the access to the tracks. The current levels of charges all across Europe vary from 10-12% cost coverage to 10% profit (110% of costs). Harmonisation of pricing regimes does not help much if it simultaneously ignores the question of the level of charges. On the other hand, the level of charges should be discussed with all the national governments, as it is the government that has to pay for the uncovered costs of the railways. State budgets have different limitations in each country. Therefore, an incentive for harmonisation should care about this matter as well.

References

[1] Dénesfalvy, Á.: *Network Statement Chapter 5 – Services*, Workshop on drafting of network statements in South-Eastern Europe organized by the European Commission in cooperation with CER, 11-12 January, 2007. Skopje, Macedonia

[2] Dénesfalvy, Á.: *Regulation and changes of IM's services systems*, Transportation Review, March (2007) pp. 112-120.

[3] Farkas, Gy., Dénesfalvy, Á.: *Benchmark analysis of railway infrastructure charging systems*, Transportation Review, October (2005) pp. 374-386.

[4] Farkas, Gy., Bokor, Z.: *Rail Charging System And Controlling Based Rail Strategic Planning In Hungary*, Proceedings on European Transport Conference, 9-11 September (2002) Homerton College, Cambridge, pp. 16.

[5] Dénesfalvy, Á., Farkas Gy.: *Implementation of infrastructure service and charging system in Hungary*, Proceedings on Scientific-expert conference on railways, Niŝ, Srbija, 9-10 October (2008). pp. 29-32.

[6] Rónai, P.: *Rail Charging and Accounting Schemes in Europe*, Case studies from six countries – Hungary, CER-EIM booklet, May (2008) pp. 40-49.