

## MODELING OF TRANSPORT DEMAND IN RELATION TO COMPETITION ON TRANSPORT MARKET

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*Summary: This article deals with modeling of transport demand and its requirements in relation to competitive environment of transport market. Basic factors with influence on transport demand are outlined here as well both from macroeconomical viewpoint and from transport system viewpoint. Article also emphasizes interdependent relations in transport and economy and the main aspects of competition on transport market.*

*Key words: transport, demand, capacity, model, firm, user.*

### INTRODUCTION

Transport is considered as one of the most significant factors of social and economical development, because it is able to support competition, economic growth and employment. From market viewpoint, transport ensures overcoming of time and spatial disharmony by production and consumption of goods, thus transfer of goods from place, where it has minor useful effect to place with significant useful effect. It is evident, that transport system itself in economical and business context brings important profit for society. The important viewpoint following from these facts represents transport demand as one of market category, which development is naturally not isolated from influence of many impacts and conditions of competition environment and that is why these factors have not to be marginalized.

### 1. TRANSPORT DEMAND MODELING

Transport demand (for freight traffic) mainly depends on:

- structure of activities and branches of industry in national economy,
- localization of points for getting resources, their processing and localization of sales markets,
- used technologies in production of goods and services,
- organization of goods turnover (purchase, sales, warehousing, number of organization degrees, flexibility and frequency of deliveries),
- organization of transport processes,

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- behaviour of transport users on market.

Majority of above-mentioned factors has not features of transport sector. They are connected with characteristic attributes of various industries, trade, economy from spatial viewpoint and organization of economy life. It depends on route selection, distance and number of used means for transportation of certain concrete consignment. Behaviour of transport users (economical units) on market represents relation to transport (mass or size and quantity of transportations, costs) by economical decision-making. This is one of the most important factors by investigation of incentives of enterprises behaviour and needs of national economy. However, considerations in categories of total transport capacity and transport demand are usable to a limited extent by decision-making processes. They do not answer the number of questions:

- character of hauled loads from transportation viewpoint – transporting capability and possibilities,
- requirements for means of transport and organization of transportation processes,
- possibility of substitution of particular factors with impact on economy transport demand,
- required transport capacity (trains, trucks etc. and their proportions),
- required qualitative characters of transport capacity (mass scale of transportations, elasticity, degree of operational reliability, speed etc.),
- technologies of transportation processes.

We can say, that:

$$\Delta Q_Z = f(\Delta H_H, \Delta \varphi_T) \quad (1)$$

$$\Delta Q_{ZC} = f(\Delta Q_Z) = g(\Delta H_H, \Delta \varphi_T) \quad (2)$$

These equations express increase of transport demand as result of increase of total production volume  $\Delta H_H$  and changes in transport demandingness  $\Delta \varphi_T$ , what is also reflected in necessary changes of transport capacity  $\Delta Q_{ZC}$ .

It is also possible to consider this problem in vector interpretation,  $H$  represents vector of activity volumes of  $n$  particular industries of economy:

$$H = \begin{pmatrix} H_1 \\ H_2 \\ \cdot \\ H_n \end{pmatrix} \quad (3)$$

Each industry (or eventually goods groups/types) is distinguished by its own volume of transport demandingness  $\varphi_T$ :

$$\varphi_T = \begin{pmatrix} \varphi_{T_1} \\ \varphi_{T_2} \\ \cdot \\ \varphi_{T_n} \end{pmatrix} \quad (4)$$

Each of these industries (goods groups) creates demand for transport services in volume:

$$\begin{pmatrix} H_1 \\ H_2 \\ \cdot \\ H_n \end{pmatrix} * \begin{pmatrix} \varphi_{T_1} \\ \varphi_{T_2} \\ \cdot \\ \varphi_{T_n} \end{pmatrix} = \begin{pmatrix} Q_1 \\ Q_2 \\ \cdot \\ Q_n \end{pmatrix} \quad (5)$$

Vector  $Q$  in this vector equation expresses volume of demand connected with certain concrete quality volume of provided services  $S_i$  to each  $i$ . Each  $S_i$  is vector describing essential qualitative characters of services in relation to each particular subsystem  $i$ .

## 2. COMPETITION ON TRANSPORT MARKET REGARDING THE TRANSPORT DEMAND REQUIREMENTS

With increasing competitive power of transport services providers, it is not sufficient for transport firms to know perfectly only their own customers. They must pay the same attention to their competitors as well. Far-seeing firms do not hesitate and systematically collect needed information about competition.

It is necessary to distinguish in transport sector competition especially in freight and passenger transport. Competitive equilibrium in freight transport is unstable first of all among companies of rail and road transport but also among companies of introduced transport modes. It is caused especially by the fact that competitors are nearly identical and undertake in the same way. Public passenger transport has rather regulated competition, because transport companies provide in majority transport in public interest.

The first horizon of competition conception in transport is branch or market competition conception. Branch competition conception works on an assumption that transport is one of branch of economy and transport firms offer services which are simply able to substitute each other (substitution services). These services has high mutual demand elasticity. It is competition of transport firms within the whole transport sector.

Market conception of competition focuses attention of transport firms on wider scope of potential competitors which can satisfy the same customer needs (transport, transfer). It is in essential about activities of firms except for transport sector which can in certain way substitute transfer needs (travelling) of passengers, possibly goods. Need of travelling (personal contacts) can be in some cases intermediated by informational technologies. Generally, market conception of competition enables to recognize wider scope of real and potential competitors and to create better long-term strategical plans to firm.

Competition among firms of road and railway transport (intermodal competition) is highly actual in conditions on transport market of Czech Republic, it is valid for firms within transport modes of road and railway transport as well. The first step of competition use on transport market was demonopolization and creation of competitive environment in transport sector.

The main competition situation of firm can be divided into five types. It depends on number of transport services providers on transport market and on rate of difference among particular transport services. These cases can exist:

- only one transport firm on certain territory,
- few transport firms with identical type of services,
- few transport firms with similar type of services,
- many firms with identical assortment of services,
- transport firms with ability of total or partial services distinction.

It is necessary to achieve certain advantage before competition in connection with transport firm need to operate efficiently on transport market and to face to threats of competition. It can be ensured by achievement of competition advantages. Competition advantage lies in the fact that we emphasize possible advantages before competition. This advantages can work on these assumptions:

- firm will achieve singularity in low costs,
- firm will achieve singularity in differentiation of services,
- firm will achieve to mark its own supply off from competition.

Transport firms achieve cost reducing especially by use of two types of strategical concentration. Firstly it is looking for ways which lead to reduction of costs which can be influenced by management of firm. The second type is achievement of lower costs per unit of transport capacity by increasing of these capacities. Bigger transport firms can be capable to place own constrained resources of factors of production more efficiently than small firms. These savings are results of higher utilization of firm capacities and its equipment.

Singularity of transport services can lie in their complexness and diversity. Complexness of service represents complicated character of steps and sequentions which create providing process of transport service. Diversity reflects functional range and variability of provided service processes. For instance transport service – transportation of dangerous goods – is little varied (railway or road transport), but highly complex (according to requirements of relevant dangerous goods transportation agreements).

Transport firms must search possibilities how to distinguish own services and to achieve competitive advantage. Distinction possibilities can have form:

- transport service (availability, delivery term, technology, diversity, complexness),

- personnel providing service (competence, reliability, communicativeness, politeness, credibility),
- distribution (coverage of transport market, proficiency and design),
- image of firm,
- price.

Distinction comes into account if it is for customer important, evident, perfect, transmittable, available and for firm rentable. Firms must present own distinction of service by appropriate way.

Importance of competitive advantage is the greatest by nearly saturated market where higher number of firms operates and where supply exceeds the demand.

### 3. CONCLUSION

Transport development in many ways comes near to borders, which must be explicitly defined not only from technological viewpoint, but also from economical viewpoint. It is determined firstly by interdependent relations between transport and economy. Both systems reciprocally support and influence each other and it is necessary to include them not only in contemporary state assessment, but also in prognosis and future requirements for transport and economy. Many methods, which contribute to define strategies of future development of transport networks, do exist, and macroeconomical viewpoint represents only one of ways how to form future transport in a better way and in a higher quality..

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