

THE ACCEPTABILITY OF ROAD CHARGES FOR COMMERCIAL TRANSIT TRAFFIC

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Abstract

This paper summarises the results of a key informant survey carried out to assess the acceptability of distance related road charges when raised on commercial freight vehicles in transit through Germany or Switzerland. Economists advocate road pricing as an effective method of regulating negative transport effects but even though policy makers and the general public are acutely aware of the effects of road transport, in many European countries a strong objection still remains to the introduction of road charging schemes. What elements of a pricing scheme help improve acceptability and what aspects can cause a scheme to fail are the subject of recent research within the European Union Framework Research Programmes.

Although some empirical work has been carried out in the area of acceptability of urban charging schemes, there is little or no survey information available regarding the acceptability of interurban road charges for commercial freight transport – especially when these charges are raised when in transit through a foreign country. In light of the introduction of distance related road charges for freight vehicles transiting through geographically central European countries (Switzerland and Germany), transport organisations representing commercial freight operators in bordering countries were surveyed.

The survey was carried out as a self administered questionnaire using statements ranked on a 5 point scale between strongly agree to strongly disagree. Questions relating to road pricing in general and the perceived outcome of road pricing schemes were asked. The relationship between acceptability of road pricing and use of revenues and possible compensation measures for commercial vehicle operators was explored. Finally, questions about the technical system used and the importance of interoperability between charging systems were posed.

Results show that there is a preference for charges to be set at the European rather than the national level. A strong desire for equal treatment of national and foreign vehicles regarding charges and compensation is seen. No conviction that road pricing is a suitable instrument for reducing congestion, accidents and the environmental effects of road freight transport can be noted. There is no indication that transport associations predict a modal shift for freight transport brought about by additional road costs. The lack of interoperability between the charging systems in use is seen to constitute a major problem for freight vehicle operators.

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1. INTRODUCTION

This paper summarise information obtained about the acceptability of road charges paid for commercial transit through Germany and Switzerland by means of a key informant survey carried out amongst road transport and combined transport organisations. The countries surveyed (Austria, Belgium, the Czech Republic, Denmark, France, Italy, the Netherlands and Poland) have the highest rate of transit through Germany and Switzerland and apart from national hauliers are the most affected by distance related road charges.

The introduction of road pricing is a highly controversial topic and the lack of acceptability is often cited by policy makers as one of the grounds for failing to implement road pricing schemes. Although many studies have examined the acceptability of urban pricing and several studies provide information about the acceptability of road tolls for commercial HGV transport, little information is available about the acceptability of tolls paid while in transit through a foreign country. Therefore, this paper aims to describe a wide range of results providing first information in this area rather than give an in-depth analysis of specific aspects of acceptability. The survey was carried out within the European 5th Framework Research Programme Project REVENUE (Revenue use from transport pricing).

The first part of this paper describes the distance related road charging schemes in Switzerland and Germany that form the basis for the evaluation. Following this, some of the results of the key informant survey are discussed.

2. TRANSIT THROUGH SWITZERLAND AND GERMANY

Because of their geographically central position in Europe, Switzerland and Germany experience a higher amount of transit traffic than other more peripheral countries. This is especially true for heavy goods vehicles (HGV) traffic. For Germany, not only the north south motorway routes are of importance for transit traffic, east west connections are becoming increasingly utilised as transit routes. In Switzerland, alpine crossings (passes and tunnels) experience large amounts of transit traffic as they provide important links between northern and southern Europe.

2.1 Switzerland

Commercial road transport through Switzerland has been documented as being problematic for the environment and those living near transit routes since the 1930ies (Lauber, 2001) and since this time road freight transport in Switzerland has been subjected to various restrictions and charges. In 2003 approximately 19% of all road freight vehicles (or 1.3 million vehicles) crossing the alps used a route through Switzerland (LITRA, 2005). Alpine road transit is, by nature, highly concentrated on a few routes only - creating a major environmental impact on a small geographical area. Because of the lack of available land in narrow alpine valleys, roads take up a comparatively high proportion of the useable land. Emissions from road transport are also problematic as the atmospheric conditions in narrow valleys can lead to a high concentration of airborne pollutants, causing negative health effects for those living in the valleys and overall damage to the alpine ecosystem.

Basic transport data

Switzerland has a total road network of approximately 72 thousand kilometres in length, from this the motorway network has a length of 1638 kilometres. In 2003 the volume of freight transported was estimated to be 36.2 billion t/km. Freight transit through Switzerland is carried out mostly by road and rail. In comparison to these two modes the relevance of air freight, inland waterway transport and transport by pipeline is low (approximately 6% of the total freight volume combined). The modal split for 2003 shows that approximately 66% of the total freight volume was carried by road, from this 6% was purely transit traffic. Rail carried 28% of the freight volume. Here the percentage of transit rail makes up 15% of the total freight transport volume or approximately 60% of the total freight transit volume. Although this is a relatively high percentage for rail freight transport, the share has continually decreased since 1950 when over 99% of all freight in transit was carried by rail (LITRA, 2005).

Introduction of HGV charges in Switzerland

In a national referendum in 1998, the Swiss population voted positively to introduce a kilometre based road pricing system for all vehicles with a maximum permissible weight of 3.5 tonnes or more and consequently the Swiss Heavy Vehicle Fee (HVF) was introduced for the use of all roads in 2001. At the same time the maximum permissible weight limit for HGVs was increased from 28 tonnes to 34 tonnes allowing more transport efficiency and providing a way to offset the additional costs caused by the road pricing scheme (Felix, Neuenschwander, 2002).

The goals of the introduction of road pricing are to ensure the user pays principle is the basis for road charging in Switzerland and to shift more freight transport from road to rail. The shift in the modal split is to be encouraged not only by the increased road charge but also by improvements to the rail network. Revenues from the HVF are to be used entirely for investment in transport infrastructure. Two thirds of the revenues are earmarked for financing national railway projects. The remaining third of the revenues is designated to the Cantons for financing road construction and maintenance.

Technical System

The Swiss Customs Administration (Eidgenössische Oberzolldirektion, OZD) was responsible for the implementation of the technical charging system and continues to run and maintain the system. The Swiss Customs Agency is directly supervised by the Federal Ministry of Finance.

The technical basis for the Swiss HVF system is a vehicle on-board unit (OBU) that automatically records the kilometres driven on Swiss roads through a connection to the tachograph. This simple record of distance driven is coupled with a global positioning system (GPS) and a movement sensor to ensure the tachograph signal is not intentionally interrupted or falsified. A chip card within the OBU records trip mileage. A dedicated short range communication airtel (DSRC) is used to switch the OBU on or off when passing the border and for compliance checks at both stationary and mobile control points. Since the start of 2004 the Swiss OBU can also be used on the distance dependant road charging

scheme in Austria. This is the first example of interoperability of road charging systems in an international context (EZV, 2005).

Although the OBU is mandatory for vehicles registered in Switzerland, foreign vehicles can choose between an OBU and manual payment. Manual payment involves being issued with a chip card with charging relevant information recorded (vehicle maximum permissible weight, emission class etc.) and checking into a terminal at the Swiss border where the current tachograph reading is documented. The road charge is then calculated when leaving the country. In 2002, foreign vehicles paid approximately 22% of the total HGV charges collected in Switzerland. More information about the HVF is given in table 1.

Effects of the introduction of the HVF

The rapid annual increases in commercial road transport experienced at the end of the 1990's have not continued although the road freight transport volume continues to increase slightly. It is considered that the introduction of the HVF has led to a more efficient national transport sector through the consolidation of small companies, allowing a more efficient use of vehicles. Furthermore, the structure of HVF charge which reflects the emission class of the vehicle has brought about a shift in the vehicle fleet favouring low emission vehicles. This in turn has reduced transport related air pollution emissions (Felix, Neuenchwander, 2002).

There has been no major change in the modal split for freight transport since the HVF introduction. This was not expected within such a short timeframe because the share of freight transport by rail in Switzerland is already comparatively high and additionally, the competitive advantage gained by rail after the HVF introduction was somewhat equalled out by the gain in productivity in the road sector resulting from the higher allowable vehicle weight limit. First in 2007, when the first new rail link across the Alps, the Lötschberg, will be opened can a significant modal shift in freight volume from road to rail be expected.

2.2 Germany

Basic transport data

The length of the road network in Germany is approximately 231 thousand km (excluding urban roads for which there is no data). The federal motorway network makes up about 5% or 11.5 thousand km of this total. In 2002, the freight transport volume in Germany (excluding maritime shipping) amounted to over 500 billion tonne kilometres. Approximately 70% of this volume was transported by road, 14% by rail, 13% by inland waterways and the remaining 3% by pipeline (VIZ, 2003). Approximately 30% of the road freight transport volume in Germany was carried by foreign vehicles. This equals slightly more than 20% of the total freight volume and has increased rapidly since 1991 when 13% of the total freight volume (including cabotage) was carried by foreign vehicles.

Introduction of road pricing in Germany

The German Government decided to introduce distance related road charges on the German Federal motorway network for heavy goods vehicles with a maximum permissible weight exceeding 12t GVW in 2001 (BMVBW, 2001). The goals of the road pricing strategy are to introduce the user pays principle for HGV road use; to create better competition between transport modes; to finance the infrastructure costs of all transport modes; and to develop innovative road pricing technology.

Technical System

The Federal Ministry of Transportation, Construction and Housing is responsible for road pricing in Germany. The day to day supervision is carried out by the Federal Office for Goods Transport (BAG). The system was built and is managed by Toll Collect, a private consortium. The Toll Collect system implementation was delayed due to technical problems but successfully introduced on 1 January 2005.

Of central importance to the Toll Collect technical system is the vehicle OBU consisting of a GPS receiver, a digital map and a mobile phone providing contact with the charging centre. The OBU identifies when the vehicle is travelling on a section of road where road charges are to be paid and transmits pricing relevant data to the payment centre. A DSRC transponder integrated in the OBU makes automatic compliance checks possible. The OBU in its present configuration not interoperable with other road charging technical systems in Europe. It is also not possible to charge foreign road charges (for example the Swiss HVF) to a German Toll Collect account for payment (as for example in the global roaming option of mobile phone operators). The use of the Toll Collect OBU is not mandatory for any vehicle but if no OBU is fitted a manual login, providing vehicle data and the route intended to be taken on the motorway, must be carried out before each trip is started.

3. ACCEPTABILITY OF ROAD CHARGES PAID IN TRANSIT THROUGH GERMANY AND SWITZERLAND

To gain first information about the acceptability of road charges while paid in transit, a key informant survey (KIS) was carried out among haulier and combined transport organisations in countries where the use of motorways in Germany and Switzerland for transit is most important. These countries are: Austria, Belgium, Czech Republic, Denmark, France, Italy, the Netherlands and Poland. The survey was carried out in the third quarter of 2004. At this point in time the Swiss technical system had been in operation for almost four years. The introduction of the German system had been delayed for over 18 months due to technical problems and it was not clear if the system would successfully start on the proposed date of 1 January 2005.

A key informant survey is carried out among participants deliberately selected because of their knowledge in the area being surveyed. For this survey, transport organisations representing companies carrying out commercial transit transport (road transport or combined transport) through Germany and Switzerland were considered to be the target survey recipients. The exploratory nature of a KIS allows for results that are not aimed at being representative for all foreign commercial transport companies but should be seen as an infor-

mation gathering exercise held with experts in relevant countries. The KIS was designed to provide information about the range of attitudes that are present amongst foreign commercial transport operators but does not show us how these attitudes are distributed within the transport sector on the whole. Because of the exploratory nature of the KIS a small number of survey participants are adequate to provide a first insight into the area of the acceptability of road charges on transit routes. Non-commercial transport and other commercial transport forms for example buses and coaches were excluded from the survey. The method chosen for the survey was a self-administered survey sent out by email. In total 38 organisations were contacted for the survey, the response rate was approximately 35%, 16% refused on grounds of lack of information, 5% were excluded because of identical replies stemming from inter-organisational work groups and the non-response rate was 39%.

The survey consisted of statements that were ranked by the participant on a 5 point scale between strongly agree to strongly disagree. The statements related to road pricing in general and the perceived outcome of road pricing schemes. The relationship between acceptability of road pricing and use of revenues and possible compensation measures for commercial vehicle operators was explored. Finally, questions about the technical system used and the importance of interoperability between charging systems were posed.

3.1 Survey results

Perception of commercial road transport and outcome of road charges

The majority of organisations feel that conditions are worsening for road transport operators and there is no belief that the introduction of (or continuation of) distance related road charges will improve these conditions. In past research (Link 2000, COWI 2002) accidents and the environmental effects of road transport were perceived as being the most serious problems related to road freight, this was not the case within the REVENUE transit survey. Congestion on motorways was not rated as being significantly worse than congestion in cities.

Some explicit Government goals relating to the introduction of road charges were not considered to have been met by those answering the survey. Distance related road charges, for example, were not considered to be an effective instrument for reducing either the amount of freight transported on roads or the accompanying negative effects of road freight transport. No viable alternative to road freight transport was seen and no shift in the modal split was considered to result from the introduction of road charges.

However, some important Swiss and German policy goals were considered to be met by road pricing. Distance related road charges were favoured over other transport taxes and charges, showing overall acceptability for the user pays principle. Both Switzerland and Germany have structured road charges to reflect the emission category of the vehicle. In doing so, a financial incentive has been used to achieve environmental goals. The results of the survey show that this incentive may be working, as a shift in the structure of vehicle fleet towards low emission vehicles but not towards smaller vehicles was recorded. All of the organisations answering the survey felt that road charging in Germany and Switzerland was an important area of concern for them. Figure 1 shows some relevant survey results.

Effects on transit traffic and best use of revenues

One of the outcomes of the introduction of road pricing in Switzerland was the restructuring of the transport industry resulting in an overall productivity gain. Transport organisations surveyed were unsure if road charges would improve the efficiency of transport companies using roads in Switzerland and Germany for transit. There was also no agreement if increased transport costs would force smaller transport companies out of business. Additional transport costs caused by road charges are to be passed on to the end customer rather than being absorbed by the transport sector itself.

One of the key issues that seems to promote the acceptability of pricing measures is the final use of the revenues raised within the charging scheme. The results of previous research repeatedly show that acceptability for road charging is highest when the revenue use is linked to transport infrastructure investment (AFFORD 2000, Link 2000, COWI 2003). In both Switzerland and Germany, the revenues arising from the HGV distance related charge are being (or will be used) to finance the construction and maintenance of national transport infrastructure. This investment is not limited to the road network, in fact in Switzerland, the majority of the revenues flow to rail infrastructure projects. However, for commercial transit operators the use of road charging revenues for improving and extending road and rail networks or all transport networks was not considered to be acceptable. The only acceptable way to use revenues shown within the survey is to earmark them completely back to the road network. There is a strong reaction against using revenues from road charges for reducing the overall deficit and the use of revenues for reducing the overall tax burden is also rated as being unacceptable. These results are shown in figure 2.

Fairness and compensation

Distance related road charges in their present form in Germany and Switzerland are seen as being unfair to the road transport sector and compensation is considered to be necessary. There is a strong wish for all vehicles using the roads to be treated equitably, regardless of the country in which the vehicle is registered or the travel purpose. This includes introducing road charges to private vehicles. One of the reasons that distance related charges are perceived as being unfair is the lack of transparency in the method used to set the level of the charge. Also, the belief that the payment of road charges can be avoided leads to the perception of charges as being unfair for those who do pay. There would be more acceptability for road charges if they were set at the European level rather than by individual national governments.

Social responsibility is shown on the side of the organisations surveyed through the rejection of compensation measures that would include an increase in the allowable driving times. The reduction of vehicle related taxes all over Europe was seen to be the most efficient way to compensate transport operators for additional costs occurred in transit transport. A fuel tax rebate for those paying road charges was also considered to be acceptable. There was no agreement if an increase in allowable vehicle weight would be an acceptable form of compensation. These results are presented in figure 3.

Technical systems and interoperability

The lack of interoperability of charging systems is seen as being a problem by the majority of organisations completing the survey. Based on the background information that in some countries technical and billing interoperability is available for a small monthly fee (approximately €2/month) we asked organisations to rate full interoperability at no cost and at a small cost. Here the information provided is very clear, interoperability is desirable but only if it comes with no extra cost. Technical interoperability (one OBU or transponder per vehicle) is rated as being more important than organisational interoperability (one invoice per vehicle and payment period) by the majority of the organisations answering the survey. Simple technical systems were rated as being preferable to complex GPS-based systems (see figure 4).

4. CONCLUSIONS

This paper summarises some information about the acceptability of road charging gained within a key informant survey carried out amongst transport organisations with members involved in commercial HGV transit through Germany and Switzerland. The results show that although transit traffic considers distance related charges to be better than other forms of taxes and charges, the acceptability of the introduction of road charges in general is poor. The condition on the roads is classed as poor by those surveyed and the overall responses show that distance related road charges are not considered to an effective means of improving this situation.

However acceptability for distance related road charges can be improved, for example by using a transparent method of defining the charge, introducing the distance related charge to all vehicle classes including private vehicles, offering some form of compensation for increased commercial transport costs and ensuring interoperability between technical charging systems. Transport organisations surveyed felt that it would be more acceptable to determine the level of the charges raised at the European rather than the national level.

In direct conflict to German and Swiss transport policy where revenues from road charges are earmarked to road and other transport networks, the only acceptable use of revenues reported in the survey was for the maintenance and construction of the road network only. Transport organisations do not feel that the earmarking of revenues for any other transport mode is acceptable. The use of revenues in the general budget is completely unacceptable for the organisations surveyed.

Transport organisations surveyed do not see that road charges have made commercial transport operators in their country more efficient, but then again there is no belief that increased transport costs have forced small operators out of business. Transport organisations (road and combined transport) see little alternative to road transport and do not foresee a change in the present modal split being brought about by increased road charges.

Table 1 Summary of road pricing systems Germany Switzerland

	Germany	Switzerland
Toll requirements	12 t permissible vehicle weight	3.5 t permissible vehicle weight
Legal Basis	Motorway Toll Law for Heavy Commercial Vehicles (ABMG) from 12.04.2002 Ordinance by the Federal Ministry for Transport, Building and Housing (BMVBW) Regulation, Federal Road Toll Law 2002 (BStMG), BGBl. I No. 109/2002 from 16.07.2002	Heavy Transport Tax Law (SVAG) from 19.12.1997 Ordinance by the Swiss Department of Environment, Transport, Energy and Communications (UVEK)
Toll Operator	Toll Collect GmbH www.toll-collect.de	Regional Customs Office (OZD), Bern www.zoll.admin.ch
Supervisory Authority	Federal Office for Goods Transport (BAG), Cologne www.bag.bund.de	Regional Customs Office (OZD), Bern www.zoll.admin.ch
Tolled roads	Federal motorways	Complete road network
Tolled routes in km	12,000 km	71,000 km (2.1% motorways, 25.9% main roads, 72% other roads)
Distance based toll km	From 01 January 2005: €0.09 – 0.14 (no turnover tax)	From 01 January 2001: €0.11 – 0.45 (no turnover tax)
Calculation basis	Distance travelled, number of axles, pollution class	Distance travelled, permissible vehicle weight, pollution class
Projected toll income per year	€2.8 billion (estimated for 2005)	€509.4 million (CHF 800 million) in 2002
Payment method	Cash, EC/credit card, fuel card, direct debit	Cash, EC/credit card, fuel card, direct debit
Technology	GPS, wireless mobile (GSM), DSRC module (microwave)	Microwave technology Speedometer, GPS, DSRC module (microwave)
Automatic log on	On-Board Units as needed (projected long-term: up to approx. 800,000) Internet log-on	55,000 On-Board Units
Manual log-on	3,500 toll station terminals	Payment booths at border crossings (for foreign vehicles)
Enforcement	Approx. 300 control bridges. 278 vehicles carrying out mobile enforcement checks	Approx. 10-15 control bridges, vehicles carrying out mobile enforcement checks
On board unit	On-Board Unit (OBU)	Tripon CH-OBU 1
Installation	Domestic trucks: No installation required, manual log-on option available Foreign trucks: No installation required, manual log-on option available	Domestic trucks: installation required for all trucks = 3.5t Foreign trucks: No installation required, manual log-on option available at border crossing stations
Cost	On-Board Unit: free Installation: costs paid by vehicle owner	On-Board Unit: free Installation: costs paid by vehicle owner
Distribution/installation	Distribution and installation: In country: approx. 1,600 service partners Foreign: approx. 350 service partners	Distribution: Regional Customs Office (OZD), Bern Installation: approx. 370 authorised garages
Source: Borgnolo, Neuenschwander, Stewart-Ladewig (2005)		

Figure 1 Results: Problem perception and road charge outcome

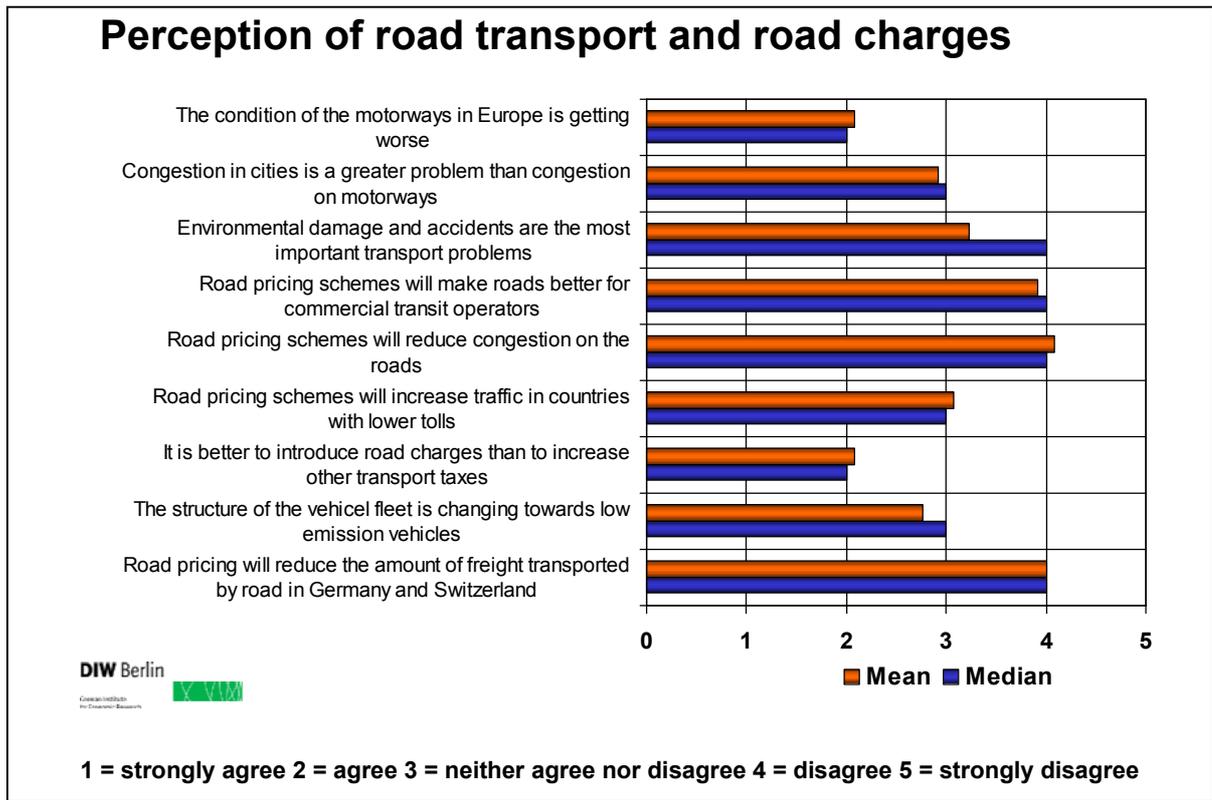


Figure 2 Results Effects of road charges on transit transport and best use of revenues

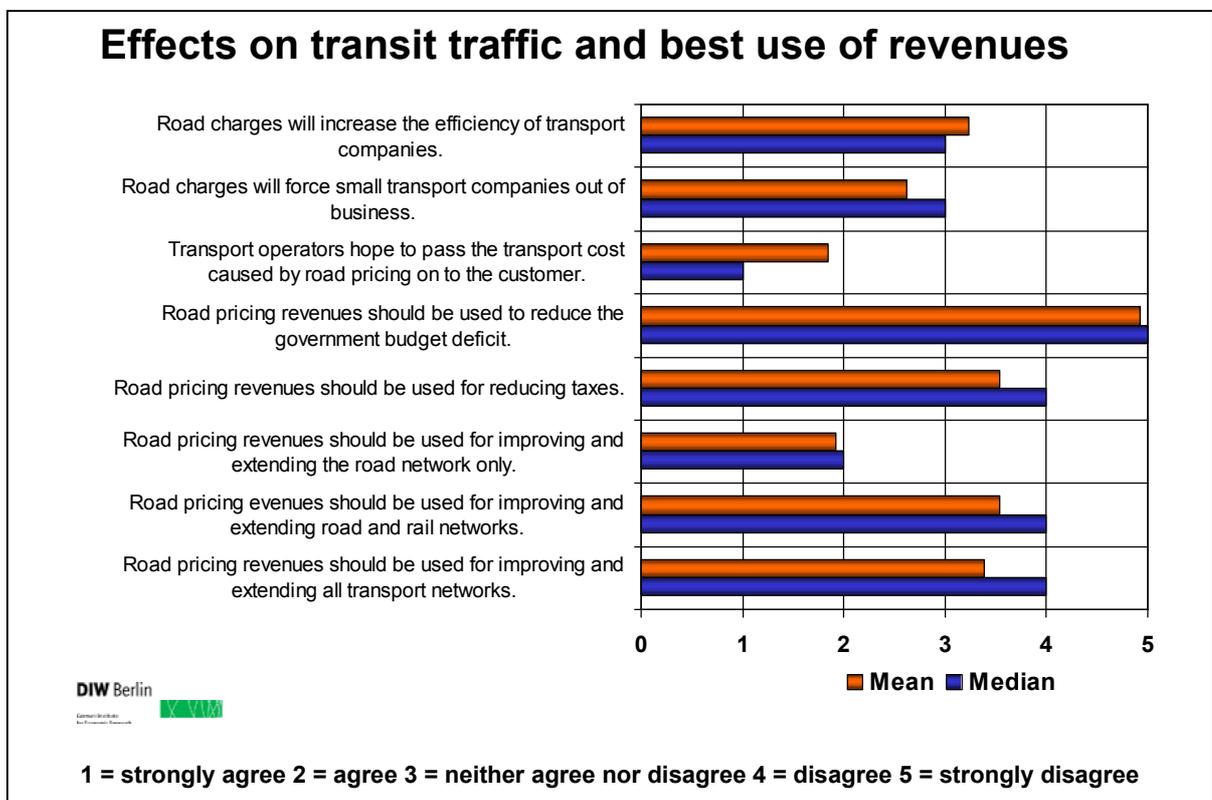


Figure 3 Results: Fairness and compensation

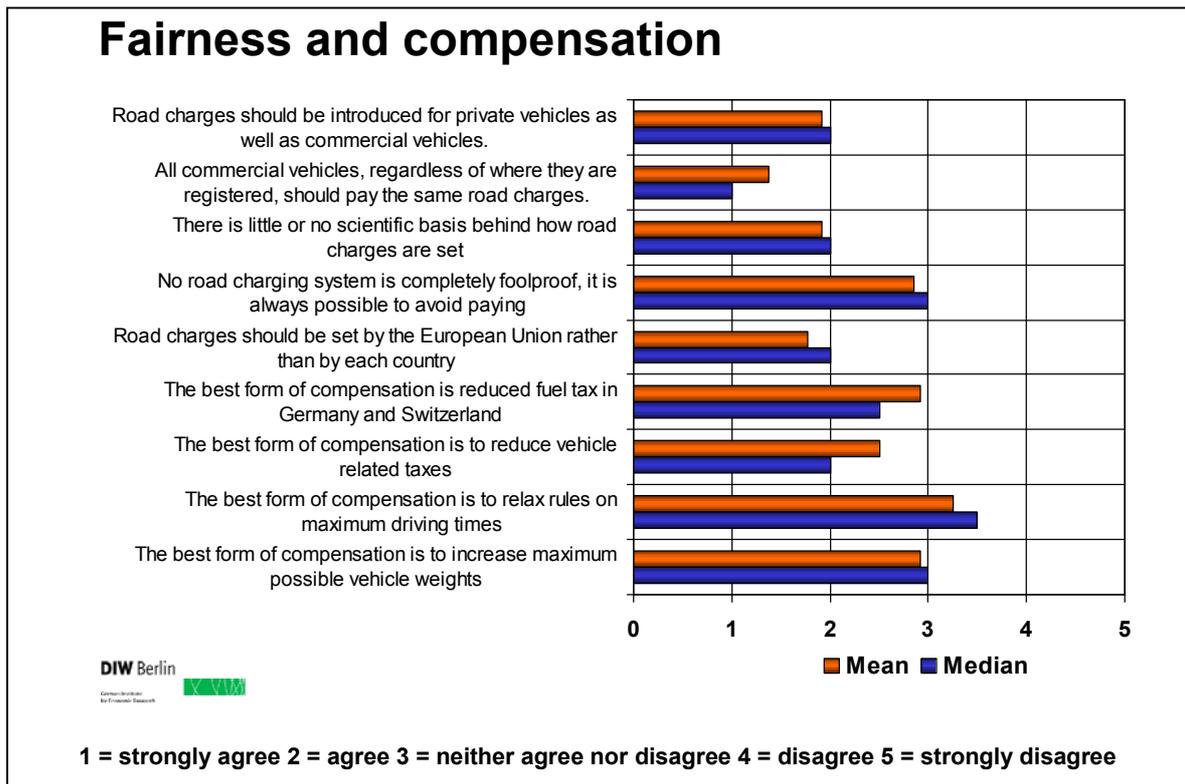
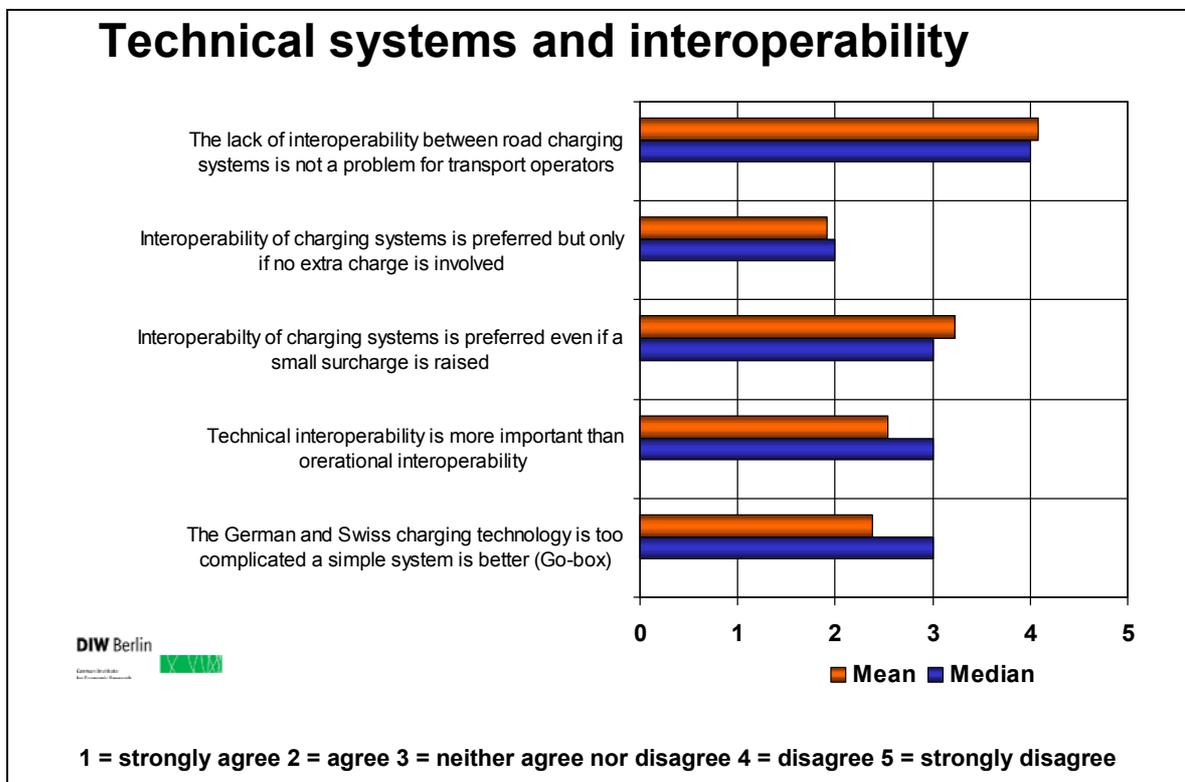


Figure 4 Results: Technical systems and interoperability



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