

Strategic policy instruments in managing freight transport demand

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Abstract

The economic crises highlighted the importance of re-thinking the operation of the transport sector. Companies, research institutes, governments and the society are all interested in smart solutions to reduce internal and external cost effects of road haulage via increasing efficiency and widening the utilization rate of available capacities along with the mitigation of social side effects of road transport, especially with managing transport demand. The overall regulatory framework set by the European common transport policy and national transport policies shall create suitable incentive frames to reach these general aims. Both administrative and financial policy instruments are available for such actions, but their impacts are different. This article discusses the conditions of utilization and the expected effects of the applicable instruments.

Keywords

freight transport · policy instruments · demand management

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1 Introduction

The road sector plays a dominant role in satisfying the customers' shipment needs. The existing general practice of organizing the cargo processes primarily focuses on the customers' needs and cannot pay enough attention to higher level economic and social objectives. This habit often leads to undesired traffic congestions which affects directly both the hauliers and the society. The available resources to improve the road infrastructure services are lacking nowadays, so decision makers on the higher levels must search for alternative instruments to enhance the sector's quality. Improving the intensity of freight transport can be effectively initiated by policy instruments like traffic control or mobility management. Such actions often do not need very expensive development instruments, rather policy-like regulatory measures which offer relatively cheap, easily applicable solutions, first of all via reorganization of the legal background and road pricing. However, wider application of these instruments requires deeper impact analysis in advance like DEA [1]. This article demonstrates that in given regulatory framework such administrative and financial regulatory instruments can lead to significant modifications in the road freight transport.

2 Regulatory framework

The main framework of the regulatory instruments is determined by the transport policy of the European Communities and the renewed Lisbon Strategy. According to this the major macro-level aims are to develop and improve the economy and resource efficiency which, along with the direct, micro-level aims, have to be supported by all regulatory solutions. Directly the latest White Paper [6] declares the following objectives for the freight sector: achieve essentially CO₂-free city logistics in major urban centres by 2030, 30% of road freight over 300 km should shift to other modes such as rail or waterborne transport by 2030, and more than 50% by 2050, move towards full application of "user pays" and "polluter pays" principles and private sector engagement to eliminate distortions, including harmful subsidies, generate revenues and ensure financing for future transport investments. – without curbing the mobility needs. Beside these goals, the special conditions evolved in the last decade

have to be taken into account as well: the ageing of the European society, the migration, inner mobility, the environmental challenge, the scarce availability of energy resources, the urbanisation and globalisation. These circumstances might urge decision makers to rethink the structure of national transport policies and to create a sustainable vision for the future. The basics for this vision shall be the provision of a safe, comfortable and interoperable transport system, smooth functioning internal market, the development and maintenance of an integrated infrastructure network, conception of the transport system with special view on sustainability, development and use of intelligent technical solutions, availability of quality governmental services and employment, increase of system efficiency due to intelligent pricing and finally better availability of services via circumspect transport and land use planning [6].

Along with vision statement some strategic components can already be found on the list of utilized instruments. The EU has adopted its first freight transport and logistics action plan, the key element of which is such an electronic map application that can help trace the movement of freight. This is the eFreight concept. The aim of the EU with the ITS action plan is to develop ICT based, interoperable information systems and intelligent transport solutions and the promotion of their usage in freight logistics, including the control of dangerous goods, the transport of livestock, but also digital mapping, telemetry, gathering, storing, analyzing, and providing access to cargo data. Freight transport, fleet and terminal management applications would help the operational processes at haulers [7].

The handling of needs and problems emerging on lower levels belongs to the echelon of strategic planning. Among these, special attention should be paid to the prevention of undesired traffic deviations, the mitigation of night and weekend traffic, tackling city congestions, the decrease of environmental burdens and the development of a secure living neighbourhood and competitive economic environment. Strategic financial planning can lead to significant enhancements in the whole supply chain [2].

3 Regulatory instruments

These instruments are part of freight and logistics management on the strategic level, and within these they focus on the network-like cooperation of the stakeholders of freight transport (like the transporters, the infrastructure provider and traffic controller, the decision maker). Analysing all levels of cooperation helps to discover the aspects valued by the partners and the network of their relationships. The significance of planning is that the efficient cooperation of identified stakeholders and groups enables the fulfilment of the generally identified, community level regulatory frameworks, while the participants realize the potential lying in the synergy resulting from efficient cooperation, and at the same time can attain their own interest during cooperation. The steps of cooperation are the following:

- contact between the identified stakeholders, introduction of

the interested parties to each other,

- identification of the subjects (actions) of common interest, and a purposive dialogue between the parties,
- gathering opinion from other stakeholder groups about the material created during cooperation, incorporation of feedback and launching concrete actions.

This group of regulatory instruments requires a very small level of intervention, but due to the network-like cooperation the social-economic benefits gained from the individual contributions can be multiplied [8].

The regulatory instruments determining the technical conditions are the changes building on innovative, e-logistics platforms, utilizing service models and needed for the more developed freight distribution in the cities. Further regulatory measures which lay down the technical conditions deal with the determination of the time windows to be used by the freight transport companies for movement and the propagation to participate in such systems. The e-logistics solutions built on e-commerce and e-business enable the complex handling and utilization of available logistic resources of the company (fleet and capacity, logistics platforms, groupage transport service and loading points, routes etc.) within a flexible, demand-oriented, electronic service integrated into the intelligent transport system of the city [10]. Although it has an influence on different logistics strategies, the movement of goods in time periods when there is no rush hour, leads to social and economic benefits which outweigh the individual losses. The direct aim in connection with this is the modelling of the participation of carriers in this flexible transportation system and the appropriate creation of incentive solutions [8].

Road pricing policies can also be seen as regulatory instruments. It is important to note that the selected aim to be reached by the pricing policy has a huge effect on the expected results and on the variety of solutions that can be employed. (See Fig. 1.)

Basically two different aims can be identified: financing – to cover the infrastructural and social costs; and regulation – to decrease the environmental burden, to influence transport demand. But these two might overlap as well.

The simpler pricing schemes, employed on individual roads are designed to support the self-financing of the given infrastructure component and the provision of a service of adequate quality for the users. On the other hand, the pricing schemes embracing a whole network with fees proportionate to the distance covered seem to be an alternative of the existing tax-like pricing schemes. Keeping in mind the “user” and the “polluter pays” principles, the most efficient instrument of the pricing policies seems to be the introduction of the mobility based or if possible, the purely performance based pricing scheme.

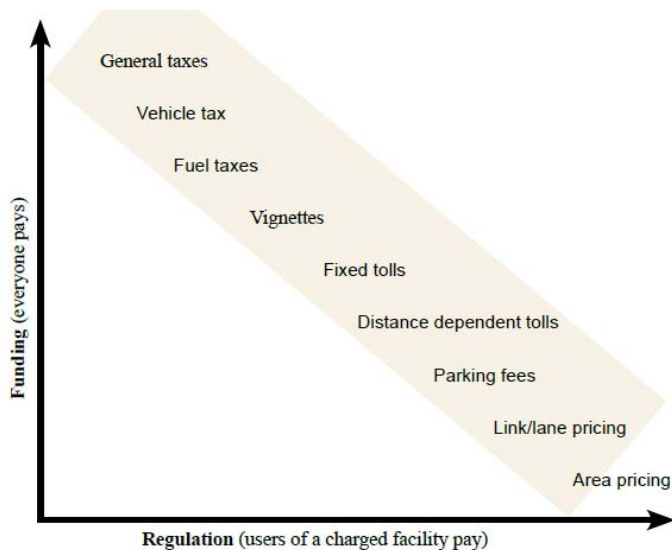


Fig. 1. The applicability of pricing schemes [9]

4 Influencing demand

In the planning phase of the individual regulatory instruments it has always been kept in mind that these always constitute part of a bigger, more complex regulatory package and thus these instruments have to be planned together with the countermeasures to be introduced as a reaction to their effects in way that the sum of the different impacts is positive. Main aim is influencing demand – without curbing it – to improve the efficiency and capacity utilisation of transport network – in a multimodal sense.

In the light of the experience gathered up till now, the most efficient way to influence transport demand is the initiation of non-fee based regulatory measures, although, it has to be noted that there is still much room for research in this direction, but it is evident that such pricing schemes will become more and more significant within the regulatory field in the future.

Reviving the frames of regulatory policies through cooperation has a substantial impact not only on macro- but on micro-level as well, as the increased economic efficiency can help decrease transport costs and resource utilization. Influencing road transport demand through the regulatory framework might amplify the efficiency of the network, reduce the need for the construction of novel infrastructure, augment management comfort, help to increase transport safety and security, and finally might positively affect wasteful transport habits for the sake of sustainability. Cooperation within the group of stakeholders with common interests enables the efficient construction of co-modal transport chains as well.

With the help of real-time information used in integrated e-logistics services the service provider might continuously monitor the actual state of his transport processes, thus in case of deviations, within the free capacities under his jurisdiction, through replanning the transport task or through reloading, he will be able to maintain or even improve the transport efficiency of the whole system [8].

Within city or metropolis environment congestion free infrastructure service can be reached by the limitation of entry, as this is the key to resolving congestions. However, at the same time, the effect of the measures on freight transport processes in the city has to be analysed, including the effects on freight transport companies. Concerning air pollution, CO₂ and noise emission, it is the responsibility of the city councils to revise existing entry limitations, as the possible undesired micro-economic effects of previously introduced and purely sustainability based measures have also to be taken into account.

The implementation of intelligent freight transport operations in the city and the widespread use of on-board navigation require European level standardization of data processing, exchange and interfaces. Modal choice regarding the question as how to reach a destination lying in the city leads us to the so called last mile problem. Namely, reaching the city environment, road freight transporters, having come so far, are not keen on changing to another alternative. The solutions to the problem are not settled yet, due to the strong differences between the micro- and macro-level interests [8].

Should we want to influence mobility demand through pricing policies then instead of shifting demand to other transport modes, as stated in transport policy frameworks, one should foremost endeavour to distribute the demand in time and space. Experience shows that the modification of pricing schemes leads almost solely to reorganization within the road transport sector. Change in modal choice is only marginally observable.

Tax-like components of charging schemes are vehicle tax and excise. These factors have only an indirect effect on transport demand: although annually they mean a big financial burden for the carriers, but on the one hand the carriers react inflexibly on the changes of these, and on the other hand they just shift these costs to the customer.

Time-based vignettes, distance related road charges, parking fees, line-/lane pricing and entry fees are usage connected components of the pricing policies. Due to their different characteristics these measures have different effects on the stakeholders and other participants. (See Fig. 2.)

Just as regulatory measures need to be assessed in their complex environment, so must the pricing policies be created and changed in view of the charges inherent in the whole transport system. Due to the revenues collected, the pricing systems significantly augment general social welfare, but on a micro-level they might amplify the burdens of road users. Thus it is of utmost importance to use the revenues gained in an efficient and transparent manner. In the same way, traffic reduction due to the increase in the costs of mobility might be seen positive from a social aspect, but from the point of view of the companies it can only be accepted if the decrease in mileage does not lead to a reduction in transport volume. Such impacts can be made transparent through detailed cost calculations [3]. To enhance the acceptability of the system every effort must be made to recycle the revenues in the interest of the stakeholders, but the labelled



Fig. 2. Effects of pricing policies [5]

utilization does not necessarily lead to the most efficient solution and so, the option to use it in other fields shall be investigated in every case. If the amount of revenues collected is bigger than the costs to be covered, the most efficient utilization of the difference seems to lie in the reduction of the burdens on labour [4].

Acceptability is also served by the solution based on the opinion of road users. According to surveys, lorry users regard the introduction of time variable road charges as an efficient measure to fight congestion, while emission objectives are mainly served by the distance proportionate differentiation also paying attention to emission standards, as this contributes to the modernization of the fleets and more efficient transport management. Apart from emission standards, fee differentiation according to road categories is also acceptable. Road users claim a right for seeing that the charges paid improve their transport conditions.

In a city environment we can draw different conclusions. The introduction of a city road pricing scheme (along with the transformation of the existing motorization burdens) proves in the first line efficient in reducing mobility demand, mitigating congestion, air pollution and the number of accidents, and in a secondary way, in yielding additional financial resources [4].

It is to be noted that due to lack of experience individual system planning is needed in every case, which means most of the times an expensive system development.

5 Summary

There is a very wide variety of regulatory measures available for influencing transport demand, and they are able to serve hugely different interests from strategic level down to company level. These solutions can only work efficiently if they are implemented in a complex system, with attention to all stakeholders' interests.

The strategic group of instruments provides an opportunity to influence demand in the long term, and with the change of technical parameters, one can, on the one hand, immediately in-

tervene in the transport processes, and on the other hand with knowledgeable company behaviour results can be achieved in the long term as well. Via applying pricing policies or reshaping existing pricing systems only partial results can be attained, chiefly in city environment, where the factors of sustainability and competition are becoming more and more valuable.

All measures have an effect both on macro- and micro-level, but only those systems are viable in the long term which are able to exert a positive influence on both echelons, thus creating the acceptability of the given solution. Only measures relying on consensus are feasible.

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