COMPETITION AND RAILWAY SYSTEM

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ABSTRACT

The solution of traffic modes competition in the frame of transport system is not still quite satisfactory. The competition one can understand on one hand as state and on the other hand as process. For this reason, different kinds of market situations can appear with time.

The similar problems have accompanied the transport system. For this, the review of the different ways to put competitive pressure on railways is presented. The contribution deals with the possibilities offered by microeconomic theories influencing also practical application in organization and management of railway system. Consequently, the availability of railway system competition is provided.

Having described this way the article discusses the difference between coordination by means of direct control and market mechanism, the determinants of the size of an enterprise, nature of competition in the various modal markets and effects of economies of scale and scope influencing the optimal size of transport enterprise. The term economies of density is unique for transport and from the short-term time is particularly important for rail transport.

Keywords: competition, railway, transport modes, organisation, economy

1. INTRODUCTION

In theory, the term « competition » has a number of meanings. The basic approach to the competition is given by wide range of degrees forms perfect competition to pure monopolies. Because of the strict requirements applying to perfect competition, even the most effective forms of competition used in practice may be described as imperfect one. These imperfect forms which nonetheless bring satisfactory results, are workable competition.

The competition is primarily oriented on railway system. The reason for this approach is given by continuing expanding development of road transport, worst environment condition, not quite good projecting of inventory system and logistic of material, products and goods flows. Problems are also possible to find in traffic of goods and products in the frame of European transportation system. Transportation in many ways is connected with overloading of transport infrastructure. Transport flows happen depend on road network, on development of car industry and individual car transport. The railway transport could be very active transport mode providing the positive contribution to the limiting negative factors by current transport system.

The railway is coming to the competition but with not quite adequate response to this challenge. The term imperfect competition brings the new view on understanding of competition. The static and dynamic approaches to the competition can influence new application in transport system and especially in railway system.

2. RAILWAY AND MICROECONOMIC ASPECTS

The railway can be studied from the different forms of competition. From the point of view of transport system is possible to search the external competition through competition among various modes of transport. The further competition can follow in certain mode (rail, road, air). In this type of mode the parallel competition is one of form providing alternatives to shippers. Such competition can be called inner one. Transport market creates various forms of market segments where the competition is supported by competition in market as static approach and competition for market as dynamic one.

2.1 Inter-mode competition

One of factors of inter-mode competition is relation between road and railway transport. The development of this relation is typical for Europe and USA. Very low share of person traffic in USA or small share of freight traffic in Europe gives the clear characteristics of this competition. It is fact that the shares on transport market are influenced by the factors as geographic, economic and qualitative items (disperse of demand, bad access to stations, request “door to door”, minimising of traffic time). The competition among different transport modes creates pressure on railway. The inter-mode competition constitutes the important pressure on railways; with the possibility that some external factors can influence the result of the competition. The railway system for different reasons is notable to response to this challenge and in many cases to substitute the road transport. The competition depends on quality of road network and

the density of railway infrastructure is one of important factor how to support the advantage of railway is the existence of externalities. This factor can significantly influence the urban areas.

2.2. Parallel Competition

This type of competition is created on market where systems are in operation a small number of large integrated railways. These systems, railways firms offer services and operate on different relations (routes), providing alternatives of traffic possibilities. Parallel competition for implementation has to fill the following conditions:

* Transport network has to offer the different alternatives between main freight transport generation.

* Effectiveness of this competition supposes the existence of suitable traffic composition. It means that we have no basic and important cost distortions between the routes, in another words, one firm has no important cost advantages given by specialisation in freight traffic only.

* Effective regulation supporting the fair competition (no collusion, no attrition war, no cross financing).

* The parallel competition can cause the overinvestment and capacity excess.

Transport markets provide wide possibilities of situations of competitive relations between operators. Competition occurs at all stages of transport activities (management of infrastructure, transport services, vehicle production market). Transport technology process can be divided to the chains, involving a multiplicity of markets. The different degree in different areas can be developed (operators vs. providers of vehicles or rolling stock, operators vs. final customers, operators – intermediaries – customers).

Vehicle production market is fully competitive for cars and truck. There are two approaches to the market of rolling stock providers. One approach is European way coming up from historical development where the railway operators were independent of each other (usually state monopolies) and had no pressure of international competition for the provision of rolling stock. The result was bilateral monopoly between rail operator and rolling stock provider giving the benefit from rolling stock for specific and individual situations.. On the contrary, the second approach, American way led to the long production run, widely used standards, interoperability of rolling stock over the whole continent with the benefit of universal rolling stock with great initial cost, but with longer operation run.

Under pressure from liberalisation and the EU´s effort to increase the competition, the European railway needs to be international.

2.3 Competition in market

The degree of competition, in this type of market, can be considered as a number of firms with its market shares. This "density" of firms is measured by Herfindahl-Hirschman index (HHI). The degree of concentration is expressed by

$$HHI = \sum (S_i / S)^2 \qquad \text{(Eq. 1)}$$

where S_i share of output of i-firm on market
S total output on market

If HHI → 0 then market has low degree concentration (higher degree of competition).

If HHI → 1 market has only one firm or few firms with the high degree of concentration (due to theory, such market is monopoly or oligopoly).

If we think in this line of theory, we assume such market as a static one. Such market, however, is changed in time. Because of very low number of suppliers search the high profit, the market is subject of interest further firms desiring to earn access market as competitors.

2.4 Competition for market

Market access describing in the previous part, expresses the change of state of market situation. The result is dynamic behaviour of market. Dynamic approach needs an important item: open market. Such competition is called competition for market and creates the possibilities of penetration of new subjects. Due to number of new subjects the pricing and profit on market is influenced. Open market supports the time changes of market states leading to the withdrawals of subjects which are not able to be competitive.

Competition for market can cause the potential competition, for instance, in the case of oligopoly one. In this competition the sellers in a market are limited to a small number. The sellers´ actions have influence on other sellers' decisions. The possible marginal income that a seller can earn by increasing his output is dependent on the unknown future actions of other accessing firms. Firm's estimation of marginal cost is dependent on its assumptions regarding of possible reactions of these accessing firms. These oligopolies find difficult to manipulate price to high level. Dynamic approach to market offers the question what is a reason for existence of regulator.

3. ORGANISATION POSSIBILITIES

Inter-modal competition can be considered as effective form of workable competition which is found in practice. Inter-modal competition is suitable for transport system where transport network and capacity are in satisfactory state.

The competition in market and for market is connected with vertical separation. This separation depend on different factors among them the inter-modal competition and

passenger railway transport are important. Separation of freight and passenger transports supposes to appreciate the economics of scope between the two activities Problem can be seen in appreciation of operations of two activities on the same infrastructure with the different operation characteristics. The reason has not to be only cost approach. Instead of this, the following factors can be given:

- the optimal geographic range of freight and passenger activities is not in the same way,
- cross financing between the two activities is very likely in case of integration and can create the problem inside company,
- Usually happens that company is more oriented on passenger or on freight transport and one activity suffer from integration.

Organisation of the horizontal structure could be based on the optimal size of firm. It depends on the relation between small and medium-seized enterprises and large railway firm. Optimal size of vertical oriented enterprise depends on integral operation passenger and freight traffic. Horizontally oriented firm for passenger railway traffic cannot be too large and can be successfully used for regional organisation structure.

Effective competition is a prerequisite for the optimal allocation of scarce factors through the market and this effective competition depend on the size of enterprise relative to the size of the market in which it operates.

If we suppose that the law of diminishing return does not apply and that is no limit to the economies of scale which can be achieved in the various operating processes, then the unit costs will decrease in short and long terms, economic organisation would make no problem. To ensure the best possible allocation of scarce factors of production in these conditions, the market would have to consist of a single supplier of service under consideration, since it would be possible to decrease unit costs continually by the further expansion of supplier.

To provide the transport services, the enterprise demands the different organisational structure and operation approaches. For this reason the transport market is composed of competition enterprises of different size. All these firms are in different stages of curves of diminishing returns and returns of scale. The transport sector consists of various numbers of operating processes, such as the operation of different transport means on the traffic routes, operation of signal control system, the production of transport means and their assembly, construction and maintenance of transport infrastructure. It cannot list in detail the number of transport activities and individual processes involved in providing the various transport services. These services are different in nature and in number.

All these processes and services should be planned and organized. The coordination has to be managed in harmony with the others in the way to achieve the common target. For the transport economics the target is to provide the demanded services at the lowest costs. This condition can be provided by two approaches:

- each process and service can be managed individually in such way that

the coordination of different , but related process which provide the needed transport service, can be left to the movements of supply and demand curves functioning through the price mechanism,

- Coordination can also be achieved through placing of various related processes under direct control of single transport firm.

The size of enterprise should depend on grouping of different processes and activities. If transport operator considers garaging, operation and repairing as a different processes, each process ca be controlled separately (operator pays rent of garage on independent garage firm and in the same way the repair of transport means). On other hand all these processes can be managed by single firm. The large number of processes controlled by single firms, the less number of independent firms but the less number of owns the large size of them. Coordination in large size firm is centrally controlled, in other word; price mechanism influences the coordination of large number of small firms.

From the point of transport economics the assessment of the size of transport enterprises should concentrate on the relative economic merits of direct control and price mechanism as a means of coordination processes. The result should tend to such number and size of enterprises that are able to satisfy aggregate demand under lowest costs. It is eternal problem of relation between large and small and medium-seized enterprises.

4. EFFECT OF ECONOMIES OF SCALE

Larger firms may be able to allocate scarce production factors to more effective use than small ones. It is a case of economies of scale and scope. Economies of scale are result of higher employment of capacity of firm and equipment providing reduced cost per unit.

No firm remains indefinitely in a stage of increasing returns and there are the technical and economic limits to the economies of scale that can be achieved. Economic limits are connected with size of demand or market which can be cut the capacity of transport firm because of ineffective using of capacity. Instead of economic limits we meet the technical limits to the economies of scale. It can be divides to two items:

- technical limits characterising construction and operation parameters of equipment (transport means),
- Technical limits relate to the capacity of complementary equipment (equipment needed for functioning of transport system).

The technical and economic limits relate to economies of scale are alternative limits. If economic applies, one firm can satisfy the whole demand. If technical limits are operative limits, the satisfaction the whole demand depend on capacity employment more than one firm. One supplier can create optimal market structure when technical reason of economies of scale results in lower unit cost than the large number of smaller ones could provide or the better employment of current capacity will be less costly than

investment to the new equipment.

In transport, with exception of railway, the size of enterprise is such that the potent ional maximum economies of scale are soon exhausted. Larger enterprises can move effectively use their production factors because of better coordination between processes and operation unit. If input of processes to the production system is provided by the group of small enterprises, usually, from the point of view organisation and economies of scale, is better to make decisions and satisfying of these processes in the frame of one firm.

The railway has the different processes as maintaining and controlling, the use of the railway track and operation processes which represent outputs which could just as well have been provided by different enterprises. All these technological processes are very closed associated that their coordination by one firm brings the economic advantages. Primary savings is possible to find in managerial costs while the other cost should not be higher than would have been in operation in separate enterprise. Integration trough grouping of different processes and activities under a single enterprise's direct control can be seen as a vertical and horizontal integration.

In horizontal integration parallel processes are coordinated by the direct control methods in the frame of single firm (coordination of line-haul transport). Coordination of transport processes by direct control, usually by single higher system creates the horizontal form.

Vertical integration is concern the processes that can be characterised as a heterogenic ones and they are form in the chain of processes. The transport is an element in that chain (own transport in different industrial company).

Any enterprise reaches the point where diseconomies of scale set in. The optimal size of enterprise is a matter of balance between economies of scale and of scope on the one hand and diseconomies of scale on the other hand. Usually the general rules are in absence so that the unit costs of an enterprise give the reliable measure of optimal size.

5. CONCLUSIONS

The described forms of competition one can find on the transport market. The different modes of transport are characterised by different forms of competition.

In the railway transport has been seen that its long-term function is horizontally oriented with the constant scale of economies. It is basic view to differ between the decreasing unit cost and the economies of scale and economies of density. The latter possibility can create the nature monopoly with the respect to the transport route. The connection of different transport routes in the way to reach the economies of scale leads to creation of nature monopoly. In fact, many countries have only single railway firm. The optimal size of enterprise is not quite unambiguous solved problem.

Effective competition is a prerequisite for the optimal allocation of scarce factors of production trough the market. The competition depends on the size of enterprise with the respect to the size of market. To provide transport services is determined by

different organisation structure and different operational approaches. For these reasons the transport market consists of competitive enterprises of different sizes. The enterprises passes through different phases of diminishing return curve.

The transport market can be divides to the two separated markets of passenger and freight transport. Each of these markets will be homogeneous one and all markets can differ due to different factors (geographical area, sorts of offered services and their quality.

Organisation of supply can take different forms in transport:

- Integrated operators providing a complete service
- Restructured railways as in many European countries were presented and creations of unique European railway system.

Both situations can lead to the monopoly or oligopoly organisation or to the extremely large number of firms. There is also a varying role for government in transport due to supporting of public sector through various types of franchising, varying degrees of regulation of private firms. There are three possibilities how to solve it: integration or fragmentation, monopoly or competition and liberalism vs. intervention.

The organisation structure depends on the three items.

- Infrastructure level (ground, road, rail, air).
- Information level giving the possibility of the best utilisation of the infrastructure (signalling and the information system on the rail network)
- Service level (price, frequency, quality).

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