

EUROPEAN CONFERENCE OF MINISTERS OF TRANSPORT



FIFTY YEARS OF TRANSPORT POLICY

1953

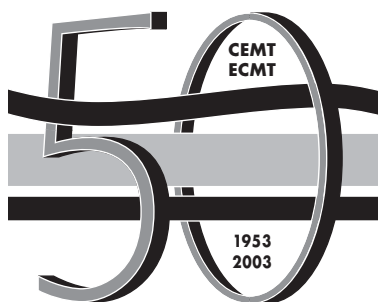
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2003



FIFTY YEARS OF TRANSPORT POLICY

Successes, Failures and New Challenges



FOREWORD

The Protocol establishing the European Conference of Ministers of Transport (ECMT) was signed in Brussels on 17 October 1953. To mark the fiftieth anniversary we decided to take a broad look at transport policy in Europe over the past fifty years and to assess its strengths and weaknesses. A note entitled "Transport policy: successes, failures and new challenges" was drawn up by the Secretariat for discussion by the ECMT Council of Ministers at its session on 23 and 24 April 2003 in the Egmont Palace Brussels, the very location where ECMT first came into being.

This report, which reviews transport policy over the past 50 years, first draws attention to the remarkable progress that the transport sector has made over the past half-century. Extraordinary productivity gains have been made and these gains have clearly helped to drive economic growth. Transport is now faster and cheaper than ever, and enhanced co-operation at the international level has allowed policies to be rationalised and harmonised. A number of inadequacies are also apparent, however, in that transport still suffers from congestion, pollution, accidents, inappropriate pricing, under investment and the continued lack of a genuinely comprehensive transport chain. The array of instruments used at the policy level remains limited, with too much emphasis on the supply side and assistance to suppliers; and at the same time, the institutional structures serving the sector remain too fragmented.

Noting these shortcomings, the report for Ministers describes the challenges that transport policy will have to meet in the future. At the broadest level, transport policy may well have reached a turning point. It will not be possible to manage the forecast growth in traffic using traditional methods that concentrate on increasing infrastructure capacity. New incentives and new instruments for pricing, investment and demand management are required. To meet the challenges now emerging, the report suggests a number of strategic directions for future transport policy. These lines of approach were widely discussed by Ministers who were able to reach a broad consensus on the need to:

- Strike a new balance between strategies for reducing demand and those aimed at increasing mobility; besides measures designed to improve transport supply, more attention than has been the case in the past needs to be paid to the factors determining demand.
- Continue to open up international markets on the basis of quality and transparency.
- Pursue regulatory reform, paying particular attention to the effective implementation of measures decided on and conducting a more open review of the successes and failures of the policies implemented.
- Make greater use of direct charges for infrastructure use, collecting charges as close as possible to the point of use whilst ensuring that the competitiveness of peripheral countries is safeguarded.
- Increase the use of new technologies which offer many ways to improve the efficiency, safety and sustainability of the system; and carry out more research into transport economics and policy.

- Improve the co-ordination of infrastructure planning, taking special care to maintain the quality of existing infrastructure.
- Improve assessment methods in order to reduce the time taken to implement projects and ensure their sustainability.
- Involve the public more closely in the planning process.
- Put in place institutions that will foster a more integrated and strategic approach to planning and thereby avoid excessive fragmentation of planning and investment processes and operations management.
- Make road safety an integral and permanent goal of transport policy by refusing to accept the inevitability of road accidents.

The first part of this publication consists in the report submitted as a discussion paper for the Council of Ministers. This report draws heavily on papers commissioned from seven leading experts chosen for their invaluable past contributions to policy research and to the work of the ECMT. These seven experts were given *carte blanche* to write freely on topics which, in the light of 50 years of transport policy, they felt would prove to be major issues in coming years. The papers they submitted cover a wide variety of subjects, ranging from rail policy to the role of inland navigation, competition versus regulation, dialogue between decision-makers and experts, changing patterns of travel behaviour, the funding of investment, the specific problems faced by transition economies or peripheral countries, technological progress, etc., and have also been included in this publication. Indeed, I would like to express here, in these few brief lines, the profound gratitude of the ECMT to these authors for their work and for the original ideas they have produced.

This publication, issued to mark the fiftieth anniversary of the Conference, is a contribution by the ECMT to reflection on the future of transport and its role in modern economies and societies. We hope it will stimulate debate and discussion and lead, at national and international levels, to improved policies and measures in this vital sector.



Jack Short
Secretary-General

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SYNTHESIS PRESENTED TO THE 87TH SESSION OF THE COUNCIL OF MINISTERS

This document is intended to stimulate discussion among Ministers and to lead to broad agreement on the priority issues for Transport Policy in the future. It builds on some of the main points and ideas in the background reports from the seven invited experts and also draws on current and past work in ECMT and elsewhere.

TRANSPORT POLICY SUCCESSES AND FAILURES

It is not straightforward to measure successes and failures as transport policy is required to meet multiple objectives, whose relative importance differ over time and place. The following summary is therefore somewhat oversimplified but is intended to facilitate discussion.

Considerable progress

*Increases in
transport productivity
drive economic
growth*

In a general sense, viewed over a long period, the developments in transport have been impressive. The enormous changes in the world economy, including the dramatic increase in international flows of goods and capital, i.e. globalisation, depend critically on reductions in communication costs. Indeed, recent empirical evidence shows that the productivity increases in the transport sector are the most important determinant of the structural changes in the world economy. These productivity increases have been facilitated by reductions in trade barriers, opening of borders, significant investment in facilities and equipment, a substantial body of law and practice at national and international levels and increasingly trained and skilled professionals in the sector. New techniques and technologies (high-speed trains, containers) have also contributed to improved productivity. Increased demand, structural economic change towards higher value goods and new global industrial logistics patterns have placed great pressure on the transport system and, as a consequence, the infrastructure, especially roads and airports, has catered for massive traffic increases.

*Transport is
faster and cheaper
than ever*

In general, accessibility and mobility opportunities have increased phenomenally and transport is faster, safer, cleaner and cheaper than it has ever been.

*Enormous
progress
internationally*

At international level there has been over recent decades a great improvement in understanding, in information exchange and in developing agreed approaches and policies. Many of these agreements are now enshrined in legislation in the acquis of the European Union or in conventions or agreements in UNECE and elsewhere. In the ECMT, the reports, recommendations and resolutions have contributed to this process and represent a large body of experience and knowledge available to policy makers, experts and the public. The recommendations and resolutions adopted by Ministers provide agreed frameworks for

***...including
ECMT Acquis***

general policy as well as concrete and forward looking recommendations on many specific areas of policy. Examples include over thirty recommendations on Road Safety and innovative Resolutions on Environment, on Accessibility for older and disabled people, on economic instruments, on Crime and Terrorism in transport and on pan-European integration. A concrete example is provided by the ECMT Multilateral Quota where some of the principles agreed are actually applied in practice. These and other examples demonstrate the willingness of countries to look forward and to tackle common problems together. Regular reviews show that there has been significant progress in implementation of the agreed decisions in very many Countries and that as a result there have been significant advances and improvements to policy at national and international level.

But behind this positive picture, there are many problems and areas where improvements have been slower than hoped for. These include:

The system is still not sufficiently safe, clean or accessible

***100 000 people
killed on roads each
year***

- The number of people killed in road crashes in ECMT since it was set up is probably of the order of 3 million. Annually about 100 000 people are killed and 2 million injured in the ECMT area. Associate Countries account for an additional 80 000 deaths. The causes are fairly well known and effective policies and measures have been identified including in over 30 ECMT recommendations. But the implementation of these differs enormously between countries. Moreover, there are totally different standards of safety in the different modes with risk rates in road transport being twenty times higher than in other modes.

***Traffic growth
reduces
environmental
improvements***

- Environmental concern began in the 70s and grew through the 1980s and 1990s. In this period, rapid progress has been made in introducing and tightening pollution norms for cars and trucks and in improving the appraisal methods for infrastructure planning. But continuously growing traffic volumes have limited the benefits of these initiatives and created new problems, such as ever-growing congestion, particularly in and around urban areas. Moreover, little progress has been made in reducing transport's contribution to global warming and its virtually total dependence on oil.

***Ageing
population will have
access problems***

- Though a lot has been achieved for older and disabled people, much of the transport system is still inaccessible or very difficult to use. More generally, for those without access to a car, participation in many societal activities is becoming more difficult. These problems will get more serious as populations age.

Transport is not efficient enough

Deregulation uneven between modes

- Deregulation and liberalisation have been gradually introduced over the past two decades but unevenly between modes and countries. Most studies show significant benefits to consumers from deregulation. Railways and waterways have been slower to profit from the productivity and efficiency gains that deregulation has brought to other modes.

Subsidies do not always show value for money

- Enormous subsidies have been, and are still being paid, especially for railways and public transport services. These subsidies have not always provided good value for money and have not given incentives to companies to be more efficient.

Congestion

- The systems' efficiency has also been limited by congestion, which is a serious and growing problem in and around many cities and also on some interurban links including those with difficult topographical conditions.

Pricing shortcomings

- Reliability is too low and disruptions due to strikes and technical or organisational failures are too common.

Investment shortfalls

- Charging instruments have been poorly targeted, resulting in inefficient use, especially of roads. Taxes and charges are often inconsistent in their objectives. Investment has averaged close to 1% of GDP in the ECMT area over the last 30 years but there has been wide variation between countries and recent evidence points to a decline in this share. There are serious expenditure backlogs in many countries, especially in the transition countries, in several of which even routine maintenance has been seriously neglected. The links between pricing and investment are not well understood.

Incomplete transport chain

- The different modes do not yet form a complete, efficient transport chain. Interchanges and interoperability between modes, both for people and goods are still slow and inefficient. There is a lack of compatibility and continuity for infrastructure and services on a pan-European level. Inconsistencies or different rules between modes are sources of competitive distortions (different pricing or taxation regimes) or inefficiencies (different documentary requirements). Planning remains mode- or area-specific even though there are strong interconnections between modes and administrative levels. For example, building roads will affect rail or public transport use or increasing airport capacity affects surface transport. The new concern about terrorism has seen much tightened security in aviation but there is not yet a consistent approach across the modes.

Policy aspirations have been difficult to implement

***Implementation
has often proved
difficult because...***

- In many areas, and at both national and international level, stated policy aims have either not been met or only attained to a limited extent. There are many reasons for this, including pressure from lobby groups, difficulties in dealing with the social consequences of change and communication failures. The most striking examples are in rail transport and road pricing. The former has almost never been able to meet the hopes for increasing modal share or taking traffic off the roads; the latter has been discussed now for almost 40 years with only limited success at implementation.

***...overemphasis
on supply side***

- An important factor behind disappointing outcomes has undoubtedly been that there has been too much hope placed on supply side instruments and on alternatives to the car. The main response to problems of congestion and pollution has been to support rail or public transport. It is now known that these measures are not effective by themselves and other instruments are needed at the same time to solve problems on the roads. The factors leading to increased use of cars and trucks have not been the subject of policy intervention or at least have been outside the possibilities of transport Ministries (land use and urban sprawl, logistics developments, fiscal benefits for car drivers). Measures that would influence these variables (for example pricing or restrictions) are politically unpopular and there has been a reluctance to use them.

***...inadequate
enforcement***

- Enforcement of rules, especially in road transport has been inadequate in many countries. This may have affected safety and given road a competitive advantage over rail in these countries.

***...support to
producers rather than
users***

- A linked reason is that there has been too strong a tendency to support producers of transport services rather than consumers. Ministries have spent a great deal of their effort in dealing with the publicly owned airlines, rail companies and public transport operators under their responsibility. This can be understood as a form of capture of Transport Ministries by service producers. At international level, this has led to a tendency to protect national companies from what is seen as unfair competition from other countries. Many of the bilateral systems in aviation or road transport have had such objectives and Ministries have been slow to realise that economies and consumers will be better served by having more efficient transport operators, independent of their nationality.

Transport institutions have been too fragmented

Institutions fragmented between...

...modes

- Fragmentation of planning and implementation between modes

Regulation, taxation and investment policies for the different modes are often departmentalised, leading to distortions between modes and inconsistencies in planning and operation. Ministries, regions and cities have road and rail or public transport departments that often have little contact. Safety standards in the different modes are totally different.

...jurisdictions

- Fragmentation between jurisdictions

Jurisdictions often compete for development and the transport consequences are not taken into account. In the absence of national land use frameworks, the result can be uncontrolled increases in traffic, increased urban sprawl and growing car dependence.

- Tensions between planning and political processes

Transport planning requires a long time horizon compared to the political process. Consequences of this include revisions of plans during the implementation process, an overemphasis on new investments relative to maintenance and a general difficulty to deal with long-run trends.

CHALLENGES FOR THE FUTURE

Implementing existing agreements

The instruments and measures needed to achieve a more sustainable transport policy are very often known. In areas such as road safety, accessibility and transport and environment there are many individual and consolidated recommendations and resolutions agreed formally by Ministers over several decades that provide clear and comprehensive prescriptions for improvements. Effective implementation of these decisions remains important and should provide significant benefits in many countries.

Measures that work together

Valuable as these recommendations and decisions are, there are a number of problems. We mention three. First, most countries, but especially transition countries, have difficulties in selecting priorities and assigning due weight to the many different instruments and measures that are required. Second, there are problems in constructing packages of measures, where the different measures reinforce rather than contradict each other and, third there are many practical and political problems of implementation.

...beyond short term political horizons

Additional factors that sometimes increase complexity are that public expectations for transport performance are increasing and are often contradictory. Finally, reconciling good long-term transport planning with short-term political horizons is a permanent difficulty.

***Significant
differences across
ECMT***

In assessing the challenges facing transport policy making, it has to be kept in mind that there are substantial economic differences across the ECMT membership. This necessitates flexibility in implementation of policy to respect differing priorities but without, at the same time, creating a multispeed Europe.

The following, rather general, list of challenges suggests a framework within which policy formulation and the specific needs to improve accessibility, safety, efficiency and environmental performance can all be improved.

***A turning point for
Transport Policy?***

Many experts believe that transport policy may be at a significant turning point. The foreseen growth in traffic cannot be managed in the traditional way by expanding infrastructure capacity. New incentives and instruments for pricing, investment and demand management are needed. The challenge is to introduce these instruments so that they achieve their aims in a way that is understood and accepted by the public. To do this the following are required.

Transport needs to be looked at in a more integrated and strategic way.

***Transport
Ministers' aims need
support of parliament
and society***

- Transport is essential to the economy and the smooth functioning of society. Across the world, transport will play an important role in meeting Millennium Development aims as agreed in the UN. All sectors depend on it and it has impacts and relationships with policy areas like trade, industry, energy, environment and land use as well as significant fiscal and economic impacts. The different Ministers and Ministries need to work together more to develop shared visions of the role and aims in transport policy. A broadly agreed transport policy across government departments and in parliament can ease many of the implementation problems that arise.

***More integrated
services***

- Transport users increasingly require services that are more integrated among modes and more global in their coverage. Exchanges take place not just on an international level but across continents. Convergence and simplification of rules and practices need to be increasingly global to respond to this.

and institutions

- As said above, institutions have been set up or developed in ways which have not facilitated a system wide view and which have led to fragmentation in planning, in investment and operation. There is a need to re-examine the roles and aims of transport structures and systems to promote a more integrated approach to policy.

***Supply and
demand side
instruments***

- It was argued above that too much reliance had been placed on supply side instruments. From now it is essential to use demand-side tools with supply side instruments and combine these with communication and information tools in more appropriate institutional frameworks. This can allow the formulation of policy packages in which all the instruments and measures work together, rather than against each other, to achieve objectives.

More consultation

- Transport differs from most other policy domains in that the public has a daily experience on the implementation of policy. This fact that almost everyone interfaces regularly with the transport system necessitates more openness, consultation and communication with the public and civil society on the aims of policy and the means to implement them.

Transport growth must be managed and Ministers of Transport need to be more proactive

Balance between managing demand reduction and enhancing mobility

- Traffic volumes have multiplied by 4 or 5 in the ECMT area over the last fifty years and the forecasts indicate that there is still substantial growth ahead. Moreover, international traffic is growing faster than national traffic. Dealing with this growth will require more diversified strategies than in the past. There will be a difficult balance to strike between demand-reduction strategies and mobility enhancing ones. In cities it has long been accepted that cars are inefficient users of urban space and that a range of measures is needed to reduce their adverse impacts. In interurban traffic, administrative restrictions are not very effective and economic instruments that aim to increase efficiency are more appropriate. Combinations of measures are needed to reduce pressures.

Bring charges closer to the point of use

- Among the measures that are required, charging for the use of infrastructure close to the point of use promises to improve the efficiency of the road system and to improve economic performance and should be seen as part of the approach for the future. Road user charging for trucks has been introduced in Switzerland and is to start in Germany in August 2003 and in other countries after that. Such charges are needed also for cars which, in fact, cause most congestion. London implemented a cordon-pricing scheme in February 2003 designed to curb traffic in the city centre.

Deal with generators of demand

- Transport Ministries have generally responded to increasing demand by building infrastructure. While new or enhanced infrastructure will always be needed, capacity expansion cannot continue indefinitely. Ministers and Ministries need to be more proactive in dealing with the generators of transport demand, that is, where people choose to live, where companies locate and how trade flows are organised. They need to spend more effort on existing infrastructure to maintain it properly, to upgrade and rehabilitate it and to use it more efficiently. If demand is not managed, the benefits of new investment are eroded, and sometimes even rendered a waste of money.

Maintain infrastructure to high standards

Influence travel behaviour

- Travel behaviour has often been taken as a given and not amenable to influence by policy. Evidence shows that travel behaviour varies very much more than is often thought, but the effects of policy change take several years to work through. If inconsistent or partial policies are implemented, the effects on behaviour may be opposite to what is intended, so it is vital to have a coherent combination of policy instruments, both 'sticks' and 'carrots' which are pulling in the same

direction. Influencing travel behaviour is often not a policy objective in its own right, but it can be a necessary condition of success in meeting other objectives of safety, efficiency and environmental improvement.

Use new technology proactively

- Similarly, new technology offers many possibilities to improve efficiency, safety and sustainability of the system. But so far, the applications have not met these aims (especially as regards safety). The possibilities now becoming available, for example use of satellite tracking systems for electronic kilometre charges and automatic number plate recognition systems, or for enforcing speed limits will improve opportunities for meeting the policy objectives above. Ministries need to be more proactive in defining the conditions and in facilitating the introduction of such new technology.

Intervene effectively and at the right level

Transport is increasingly international

Formulation and implementation of Transport Policy remains strongly national in character but increasingly, competition and regulatory law, as well as technical and other standards are being set at the level of the European Union or globally. While infrastructure investment, traffic management policies and the fiscal and subsidy regimes are generally national responsibilities, in these areas too, there is a trend towards European intervention. Just as optimal individual decisions are not necessarily best for society, optimal national decisions do not necessarily give best international solutions. It is not necessary to harmonise everything but there is a need to be clearer on where international laws, framework policies or incentives are needed.

This demands...

The following set out some such areas.

...better co-ordination of infrastructure planning

- Co-ordinate transport and infrastructure planning at international level

The views of central and peripheral countries in Europe are not necessarily the same. Many peripheral countries rely mainly on road transport but the cumulative flows of their goods to the centre cause acceptance and environmental problems in the countries there. To resolve this tension, it seems necessary, among other actions, to attract trade flows to rail and water corridors through co-ordinated international interventions. Infrastructure planning and development on a Pan-European level is needed so that optimal decisions on a wide geographic scale are fostered. Planning, which has been largely national, needs to become more international. The different international planning concepts, like the Pan-European Corridors, TENS, TINA need to be streamlined and made more consistent. Even though road investments often have higher rates of return there is a strong case for public funds (from the Union) to be strongly oriented for these rail and water links, whilst being tied to the needed policy reforms in these modes.

*...open markets
on the basis of quality*

- Open international markets on the basis of quality

The benefits to consumers and economies from opening markets can outweigh the disadvantages if the regulations are properly designed. The principle underlying market access on an international level should be quality. For road transport this should be reflected in the highest standards of environmental protection, safety and personnel. Road transport is still dominated by bilateral arrangements, which are non-transparent and sometimes discriminatory. Moving from these to a more open multilateral system based on quality is needed. Rail absolutely needs the dramatic increases in productivity that deregulation can bring. Independent regulators at international level may be required to ensure implementation.

*...more efforts on
implementation*

- Review and benchmark shared international targets or policy objectives

Policies or objectives without legal underpinning are common. Implementation, which has generally been slow, can be supported with reviews and benchmarking based on peer pressure to incite countries to improve performance in certain areas. Urban transport, safety, access and environmental policies fit into this category.

- Concentrate more on implementation issues

What to do is more or less known but doing it is often very difficult. Proper sequencing of measures, communication strategies and dealing with those adversely affected are among the crucial areas where experience and lessons can be shared.

- Devolve powers but within a clear framework

On the other side, regional and local authorities increasingly have powers and responsibilities devolved to them. Here it is important that the decentralisation of powers is consistent with the devolution of resources and that consistent policies are followed at local and regional level. Unilateral action at local level -- for example to ban traffic -- should be avoided. This is why national or international frameworks or guidelines including mechanisms for concertation between levels are essential. For example, in relation to Urban transport, Ministers agreed in Lisbon 2001 on such a framework.

*...continue
regulatory reform*

- Reassess regulatory reform

The question is not whether markets work or not. It is about the appropriate regulatory framework for them. Some economic characteristics in transport (economies of scale and scope, high fixed and low marginal costs, externalities) and the fact that markets are not concerned with distributional consequences imply that leaving transport entirely to the market does not necessarily serve the best interests of the society. The task of regulatory policy is to reduce distortions, take care of externalities and manage distributional effects. Dialogue with competition authorities is required on the most

appropriate solutions. Public service obligations, common in transport, need careful definition and management to avoid waste. (In the new context of separation of infrastructure and operations, the balance between assistance to operators and infrastructure suppliers may need to be moved closer to the infrastructure providers. Finally, there is no point in introducing rules that cannot be enforced.

...Institutions that meet aims

- Develop structures and institutions that support the aims of policy

Fragmentation of institutional arrangements can lead to wasteful competition for resources or to different approaches for different modes. Institutions are needed that look at the system in a sufficiently broad way to avoid inconsistencies or fragmentation. In some cases, independent regulators are needed to implement policy in a transparent way.

Infrastructure investment remains essential but needs to be better assessed and users will have to pay more directly

Investment remains essential...

Investment remains a major responsibility of Transport Ministers. There are and will always be large spending needs in transport and not only in poorer or transitional countries. Even if the quantity of infrastructure does not expand there is a great need to improve its quality.

There are several important issues related to investment:

...but assessment methods need improvement

- Planning and assessment methods need further improvement

Ministries will be looking to improve the value for money in investments and to strengthen valuation methods for assessing infrastructure investment. There are still serious difficulties to compare proposals between modes. Traffic forecasts have very often been wrong for example in urban public transport systems the number of car drivers attracted has been overestimated and for tolled roads the number of users overestimated. There are not enough ex-post studies to evaluate anticipated and actual effects. Interactions between parts of the system are still poorly understood, as for example, between urban and interurban congestion. Strategic appraisal is only beginning.

...so that projects can be implemented

- Time from planning to construction needs to be reduced

Implementation of agreed infrastructure has taken longer and longer as consultation procedures have become more complex and as opposition to projects in all modes has grown. More needs to be done to make procedures transparent so that when they are completed investment projects can be constructed.

Seek private sector involvement

- Financing; be realistic about private sector participation

Transport infrastructure financing remains essentially public. There have been some striking examples in attracting private funds (e.g. channel tunnel) but there have often been problems, with for

example, cost overruns or revenue shortfalls and the private sector expectations do not correspond with public sector ideas on risk sharing. There are an increasing number of public private partnerships but these are complex and it seems unlikely that they will be able to provide more than a small share of needs. In such partnerships commercial risks should not be taken on by the public sector. Care should be taken in making long-term contracts with the private sector to operate infrastructure as they can reduce Governments' flexibility for example to introduce appropriate pricing.

While it seems likely that most transport investment and much operation will remain under public responsibility there will be a search for more private participation. At present public sector institutions are not strong enough to deal with this.

...and make more use of direct charging

- Make more use of direct charges for use of infrastructure

There is often opposition, for example from Finance Ministries to using fuel taxes as an earmarked source of public funding of transport. But there have been recent changes whereby new charges or tolls can be earmarked in some countries and cities. With the pressures on budgets and the need to limit public borrowing, this possibility to finance needed investments through recourse to more use of direct user charges is surely a promising one for the future so long as the investments funded show good socio-economic returns. Principles for these charges need to be respected and Ministers have already agreed that they should be non-discriminatory, linked to costs including externalities, and that the receipts be used transparently to reduce the externalities and or improve the system. There is a strong case to move from systems of tax or charges based on vehicle ownership to ones where payment is linked to use and costs caused.

Monitor progress better and more openly, and strengthen research

Improve data

- Transport data remain extremely weak at an international (also local) level. There needs to be a substantial effort to improve the quality and quantity of statistics to aid policymaking. For example, data on international traffic, on investment, on air quality are either non-existent or of poor quality.

***Review successes
and problems***

- Good policy depends on better data but also a more open approach by countries to learning from each other and to admitting that policies have not always succeeded as well as intended. Countries will benefit from more open review of the successes and failures in their policies.

***Strengthen
research***

- Research is an important component of policy review and formulation. Deficiencies in market and political processes are also reflected in research in transport economics and policy, resulting in an over partial view of problems and solutions. Research can help by providing a broader perspective on issues such as:
 - Pricing, taxation and financing.
 - Interaction between different modes.
 - Interregional and international consequences of regional and national policies.
 - Political processes in planning and implementation.
 - Addressing institutional change.
 - Secondary policy effects, taking a more long-term growth perspective, demonstration of costs of short-term orientation.
 - Forecast of quantitative effects by multisectoral, multimodal approaches.
 - Understanding consumer behaviour.

CONCLUSION

This report summarises some of the successes and failures in transport policy over the last few decades. Considerable progress has been made and the transport systems of today are faster, cleaner and safer than they have ever been. International co-operation has been strengthened considerably and significant steps have been taken to improve understanding and to streamline and harmonise policies. But there have been failures and weaknesses too, including in policy implementation, in using too limited a range of policy instruments, in over-fragmented institutional structures and in communication with the public. Based on this analysis the challenges facing transport policy in the future are then set out. Implementing fully the policy decisions already taken would make a significant difference. But in addition, transport faces emerging challenges and the note suggests new strategic directions for transport policy making and for Transport Ministers and Ministries. These include taking a broader and more holistic view of transport, taking a more proactive approach to dealing with traffic growth, strengthening institutions to support these aims and improving communication to help implementation.

RAIL POLICY AND RAIL SUBSIDIES – AN ENDLESS HISTORY WITH WEAK RESULTS

Professor Gerd ABERLE
University of Giessen (Germany)

1. Private capital is afraid of streaming to rail investments

European governments as owners of the state railways, or the rail companies themselves, have to invest billions of euros in the rail system. But the scarcity of public means and own financial resources hinder more and more the fulfilment of this task. As an alternative the attraction of private capital for rail investments could solve the problem. But up to now private capital gives railways a wide berth.

The main reason for the shortage of private capital in the large European rail companies – mostly former state railways – lies in their poor economic performance. Fundamental changes, through restructuring, are required in the fields of:

- Cost management.
- Market orientation.
- Quality and reliability.
- Independence from political conditions that result in additional costs without financial compensation.
- Infrastructure management that guarantees network access for third rail companies without discrimination.
- Separation of rail infrastructure and rail transport services to enable intramodal competition free of discrimination.
- Neutralisation of historically accumulated debts in the rail system.
- Harmonisation of technical standards in the rail system where differences hinder co-operation between railways across borders and hinder market entry for new rail companies.

The permanent decline of rail market shares in the EU 15 since 1970, 13.4% to 1999 in freight transport (8% if Short Sea Shipping is included) and 6.1% in passenger transport (5 modes), despite huge and rising subsidies in most countries, is a dramatic development.

It has to be seen that the market demand for quality standards, reliability, flexibility, and short and calculable transport times has increased fundamentally during the last 30 years. Market share is particularly small in long distance passenger transport, with shares between 4 and 8% (except Switzerland with significant higher shares resulting from special geographic conditions).

Most European railroads are organised as vertically integrated and state owned companies. They use special national technical standards and work primarily in their home countries. But the predominant growth in freight transport has been concentrated on international trade, where efficient strategic co-operation between the national orientated rail companies is still the exception. The rail companies always ask for more financial assistance from their state owners although the subsidies given in relation to market shares in freight and passenger transport markets appear more and more irresponsible under economic evaluation. Transport policy looks more or less hopefully to a better rail future, but this has been the hope for decades.

2. State ownership of rail companies conserves traditional behaviour and organisational structures

Increasingly, huge subsidies in the rail sector, which are mainly concentrated in network investments, terminals and sometimes rolling stock, are based on two arguments:

- The environmental advantages of rail transport compared with road haulage and passenger cars.
- The forecasts that freight transport growth rates in the next 10 to 15 years will reach more than 40% with risks deriving from the enlargement of the European Union with eight Central and Eastern European countries. Because of alternative infrastructure constraints, Europe needs an efficient rail system especially for freight services.

But deficits in the quality of rail services cannot only be eliminated only through more subsidies, or by rising fuel taxes and road user charges for road haulage, the main competitor. This is demonstrated by the Norwegian Case: User Charges for railroads are zero, combined with high and rising fuel taxes for road haulage. But the market share of rail freight services is permanently declining and that of road transport increases.

Two essential facts should be taken in mind. In political discussions these facts are permanently dismissed:

- Railways are a technology developed more than 100 years ago. Except for high-speed rail, technical progress is weak compared with the main competitors. It should be realised that the basic characteristics of rail systems increasingly do not meet the quality standards of transport demand, especially in freight markets. The integration of rail services into logistic chains is difficult and in border crossing relations absolutely uncompetitive. A successful rail system cannot satisfy all transport needs, but has to concentrate on specialised tasks. The experiences of the last 40 years show that new techniques, higher productivity and better qualities can be reached only by the pressure of competition and not by administrative market regulations. And in the game of competition the intramodal competition (rail on rail competition) is more efficient than intermodal competition.
- A fundamental problem is state ownership of most European railways. New intramodal competition increases economic risks for the established rail companies. One response to these new competitors has been a refusal to separate rail networks from rail transport services institutionally, keeping reform only to the level of accounting separation. As a result the vertically integrated railroads control bottlenecks on the network as a monopoly, controlling essential facilities for all third parties. Moreover governments will get full political assistance by the unions when deciding to maintain vertically integrated rail companies in their countries. The empirical finding is an inability of national governments

as owners of the rail companies to exercise sufficient pressure for far-reaching reforms. Nearly all deregulation in the rail industry in the last 10 years were induced by the European Union authorities. But it is a slow process with permanent attempts by some governments and rail companies to preserve traditional structures and behaviour. The history of the vertically integrated railways is a chain of unsuccessful efforts to conserve market-incompatible structures.

3. Financing of rail infrastructure: a serious problem

The central problem of rail policy is that of organisation, management, and financing of rail infrastructure. In all European states extraordinary subsidies are given for network investments, sometimes even grants for network operation (as e.g. in Switzerland).

As a consequence of the cost function of the rail networks (extraordinary high capital costs, very low short-run marginal costs, decreasing short-run average costs, scale economies), the chances for covering total costs from user charges are very small. On the other side, public financing of investments in the rail infrastructure gets more and more difficult because of the large amounts needed, and the general problem of financing public expenditure.

In this situation two alternative ways of financing rail infrastructure have been developed:

- Imposing high user charges on competitors to rail transport, especially on road freight transport, and transferring part of the income to rail infrastructure investments. Together with relatively small rail infrastructure use charges, these *à fonds perdu* grants are indispensable for infrastructure investment in the rail industry. The willingness (or better: the ability) to pay by the users of rail networks is not sufficient to cover the full costs of rail infrastructure.
- Attracting private investment capital, outside the national budget, and creating more independence and flexibility for rail management.

But the prospects to attract private rail infrastructure capital are very low. Rates of return on investment are unrealistic. BOT-models (build, operate, transfer), which are applicable to road investments, although often with public private partnership supplements, cannot be seen as an alternative to public subsidies for rail network investments. This follows from the cost functions of rail network with economies of density and scale on the one side, and an inability in a market environment to add price components to the very low marginal (and incremental) costs to cover capital costs and secure a profit.

These indispensable subsidies, which cover the main part of capital costs, are an important reason why governments as owners of the vertically integrated rail companies try to reduce the intensity of competition in the rail industry. Furthermore railroads seem to be an excellent investment to reach a bundle of economic, social and military goals, often without sufficient financial compensations to the rail companies. These attitudes result from periods in the last century, when railroads were in a monopolistic market position and generated considerable profits.

Neutral rail network companies offer better conditions for attracting more rail services than these existing network companies which are part of vertically integrated railway companies. It is obvious that profit can only be realised in passenger and / or freight transport services and not in the supply of network services. This depends on the special cost functions of network service production and the

relatively high price elasticity at all levels of rail activity (network market, markets for passenger and freight transport services).

A separated rail track firm which is not integrated into the business plan of a combined infrastructure and rail transport company has its main task as attracting demand for train paths. There are no temptations to favour the companies own services over those of a competitor (third party operator). This can be reinforced by financial incentives for the management and leads to a higher level of revenues from user charges. Deficits in network quality, e.g. in maintenance or reinvestments, can be prevented by introducing appropriate penalties.

An independent rail infrastructure company will be in a position to attract private investment capital within the framework of a private public partnership (ppp) approach. 50% to 80% of investment costs could be financed by public subsidies, meanwhile all other costs should be covered by user charges. By eliminating discrimination, the real separation of rail infrastructure and transport services offers chances to attract private investment capital for the rail network even though the biggest part of capital costs require public subsidy *à fonds perdu*.

The British experience has shown that rail infrastructure cannot be organised as a company which covers full costs as well as a profit rate through user charges only. So far no totally privatised rail network company exists.

4. Neutral acting rail networks are needed

The state ownership of railways leads to a transport policy that concentrates on a rail policy dominated by the interests of the state railway. But this procedure is of no assistance to a strategy for rail revitalisation. The focus of transport policy should be the rail sector in a comprehensive sense, where small, medium-sized and large rail companies are in business, all using the rail network free of discrimination in the fields of network access, charges for train paths and availability of slots. With reference to these conditions, vertically integrated state railways have a serious problem. Their monopolistic supply of network services comprises a big potential for discriminative behaviour. This potential will be kept in mind by third parties before entering the rail market. The only way to eliminate potential discrimination is the legal and institutional separation of network and transport services. As the state budget will be at all times responsible for considerable shares of network investments disintegration with other forms of intelligent links between network and transport services must be discussed. The status quo-organisation of most European railways is orientated towards national business although the music is playing for international freight services. The long tradition of an absence of technical standardisation and only weak collaboration of national state railways must be destroyed. Reaching interoperability in standards in 10 to 15 years as announced by the UIC is too late. New market losses could be the consequence. This has to be seen against continuous productivity gains in road haulage, which furthermore will reduce its pollution impact by 2010 to an impressive degree.

Border crossing and the use of road infrastructure in different countries causes little or no problems for road haulage. With neutral rail-networks in different European countries a chance for effective co-operation is created. Technical standardisation and co-operation will be pushed, because their interest is concentrated on increasing the use of infrastructure capacity and this leads to corresponding earnings.

5. Conclusions

To force the chances for railways to stabilise their position in international transport markets there is an urgent need to harmonise three general conditions, under discussion for many years. This concerns especially freight activities, with a big and growing share of border crossing traffic. International rail passenger transport plays a smaller role than freight transport as its volume is much lower, capacity restraints and the forecasts for its development are considerably more modest. The three conditions are as follows:

- Opening of national rail networks by all European countries; the big differences that persist across Europe are lamentable and real reciprocity does not exist.
- Harmonisation of technical standards in the rail system in Europe. Over a long period national rail companies and national manufactures (of locomotives, electronic equipment, etc.) have used a lack of interoperability as a barrier to entry. Resistance against rapid steps to improve interoperability still exists.
- Harmonisation of taxes. Energy taxation and value added taxes differ between the European countries and their rail companies. Distortions in competition between the railways result, relevant not only in the case of open national rail markets.

State governments must take decisions on the basis of their political responsibility, not just as owners of the state railways. They should put their railway companies under pressure. Otherwise railways will not survive, especially in the freight business.

The enlargement of the EU will shift modal split to road haulage. The new member states have invested over the last few years much more in roads than in rail infrastructure or rolling stock. In some CEEC railways, traditional behaviour as state administrations without any orientation towards rail customers and market conditions is still conserved. The quality offered by the CEEC railways is insufficient to meet the demands of the market. Following from this, the result will be a continuous fall in the rail freight share of modal split in the CEECs and in the EU in the coming years. The biggest rail company in the CEEC, the PKP in Poland, suffers from a very low quality of network and rolling stock and a serious financial crisis, so much so that alliances planned with EU 15 railways came to nothing. In most of the CEECs the situation of rail transport, especially in the freight sector, is alarming. The opportunities for the railways stemming from high transport distances will not be capitalized by the rail companies. All scientific forecasts show a significant rise of road modal split (e.g. Prognos European Transport Report, Basel 2000).

The main problem is the extremely long time necessary for interoperability improvements in rail quality and for a market-straightening of technical standards is problematic. High expectations are placed in the European Train Control System (ETCS), which should raise efficiency and productivity, and improve the use of the network to an outstanding degree. But the time necessary for implementation in Europe is defined as 18 to 30 years (according to announcements by rail companies and the electronics industry). During this extremely long period, markets will be lost by the railways. Politicians and rail managers must realise: time works against railways.

What does the rail industry need? Pressure needs to be exerted by the national governments as owners, pressure from EU institutions, especially by the European Commission and the European Parliament. The managers of rail companies need to install a fundamental change in the thinking of rail management. To achieve this it seems that some railways might have to go bankrupt.

It is an open question whether the recent strategy of state railways to buy big freight forwarding companies will be successful. The goal is to get more logistic competence and to reach a market position as a logistics provider. But the other side of the medal is a new field of strong competition with world-wide forwarders and providers of logistic services. Perhaps it would be more efficient to raise the quality of rail transport services, especially in international relations, than trying to be a big logistics player.

Another potential development should be recognised. The evolution from a freight carrier to a big logistic player can push back the original task of a rail company (running rail traffic) in favour of non-rail oriented commercial activities. The attraction to change the business focus exists. But in this case new questions have to be answered by the rail companies as well as by the politicians: Why do taxpayers have to finance subsidies of the railways with billions of euros every year when the basic business is gradually being replaced by general logistics' tasks with a very small share for pure rail freight services?

EUROPEAN TRANSPORT POLICY AND THE POSITION OF INLAND NAVIGATION

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1. Introductory remarks

The increase of freight transport in Europe is dramatic. The central European countries in particular suffer from growing bottlenecks in the infrastructure network. Changes in the user charging systems as proposed by the European Commission (Green book 1995; White book 1998) and by scientists (Transport Research Fourth Framework Programme – Strategic 2000) can optimise the use of existing network capacities. But this is not sufficient. Moreover it is an urgent task to activate and modernise all infrastructure capacities available for freight transport. In some countries with very high growth rates in freight transport and serious risks of rising congestions, difficulties in the fulfilment of logistic demand, and increasing external costs, one section of infrastructure has significant free capacities: inland waterways.

European and national transport policy stress the advantages of inland shipping (low energy consumption, low external costs). But a coherent investment policy for inland waterways is lacking. Even losses in the construction of waterways can be seen as a result of the lack of financial resources. Transport policy seems only interested in road and rail infrastructure.

2. Inland navigation and the development of freight transport in Europe

All available forecasts show us that freight transport (in terms of tonne-kilometres t-km) will grow much faster than the rail GDP. In the European Community this development started at the end of the 80s and results in values of the transport elasticity higher than 1. In the period before, most European countries showed transport elasticities with figures significantly lower than 1 (Baum 2002).

The reason for this change in the transport elasticity can be found in four developments:

- Rising transport intensities in the most growing production sectors.
- Outsourcing activities with longer transport distances (national and international).
- Globalisation leading to fundamental changes in the logistic conceptions (procurement, production, distribution, supply chain management).
- Widening of markets by the enlargement of economic and political integrated areas.

The statistical data reflect these impacts for the period 1970-99.

Table 1. **Annual Growth Rates EU 15; change in percentage**

	1980-1990	1990-1997	1998	1999
GDP*	2.4	1.8	2.9	2.5
Freight Transport	1.9	2.6	3.7	3.6

*. Real growth.

Source: European Commission / Eurostat (2001): Energy and Transport in Figures.

A look at the development of modal split clarifies fundamental differences.

Table 2. **Performance by Mode of Transport EU 15 (Billion tonne-km)**

Year	Total	Road	Rail	Inland Waterways	Pipelines	Short sea shipping*
1970	1 338	412	283	103	68	472
1980	1 892	626	287	107	92	780
1990	2 294	933	255	108	76	922
1995	2 627	1 136	221	114	85	1 071
1999	2 960	1 318	237	120	89	1 195

* (Intra EU 15).

Source: European Commission / Eurostat (2001): Energy and Transport in Figures.

The growth-rates of total t-km and those of the transport modes in the period 1970 – 1999 underline the unbalanced development in the freight transport system with serious impacts on the transport infrastructure.

Table 3. **Growth rates of goods transport in the EU 15, 1970-99**

Mode	Rate
Road t-km	+ 220%
Rail t-km	– 16%
Inland waterways t-km	+ 17%
Pipelines t-km	+ 31%
Short sea shipping t-km	+153%
Total t-km	+ 121%

Following from these different trends the modal split changed considerably between 1970 and 1999 (EU 15):

Table 4. **Modal split 1970 - 1999**

Mode	1970	1999
Road	30.8%	44.5%
Rail	21.1%	8.0%
Inland shipping	7.7%	4.1%
Pipelines	5.1%	3.0%
Short sea shipping	35.3%	40.4%

Without Short Sea Shipping (only 4 modes) the modal split in 1999 shows the following figures:

Table 5. **Modal split in 1999**

Mode	Taux
Road	74.5%
Rail	13.4%
Inland shipping	6.8%
Pipelines	5.1%

In the White book 2001, the EC-Commission made a forecast of future freight transport in the period 1998–2010. The status quo-development (trend) and the preferred scenario C (based on a bundle of modal split influencing political activities) are presented at the background of growing bottlenecks in the transport infrastructure, especially in the road network.

The EC-forecast (trend and scenario C) shows the following figures:

Table 6. **Growth Freight Transport 1998–2010 (tonne-km)**

	Trend	Scénario C
Road	+ 50%	+ 38% = + 481 billion
Rail	+ 12%	+ 38% = + 92 billion
Inland shipping	+ 14%	+ 38% = + 46 billion
Total	+ 38%	+ 38% = + 619 billion

In these forecasts no differentiation was made between inland shipping and short sea shipping. Short sea shipping uses parts of rivers and channels too; so inland waterways are partly bi-modal.

The political goal of the European Commission is to stabilise the modal split for 1998, which would stand for an equalised growth of tonne-kilometres by all modes with 38% and shows considerable deviations from the trend.

Within in the next 15–20 years freight transport will rise between 40% and 50%. Resulting from this growth the number and significance of bottlenecks in the infrastructure capacity will become a serious dimension with heavy impacts on the quality of freight transport services, congestion costs, and environmental problems. Enlargements in road capacity are difficult and cannot solve these problems in general. Rail networks are already overstrained in the main corridors (national and international). There is a conflict between freight transport and passenger transport (high speed traffic; commuter traffic) regarding the allocation of train paths.

From we conclude that all available infrastructure capacities should be used so as to keep in reserve infrastructure capacities for those kinds of modal transports which cannot be shifted to other transport modes. In this context inland shipping has to be considered seeing that it offers extensive reserves in barge capacity as well as in waterways.

It must be underlined that in the European Union, inland navigation is used only in 6 countries for freight transport (Germany, Netherlands, Austria, Belgium, France and Luxembourg) with very different shares of total freight transport (t-km 1999; modes).

Table 7. **Share per country**

Country	Share
Netherlands	41.8%
Germany	12.8%
Luxembourg	10.3%
Austria	5.2%
France	2.0%
EU 15	6.8%
<i>Source: European Commission / Eurostat (2001): Energy and Transport in Figures (3.4.4).</i>	

3. Transport policy and the role of inland shipping

In some countries the transport volume of inland shipping is either fundamentally higher than that of rail (NL) or nearly 90% of it (Germany). Considerable potentials for inland navigation lie in traditional as well as in new markets (ECMT 1997, Round Table 108). Openings are even given in logistic chains where reliability, not transport speed, is demanded. With a view to the relatively wide-meshed network of inland waterways, combined transport is the key for more intensive use of inland shipping.

An essential point is the support by the transport policy in the field of infrastructure measures. Here the waterways only play a marginal role, although policy makers permanently stress the economic and environmental advantages of inland shipping.

There are deficits in waterway investments. In the 15 EU countries, 29 500 km of inland waterways with 2 776 locks (navigable canals, rivers and lakes) are regularly used for transport, compared with 152 720 km of railway tracks. Maintaining the waterways in a qualified condition is difficult due to financial bottlenecks. For the past 15 years, new waterways have not been a topic in political discussions; a large number of locks are antiquated and therefore a handicap for efficient inland navigation.

The impression arises that national as well as the European transport policy are not really interested in the modernisation of inland waterways, although considerable capacity reserves exist. Are inland waterways a forgotten potential with respect to the threatening infrastructure bottlenecks in several European countries?

It is not clear why the political interest in the development of inland shipping is so weak.

4. Some additional economic arguments

Major economic figures show impressive advantages of inland shipping compared to road haulage and the rail industry: energy efficiency, pollution, land use, and labour productivity. In 1995, 37 500 people were employed in EU inland water transport with a performance of 114 billion t-km and a productivity of 3.04 million t-km per employee (EU 15). Comparable statistical data for the 15 EU freight railways is very poor. Figures for Germany show an employment productivity in the rail cargo sector of 2.47 million t-km (2001, only transport services without rail track).

The Trans European Network Programme (TEN) did not include in its first version (“Essen-Projects”) an inland waterway project and only 1.8% of the budget for a pushing-start financing. The “new specific projects” (priority projects 2. stage) contain only one waterway project. All TEN-projects show the dominance of rail projects. A comparable situation can be found in several European countries.

In contrast to the rail sector no EU-wide masterplan for investments in inland waterways is available. Especially from the rail side, one argument against investments in inland waterways has been stressed for many years: the low coverage rate of infrastructure costs by the inland shipping. But the railways should handle this argument with gloves.

Available statistical data from Germany are used as an example. Without considering positive external benefits of inland waterways (water resource management, irrigation) the coverage rate of infrastructure costs by inland shipping user charges only meet 10%. This very low coverage rate also depends on the free of charge use of most important waterways as the Rhine and the Danube, which results from international agreements. The coverage rate of rail infrastructure costs by rail cargo services is 16% (value for 1997; investigation by *Deutsches Institut für Wirtschaftsforschung* (DIW, Berlin, 2000). This low rail coverage rate differs from that published by the German rail network company (DB Netz) as it takes into account the considerable state infrastructure subsidies, which are not included in the accountancy of the rail network company, DB Netz.

But it seems more suitable not to compare coverage rates or absolute uncovered infrastructure costs but to have a look on the total uncovered amount of infrastructure costs related to 1 000 tonnes-kilometres purchased:

Uncovered amount of infrastructure costs (1997):

- DB Cargo: 58 € / 1 000 t-km.
- Inland shipping: 13 € / 1.000 t-km.

An additional problem of inland navigation should be mentioned. It concerns the inland navigation ports. In most countries they are owned by local communities or public companies, which monopolise not only the basic port infrastructure but in addition most harbour services. In many cases investment decisions to build new ports are made by regional administrations. The hope for new and

better regional economic conditions can lead to a great number of small-sized inland navigation ports which are competing amongst themselves. Often this competition process is based on considerable public subsidies and therefore distorted.

5. Conclusions

Urgent needs for the future transport policy are:

- Development of a European master investment plan for waterways concerning inland shipping and short sea shipping.
- Development of models for co-operation of bi- and three-lateral transport services (inland and short sea shipping, road haulage, and rail) with respect to logistic requirements.
- Identification of new markets (products, transport relations, combined transports) for inland navigation services (helpful work was done in the reports for ECMT Round Table 108, 1997).
- Development of new types of vessels to meet transport demand for short distances (< 250 km water transport), e.g. container services.
- Provision of financial means at the same conditions offered to rail track investments and rail terminals for combined transport road/rail.

The main goal of all these measures is the relief of rail infrastructure and in a smaller volume of road infrastructure. Their capacities are indispensable to fulfil the social and economic demand for future levels of mobility.

With respect to the necessary sustainability conditions, attention has to be paid in particular to the transport sector. Following from the considerable environmental effects which accompany all transport activities inland navigation gets a special relevance. The comparative advantages by emissions (pollution, noise), energy consumption, congestions, and accidents should be kept in mind. It is obviously that only in few European countries inland shipping can play a remarkable role in transport markets. But these potentials should be used as well as those of short sea shipping, although pressure groups from rail and road industry are much more active (and successful) than the inland shipping lobby.

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ASSESSING OUR EXPERTISE

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European research in the field of transport economics owes a great deal to ECMT activities and initiatives. The full collection of Round Tables and Symposium reports prepared at the instigation of the ECMT provides an encyclopaedic body of knowledge. It bears witness to the vitality of European expertise and is an essential tool of reference for transport economics.

The value and interest of the topics selected has always resided in the fact that they reflect the two-fold dimension of the ECMT -- the dimension of a Conference of Ministers, meaning that the questions raised address immediate and, if possible, future policy concerns, but also a scientific dimension, meaning that the research community's knowledge and expertise are applied to answering these questions, if only partially. Thus, the Round Table reports, including the valuable summaries of discussions, constitute a long-term dialogue between decision-makers and experts -- a dialogue of over 20 000 pages that has been maintained for over 35 years.

The purpose of this brief report will be to take stock of this dialogue. For this exercise to be useful, it must be critical and, more specifically, it must answer the following three questions:

- Has this dialogue addressed the right issues, i.e. those faced by decision-makers?
- Have the experts been able to provide the right solutions?
- Can we identify tomorrow's issues and will we be able to provide solutions?

1. Have we been addressing the right issues?

This is a question that a number of *rapporteurs* were already asked to address at Round Table 100, which was held in 1995 and was specifically devoted to this issue. As I was one of these *rapporteurs* and had chosen to focus on the challenges facing policymakers, I suggested¹ that analysis and comparison showed that there were four main groups of subject areas that the ECMT had been asked to study (or had done so on its own initiative).

These four main subject areas will be described below in the chronological order in which they emerged as policy issues.

Since in the 1960's policy was focused on the optimum allocation of scarce funding resources, the issue of the *evaluation* of investment was given priority, starting with the evaluation of specific projects and then the evaluation of transport policy encompassing co-ordinated investment strategies. This category may be taken to include evaluation-related needs for data on demand or simulations of

1. "Research and Transport Policy" in Transport Economics Research and Policymaking, ECMT, OECD Publications, Paris, 1999, pp.127-134.

demand. Similarly, issues relating to external effects progressively began to emerge in connection with this subject area.

The issues of *pricing policies and investment funding* emerged virtually at the same time. Charges for the use of infrastructure became a much more topical issue since the progressive implementation of a common transport market within the European Community was based on a principle of regulation through competition, in particular between transport modes, which assumed equitable pricing of infrastructure use between these different modes. Again, issues related to the internalisation of external effects also came gradually to the fore as these effects were factored into the pricing system.

The third set of issues appeared very early on in an isolated fashion, but became much more important in the 1980s with the introduction of deregulation policies, particularly in the field of road freight transport. These issues relate to the different forms of operation of the transport market, be it within the same mode or between competing or complementary modes. As a general rule, work in this area deals with means of *regulating the sector*, that is the means of determining levels of transport provision, price formation and, ultimately, levels of demand.

The fourth set of issues relates to ways in which transport policy structures space, that is to say, the impact that policy has on urban configurations, on regional development or on the location of industry. This naturally appears to be less crucial than the two previous subject areas, for these are issues that are only raised once the most urgent investments have been made and a certain level of development has already been attained.

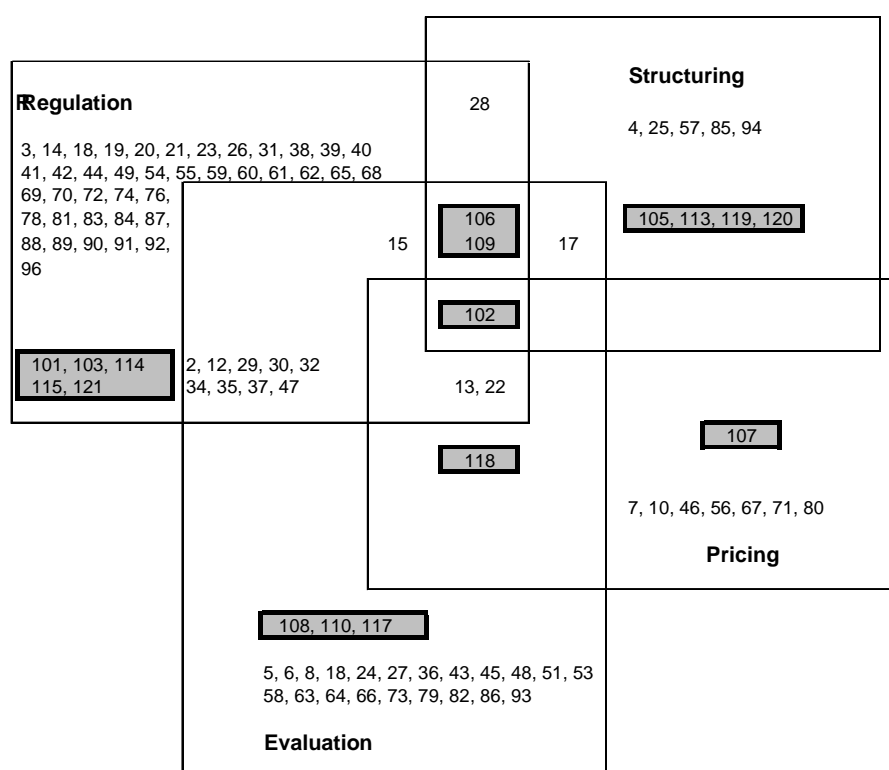
While this classification is by no means exhaustive, it does make it possible to place nearly all the Round Tables in a particular context. Apart from Round Table numbers 1, 50, 75 and 100 devoted to discussion of research options, only two (numbers 77 and 95), given over to very distinctive issues, fall outside of the four subject areas mentioned. The classification does not, moreover, seek to be restrictive insofar as some of the Round Table topics touch on two or more of these four subject areas.

The following diagram² shows these subject areas under the terms of regulation, structuring, evaluation, pricing, which are to be taken in their broadest sense. As pointed out, they form sets that overlap. The Round Tables, identified by their number, are located on the diagram in accordance with their singular or plural reference to the four subject areas. The most recent Round Tables (after No. 100), which are highlighted in the boxes shaded in grey, do not suggest that there has been a significant shift in the pattern of the issues addressed. Other than in the case of “regulation/evaluation, there is little linking of subject areas throughout the period, although some major issues of immediate concern do in fact span two or three.

A pricing policy, for example, which is designed to protect the environment can push up the cost of transport to areas at some distance from development corridors and so obstruct the aim to achieve a well-balanced structuring of space. This means that that pricing is linked to the structuring of space, but also to evaluation since these policies involve making a trade-off between the reputedly positive and negative effects. As a further example, charges for the use of infrastructure can influence modal split and therefore demand and, in the last analysis, may help to shape assessments of alternative investment projects. There is no shortage of other instances of difficulties that have not always been easy to describe or, accordingly, resolve.

2. This diagram is an updated version of the one presented in our Round Table No. 100 report.

Figure 1. The four subject areas
Distribution of Round Tables by subject area



If the diagram above had also covered the sectoral breakdown in documentary classifications (passengers/freight, geographical level, mode), it would have been even clearer that our approaches to subject areas are in most cases seeking to analyse and seldom to synthesise. We are better able to assess two versions of the same project than decide whether to invest in this or that mode or at this or that geographical level. We are not well equipped to take a comprehensive view when assessing plans for national or international infrastructure, still less to judge the consistency of plans involving different modes. Lastly, we are not really used to defining and weighing up the basic choices that have to be made when framing a transport policy, those which will determine how the system will evolve from then on, namely the targets for the sector in terms of economic efficiency, the environmental and spatial objectives; the conceptual framework for assessment; pricing principles; funding arrangements. All these components must be built into a coherent whole.

These issues should occupy central positions on this diagram and call into question the distinction that we have made between the four subject areas. In other words, this analytical tradition has left us ill-prepared to tackle what has now become an overarching concern of our transport policies, namely sustainable development. How can we address this objective unless we include not only the choice of investments (and thus their evaluation), but also the channelling of demand (and therefore pricing), the structuring of space (and therefore spatial equity) and, of course, the regulatory system as a whole?

Obviously, a research programme or Round Table topic cannot be expected to encompass all major aspects of transport policy. In each of these cases, rational inquiry cannot be conducted without dividing a problem into its component parts. However, although general policy issues have to be broken down in order to study them in greater depth, the individual segments defined and the specific

approaches adopted should also be interconnected and compared to see if they constitute a consistent policy.

To illustrate this tendency towards an overly isolated approach to analysing issues, I would like to give a simple and highly topical example that in all likelihood is not unique to France. When a major corridor is saturated or becoming saturated³, it is necessary to address the issue of whether its capacity should be increased. If an economic evaluation is made of an investment, such as widening a motorway or building an additional road along the same given corridor, it is very likely that the social and economic return on the investment will be seen as being very high, for this new stretch of highway is sure to attract considerable traffic and users would stand to benefit in the short and medium term from less saturation.

However, there is an alternative solution to this approach, which would consist of improving the alternative routes through less easily accessible areas, varying tolls over space and time and making the rail mode more commercially competitive. This approach would involve all four of the subject areas that we have mentioned, for it clearly entails *evaluating* this alternative, but also *structuring the territory* in a more balanced way, using *optimum pricing* and introducing *regulatory methods* to make rail more competitive.

It is not easy to determine whether decision-makers bear sole responsibility for this failure to consider an alternative identified under another strategic approach or whether the responsibility lies with the experts who have encouraged decision-makers to continue to treat the investment choices, road-toll policy, intermodal policy and territorial development policy as separate issues.

Beyond this specific example, the above diagram shows that we are *little inclined to address issues using an integrated and ultimately strategic approach*. However, although experts may not always address the right issues, when they do so, are they actually able to provide solutions?

2. Do we have the right solutions?

The lengthy experience on which we can draw provides us with a chronological record of the transport issues that our countries, and therefore our policy-makers, have had to contend with. It enables us to assess to what extent the experts have been able to provide initial solutions to these issues of immediate concern, or at least how responsive research has been to addressing these issues.

3. As is the case for the Rhone Valley south of Lyon.

Figure 2. The main uses of transport models and the status of our expertise in using them effectively

<i>Main applications of models</i>	Fields of modelling research									
	Road freight	Rail freight	Multimodal freight	Car passengers	Public transport passengers	Air passengers	Passengers, all modes	Mobility, car ownership	Parking	Geographic scale
To plan and determine appropriate size of transport infrastructure										Urban
										Interurban
To manage and optimise transport networks and infrastructure										Urban
										Interurban
To simulate spatial changes generated by changes in transport supply										Urban
										Interurban
To explore major trends of the future										Urban
										Interurban
To simulate and evaluate transport-related environmental issues										Urban
										Interurban

	Not applicable
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	We believe we have expertise
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	Beginning to have expertise
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	Do not yet have expertise
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To assess these factors, we must no longer refer to major transport policy issues but adopt a more precise approach based on what may be described as demand for modelling. This consists in determining the stock of models currently available in the field of transport economics¹ and in assessing the extent to which they can provide answers to the main questions that policy-makers ask before making decisions. Though obviously very varied, these questions can be divided into five areas of concern which have progressively emerged as central issues in the area of transport policy:

- To plan and determine the appropriate size of transport infrastructure.
- To manage and optimise transport networks and infrastructure.
- To simulate the spatial changes generated by changes in transport supply.
- To explore the major trends of the future.
- To simulate and evaluate transport-related environmental issues.

A further distinction must also be made depending on whether the issue is being addressed at the urban or interurban level, for the same models are not used in both cases. In addition, the models used more often than not concern a specific segment of the transport market. These market segments are shown in the columns in the upper half of Diagram 2, and the squares below show the degree of expertise of the scientific community in each case (apart from the black squares which provide no indication).

It can be seen that we have classified many cases in the “Do not yet have expertise” category. Thus, in all areas concerning the impact of interurban transport supply on the structuring of space, transport economics has not as yet developed models capable of simulating these structuring effects adequately. Similarly, we have relatively few tools for conducting a detailed simulation of the impact of parking policy in an urban environment.

A whole series of issues are classified in the category “Beginning to have expertise”. This means that the research community has developed the relevant models, but that they are not yet fully tested or widely used. These are fields in which research programmes have recently been developed and that can be considered to have produced effective results. This is the case in particular of long-term modelling that makes prospective simulations possible, and also models that can simulate the environmental impact.

Lastly, there are the issues placed in the category “We believe we have expertise”. This includes, of course, the traditional demand forecasting models, which were developed long ago in order to tailor new infrastructure to needs and evaluate it correctly.

We should point out that the expression “We believe we have expertise” reflects not only a healthy attitude of humility on the part of experts, but also the fact that there have been many difficulties in forecasting traffic and more generally in making assessments, for the forecasting errors have not only concerned demand but also costs.

1. In order to identify this supply, we propose to use a classification based on a grid developed for a research project currently in progress at the “Economie et Humanisme” research centre (<http://www.economie-humanisme.org>). This project is managed by Eric Baye and Philippe Blancher.

Let us confine ourselves to a single example that aptly illustrates traffic forecasting errors. A report was recently issued by Standard & Poor's² on investment in toll roads on different continents. Out of the 32 cases studied, four showed that traffic was slightly higher than had been forecast, while in all the other cases traffic was lower than originally forecast and in twelve cases more than 40% lower!

It is clear that Standard and Poor's addressed these issues because they have a direct bearing on the potential for growth in public-private partnerships (PPPs) relating to the financing, construction and operation of transport infrastructure. The uncertainties relating to forecasting models and the risk premium that private operators are entitled to add to the internal rate of return on a given project are obviously linked. This would suggest that with margins for error as large as these, coupled with current rates of return, there is very little likelihood of PPPs providing a share of the private funding for most projects.

If we look beyond this intimate link between the know-how of the experts and policy-makers' powers to take action we can see an even more formidable issue start to take shape, which is that, because the implementation and impacts of transport operations are long-term processes, the right questions to ask are those which concern the far distant future.

3. Do we know how to ask the right questions now about the future and how can we answer those questions?

We shall use an example to illustrate the difficulties involved in formulating the right questions and in drawing up strategies, through appropriate research programmes, to find answers to those questions.

Let us take the case of urban areas on major corridors where traffic levels are approaching saturation, which is one of the long-term problems that causes greatest concern. We know that because of urban sprawl, growth in daily car-based mobility can hardly be avoided. We also know that the long-distance traffic using these major corridors will continue to grow. Lastly, we know that development of local rail services is restricted by the need for train paths for freight and long-distance passengers. Consequently, there is a risk of major congestion that needs to be simulated accurately in order to assess this challenge realistically. Can this challenge be met simply by increased infrastructure capacity at specific locations or by adjusting road pricing? Should modal shifts towards rail transport be encouraged on the market segments concerned and provision made for the development of the rail infrastructure which this would entail? Should consideration also be given to reviewing the entire regulatory regime applicable to goods' deliveries in urban areas?

To be able to address these questions properly, we would need to be able to have mastered virtually all of the "squares" in Diagram 2, that is say to have thoroughly tested long-term simulation models available for each one. In addition, we would have to be able to use all these simulations coherently. This is made all the more difficult by the fact that each model is based on its own specific space and time frames. For example, freight simulation models use a regional breakdown to analyse annual traffic between major areas, whereas models of passenger traffic in an urban environment generally analyse peak hour traffic between districts within urban areas. If we wish to simulate, at time horizons of 15 or 20 years, the saturation levels relating to the use of the same infrastructure by traffic flows modelled on such disparate bases, then all of these models which were originally designed to answer questions will need to be supplemented and amended. It is apparent, therefore, that there are a

2. "Credit Implications of Traffic Risk in Start-Up Toll Facilities", Rating Direct, Standard & Poor's, 15 August, 2002.

number of obstacles to be overcome before combined simulations can be made for these two different types of flow systems (as well as for many others) on the same road and rail networks serving a given urban area.

Attempts have nonetheless been made to deal with this type of problem. They consisted in taking account of both passenger and freight traffic, local and long-distance traffic, and of course factors that are known to be determining in traffic emissions such as the location of residential areas and economic activities or in some cases economic growth. Examples include case studies of the Dutch province of Utrecht made with the MOBILEC³ model or the case study of the Lyons urban region based on the TELESOPAGE model⁴.

In the latter case, the traffic forecasts made for 2015 are particularly worrying in the event of an average rate of economic growth in that peak-hour saturation of the road network would increase from around 15 kilometres of carriageway to several hundred kilometres on peripheral roads that at present are apparently far from their saturation point.

Admittedly the results obtained from the TELESOPAGE model may be wrong. In practice, the model consists in the as yet relatively untested combination of several independent models and it may well inaccurately portray the effects of heavy congestion on mobility or modal split. However, the first attempts at long-term simulation of these telescoping effects would seem to indicate that there are serious risks of congestion and problems with which we are far less familiar than the conventional forms of congestion (on exclusively urban roads, major corridors or mountain crossings).

It can therefore be seen that an expert opinion, which cannot be definitive and which is no more than a presumption, can nonetheless identify major risks which, in order to be avoided, may perhaps require forceful political action. To manage this risk in a less uncertain context, decision-makers will need to know more than the experts are able to tell them. In short, political and scientific issues are locked into a continual process of mutual exchange and reinforcement.

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3. Van de Vooren, F.W.C.J. (1998), *A Policy Oriented Model about Economy, Mobility, Infrastructure and other Regional Features with an Application to the Dutch Province of Utrecht*, 8th WCTS Proceedings, Vol. 4, pp. 43-56. A presentation of MOBILEC applications was also given by Floris Van de Vooren at the "Networks for Mobility" international symposium hosted on 18 and 20 September 2002 by the University of Stuttgart: *Towards a Welfare Optimal Planning of Infrastructure*, pp. 146-156 of Volume 1 of the proceedings of the Symposium.
 4. Routhier, J.-L. *et al* (2000), *TELESOPAGE, Modèle de simulation des trafics de marchandises et de personnes, locaux et interurbains, dans un espace de région-ville*, Final report, 171 p. This research project was directed by Jean-Louis Routhier from the LET, Pierre-Yves Hennebelle from the ISIS company and Eric Saliou from the CETE in Lyons.

COMPETITION VERSUS REGULATION IN TRANSPORT

THE APPRAISAL OF PAST POLICIES AND LESSONS FOR THE FUTURE

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1. The “cycles” of Transport policy

My basic view of transport policy in Europe, but also of policy making in general, is that structural changes are taking place in “cycles”, following an almost “epochal” fashion, that is characterised by a prevailing “policy trend”, current or foreseeable technologies, and of course the political, cultural and economic environment in which Transport operates.

As I have noted in an earlier ECMT paper of mine (Giannopoulos, 2000), there are first, long – term cycles, which are due to major “jumps” in the technology, or the political or social environment. Examples of such cycles are the coming of the railways, the emergence of private motorised transport, the take-off in commercial aviation, and the recent dawn of the Information age. These were primarily “technical” revolutions but there are also examples of “revolutions” in the political or socio-economic fields, which started major long-term cycles of change. The creation of the European Economic Community (originally) and later the European Union is certainly one of them, as also is the abolition of Communism and the change of the Eastern European countries to market economies, or (perhaps of a smaller magnitude) the recent wars in South Eastern Europe.

On top of these long-term cycles, there are superimposed identifiable short-term ones. If we just take the past twenty years, for example, one can identify the 70s as the age of “energy and environmental consciousness”, the 80s as the age of “Regulatory Reform”, and the 90s as the “Decade of Infrastructure Issues”. The years 2000 are sure to be characterised as the years of “Telematics” and the advent of the Information Society. The information revolution cycle is only beginning and is likely to proceed with lightning speed all through the 00s and 10s.

The focus of the Transport policies that have been applied at EU level over the last “short cycle” i.e. for the last 10 – 15 years has been the **creation and proper functioning of the “internal market”**. This has been based on what I can call conditions of “*very loosely controlled competition*” in which the main preoccupation of the public sector is the safety of operation and the protection against unfair competition. A continuous push for privatisation in the transport sector and “protection” of the full and fair competition conditions has been the main pre-occupation of the EU and National Governments alike.

A second most notable focus has been the emphasis on interconnections of networks and interoperability because this is imposed by the need to enlarge the Transport markets, and further “protect” competition.

I expect that the current “cycle” with the above focal points will continue until the mid ‘10s or even 2010.

Then the results of the policies followed in the current cycle (like those of similar policy cycles in the past) will soon be visible and this by itself will call for a new “policy cycle” to begin in which important adjustments and changes will take place. These will then characterise our Transport policy scene for the next 10 – 20 years until a new “cycle” begins, and so on.

In this note, I will therefore try to briefly summarise what the results of the current cycle are (in my view) and what the characteristics of the next cycle might be. Thus through this perspective I will give my views on the issues and priorities that should emerge in our transport policies for the future.

2. Results of past and present cycles

The current policy cycle, which may be traced back to the first formulation of the **common transport policy** of the European Commission in the mid- ‘80s, is characterised by:

- Strong privatisation moves across the Western (initially) and later on across all European countries. These moves were certainly not of uniform speed or depth in each country and this already provides a good basis on which to judge the success of this particular policy trend.
- Gradual liberalisation of transport service provision, i.e. lifting of all regulatory or intervening powers of the state in the functioning of the Transport market.
- Strong (and ever increasing) reliance on Technology to solve or alleviate problems in all aspects of the operation of the system from congestion to operation efficiency and safety.

Very recently (through the new White Paper on Transport Policy) a fourth element of (policy) preoccupation has been added: *the user*. “Placing the user in the middle of it all” will most likely become the “logo” of the ‘90s.

More particularly as regards the results so far:

Privatisation and liberalisation has been a policy with (at best) mixed results. In the airline sector, where this policy has advanced the most, the initial euphoria of airline privatisations in the UK and other central European countries has recently produced a backlash of results and feelings that are caused by a number of spectacular failures of long and nationally important companies (e.g. Sabena, Swissair), and the serious financial difficulties faced by most large and long established in the market carriers. In the railways, this policy is still far from being implemented in the majority of countries so results are still early to judge. Already however, serious questions concerning the safety of operation are being asked in relation to the fully liberalised rail market in the UK.

In the maritime sector, the experience is that fully liberalised markets have so far worked fairly well but the provisions for services to small and “non-commercial” islands and / or destinations need to be re-evaluated because there the results are still not satisfactory.

In addition some horizontal issues have become “buzz” words through continuous repetition and (unfortunately) less action. Just to remind some of them we mention:

The continuous push for integration

The (obvious) need to push for truly integrated transport services and systems that will take advantage of the tremendous possibilities offered by Technology but also economies of scale has been

paid lip service ever since the beginning of the 90s. However, “Integration” at the geographical, the technological, and the modal level is still far from been attained and the continuous push for more integrated systems and services that will benefit the end user is likely to continue as a very important policy objective until the market itself makes the provision of such systems self supporting and evident.

The continuous push for common standards

Many of the developments in telecommunications and information technology and their applications in transport have emerged in different ways, at different times and at different speeds. Thus policies in the current cycle, have aimed at helping to achieve horizontal and vertical co-operation among the various systems and technologies, with partial success so far.

Solving the Institutional and legal issues

From the beginning, it became clear that the new technology driven systems and infrastructure, couldn't simply develop from the modernisation of existing physical infrastructure through repair, replacement and optimisation of existing technical infrastructure systems. They also require the “institutional and social” modernisation and acceptance of these systems.

Examples of such institutional and legal aspects, are questions of liability and authentication in electronic transfer of data, questions of securing privacy and accuracy in electronic booking and payment systems, protecting the commercial interests of companies dealing through the Internet as regards access to confidential information, various fair competition issues, the issues related to the internalisation of the external costs, etc. These issues have been dealt with fairly vigorously all through the 90s and are likely to preoccupy policy makers until the end of this cycle.

Considering the User, and the Social and Behavioural issues

Transport has now been accepted as the element of society's overall “*mobility package*”. As such, the issues relating to social justice, equity, and public acceptance have now been recognised as important issues that need urgent attention. The recent EU White Paper on Transport Policy brings also in the surface as the controlling element “of it all”, the User. This I see as an important turn in the focus and orientation of Transport policy, which is inevitably going to influence and have an impact on the next cycle.

Consideration of the externalities

This is an item that has been “present” in Transport policy considerations since the beginning of this cycle. However, as we all know, very little progress (if any) has been made and it is evident that the issue will continue to preoccupy policies and policy makers in the future.

3. The characteristics of the emerging new cycle

3.1 Basic Assumptions

So if the above are some of the most notable trends and “events”, in the current cycle how can we derive the future? What will be the necessary or likely, characteristics of the new transport policies in the EU of 25, as well as in the rest of the European countries?

This can only be based on some assumptions about the overall context of Europe, in the sense of the EU, i.e. which kind of European Union is envisaged. This may look a bit biased towards the importance of the role of the EU, but it is a fact that has to be faced that an EU of 25 countries (and later on perhaps more) will be the *de facto* pivotal force in Transport Policy formulation for the future decades.

However, without being too specific, a few general assumptions are also necessary to be mentioned here, before we embark upon what in our opinion will be the main characteristics of future Transport policies.

Assumption I:

- The next decade (2020's) will see a stronger European government with the means to impose and safeguard a pan-European Transport policy. This means that although each country will have its own legislation, jurisdiction and government, European institutions will have decisive powers over certain sectors of the economy such as international trade and industry, research and technology, environment, transport, and telecommunications.

Assumption II:

- In the coming years until 2020 (and hopefully far beyond it) there will be peace in Europe or its neighbouring areas. The events of 99 in South Eastern Europe have brought some parts of this region back many decades in terms of Transport (and other) infrastructure as well as on almost all issues of socio-economic development.

Assumption III:

- European or national government policies will continue to be formed by a process of “balancing” the concerns for “growth”, “equity”, and the “environment”. “Growth”, would call for a high-tech and market economy scenario with as little state intervention as possible. “Equity”, would give emphasis on policies that primarily try to reduce inequalities in society both in social and spatial terms, while the “environment” would give the emphasis on the quality of life and environmental aspects. This process of formulating policy is likely to continue in the future, i.e. to follow a stepwise process, that moves by successively focusing in one of the above three basic concerns.

3.2 The main issues

It is my conviction that all the necessary actions and “elements” of a sound and comprehensive transport policy are already here. Most of them are already mentioned in the EU White paper on Transport Policy. What is needed is to be able to see which of these will become the critical elements that will influence the formulation of the coming cycle of transport policies, and what the priorities should be.

First and foremost, it seems that the continuous application of further *privatisation and liberalisation* policies in the transport sector, will meet with more and more resistance and resentment from the employees (who will see their jobs been reduced or vanished), but also from the society as a whole who will want to see some level of subsidisation and/or guarantee that basic transport services or levels of service will be maintained and secured from the economic risks of full privatisation.

This means that over the course of this decade (i.e. in the new “cycle”), policy makers will have to sort out the degree and extent to which they wish to push the *Privatisation and liberalisation* policies of the current cycle. My view is that a new emphasis will have to be placed on some important issues with a view to placing some distinct limits and safeguards as to how far we go. These issues may be identified in the following areas:

1. Securing transport services to underprivileged and less accessible regions and sectors of the population. This already exists in the face of “Public Service Obligations” but it is my view that these provisions will have to be given far more emphasis than today, and further extended and strengthened in the future.
2. Formulating and placing rules and agreed practices in order to act in cases where the private sector is not interested, or fails in the provision of important transport services. This is the case e.g. of providing public obligation services or in areas where strong seasonal variations of the demand or other factors create a “grey”, so to speak, area.
3. Implementing extensive and continuous monitoring mechanisms in order not only to monitor current trends and practices, but also to foresee and prevent situations in which the market may need adjustment.
4. Financial issues and transport investment funding. Ensuring efficient but above all *fair implementation of the “user pays”*, and where appropriate, the “*user subsidised*” principle. This is related to the need to establish the true costs of transport provision.

These are issues whose solutions are of the outmost importance to find, if we are to see the continuation into the next cycle of the basic policy of privatisation and liberalisation that is in the centre of the current cycle

Secondly, the current cycle has established the principle that provision of more infrastructures alone does not solve the problems. What is needed is being able to influence the “USER” to use the system in a way that minimises the total social cost of transport. I think that “*Placing the User in the middle of it all*” although very correct as a principle to establish, is not enough. A relatively “ugly” word used in the past for what is needed here is “demand management”.

What I would therefore suggest is to put more emphasis on policies and actions which:

- Make the users aware of the costs and impacts of their choices. This calls for awareness campaigns in which detailed and carefully collated data are given to the users in support of specific policies.
- Make the users part of the solutions envisaged by the policies. This takes account of the fact that the users can contribute considerably to the formulation of a correct and “acceptable” policy. An “acceptable” policy is then a successful policy.
- Provide to the users all the necessary real-time information on their choices (e.g. traffic conditions or intermodal schedules) at the appropriate time in order to make the appropriate choices. How easy it will be to change Travel Behaviour is a subject dealt with in the paper by Phil Goodwin.

Third, the question of *Externalities*, an issue side-stepped for many years in the current cycle, will now have to be faced and appropriately approached. The same technological breakthroughs that are

currently shaping the face of Transport in the end of the current cycle, and which will also influence the next cycle, will soon make it possible to measure and account for these external effects. The issue will therefore be primarily a political one and policy makers must be ready to face it.

Finally, the cataclysmic advances in *Technological Applications* will inevitably and inextricably influence the next cycle and the future Transport Policies. Technology will be the “enabling” factor for almost all policies to be formulated and followed in the future. The capabilities that will emerge from *Convergence* i.e. the union of telecommunications, information technology, the Internet and consumer electronics will give limitless new possibilities for applications on the European Transport scene.

What should be of interest and concern for the policy makers as regards new Technology applications, is:

1. The possible timing and the market implementation of these applications.
2. The investigation and promotion of new business models which when they emerge will provide the necessary market conditions for success. They will however, have to be test-bedded by industry and entrepreneurs operating in the areas that provide the most fertile conditions for experimentation.

It is reasonable to assert that the remaining of this decade will be the time when most of the “initial” new technology applications in the transport field, that started their first stages of evolution in the 1990’s, will mature and achieve wider market acceptance and integration. The technological challenge for the new cycle, will thus be: *to make sure that the so called “intelligent” Transport infrastructure development, that will be built on the “Ambient Intelligence” (AmI)¹ environment that is expected to characterise the years 2010 and beyond, is in line with the real needs of the users and society as a whole.*

In a special report prepared for the IST programme of the EU (IPTS, 2001) on the prospects and potential timing for the materialisation of the *AmI* it was noted that:

“... the vision of Ambient Intelligence is a strong starting point for giving direction to research and policy formulation over the coming years. Major opportunities to create an integrated Ambient Intelligence landscape can be built upon European technological strengths in areas such as mobile communications, portable devices, systems integration, embedded computing and intelligent systems design... Next to technological and economic feasibility, the implications for issues such as energy, environment, social sustainability, privacy, social robustness and fault tolerance may in the longer run determine the success or failure.”

The above passage from the IPTS report on AmI also indicates the particular “social” and “human” dimension that is always present in European technology development.

3.3 Issues and Challenges for Transport Policy in the coming years

So what should the emphasis be on Transport Policies in the coming “new” cycle?

My view and interpretation of what was pointed out in the above, i.e. where the emphasis should be placed in the coming years, is the following:

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1. Ambient Intelligence (AmI) stems from the convergence of three key technologies: Ubiquitous Computing, Ubiquitous Communication, and Intelligent User Friendly Interfaces.

1. Devising and placing more distinct limits and rules to market liberalisation and privatisation in the transport sector, so as to avoid the malfunctions of the past and ensuring that “public interest” is always present to reassure the users of a minimum of service provision, and of generally acceptable levels of service. In other words the “new cycle” is expected to be more “regulated” than the past one.
2. Setting up these minimum “thresholds” of acceptable levels of service, and setting up and maintaining mechanisms for monitoring these levels and the functioning of the market, in general, in all modes and types of transport.
3. More push for integration and common standards. Integrated and interrelated services in the transport sector have also been a target of the 90s but now that the technological “enablers” are present, this push must regain its momentum for final and concrete results. This “push for integration” is very much in line with the policy to utilise more the capabilities and prospects of the railways and other less utilised modes today. The push for common standards is along this line too, and refers not only to technological standards but interoperability standards and actions across modes and within one mode too.
4. Creating new Pan-European Institutions and Organisations that will reflect the new face of multinational, intermodal, technology driven, and borderless European Transport. The “pan-European” nature reflects primarily the inclusion into one system of the totality of European countries i.e. far beyond EU members. The ECMT is a particularly well-placed Organisation to advise on the type, structure, and mandates for these new Institutions and “pan-European” Organisations.
5. Establishing finally, and implementing a commonly agreed framework for financing Transport Infrastructure. The balance between public funding, private funding, and application of the “user pays” principle, is something that needs to be established once and for all. The decisions to be taken on this issue will inextricably determine the rate and extent of developing Transport Infrastructures for the 2010s, especially in the developing areas of Eastern Europe. Of particular importance in this respect is the regulatory capacity that will be acknowledged to governments to set the “right” balance, but clear and objective rules should be established as to ways in which to arrive at this right balance.
6. In relation to the previous point, one main aspect of transport policy formulation in the coming years will be the final and irrevocable settling the questions regarding the calculations of the costs related to the “externalities” of transport provision, and their inclusion in the total cost of transport.
7. Making the “User” much more involved in his (her) transport planning, and execution, and providing him (her) with all the available choices so as to make the right decisions concerning his (her) particular transport. This calls for at least providing them with timely and accurate information about all aspects (and costs) of their trip.
8. Taking full advantage of the capabilities offered by the Information Society Technologies (IST) and their applications in the field of transport. Policy, calls on policy makers to facilitate the establishment and fast proliferation of IST in all aspects and areas of transport provision.

9. Investigate the impacts on transportation and society of IST, and promote new business models for their application in every day transport, especially for e- fulfilment in relation to e-commerce.
10. Finally, the future will call more and more for policies and actions aimed at changing travel behaviour. These policies should aim at making trip makers and trip making more aware and thus complying with the existing capacities and capabilities of (Transport) infrastructure in both urban and interurban areas.

The above make my Decalogue of principal priorities and issues for Transport policy once the current “cycle” ends and the “new” cycle in European Transport policy begins. The timing of this (beginning of the new cycle) is something one cannot surely predict, but it looks as if it is a matter of the next few years. Equally for how long it will last, but in any case beyond 2010.

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HOW EASY IS IT TO CHANGE BEHAVIOUR?

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The success of many transport projects and policies depends on how travellers respond to them. But some argue that trends in travel behaviour so strong, and travel habits so deeply entrenched, and freedom of choice so tightly constrained, and people so resistant to change, that the trends cannot be changed significantly by any feasible transport policy initiatives. Others argue that transport choices by individuals and companies are conditioned by the price and quality and alternatives that are open to them, and that in most cases they will respond rationally and sensibly, so that well judged policies *can* mould and develop the market, and improve efficiency and quality of life.

This difference in judgement may reflect philosophy and optimistic or pessimistic personalities, but the argument is essentially an empirical question, to be resolved by evidence from experience.

This paper reviews the statistical and empirical evidence of changes in behaviour from practical implementation of policies: transport prices, road-building, public transport improvements, traffic management, reallocation of road capacity, 'soft' initiatives, and transport plans.

The conclusion is that the evidence clearly demonstrates that travel behaviour *does* change – often more than we forecast – but in complex ways that take several years to evolve. The changes are not always in the expected, or intended, direction, and they have important features that are not fully captured by the standard methods of forecasting and appraisal. There is much evidence of an extraordinarily wide range of behavioural change that happens anyway, even without policy intervention: this 'natural variation' provides a base pattern which is more volatile than it appears, providing opportunities for specific target changes that are often ignored. The key to identifying and understanding this is the *time-scale*: in the short run, often habitual choices predominate, but in the longer run these habits are unpacked and entirely new habits are developed. Models and analyses which do not look at changes over time, cannot hope to understand, or forecast correctly, the full response to changes in prices, speeds, quality or infrastructure.

Although every situation is different, on average the long run effects of a 10% change in fuel price (for example) will be a change in traffic volume of about 3%, and of fuel consumption of about 7%. A 10% change in public transport fares may in the long run change the use of public transport by between 5% and 9% (and even more for some particular markets) with between 10% and 50% of these drawn from car use. For both car use and public transport use, the first year effects are likely to be less than half of the full effects. Town centre pedestrianisation, if designed well and accompanied by good complementary policies, can result in doubling the number of pedestrians in the area. Reallocating road space (for example to bus lanes, cycle lanes or pedestrian facilities) can result in an average 20% reduction in traffic flows on the treated and neighbouring streets. Road building can induce new traffic of the order of 10% to 20% of the flows that would otherwise apply, and more when congestion is

(initially) substantially reduced. Workplace travel plans can attract 10%-60% of their target market. Individual marketing at the household level can reduce car use by those participating by 10%-20%.

A particular recurrent problem is that even when the travel choices of some individuals respond substantially to new alternatives, the advantages of this may be offset by other individuals 'responding to the response'. For example, public transport improvements may attract significant numbers of car users, thereby initially relieving congestion - which attracts new car users to make use of the improved traffic conditions. Similarly road construction also induces extra travel, which reduces the period of relief from congestion and hence will often reduce the value for money of the investment.

This is one of the reasons why the *overall* effect on travel conditions of isolated separate initiatives can sometimes be disappointing. Anybody who hopes that 'better public transport will solve the problem' or 'road charging will solve the problem' or 'road building will solve the problem' is unlikely to be successful. This underlines the importance of implementing a coherent overall transport policy whose individual parts reinforce each other, rather than pulling in opposite directions, and which must be sustained for periods of up to a decade for the full effects to be gained.

1. Introduction

It is well understood that most journeys are not made for their own sake, but in order to undertake other activities at the journey's end. Travel choices have to be made – when, where, how often, what time, what mode, which route, who with, how fast, in what conditions, etc – and these choices are made by millions of separate individuals and companies, each in pursuit of their own quality of life and profit, as constrained by the reality of social and economic pressures and always by what alternatives are available.

The combined effects of all those decisions influence the overall level of congestion and its location in time and space, the overall level and type of emissions, and the conditions of travel. In turn these have results on economic efficiency, environmental consequences, social equity and public opinion. But in most cases these wide effects are not a decisive influence on the individual choices, which are concerned with individual objectives, not social outcomes. It is these aggregate consequences that, in many cases, are the focus of transport policy concern – to reduce congestion, or to reduce environmental damage, or to increase social inclusion, or to increase economic efficiency.

So it is very rare that transport policies will aim at 'changing behaviour' as their *prime* objective. But that does not mean that such changes in behaviour are unimportant – quite the opposite. Changes in behaviour will, in many cases, be a necessary condition for their success, or an unintended reason for their failure.

Therefore many transport policies will be judged to be more or less effective, according to whether travel choices are seen as fixed and committed, or volatile and easily changed. Indeed, the main function of most forecasting and evaluation exercises is to assess how much travel choices will change between now and some future year, and how much they will further change according to whether a policy is implemented or not. Transport appraisal of a new road, or a bus lane, or congestion charging, is really about answering the question *how much difference will it make?* For that question, knowing about the responses is absolutely at the heart of deciding what to do and what to reject.

Over the years, policy makers have made widely different judgements on this question. At one extreme, there is the view that transport choices are driven almost entirely by considerations outside policy influence – income, the constraints of needing to get to work, family obligations – and the therefore the job of policy is simply to provide the infrastructure to let people get on with it. (This was

the implied assumption, especially during the decades from around 1950 to 1980, when major road improvements were assessed using models which said the only difference they would make to choices was to enable people to drive on faster routes in preference to slower routes. In this case, the resulting choices, that people actually made more or longer car trips, were unexpected and unintended).

At the other extreme, there is the view that people will easily and swiftly shift, in very large numbers, from one mode of transport to another simply as a result of improving it. (This was the implied assumption in some places where new rail systems were constructed as the main method of reducing road congestion, and without complementary other policies. In some cases, the resulting change in behaviour was less than expected or intended, and the financial or transport impacts were disappointing).

But the question is a much broader one than these examples. Every public transport investment needs to estimate whether enough people will be attracted to the improved service to make it worthwhile. Every road investment is sensitive about whether too many people will be attracted to the improved road, and induced traffic will reduce its benefits. Every proposal for a tolled road, or for a charged road network, needs to estimate whether rather few people will be deterred by the price (good for revenue, bad for relief of congestion), or very many will be deterred (bad for revenue, good for congestion relief) or whether they will go somewhere else (bad for revenue, and possibly worse for congestion elsewhere).

These problems come together when considering, for example, policies to reallocate road space from general traffic to a designated priority mode (e.g. bus lanes, or street-running light rail systems). Then, the increased public transport use will affect the financial viability of the investment, and the degree of diversion of remaining car users to other routes will affect the technical viability of the resulting traffic conditions.

The same issue arises in virtually every other transport policy or project of any interest. Changes in the tax regime affecting costs of operation of heavy lorries in different European countries depend on the sensitivity of commercial operations to price changes, which is crucial for calculating the tax revenue effects. Provision of new airports, or air traffic control, will have quite different results according to whether the volume of air travel is considered as being affected by these changes, or driven only by economic growth and unaffected by price and quality of service.

Landmarks in changing professional opinion on these questions may be seen in four applications:

1. Does road building induce extra traffic, and what follows for the 'predict and provide' approach to road building?
2. Do motoring costs have a big effect on traffic volumes, and similarly do public transport fares have a big effect on patronage, and what follows for pricing policy?
3. Do traffic restrictions cause unacceptable levels of congestion on alternative routes, and what follows for policies on pedestrianisation and public transport priority?
4. Do 'soft measures' of publicity, information, education and attraction have substantial effects on choice, and what follows for the balance between 'sticks' and 'carrots' in sustainable transport policy?

The objective of this paper is to consider the real evidence, from real-world policy implementation, we now have on this question. What have researchers actually found about how

variable or invariable travel choices are, and how this may be different in the short and long run? And can we understand the results sufficiently well to forecast what may happen in the future, and to judge whether the forecasting models we use are giving us the true picture?

2. Induced traffic

In many countries, the development of high quality interurban road networks in the last half century has been founded on an approach sometimes called ‘predict-and-provide’, in which traffic growth has been predicted as a function of autonomous influences such as national or local income, demographic change, social and life-style changes. These were used to the volume and location of future demands on the road system. In turn, the main pressure points were identified, and new capacity constructed, broadly (as far as practically possible) intended to keep pace with the expected traffic growth. The methodologies used usually made calculations of the proportion of the traffic which would be expected to change route from an old unimproved road to a new improved one, but it was assumed that the total number of trips, or their origins and destinations, or the method of transport used, would not be affected by the new road. Therefore the benefits in reduced congestion would be enjoyed either on the new road, or on the relieved old road, or both.

The empirical evidence against such an assumption mounted during the 1980s, and was brought together in a series of reports in different countries in the 1990s, notably the SACTRA (1994) report in the UK. The following section summarises the empirical evidence cited by SACTRA (1994).

Differential Growth Rates

Traffic growth rates have generally been slowest where congestion is worst, and fastest where existing capacity is still spare, or new capacity is provided. From 1980 to 1990, measured traffic on major roads in built-up areas grew by 20%, on major roads in non-built-up areas by 58%, and on motorways by 73%.

Evidence inferred from econometric and survey studies of travel demand

SACTRA (1994) considered empirical evidence four separate strands of analysis, namely evidence on the effects of money costs of car use (of which an updated account is given below), motorway capacity, travel time budgets, and the value of time.

On assumptions drawn from a literature review, an average speed change saving 10% of journey time would cause a 4.5% increase in traffic volume, though this would vary by journey purpose, area, mode, speed of travel, type of person and many other factors. A particular aspect of importance in considering how sensitive the result is to the assumptions made is that the -0.15 fuel cost elasticity is usually treated as a short-term effect (that is, within the first year). As described below, there is substantial evidence that the longer-term effect is significantly greater than this. If we take the estimated longer-term elasticity to be of the order of -0.3, for example, the implied journey time elasticity would be nearly -1.0. A 10% change in speed would then lead to a longer-term change in traffic volume of nearly 10%. In congested conditions, where time is a large proportion of the generalised cost of journeys, the implied travel time elasticity will be greater, and in uncongested conditions, smaller.

With these caveats, the Committee noted that, in round terms, reasonably well-established research on petrol price and on values of time suggests an overall average short-term elasticity of traffic with respect to travel time of about -0.5, and a longer-term elasticity of the order of -1.0.

Comparisons of predicted and out-turn traffic levels

Forecasts of the traffic levels expected on an improved road are routinely made as part of the planning and evaluation of each scheme. Comparison of forecast and outcome traffic levels was applied to a large number of other schemes, of all types. The counts are generally taken about one year after opening. SACTRA (1994) gives detailed figures for 151 schemes which had been studied in this way. Comparable information was provided to the Committee after completion of its report, and published later (Goodwin, 1996), for the alternative routes, sometimes called 'relieved routes' for 85 of these. It was notable that the underestimates are greater for the alternative routes than for the improved roads themselves. Observed traffic levels on 39 rural roads which had been relieved by trunk road schemes were nearly 20% higher than forecast. The roads which bypasses had been intended to relieve showed traffic levels 25% higher than forecast, even though the forecasts for the bypasses themselves were (on average) reasonably good. As a whole, the discrepancy for the improved roads was a little over 10%, but for the relieved roads over 16%.

Before and after traffic counts on road improvement schemes

Detailed analysis was carried out of 11 before-and-after studies in which traffic levels were counted, and could be compared with control general growth or specific (unimproved) roads in the same area. It was found that:

1. The growth rates in the corridors observed were in every case substantially greater than the controls, and than other growth rates - an unweighted average 'unexplained' growth of 25% from 20 counts cited, albeit a range from 7% to 66%.
2. This unexplained element systematically increases over time. The unweighted averages are: less than a year 9.5%; one year 22%; 2-5 years 26%; greater than 5 years 33%.
3. In some cases, a reduction in traffic on the alternative routes was observed but on average only about half as great as the increase in traffic observed in the improved route, *i.e.* the relief was less than would be hoped. In some cases an *increase* in traffic was observed on the alternative routes studied. (This is consistent with the greater discrepancies in the forecasts for relieved routes noted above).

American interest in the subject is growing, as shown in a review by Noland and Lem (2002), summarising seven studies which look at the effects of increases in road capacity (measured by lane miles) on traffic volumes, expressing their results in the form of elasticities. These are shown in their table, reproduced below.

Table 1. Summary of Effect of Road Building on Traffic

Source	Travel time elasticity	Lane mile elasticity	Type of model	Data used
Goodwin (1996); SACTRA (1994)	-0.5 - -1.0			Derived from gasoline price elasticities
Hansen & Huang (1997)		0.3 – 0.7	Time-series cross-sectional fixed effects	California County-level data
		0.5 – 0.9		California Metropolitan-level data
Noland (2001)		0.3 – 0.6 (short-run)	Time-series cross-sectional fixed effects	State-level data
		0.7 – 1.0 (long-run)		
		0.5 – 0.8	Difference model with fixed effects	
Noland & Cowart (2000)		0.8 – 1.0 (long-run)	Time-series cross-sectional fixed effects	Nationwide metropolitan-level data
		0.3	2 stage least squares with weak instrument	
Fulton et al. (2000)		0.3 – 0.5	2 stage least squares with good instrument	County level data from Maryland, Virginia, North Carolina, and DC
Cervero & Hansen (2001)		0.559	2 stage least squares with good instrument	County level data from California
Rodier <i>et al.</i> (2001)		0.8 – 1.1	Disaggregate modeling study	Sacramento regional data and modeling system
Strathman <i>et al.</i> (2000)		0.29	Cross-sectional model	NPTS data, individual-level, nationwide
Barr (2000)	-0.3 - -0.4		Cross-sectional model	NPTS data, individual-level, nationwide

Source: Noland and Lem, 2002.

Concerning European research since the SACTRA 1994 study, the main source is ‘Infrastructure-Induced Mobility’ ECMT Round Table 105, OECD Paris, 1998. This report contained 4 main papers (from Austria (Cerwenka and Hauger, Vienna), Spain, France and UK), and five shorter papers (from Germany (Blum, Dresden) France and Sweden). The figures lay within the same range. ECMT touched on these questions from time to time in a number of Round Table conferences, and brought the available evidence together in Round Table 105 in 1996. Although there continued to be discussion about the size of the effect, and especially on differences between different countries, the Round Table conclusion was very firm:

“There can be no doubt that the phenomenon of induced mobility is likely to remain with us in the future”.

The report commented:

“Induced traffic is a hotly debated issue, but the experts are no longer in any doubt that it is a very real phenomenon...As recently as ten years ago, many experts would have disputed {its} very existence...Today a consensus is emerging”.

It should be stressed that it is rarely the case that induced traffic completely uses up the benefit of the new capacity – this is likely to happen in special cases, for example where there are spillover effects on surrounding networks or other modes of transport. Indeed, there are some benefits to the induced travellers themselves, to be offset against the additional congestion they impose on others. The net effect is more likely, in conditions of present or expected congestion, to reduce the period of relief offered by a new road, and hence its value for money, as compared with the case where induced traffic is ignored.

3. Evidence on Effects of Price on Travel

Elasticity is a very simple aggregate concept, which measures the size of the effect on demand that will be caused by a 1% change in price (or speed, or income, or other influences). In practice it is always more complex than this, as is now well recognised, because in the transport sector the ‘price’ is known to be a complex schedule of costs related to many different dimensions in time and space, and also is not only measured by money, but also by travel time, reliability, and comfort, and sometimes even by effort, stress, inconvenience, status. Any of these may be perceived as quite different from their real conditions, and every aggregate market will have many different sub-markets, and indeed individual consumers, all with their own priorities, tastes, preferences and biases. Also, every single situation has specific special characteristics, which are likely to be different from the average measured by the elasticity.

There have been many hundreds of studies of price elasticity, and these have been used as a resource for ECMT discussions since its inception. During the period, some shifts of focus or methodology are noted, of which the most important is a shift, mostly of technical interest only to a minority of econometricians, from the use of static or equilibrium methods, to dynamic or time-dependent ones.

The most recent review of evidence (Hanly *et al*, 2002) looked at published empirical studies, updating earlier reviews mentioned below. Taking what we judged to be the best-defined results, the overall picture they imply is as follows. (All the statements may, according to the methods used, be reversed by replacing ‘up’ and ‘down’).

If the real price of fuel goes, and stays, up by 10%, the dynamic adjustment process suggests that:

1. The volume of traffic will go down by roundly 1% within about a year, building up to a reduction of about 3% in the longer run (about five years or so).
2. The volume of fuel consumed will go down by about 2.5% within a year, building up to a reduction of over 6% in the longer run.

The reason why fuel consumed goes down by more than the volume of traffic, is because price increases trigger more efficient use of fuel (by a combination of technical improvements to vehicles, more fuel conserving driving styles, and driving in easier traffic conditions). So further consequences of the same price increase (though less well supported) are:

1. Efficiency of use of fuel goes up by about 1.5% within a year, and around 4% in the longer run.
2. The total number of vehicles owned goes down by less than 1% in the short run, and 2.5% in the longer run.

Table 2. Overall results: Elasticities with respect to fuel price per litre, whole database

Dependent Variable	Short term	Long term	Unspecified
Fuel consumption (total)			
Mean elasticity	-0.25	-0.64	-0.43
Standard deviation	0.15	0.44	0.23
Range	-0.01, -0.57	0, -1.81	-0.11, -1.12
Number of estimates	46	51	24
Fuel consumption (per vehicle)			
Mean elasticity	-.08	-1.1	-0.30
Standard deviation	N/A	N/A	0.22
Range	-.08, -.08	-1.1, -1.1	-0.89, -0.04
Number of estimates	1	1	22
Vehicle kilometres (total)			
Mean elasticity	-0.10	-0.29	-0.31
Standard deviation	0.06	0.29	0.14
Range	-0.17, -0.05	-0.63, -0.10	-0.54, -0.13
Number of estimates	3	3	7
Vehicle kilometres (per vehicle)			
Mean elasticity	-0.10	-0.30	-0.51
Standard deviation	0.06	0.23	0.25
Range	-0.14, -0.06	-0.55, -0.11	-0.69, -0.33
Number of estimates	2	3	2
Vehicle stock			
Mean elasticity	-0.08	-0.25	-0.06
Standard deviation	0.06	0.17	0.08
Range	-0.21, -0.02	-0.63, -0.10	-0.13, 0.03
Number of estimates	8	8	3

Previous generations of literature reviews had been carried out by Oum *et al* (1992) Sterner and Dahl (1992), Goodwin (1992), then Lee (1998), Espey (1998), Graham and Glaister (2000, 2002), and others. These reviews substantially overlap, making use of various subsets of the same primary sources, and updated by accumulation rather than separate consideration of new results: this naturally blurs any tendency for the estimates to change. The results do not produce any substantial divergence with the conclusions above.

Thus a 10% increase in fuel price (in real terms, and sustained) will on average produce a 1.5% reduction in traffic levels within the first year, and about 3% built up after about 5 years, though of course this may be offset by higher incomes. The effect of the same price change on fuel consumption is about twice as great, due to endogenous changes in driving styles and engine efficiency. These figures, though ‘small’ as defined in the conventions of economists’ language (i.e. they are less than 1), are nevertheless quite big enough to have a material effect on congestion and

fuel use. More important, for practical purposes, since fuel costs have generally been falling rather than increasing, the cumulative result has been a significant contribution to overall traffic growth.

For **public transport**, for many years there was a very well-established and widespread assumption that the price elasticity was about -0.3, i.e. a 10% increase in fares would cause a 3% reduction in demand, leaving a revenue increase of about 7% which is enough to encourage the industry to increase fares for financial reasons, and discourage public bodies wanting to use fares subsidies to stimulate growth in demand, since it was rather expensive to do so especially if there are other reasons (e.g. car ownership) leading to a decline. In the last ten years, the empirical studies on average have produced a somewhat higher elasticity – about -0.4 rather than -0.3, on average – but much more important, have found that there is a similar difference between the short and long run as found for car use. Dargay and Hanly's (2000) recent work on public transport demand used dynamic econometric models relating per capita bus patronage to real per capita income, real bus fares and service level. The results indicate that patronage is relatively fare-sensitive, with an elasticity for all Great Britain of -0.4 in the short-run and -0.9 in the long-run. The evidence suggests that the long-run values are at least twice the short-run elasticities and that the total response takes about 7 years. The cross elasticity between bus patronage and motoring costs appears to be negligible in the short run, but about 0.3 to 0.4 in the long run which is substantial.

Wherever the long run average demand elasticity is of the order of -0.7 or -0.8 or more for a market, this must logically imply that there must exist be some *sub*-markets where it is more sensitive than -1, in which case both demand and revenue can be increased by reducing fares – extremely important opportunity for both commercial and policy reasons. It is unlikely that there are many such cases, but if they exist at all it is well worth while searching for them. But even without this, such figures imply that those countries (including the UK) where there has been a long period of fares increases to resolve financial pressures have in doing so made a significant contribution to eroding the public transport market, and hence undermining the financial security and demand base. It appears probable that at least some of the 'trend against public transport' noted in the earlier studies, was actually reinforced by the assumption of rather low elasticity.

4. Traffic bans, restraint, reduction and reallocation of road capacity

Although some cities, especially in the 1950s-1970s, undertook major new road building right to and into the central areas, these were never as popular as inter-urban roads were in the early days. This was partly because the destruction of the existing urban fabric was so obvious and so extensive - (the phrase 'the planners have done more damage than the bombing in the last war' was ubiquitous in many European countries) - and partly because the technical merit of building roads near the centre of large cities was more dubious: theoretical work by traffic scientists had proved that the larger the city, the less successful would be attempts to provide for car-based mobility, and theoretical work by economists had suggested these were the areas where markets were most distorted and therefore revealed demand the least reliable signal for beneficial investment.

In the event, however, these arguments were sidelined by a powerful movement in civic planning, most strongly established in Germany and its neighbouring countries. (Hass-Klau, 1990) This was a movement at City level, especially, in the early stages, in those cities with a strong and culturally important historic city centre, a mediaeval or renaissance street pattern incapable of dealing with heavy traffic, and an attractive urban environment of squares, beautiful buildings and untouchable monuments. The view developed that such centres would be more attractive if, instead of providing for traffic growth, traffic was simply banned.

In most cases, such ideas were controversial, with opposition mainly from two sources, namely local traders who feared that restrictions on traffic would lead to loss of trade, and from some traffic engineers who feared that restricting traffic in some streets would cause insupportable stress in other streets, often described as 'traffic chaos'. (Resistance was especially strong among those traffic engineers who relied on a form of computer model assuming that changing a the choice of route was the only, or main, response that drivers could make to changes in road conditions - a fundamentally misleading but widely applied assumption). In addition, there are practical problems - what to do about deliveries of goods to shops; what to do about the cars owned by people who actually lived within the restricted areas; where to draw the boundaries; etc.

There is no particularly persuasive theory to solve these problems, but by now there is more than a quarter of a century of practice, and at least some of them are now solved. (Hass-Klau 1993, Carley and Donaldsons, 1997). The provision of a good quality pedestrian-only space in the heart of a city centre is now so widespread and so popular that it can no longer be treated as an experiment: these places manifestly work, deliver commercial and cultural success, and win votes. In the largest areas, there are usually special arrangements to enable public transport vehicles to enter the restricted streets; delivery lorries are allowed in at specified times of the day, usually early mornings (and sometimes cars are allowed in during the evenings). Some cities have provided inner ring roads to accommodate a proportion of the displaced traffic; other cities have decided not to. Both approaches seem to work.

For these cases, it is quite clear that traffic can be reduced substantially in a specified area, with desirable and popular consequences, and no impossibly-difficult side effects.

There has been some argument about whether such schemes reduce traffic overall, or just redistribute it. There is now substantial evidence that there are quite large behavioural responses to such schemes. The main results are summarised by Cairns et al (1998, 2002). The empirical analysis was based on evidence from over 100 locations, of which over 60 provided primary case study material, and included locations in the UK, Germany, Austria, Switzerland, Italy, The Netherlands, Sweden, Norway, the USA, Canada, Tasmania, and Japan. The studies include major town centre pedestrianisation or traffic schemes, public transport priority measures, bridge closures, and various closures due to disasters or the need for major works. The studies were based on a range of methods, including road-based and cordon-based traffic counts, roadside interviews, repeated cross-sectional travel surveys, and panel surveys.

Available evidence showed a very wide range of results. The sample of case studies for which complete traffic information was provided showed an unweighted average reduction in traffic on the treated road or area of 41%. Less than half of this reappeared as increased traffic on alternative roads, at the same or different times of the day. Thus the average overall reduction in traffic was 25% of that which used to use the affected road or area. These averages were influenced by a few extreme results - in two cases the overall reduction in traffic was greater than all of the traffic originally travelling on the treated roads, and in seven cases there was an overall traffic increase. The median indicates that 50% of cases showed overall traffic reductions, taking affected and alternative roads altogether, which were greater than 14% of the traffic which originally used the affected road. If the 9 exceptional cases mentioned are excluded, 50% of the remaining locations showed overall reductions of more than 16% of the original traffic on the affected roads.

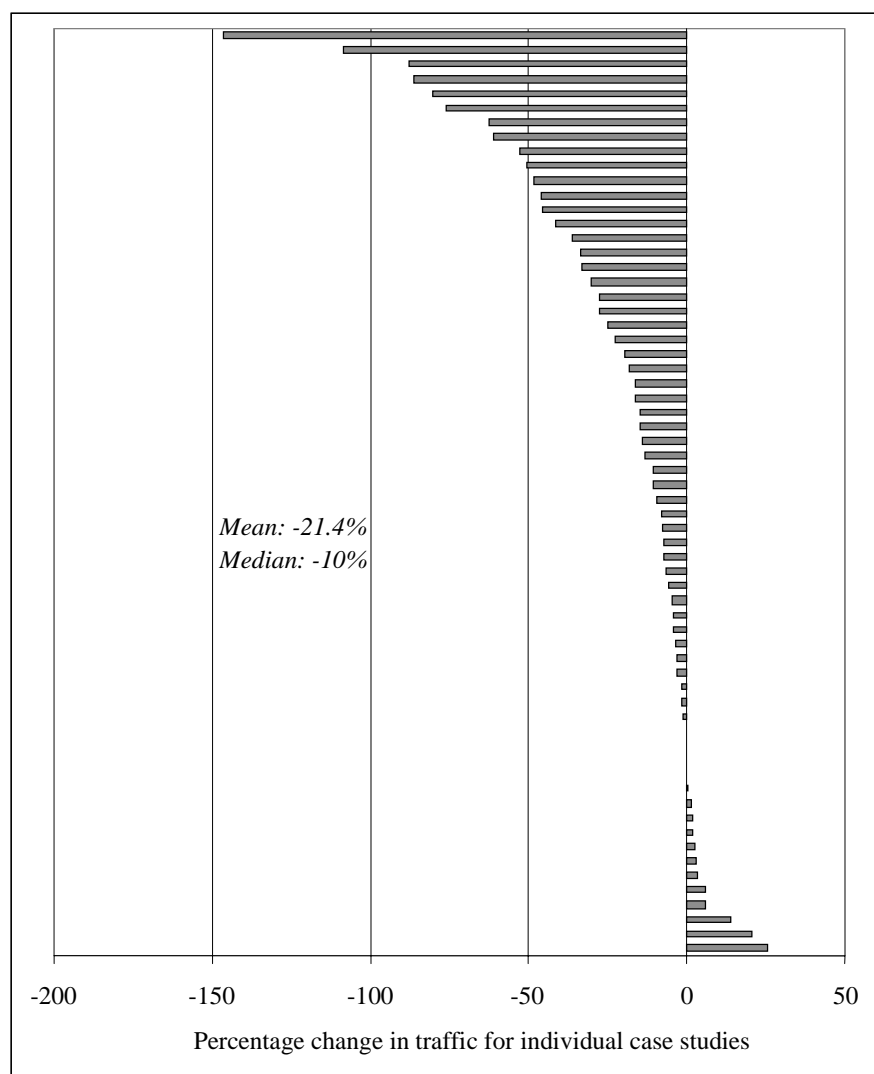
Table 3. Case Studies of effects of Road Capacity Reduction/Reallocation on Traffic Volume

	Vehicle flow on altered route/ area		Vehicle flows on parallel / alternatives routes		Traffic change	
	Before	After	Before	After		
Nuremberg Rathausplatz 1988-1993 (5 years)	25 584	0	67 284	55 824	- 146.6	*
Wiesbaden city centre + boundary 1990-92	1 303	366	8 445	7 968	- 108.5	*
Southampton city centre 1996-2000	5 316	3 081	26 522	24 104	- 87.5	*
Nuremberg Rathausplatz 1988-89 (1 year)	24 584	0	67 284	70 692	- 86.1	*
Tower Bridge closure 1993 (1 month)	44 242	0	103 262	111 999	- 80.3	
Partingale Lane local area 1997 (6 months)	988	18	2 519	2 735	- 76.3	
Rotherhithe Tunnel closure (1 month)	40 000	0	245 381	260 299	- 62.7	
Hobart : Tasman Bridge collapse (14 months)	43 930	0			- 61.3	
Orpington High Street closure 1996 (3 months)	1 105	760	7084	6 847	- 52.7	*
Bologne city centre 1981-1989	177 000	87 000			- 50.8	*
Hanshin-Awaji earthquake 1995 (after highways)	252 900	103 300	205 900	233 600	- 48.2	
Gothenberg CBD 1970-1980	150 000	81 000			- 46.0	*
New York highway closure 1973 (2 year)	110 000	50 000	540 000	550 000	- 45.5	
Edmonton –Kinnaird Bridge closure 1979 (3 months)	1 300	0	2 130	2 885	- 41.9	
New York highway closure 1973 (1 year)	110 000	50 000	540 000	560 000	- 36.4	
Hammersmith Bridge 1997 – local area only (1 month)	30 698	3 000	104 698	122 106	- 33.5	
A13 closure 8 juin 1996 (same day)	56 000	22 800	50 800	65 513	- 33.0	
Partingale Lane local area 1997 (3 months)	988	21	2 519	3 190	- 30.0	
A13 closure 1 ^{er} juin 1996 (same day)	56 000	19 722	50 800	71 463	- 27.9	
Oxford Street 1972 – 1st phase	1 800	950	4 050	4 400	- 27.8	*
Ring of Steel « central core » 1992-1994	160 000	120 000			- 25.0	*
A13 closure 15 juin 1996 (same day)	54 200	26 804	52 200	67 347	- 22.6	
Aarau 1988-94 (evening peak traffic)	1 444	1 132	2 275	2 301	- 19.8	
Oxford Transport Strategy 1999 (12 months)	57 186	46 773			- 18.2	*
Hamm 1991	21 500	18 000			- 16.3	*
York : Lendal Bridge closure 1978-79 (1 month)	16 290	0	49 100	62 800	- 15.9	
Luneburg 1991-1994	106 002	90 597			- 14.5	*
Wolverhampton 1990-1996	81 500	69 750			- 14.4	*
Hobart 1975 : Tasman Bridge restauration (5 mois)	43 930				- 14.0	
Bologne city centre 1972-1974	213 200	185 500			- 13.0	*
Leeds HOV 1998 (1 month)	3 384	2 779	10 824	11 069	- 10.6	
Cambridge –Bridge Street closure 1997 (5 mois)	23 411	20 931			- 10.6	*
Oxford – bus lanes 1974-75 (1 year)	60 684	54 820			- 9.7	#
Cambridge – Core Traffic Scheme 1996-2000 (4 years)	76 155	69 792			- 8.4	*
Loma Prieta earthquake 1989	245 000				- 7.5	
A104 Lea Bridge Road – bus lane 1994 (1 year)	34 070	31 102	81 609	82 121	- 7.2	#
Freiburg ring road 1996-97 (10 months)	34 200	22 600	64 500	73 700	- 7.0	*
Oxford city centre 1974-1984 (10 years)	60 684	56 599			-6.7	
York bus lane (7 weeks – 50% signal capacity)	681	650	600	594	- 5.4	#
York bus lane (1 week – 67% signal capacity)	681	645	600	606	- 4.4	#
Cardiff bus lane 1993-1996	156 299	149 596			- 4.3	#
Gothenburg central urban area 1975	320 000	307 200			- 4.0	*
Bristol cycle lane 1990 (18 months)	351 700	338 927			- 3.6	
Leicester ring road – AM peak	4 575	3 972	6 059	6 511	- 3.3	
Edinburgh –Princes Street closure 1997 (3 months)	221 953	215 011			- 3.1	*
Northbridge – earthquake 1994 (after)	698 000	670 000			- 1.7	
Nottingham – traffic collar 1975-76 (9 months)	13 380	13 150			- 1.7	
Wolverhampton 1990-1996	222 900	220 300			- 1.2	*
Cambridge – Emmanuel road closure 1999 (7 months)	70 030	69 792			- 0.3	*
Ring of Steel 'Square Mile' 1992-1994 (1 year)	254 192	253 613			- 0.2	*
Edinburgh – Princes Street closure 1997 (1 month)	221 953	221 834			- 0.1	*
Munich – bridge closure 1998	32 000	0	71 000	103 000	0.0	

	Vehicle flow on altered route/ area		Vehicle flows on parallel / alternatives routes		Traffic change	
Vauxhall Cross - 1999 (3 months)	537 543	539 704			0.4	
Orpington High Street closure 1996 (1 year)	1 105	744	7 084	7 461	1.4	*
Frankfurt am Main – bridge closure 1989	29 500	0	162 500	192 500	1.7	
Westminster bridge 1994-95	41 739	41 284	90 276	91 626	2.1	
M4 couloir de bus 1999 (2 months)	52 800	54 000			2.3	#
Cambridge – Bridge Street closure 1997 (2 months)	31 869	28 781	44 286	48 338	3.0	*
Norway – Street enhancement 1991-1995	15 300	15 800			3.3	*
Bristol – cycle lane 1990 (4.5 years)	351 700	372 318			5.9	
Leicester – ring road– AM peak period	10 935	11 212	7 542	7 918	6.0	
Aarau 1988-1994 (24h traffic)	18 292	17 244	26 512	30 093	13.8	
Six Towns Bypass Project 1992-95	38 212	30 968	51 697	66 808	20.6	
Leeds HOV 1998 (13 months)	3 384	3 438	10 824	11 634	25.5	

Where the third and fourth columns are shaded, traffic has usually been counted crossing a cordon around an area-wide (typically a town centre) such that there are no “alternative routes” into the affected area.
Dates refer to scheme dates. Monitoring period after scheme opening is given in brackets. * = town centre scheme # = bus.

Figure 1. Distribution of recorded changes in traffic levels for individual case studies (updated)



5. The contribution of ‘soft measures’ (further work planned on this section)

Soft measures are those which do not fit easily into the modelling framework used for transport studies, and are also often thought to be small in scale though these two attributes are not logically connected at all. Recent evidence is producing some unexpectedly and controversial large impacts – in many cases representing a 10% to 20% reduction in car use by the affected population, which is of comparable order of magnitude to many of the largest transport initiatives available. This is shown in the results of Company Travel Plans, aimed at reducing employees car use for journeys to work, collated by Cairns et al (2002).

Table 4. Changes in commuter car use over the monitoring period

Organisation	Cars per 100 staff		% -point shift	% change
	Before	After		
Orange (Temple Point)	79	27	52	-66
Bluewater	69	31	38	-55
Plymouth Hospitals NHS Trust	>78	<54	>24	>-31
Computer Associates	89	74	15	-17
Buckinghamshire County Council	71	56	15	-21
Addenbrooke's NHS Trust	<74	<60	>14	>-19
Wycombe District Council	77	65	12	-16
Orange (Almondsbury Park)	92	80	12	-13
Nottingham City Hospital NHS Trust	73	61	12	-16
Marks and Spencer Financial Services	<95	<83	>12	>-13
BP	84	72	12	-14
Vodafone	<84	<75	>9	>-11
University of Bristol	44	35	9	-20
Egg	62	53	9	-15
AstraZeneca	<90	<82	>8	>-9
Government Office for the East Midlands	<45	<38	>7	>-16
Pfizer	75	68	7	-9
Agilent Technologies	71	65	6	-8
Stockley Park	<88	<84	>4	>-5
Oxford Radcliffe Hospitals NHS Trust (JR site)	58	54	4	-7
Boots	65	62	3	-5
Average	74	61	> -14	> -18

Notes:

“Cars per 100 staff” relates to the number of commuter cars arriving per 100 staff at the time of the earliest and latest monitoring at each organisation. Staff who were parking off-site were counted as bringing a car. Staff using Park-and-Ride services for commuting were not counted as bringing a car.

Where inequality signs have been used, changes in car numbers have usually been inferred from figures about the total proportion of staff commuting by car. This usually gives a conservative estimate of change, as it does not allow for reductions in the number of commuter cars arriving per 100 staff achieved by increased car sharing, or, in the case of Vodafone, increasing proportions of people who only commute by car for some days each week.

Source: Extract from Cairns S, Davis A, Newson C & Swiderska C (2002), *Making travel plans work*: Research Report. London: Department for Transport.

6. The nature of transport behavioural responses

The distinction between short and long run affects is, *prima facie*, so entirely sensible and intuitively obvious as to be accepted, in principle, easily. Clearly, people cannot change their behaviour overnight, and are likely to choose to do so only when for other reasons (a change of job, or home, or family circumstances) it becomes convenient. The incidence of such changes in circumstances tends to be of similar magnitude as the observed differences in elasticity, i.e. happening over a five year period or so for most of the population, but less frequently for a smaller proportion: this evidence is rather consistent. The trouble is that with the exception of mostly aggregate methods used for such studies, nearly all other methods of transport forecasting make no explicit allowance for affects building up over time: this is impossible to do in standard equilibrium models, which therefore appear (entirely misleadingly) to give instantaneous changes in behaviour. This is very misleading: if the models reproduce the short term affect, they underestimate the build up in following years, and are likely to give biased assessments. If they reproduce the long term elasticities, they are likely to raise expectations and give forecasts which will lead to disappointing results in the first few years, with the danger of discrediting the forecast or, even more seriously, the policy.

Literature reviews identify a very wide range of possible behavioural responses to changes in travel conditions – a much wider range than is normally treated in formal appraisal. This includes:

- Changes in driving style.
- Moderate changes in route.
- Moderate changes in time of journey.
- More drastic changes of the time of the journey.
- Much longer diversions.
- Making a journey to a different destination.
- Changing frequency of journeys.
- Changing mode of journey.
- Car sharing.
- Consolidating trips so that several different purposes are fulfilled in the same round trip.
- Changing the allocation of different tasks within a household (errand-swopping).
- Actual elimination / suppression of trips.
- Changes in job location.
- Changes in housing location.
- Changes in developer choices for locating new developments.
- Many combinations of these.

By contrast, many assessments of transport policies have usually assumed a narrower range of responses, and in some cases little or no effect on travel choices other than on choice of route.

A starting point for seeking to resolve this discrepancy is the observation that, in the absence of *any* change in travel conditions, some of these changes of behaviour would certainly have happened anyway, to some extent. To draw legitimate inferences from the evidence, the importance of the *natural* variation in individual travel behaviour from one time period to another must therefore be considered, i.e. the change that is happening anyway, with or without policy intervention.

Such information is available, though usually ignored. Experiments show that for a hundred journeys to work, between 10 and 20 will be travelled with an overall door-to-door time more than 20% faster than the average, and a similar proportion will be more than 20% slower than the average. Survey evidence indicates that the vehicles making up the traffic stream are not, in general, the same set of cars from day to day. Similar instability is found in individual trip rates, choice between car use and public transport, car ownership and other measures of behaviour. This volatility provides the context within which changes in transport costs or travelling conditions can influence a wide range of choice and behaviour, building up cumulatively over several years. The evidence on this is collated in the Appendix.

The implication is that the empirical distinction between ‘before’ and ‘after’ conditions in the real world is not directly comparable to the modelled distinction between ‘with’ and ‘without’ in a forecast, since the former unavoidably always includes the combined effects of everything that has changed, and the latter always (by definition) keeps everything else constant. Therefore, reconciliation of the difference between common assessment practice and the *prima facie* results will partly involve understanding the role of ‘natural variability’ in travel behaviour.

The evidence suggests a range and scale of behavioural responses to changes in conditions which are greater than have often been assumed, though this is only fully apparent when distinctions are made between short and long term responses, and between individual choices and aggregate traffic observations.

Interpreting the evidence in the light of these findings suggests that: (a) there is no reason in terms of behavioural plausibility to reject the wide range of behavioural responses cited in personal surveys, or the scale and suggested structure of ‘induced traffic, and ‘disappearing traffic’ found in the traffic counts; (b) the process of adaptation to a new policy starts on day one, but may take between five and ten years before it is complete. The ‘surprising’ range of behavioural responses indicated in the case study literature is only surprising when considered against expectations of stable behaviour, repeated day after day. But this stable behaviour is at least partly a model artefact, not a description of the real world.

Consider three different literatures:

First, the evidence on ‘natural variability’ in the Appendix establishes that, both in the short run (day-to-day) and in the longer run (year-to-year, and longer), individual choices show a very high degree of variation, which clearly provides a different starting point to understanding individual choices than that suggested by the observation of stability in some aggregate average quantities.

Secondly, there is a well established literature, comprising well over 100 separate studies, calculating aggregate demand elasticities from time series data, which are analysed with dynamic models incorporating an explicit lag structure. These demonstrate that:

- Price changes certainly influence the volume of traffic. By use of standard generalised cost arguments, it can be inferred that travel time changes must also influence the total volume of traffic, with elasticities that (using conventional values of time) will generally be

substantially larger than price elasticities. A number of studies suggest that this influence acts on car ownership, as well as on the use made of each car.

- Nearly all published studies using methods allowing them to distinguish between short and long run effects find that long term transport demand elasticities are different, and usually bigger, than short term elasticities.
- The pace of behavioural adjustment is such that it takes several years to approach a notional equilibrium, typically with around 50% of the adjustment in 1-3 years, and 90% in 5-10 years.

If these findings are valid at aggregate level, they suggest that this level of change at the individual level is not random, but systematically associated with influences on travel costs.

Thirdly, case studies of road building, traffic restraint and other initiatives in particular locations show that there are substantial impacts on traffic levels, though these are complex and vary widely.

To make sense of these results, we go back to three long-lost reports in the history of travel behaviour, by Fried, Havens and Thall (1977) in the USA, Bourgin and Godard (1981) in France, and Goodwin (1984) in the UK. It is fair to say that none of these were greatly attended at the time of their publication.

Fried *et al* proposed that travel behaviour might change in the following way.

“A process of adaptation, involving changes in activity and travel patterns and adjustments over time, provides a useful theoretical framework for understanding the travel behaviour of individuals and populations: the motivating force behind these behaviours is the effort to reduce imbalances that exist or develop between personal needs and environmental structures...”

“Discrepancies in person-environment fit invoke the adaptional process consisting of informed trial-and-error sequences that continue until the discrepancies are resolved.”

This approach suggests that changes are motivated by a discrepancy in ‘person-environment fit’, and this, logically, must be due to two different causes - changes in the conditions of the person, or changes in the condition of the environment in which the person operates (including travel costs and conditions). A logical hypothesis is that people whose conditions have changed will show greater (or faster) changes than those whose conditions have stayed the same.

This suggestion was reinforced by the separate research findings of Bourgin and Godard (1981).

‘The new equilibrium is not obtained by changing instantaneously the mode choice probabilities of all individuals. The people who experience a change in life style are more likely to compare the characteristics of each mode, and possibly to change the one they were using previously. In contrast, those who are in a stable situation are more inclined to stick...there is consequently a gradual evolution towards a new equilibrium, the speed of it being partly dependent on the frequency of transition moments in lifestyles.’

Goodwin (1984), in ECMT Round Table 68, considered the importance of ‘habit’ as a source of resistance to changing behaviour, based on research carried out on bus fare subsidy in the UK region of South Yorkshire from the mid 1970s. The hypothesis was:

“We can describe, in an oversimplified way, the following typical progression of a habituated travel pattern. It is established over some...period of time, as a reaction to prevailing conditions or constraints. During its lifetime, it is accompanied by a reduction in information about and consideration of alternatives, thereby becoming more entrenched. Subsequently conditions change, but the habitual pattern is maintained until a progressive build-up of conflicting pressures becomes stronger and some particular, probably sudden, event triggers off a reaction. There is then some period of adjustment before a new pattern is established...”

The findings imply that a proportion of people, who accurately report that their behaviour has changed, will be *incorrectly* attributing this change to the transport scheme under consideration. In other words, they would have changed their behaviour anyway. This is where the aggregate results become crucial: the case-study traffic counts indicate that *more people must have changed their behaviour in one direction rather than in the opposite direction*, and the econometric results establish that significant changes in long-term behaviour can result from changes in travel costs.

The incidence and pace of general changes in lifestyle are also important for the following reason. The idea that someone might make such a big decision as moving house, or changing job, simply as a result of a bus lane, does not seem intuitively acceptable. But when such major changes are happening all the time - mostly, of course, for other reasons - it is quite reasonable to suppose that the prevailing transport conditions should tip the balance, and should also influence the specific nature of the new travel patterns which are subsequently formed.

This view of individual choices underpinning aggregate traffic flows leads to the following description. The response to changes in travelling conditions will be composed of at least two quite different processes. First, there are responses by specific individuals, limited by habit, the desire to experiment (or not to), ignorance, preferences, and by binding - but not permanent - domestic and economic constraints. For these people, minor adjustments may be quite swift, but bigger changes proceed at the pace of change in their own lives, and the pace of evolution of their attitudes and tastes. Second, each day or year, some individuals simply leave the system, and are replaced by different people making a new set of trips. These, being new, can react to whatever prevailing conditions they find, sometimes bringing a more open mind to the new situation.

The insights suggested in this section are based on work carried out over two decades ago, but applied to evidence and experience not available at the time. They re-emerge now due to two new developments. Developments in the econometric analysis of travel demand has revealed that the sensitivity of travel patterns to policy and other stimuli does indeed depend on the dynamic process of adjustment suggested. And developments in the concerns of transport policy, and partial experience of new policies in practice make it profoundly important to build such considerations into forecasting and assessment.

APPENDIX

EVIDENCE ON NATURAL VARIATION IN TRAFFIC CONDITIONS AND TRAVEL BEHAVIOUR

The point of this Appendix is to collate the evidence on the underlying inherent variability in transport conditions and travel behaviour which provides a kind of 'lubricant' that conditions the pace at which adaptation to changes in travel conditions may happen. By analogy, a surf-rider will have an easier job to move if there are waves, then if the water is calm and stable – his actions do not create the waves, but the waves enable his actions to have the desired effect.

Variation in traffic conditions

It is generally acknowledged that traffic levels will be expected to change year on year (due, especially, to a general increase in car ownership, modified by changing land-use patterns, and damped, to some extent, by increasing traffic congestion). There is also recognition of seasonal changes in traffic flow, cycles according to day of the week and season, and specific social patterns such as the heavy school traffic at the start of the school year in September.

The initial interest in day-to-day variation for this project related to aggregate traffic conditions, since 'natural' variation determines how easy it is to detect statistically significant changes in traffic flow.

The classic work on this subject is by Smeed and Jeffcote (1971). They reported on the variability of a car journey repeated 253 times between Bray and Central London, and found day-to-day variability in the overall average journey speed such that the standard deviation was between 20% and 33% of the mean. Mogridge and Fry (1984) repeated the experiment for 172 journeys between Clapham and Central London, finding a standard deviation of 15% to 20% of the mean. Mohammadi (1997) analysed data from three much larger experiments, totalling about 1 300 journeys. Standard deviation for different subsets varied from 2% to 51% of the mean, the overall figures being 16%, 16% and 20% for the three experiments (and subject to influence from a variety of factors such as incidents, weather, etc). Each of these authors cites further references, with broadly similar results.

Thus, it is the experience of drivers using the same route at around the same time on successive days that a degree of day-to-day variation is part of their normal lives. For a hundred journeys to work, broadly between 10 and 20 will be travelled with an overall door-to-door time more than 20% faster than the average, and a similar proportion will travel more than 20% slower than the average.

Two consequences follow:

1. Measures which change journey speed in the order of 5%, say - *though entirely real* - may not always be revealed statistically by comparison of one day 'before' and one day 'after' traffic observations of speeds or flows. Such considerations led, for example, to problems in detecting statistically significant changes in traffic flows resulting from the implementation of a number of traffic calming measures in Reading, because the natural variability of traffic

counts was as much as 40%. (Ward, 1997). Most of the case-studies reported here have not provided information about day-to-day variation, and therefore any one result has to be read with caution. As discussed in section 3.2, the effect is to exaggerate the range of the highest and lowest results, but not to bias the mean.

2. Drivers accustomed to variation in their own travel conditions are unlikely to all respond immediately to changes in speed, since such changes are not immediately obvious. Their ability to detect changes and respond to them will be influenced by how long it takes them to build up a 'true' (to themselves) picture of the average conditions, or the frequency of unacceptable journeys, depending on the criteria they use.

It follows that the drivers' own stability of behaviour, which will affect the time over which such a picture can be built up, then becomes important.

Variation in individual choices

Bonsall, Jones & Montgomery (1983) comment critically on household interview surveys which imply that '98% of workers who drive on a given day will also drive on a second given day', and that '88% claim never to vary their route from work'. On closer examination this proves to be very misleading. They investigated the stability of traffic flows by matching number plates on successive days on a major commuting route in Leeds, seeking to explain the results by reference to a variety of other data sources and analyses. This survey suggested that "as much as 50% of the cars present on a given day will not be present on the following day", and that even this reappearance rate decays over time. Their results, given below, are summarised in the form of an estimate of the proportion of drivers observed on one day who will be doing something different one week later.

Predicted behaviour of a sample of commuters one week later (Bonsall *et al*)

If we could trace 100 drivers, observed on a commuter radial between 08.15 and 08.30 on a given weekday, we would find that, a week later:

- 30 will drive past the same point between 08.15 and 08.30
- 15 will drive past the same point between 07.15 and 08.15
- 15 will drive past the same point between 08.30 and 09.45
- 7 will drive past the same point between before 07.15 or after 09.45
- 14 will drive to the same destination by a different route
- 8 will make the journey by another mode
- 5 will travel to a different destination
- 5 will stay at home
- 1 will have sold his car

It is notable that this very high degree of variability does not derive essentially from response to any particular stimulus. Instead, it is the typical rate of change due to all influences taken together, whether personal, policy, or random.

Atkins (1985) reports surveys of 111 households asked the same questions in March and June 1992, in a study aiming to match specific trips in order to assess the effects of a bridge toll in Southampton. Of the 111, 50 interviews did not proceed for a variety of reasons, including

house empty (2); people moved away (3) now no car (1) and car off road (1). These orders of magnitude are not inconsistent with Bonsall *et al.* For the remaining interviews which were successfully carried out, Atkins recombines some categories and provides a comparison with the results of Bonsall *et al.*, as shown below:

Table 5. **Travel behaviour variability**

Location: Time Lag: Sample:	Leeds One week Commuter radial	Southampton Four months “regular trips”
Same Behaviour	60%	49%
Different Time	7%	5%
Different Route	14%	7% (bridge)
Different Mode	8%	1%
Different Destination	5%	13%
No Journey / Different Journey	6%	25%

Despite the small sample size involved for the Southampton survey the correspondence between the sets of results appears plausible. The patterns are fairly similar, although with slight changes as expected. (i.e. For regular trips, over a longer time period, there has been a smaller percentage making the same journey and more destination changes, but fewer mode changes. Less route switching has occurred, probably due to fewer alternatives in the Southampton location).

A more recent small-scale survey along similar lines, but using retrospective questioning to detect variations from a year ago, was carried out by Anable *et al* (1997) in Oxfordshire. A quarter of all respondents stated that their travel pattern (all methods) was different in 1996 from 1995. For these twenty-nine, the changes fell into several main groups:

- Those who had changed job (including leaving or becoming students) or retired.
- Those who had stayed in the same job but had either moved house, which meant that they needed to drive further to work, or were required to drive more at work.
- Factors independent of work, such as buying a car, increasing or decreasing their mileage (using the train instead), or no longer “having to walk 4 miles a day to take the children to playschool”.
- Changes to air travel patterns, one travelling more, one less.

The majority of respondents (78) did not consider their travel pattern had changed over the previous year.

A much bigger study was carried out by the Department of Transport (1978) for a half-year period, based on two waves of a panel survey carried out in Spring and Autumn 1976 (in connection with a fare increase). The survey used a full week diary, hence taking out much of the day-to-day variability, and the results showed the degree of variation in individual travel over the half-year. Two results are indicative, both relating to quantities normally thought of as rather stable, namely the total number of journeys made (only using respondents for whom records were complete), and the main

mode used for journeys to work (only using respondents whose records were complete and who had not changed their economic activity or their level of car availability).

Table 6. **Individuals' change in journey frequency, Spring to Autumn 1976**

Journeys per week in Spring	Journeys Per Week in Autumn				Individuals, Spring
	0-4	5-12	13-20	Over 20	
0-4	274	185	92	22	573
5-12	189	742	408	103	1 442
13-20	101	506	1 011	320	1 992
Over 20	47	129	459	701	1 336
Individuals, Autumn	611	1 616	1 970	1 146	5 343

Table 7. **Linked journeys to and from work per week in Spring and Autumn 1976**

Mode of travel in Spring	Mode de déplacement en automne								Total
	Car / van driver	Car passenger	Red bus	Under-ground	British Rail	Walk	Motorcycle/ Bicycle	Other	
Car / van driver	3 882	121	33	44	58	36	54	72	4 300
Car / Van Passenger	149	633	144	20	52	69	7	4	1 078
Red Bus	106	203	2 083	108	102	140	28	10	2 780
Underground	99	43	123	1 018	81	3	12	13	1 392
British Rail	42	23	31	91	1 201	14	22	0	1 424
Walk	100	66	97	14	19	1 251	8	12	1 567
Motorcycle/ Bicycle	101	25	57	3	11	29	503	1	730
Other	92	14	42	0	2	1	9	81	241
Total	4 571	1 128	2 610	1 298	1 526	1 543	643	193	13 512

The results show that, during the period, nearly half of the sample had changed the number of trips they made in a week by enough to take them into a different, very broad, category of trip-frequency. Nearly 10% had changed trip frequency so much that they were not even in the neighbouring category. Over 20% of the sample of the most stable category of employees had changed their main mode of journey to work from Spring to Autumn, including 10% of car drivers and nearly 40% of car passengers who had chosen a different mode half a year later.

Further evidence on such changes is recorded in Stokes and Goodwin (1989). Using one-week panel data from later surveys in London from 1982 to 1985, they found that around 10% of the sample changed from being non-public transport users to users from one year to the next, with a similar proportion transferring the other way.

About 20% of the sample had increased or reduced the number of trips they made by more than 10 trips per week, compared with a mean recorded trip rate of around 25 trips. Around half of the sample stayed within +/- 4 trips of their previous year's value. About 25% of 'frequent' car drivers in each year (those making more than 10 car trips per week) were making less than 5 trips per week by car in the following year (offset by more car use from previously frequent users of other modes).

A particularly interesting result is that over 10% of the market for public transport in one year was made up of people who, the previous year, were making more than 10 trips per week by car.

The results of this analysis of changes from 1984 to 1985 were broadly similar to those found when comparing 1982 with 1983, and 1983 with 1984. The degree of year to year variation was rather stable.

Next, it is interesting to look at the degree of variation in car ownership, since this is often assumed to be the travel choice least subject to variation. Conventional analyses almost invariably show car ownership as monotonically increasing, with temporary pauses only at times of the most exceptional economic hardship. This has undoubtedly been true at the aggregate level, but at the individual level, no such monotonic effect is found. Data from South Yorkshire panel surveys show that the net increase is made up of the difference between quite large numbers of people changing in opposite directions. It is true that a majority of the population during successive two or three year periods have not changed their level of car ownership, but the fact that the net changes are increases of 2%-6% does not imply that the unchanging majority is 94% to 98%. Rather, something like a quarter of the population are in households which change their car ownership level, with around 10% of the population involved in reductions. This is shown below.

Table 8. Proportion of individuals living in households whose car ownership increased or reduced, South Yorkshire, 1981-1991

	1981-84	1984-86	1986-88	1989-91	1981-91
	%	%	%	%	%
Cars reduced	10.5	8.6	7.2	11.6	14.8
No change	76.4	78.5	79.1	73.7	64.1
Cars increased	12.8	12.9	13.6	14.6	21.1
Net difference	+2.3	+4.3	+6.4	+3.0	+6.3
Sample	3 221	2 445	1 565	2 090	660

It is notable that the period when the net difference between increasers and reducers was smallest, 1981-84, represents the end stages of a long period of reducing bus fares, and the period when the net difference was greatest, 1986-88, bridges the disruption to public transport services which was caused by deregulation and reduced support. This suggests that, for those interested in the mechanisms by which public transport quality might influence car ownership, it is necessary to distinguish the evidently distinct processes of influences on decisions to reduce car ownership by those who already have cars, or to obtain cars by those who do not.

Data from three panels show that the probability of two-car households reducing to one is much greater than the probability of one-car households reducing to zero. The main influence on this is household structure, but about a quarter of people in households going from two cars to one in one period, reverse that decision in the following period, suggesting that decisions about a second car in a

household may be generally more volatile than about the first car, and hence, subject to a degree of influence from prevailing travel conditions. This is illustrated as follows.

Table 9. **Reduction in car ownership related to base level**

	Greater Manchester 1986-1987	Netherlands 1984-1987	South Yorkshire 1981-1986
% of one car owners reducing to zero cars	8.3	5.5	13.2
% of two car owners reducing to one car	23.7	44.3	43.5
Total sample	653	1 460	1 808

All of the results reported above relate to specific choices such as method of transport used, numbers of trips and levels of car ownership. The next step, therefore, is to consider how they come together to determine mileage travelled, since this represents the bridge into observed traffic levels on the network, and resulting speeds. Information on the variation in mileage travelled is plentiful in relation to variation from one individual to another, but sparse in relation to the variation for one individual from time to time. Two indicative results are those by Goodwin (1978) and Gray (1969).

Goodwin (1978) analysed the weekly use made of 331 cars in Oxford, and found that the variation in mileage between the cars was systematically reduced when taking one day's data (coefficient of variation 1.14), two days (0.92), three days (0.82) and so on, up to seven days (0.64). This implies that some of the apparent variation between cars is actually variation between days, as was confirmed by analysis of variance. Gray (1969) provided data from which it can be calculated that the coefficient of variation between cars for a year is between 15% and 25% less than the variation for one week. Using this result to extrapolate Goodwin's results, a one year analysis would have shown a variation in mileage between cars of 0.48 to 0.54, or around half the one day figure. (Logically, there must be some further effect if five years, or ten years were taken, though such information is not available).

Thus on any one day, it might be observed that approaching a third of all cars are being used to travel more than twice the average mileage. But to a first approximation, about half of this variation in mileage travelled is not due to stable differences between the travel patterns of the drivers, but due to each of them behaving differently from one day to the next, one week to the next, one year to the next, etc.

These different results, from changes taking place from one day to the next, to those taking place over several years, come together into a picture of *aggregate stability* and *individual variability*.

Stokes (1994) analysed national survey data about the travel of (different) individuals in successive National Travel Surveys (plus supporting information) from 1952 to 1992, and also data from five waves of a panel survey of the travel of (the same) individuals in South Yorkshire from 1981 to 1993. The national figures show that the average amount of time spent on travel as a whole is rather stable, having only increased by about 10 minutes over a period in which the mileage travelled has increased by much more. (Such findings have led to suggestions that travel time is a good control variable which may be assumed to be rather stable).

However, the stability is only really noticeable when many people are averaged together.

This may be shown in Stokes' analysis of the degree of similarity between the amounts of travel time spent by individuals in total, and for each mode, from one survey to the following one. All the correlations are positive, implying that, *to some extent*, people who travel more one year are likely also to travel more in later years. But the similarity is very weak. For car travel, only around 12% of the variation in trips made between individuals in one survey is associated with the variation in the previous one, and even for car travel time (the highest correlation) only 26% of the variation is explained. These results are given the next table.

Table 10. **Correlations (R) between surveys for individuals' travel times and trips**

	Total	Car driver	Car passenger	Bus	Walk	Trips / person
1981 to 1984	0.19	0.43	0.09	0.20	0.21	0.21
1984 to 1986	0.21	0.46	0.10	0.27	0.19	0.31
1986 to 1988	0.28	0.51	0.04	0.32	0.26	0.35
1988 to 1991	0.17	0.40	0.12	0.17	0.13	0.27
1991 to 1993	0.15	0.38	0.11	0.27	0.20	0.23

TRENDS IN TRANSPORT INVESTMENT FUNDING: PAST, PRESENT AND FUTURE

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Over the past fifty years, trends in transport investment funding have changed and become more complex. There has been a clear move away from wide scale public funding towards a bigger share or “burden” on the users and more involvement of private investors. Expectations for private involvement however, have proved to be too high and in several cases unrealistic. Transport will continue to be part of Public Expenditure Programs. Nevertheless, the trend to rely more on direct users’ contributions and involve the private sector in the provision of services and managing infrastructure is irreversible -though with a more realistic balance between the three pillars (public, private and users). Governments will have to cope with this new role and develop a different regulatory capacity compared to the past. The paper also answers questions like; What can the transport sector learn from the more advanced telecommunication or electricity sectors? What are the lessons in the more advanced transition economies, that experimented with public-private partnership even before the sector had been restructured or the business environment improved? The paper focuses on land transport and especially on roads, railways and urban transport. Still there will be some selected examples from other modes and also from other sectors to underpin the analysis and its findings.

The two sides of the equation

There is a “*cat and dog fight*” between treasury and transport Ministries all over the world about the share of transportation in public expenditure. On the one hand, the transport sector argues for more budget to preserve the assets and even up-grade and expand the network in support of economic development, as well as to pay subsidies that help sustain un-profitable, but socially needed services. On the other hand, the treasury, concerned about maintaining macro-balances, is reluctant - and in cases where there are large and growing deficits unable - to meet the financial requirements of transportation. Therefore, it is the treasury, that is first of all interested in improving the efficiency of spending and operations within each sector. This calls for better sector management, more realistic subsidy structure, better service provision and asset management, e.g. for the use of modern sector management techniques (performance based contracts to be issued through competitive bidding to the private sector).

How efficiently money is spent is as important as the size of the funding coming to the sector. While this paper will not examine the ways of spending and the related sector reforms, this other half of the solution must also be kept in mind.

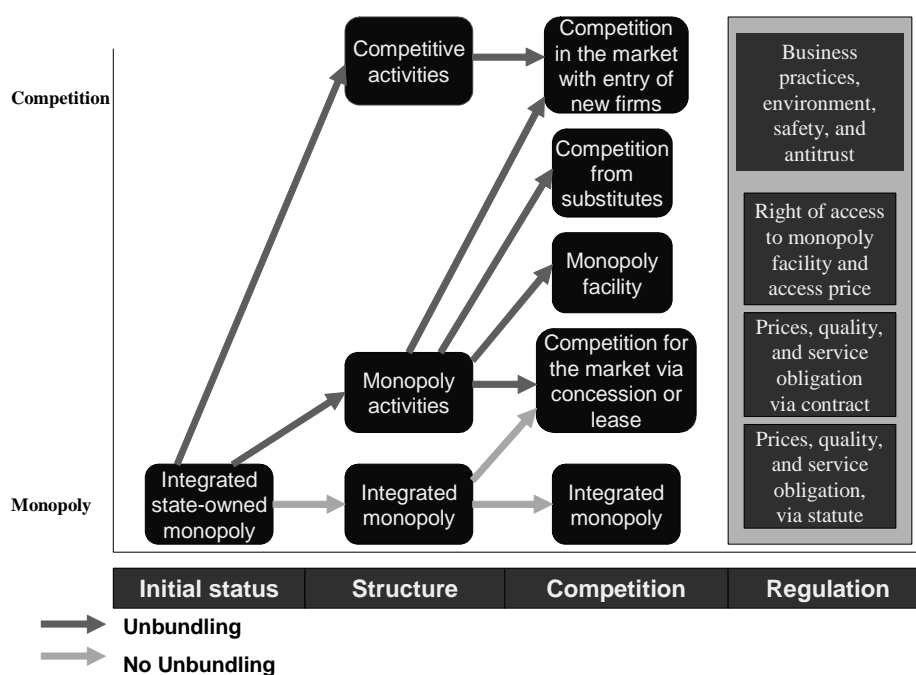
1. This paper contains the views of the author and not the official position of the World Bank.

Forces for change in transport funding

Policy development – deregulation/liberalization and privatization

As governments move away from the owner/manager/service provider functions towards being more a planner, facilitator and regulator, their interest to fund transport investments and services will change, as well as the form of and accountability for budget contributions (see figure 1). The slow down of productivity in infrastructure is a warning signal that countries cannot afford monopolistic transport operators if they do not want to see their economy become marginalized. Competition for goods markets creates the demand for low cost high quality transport services. In the globalized economy, it is no longer physical but economic distance that determines the competitiveness and wealth of nations.

Figure 1. **Unbundling activities increases the options for competition and private sector involvement**



Source: *World Development Report, 1994.*

The source of funding for transport varies as a result of changes in the market structure. Distinctions need to be made among the different modes, firstly because their “marketability level” is different, and therefore the ownership and the level of competition are largely pre-determined. There are also huge differences between infrastructure and service provision, core and non-core services, passenger and freight operations. Among the transport services, logistics and trucking are the most obvious competitive sub-sectors without any need for government ownership or funding (though in several Central Asian countries road freight transport is still state owned and highly regulated). Inter-city domestic and international bus operations could also graduate to more competition and less public funding. The rather protectionist European system, however managed to slow down this development both in East and West. Much more competition is likely to take place also in Europe for infrastructure operation and management concessions, like in airports, ports, roads and for railway service

concessions and urban transport franchises. Their success and the satisfaction of the main stakeholders' require harmony with transport policy changes.

Public resource scarcity

While this is taking place in the longer run, the more immediate driving force for changes in transport funding and for exploring new, innovative ways to raise money is simply lack of budgetary resources. It has been a common phenomenon in the developed countries, where relatively ample resources are dwarfed compared to infrastructure needs. Large-scale projects (like the Channel Tunnel) called for a pool of financiers to make the dream come true. Therefore governments in the developed world turned first of all to the private sector and offered attractive projects for funding.

Budget constraints became even more acute in the transition economies. As the political changes started in Eastern Europe, governments suddenly found themselves stripped of the already meagre budget revenues that their socialist predecessors could draw on. In the early 90s economic decline was more severe throughout the Central and East European region than the Great Depression was in 1929-33 in the USA. Recovery from the transition recession was achieved by 1998 only by the Central, some South-Eastern European and the Baltic states, while in 2000 in the CIS countries GDP was still around 60% of its 1990 level². As a result, maintenance of transport infrastructure and equipment is massively and chronically under-funded in the new members of ECMT. Investment needs in these countries are huge and of a different nature than those in the Western European countries or the ECMT associate members, like the USA or Japan.

East or West, the result however is the same: to bridge the financing gap, governments tend to give preference to off-budgetary funding of new investments. Unless project financing is feasible (adequate traffic, realistic cost-recovery, the users' willingness to pay, etc.), the costs – often the increased costs – inevitably fall back on the government. At least this has been the case with several BOT road concessions in Central Europe. Thus making off-budgetary funding a costly and temporary solution.

Expanding capital markets and private funding

While very recently capital markets showed a growing interest in funding PPPs and channelling funds through the private sector to transport and other infrastructure sectors, events like the California electricity blackout (and most recently the New York and North American electricity outage), the confidence shaken by the Arthur Anderson - Enron case, the disappointing energy FDI results (e.g. in Central Asia or in some of the South Caucasus countries), the shortcomings in the telecom markets, as well as the fiscal crisis in Argentina or the re-nationalization of several toll roads (Hungary, Mexico, etc.) led to fading enthusiasm of strategic investors. This further cooled expectations.

Understanding the risks associated with projects is critical. If there is a default, how much can be recovered? This information should be readily available. The credit ratings by S&P, Fitch and others are indicative only. High yield and low risk projects are of course the most attractive ones, therefore private investors try to avoid taking over commercial risks (see for example the Varasdin-Hungarian border motorway concession as proposed by the candidate concessionaire), particularly when the economic feasibility of the project is uncertain.

2. Transition – The First Ten Years. Analysis and Lessons for Eastern Europe and the Former Soviet Union by Pradeep Mitra and Marcelo Selowsky.

The financial structure of project financing that Banks and investors apply eventually depends on the legal and regulatory structure of the country and reflects the confidence in the recovery rate. This latter is closely associated with the perceived governance and transparency of the sector, which underlines the need for legal, regulatory and institutional reforms before national or local governments can successfully tap the capital markets for their transport development.

Technological innovation

Recent technological and technical innovations make it possible to monitor the actual use of transport infrastructure and services and eventually to bill for their use. Modern accounting methods on the one hand and the possible application of ICT in transport on the other hand help convert this sector from being a public good to becoming a service provider where the use of infrastructure and services (at least in most areas) can be measured. The technological changes open up new avenues for transport pricing, which will challenge traditional transport policy assumptions. While not exactly similar, it is broadly comparable to telecommunications, where the technological revolution altered the economies of scale and thus made deregulation possible.

Three plus one pillars for funding transport development

The traditional pillar – public expenditures

There is general concern that public expenditure figures are neither globally, nor regionally comparable. They are not readily available, either. Looking at IMF statistics, the countries in Central and Eastern Europe and Central Asia (the Europe and Central Asia region of the World Bank)³ spend around 2% of GDP on transport and communications. The EU candidate countries' public expenditure is a bit higher at 2.3% on average⁴. US government statistics reveal a much lower spending on the federal, state and local government level. Their transport related expenditure (not only investment!) was around 1% of GDP. The EU countries are also reported to spend around 1% of GDP per annum, but this is exclusively on investment in transport. Thus their total transport expenditure is likely to be higher. Do these figures reveal the true picture? Definitely not! The extra-budgetary spending techniques disguise actual transport expenditure, which is usually well below the needs for minimum asset management and economically justified new investments, to catch up with demand in economy.

In the early 90s, the road sector in Central and Eastern Europe suffered severely from the shrinking budget. At that time road expenditure was around 0.5% of the GDP. During the past ten years the expenditure increased to around 1% of GDP in the EU accession countries. Out of 28 countries of the World Bank's Europe and Central Asia region where data were available, only two small countries (Latvia and Slovenia) seem to have covered their estimated maintenance needs in 1999/2001. Another six (Lithuania, Macedonia, Romania, Turkey, Ukraine and Uzbekistan) covered around half of their maintenance needs and 16 countries covered less than 50% of their needs. The situation is most severe in the South Caucasus, Central Asia and Moldova. These countries – with the exception of the oil rich Kazakhstan and gas rich Turkmenistan – failed to grow their economies and now they belong to the low income countries. Poor transport infrastructure quality and the lack of access to markets is highly likely to play a role in this sad outcome.

The neglect of road maintenance also shows the lack of responsibility in the administrations to protect existing assets. Total road maintenance expenditure in the 28 countries cited above is around

3. The region comprises 28 countries, all the former socialist countries and Turkey.

4. Source: IMF statistics.

US\$3 billion annually, while US\$ 5.8 billion per year is the estimated need⁵. This is about 1.3% of the estimated replacement value of the total road network in these countries.

Less severe, but similar financing gaps are also seen in the developed world. The federal government of the United States, for example is facing a large and growing deficit. This has an impact on the future of federal transport funding. Thus the reauthorization of the transport programs (Amtrak, aviation, highway and transit) to take place during autumn 2003 is subject to stormy debates [Transport Research Board Finance Conference, Chicago, November 2002; Transport Research Board Annual Meetings, Washington DC, January 2003].

Box 1. The US highway system

The National Defence and Interstate Highway system was launched in 1954 by President Eisenhower, who was amazed by the European and mostly the German highway network. Now it consists of 46 000 miles and 210 000 lane miles. This represents 2.5% of the total US network and carries 24% of the total traffic.

In 2001 prices, over US\$ 370 billion in federal funds have been invested in the network. This entire amount – though channelled through the federal budget – has come from fuel taxes.

In light of the deficits in the federal budget of the US, future funding is a concern.

Similar financial constraints exist at State level and therefore more innovative funding techniques are being considered by several think tanks and State legislatures. The introduction of Vehicle Mile Fees to be electronically collected; HOT-lanes, where a fee is imposed on the use of the HOV-lanes in rush hours, and other solutions are on the list of recommendations.

Are subsidies a way to waste scarce public resources and support non-efficient organizations?

World subsidies are between \$600-800 billion, or 2.4-3.2% of world GNP. 75% occurs in the OECD countries and subsidies mostly go to agriculture. Transport, and first of all public transport has also a sizeable share of subsidies, though much smaller than agriculture. This warrants an examination of how much is used for the intended purposes and how much could be freed up for transport infrastructure development.

The general arguments against subsidies are such as that, the:

- Reduce economic efficiency – reduce allocative efficiency by distorting relative prices – and often lead to over-consumption or under-provision of subsidised services.
- Burden the government budget.
- Require methods to finance them, that mean higher taxation or higher deficits, which further result in resource misallocation.
- Make it possible for middle- and upper-income households to capture the benefits and this raises issues of equity and fairness.

5. World Bank staff estimate.

These concerns are particularly true for price subsidies. Therefore it is a high priority task to reform them and make them better serve transport policy goals (like modal split between public and individual transport in congested cities), as well as broader social interest to help the poor have access to public services, jobs, etc.

Recent subsidy reform initiatives warn us, however, that phasing out old subsidy regimes can be successful only if it is done gradually (unless the government is particularly strong and there is already a social safety net in place). Therefore instead of quick fiscal savings we could foresee large budget reallocations where subsidies are better targeted and cease to distort competition. It may be that as a result of subsidy reforms the transport sector is losing some state resources that have come into its way in a relatively easy way, i.e. through the political bargaining process thanks to the strong trade unions at the railways. At the same time, better-targeted subsidies can result in traffic growth. If the user charges are correctly set, the revenues would still come to the sector, but it will have to “work for it”.

In the case of urban passenger transport and sub-urban railways, subsidies are likely to sustain and mostly come from the local government. To achieve this however, the fiscal decentralisation process should be accelerated in the new ECMT member countries.

Subsidies should be paid either in the form of ticket subsidy or PSO compensation payment. The EU accession countries’ governments have already introduced the legal framework for PSO contract arrangement with the railways. Unfortunately, not all local governments are able to pay the PSO compensation. At the same time, railway management is either not allowed or does not enjoy the political support to make efficiency improvements, like line closure, service abandonment or suspension.

Soft budget constraints and the quasi fiscal deficit

Subsidies to railways have gone through an interesting change that would not have been possible without the un-bundling promoted by the European Community. In the EU, operating rail subsidies are legally limited to sub-urban services. Some CEEC governments continue to allocate a lump sum to the railways as compensation to the overall passenger transport timetable and the losses incurred. In Bulgaria, for example, the total state contribution amounts to around 0.8% of GDP. In addition to these contributions, there are also the debts the railways in different countries pile up as they do not pay the bills of other State Owned Enterprises (SOE) (e.g. electricity bills). In some countries (e.g. Georgia) there is a barter arrangement between the railways and the main suppliers, who are also their customers, so the balance is once in favour of the railways then of the creditors. This situation creates a quasi-fiscal deficit on public expenditure level, further weakening the state budget.

There is also evidence of “soft budget constraints” when the State owned railway is encouraged to meet its financing needs from short term borrowing or from bond issues, all with government guarantees. As a result, railways are willing to overspend, since in the end they will be bailed out by the paternalistic government.

More strategic investment planning for transport

Speaking about constraints in funding, one should recognise that in many transition economies there is no transport policy or strategy. Even where it exists, it is not linked to the medium term public investment programs or public expenditure planning. In the low-income countries, that are eligible for concessional borrowing (e.g. IDA credits through the World Bank) the main strategic framework lies in Poverty Reduction and Economic Growth strategy papers. To establish the interfaces with their aims,

transport specialists need to think in terms of the Millennium Development Goals⁶ and how transport will contribute to their achievement.

Partnerships within the government and with external stakeholders

Public expenditure allocation is based not only on economic and social considerations, but it also shows how strong the partnership is between transport and finance ministries, as well as between economy and trade ministries. Further support can also be gained from the civil organisations and the public at large that are free to express their demand.

The impact of the EU accession on public spending

The paradigm of meeting the Maastricht criteria and meeting the sectoral challenges leads to off-budgetary solutions, as the often-preferred options. These can work well in the short run. However, they will not work in the longer run if sector reforms are stalled and the revenues generated within the sector are not channelled back to it. This will be discussed in more detail under the “external pillar”.

The users’ pillar

In the past fifty years transport in the ECMT countries was largely considered to be part of public service and therefore the real costs of the operations were not meant to be borne by the users. The first “earthquake” occurred when the UK decided to privatise its bus operations and introduce a franchising system. This was then followed by many other private sectors where cost recovery became an important factor both in terms of the selected market arrangement and also in terms of clarifying interest of the public client and the service provider when subsidies were discussed.

Box 2. New waves of transport pricing – the EU principles

Pricing is a tool for transport policy intervention. Fair and efficient pricing principles:

- Polluter pays principle - users to be charged for all costs (internal and external) they impose.
- Charging at the point of use whenever possible.
- Average full costs vs. marginal social costs (distance based user charges – vignette can be temporary till electronic fee collection).
- Step-wise introduction (now HGVs, but soon also motor cars).
- Level playing field between modes for enhancing competition.
- Favour environmentally friendly modes and solutions.

6. 1. Eradicate extreme poverty and hunger. 2. Achieve universal primary education. 3. Promote gender equality and empower women. 4. Reduce child mortality. 5. Improve maternal health. 6. Combat HIV/aids, malaria and other diseases. 7. Ensure environmental sustainability. 8. Develop a global partnership for development.

The user should pay principle is gaining pace in several different ways:

- Increased conscious of road user charges (see more on this later).
- Increased cost recovery ratio becomes un-avoidable in passenger transport, where international and inter-city bus operations can be profitable provided there is some sort of competition which makes the operators improve their efficiency. Still a lot needs to be done also on this front (e.g. the recent difficulties with the Hungarian Volan companies that continue to enjoy a monopoly right in the inter-city bus operations).
- The trucking industry is already placed on a competitive contestable footing, which also allows bankruptcy of those who are not doing so well.
- As a result of the separation of rail infrastructure and operations determining the access charges has become the major intellectual, economic, policy and regulatory challenge. At the same time, these reforms phase out murky cross subsidization from freight to passenger rail transport, un-block the development of rail freight services in support of a healthier modal split, etc.
- From the on-set of commercial aviation, air-carriers have been paying for the use of the air navigation system (over-flight fees etc.) and for the use of the airport facilities while they are now required to cover their own costs (it was not always like this, in the first half of the nineties the European Commission approved the payment of 5 billion ECU subsidies to the EU airlines by their national governments).
- Ports in the Western part of ECMT have been expected to cover their costs from their users. The new Members have also started to reform their ports (there are several success stories, like the reorganization of the Polish ports and most of the Baltic ports; the first, but major steps towards modern port operations in Durres, etc.).

As the users pay principle gets stronger and cost recovery improves there will be new opportunities for public-private cooperation and for bringing more private capital to the transportation sector. The resistance to these changes however is huge and comes from all possible directions. To illustrate, the discussion in this paper is limited to user charges for road infrastructure. This selection is partly arbitrary, partly well justified as major changes in road pricing and consequently road financing are to be expected in the coming years. So much so, that insisting on the refinement of the current system (i.e. heavy reliance on the share from fuel taxes) recalls the case of the British gas lamp industry. It spent enormous amounts on R&D to make gas lamp production more efficient at a time when electricity was already invented. Unless the heated debate about road funds is converted into a more strategic discussion about the earthshaking reorganization of the road sector we are in for another “innovation to support gas lamp manufacture”.

Earmarking is a usual tool in several OECD countries and it is broadly applied in the developing and transition economies. There are several good reasons for this solution. The transport sector, however should listen to the arguments coming from macro-economists and finance ministries. Table 1 illustrates this debate and the arguments for and against earmarking and channelling the revenues to a Fund.

The main sources of road funding according to the EU supported current system are fuel tax revenues, the vehicle registration fees (purchase and annual) and tolls for case of bridges, tunnels and motorway sections. While achieving this structure is still a challenge in some new ECMT members,

one wonders how fast the move will/can be towards a more sophisticated system. To bring the road sub-sector closer to utilities, like electricity, telecom or water the vehicle registration fee could function as a one time and annually renewed access fee to the road system. The actual use of the national road network (first class roads) on the other hand can already be measured with ITS technology. The amount to be paid can be based on the distance travelled and the type of vehicle. With this Vehicle-kilometre-fee (VKmF) a new source of revenue is at hand. However it could be expected that the VKmF will gradually phase out reliance on the share from fuel tax. In this way, the debate on earmarking will be solved. To facilitate public acceptance a lot of communication is needed. Gradualism is also important – like the German solution to first levy this fee only on trucks using the Autobahns. It can be a transport policy decision if the revenues of this new – more virtual – tolling are to be used for cross-subsidies e.g. to support public transport in urban areas.

Table 1 : Arguments *for* and *against* road funds

Strengths	Weaknesses
<ul style="list-style-type: none"> - Utility function through road fee / road user charges. Users' ownership and oversight – transparency and accountability – less corruption. Multi-annual predictability – multi-year investment planning - Can borrow directly against future revenues - Cannot be easily influenced by political pressure and thus can stick to economic analysis based planning and investments - Prudent financial management, procurement and road expertise 	<ul style="list-style-type: none"> - Can be captured by “local powers”. - Limits the government's fiscal re-distribution function and can limit expenditure management. - May “over-borrow” – if it loses its creditworthiness, eventually the burden falls back on the government, which will have to bail it out. - Difficult to design its re-allocation functions to make them flexible, but not abusive to regional and local governments if all Rocs go to the Road Fund. - Road management and fund management can have contradictory agendas.
Opportunities	Threats
<ul style="list-style-type: none"> - Can grow into a national road utility that can be commercially managed - Offers more opportunities for public-private partnership and eventually for the private sector - With a well designed RF accelerated road development can be implemented with lower costs than with central budgeting due to the risk factor attached to multi-year predictability 	<ul style="list-style-type: none"> - Not appropriately established RF can be a target of political and public dissatisfaction. - The off budget status may narrow/limit the interest of the government to provide for roads as part of public goods. - Lack of proper over-sight can lead to mismanagement of the RF and trigger loss of confidence in the road sector specialists. - Poor RF management can have a backlash and can bring the sector back to central planning solutions. - National roads have too much emphasis at the cost of regional, rural, and urban roads.

With modern technology discriminatory pricing can also be introduced, e.g. by pricing the value of time in case of congestion pricing as it was introduced in London or in case of premium lanes of the highways as it is planned in the US. The introduction of High Occupancy Toll systems allows lone motorists to use the carpool lanes at an additional cost (in California it has proved to be a welcome solution and now other States are considering its application).

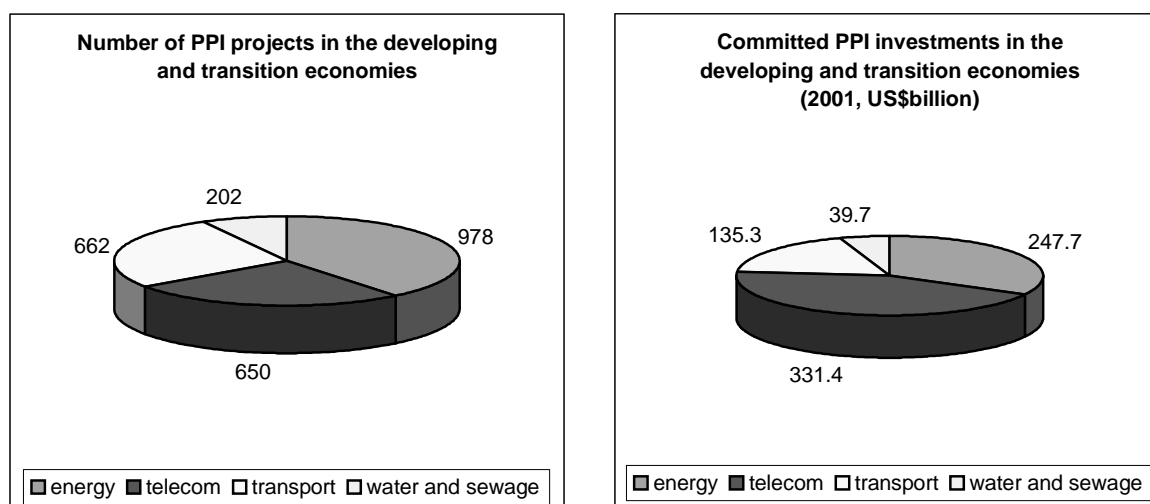
Other value pricing of transport infrastructure also occurs, when the sector is allowed to share the benefits from the increased property value (e.g. UK Docklands, where the real estate developers shared the cost of the construction of the light rail system). This solution however is generally limited to a specific area and not used countrywide. Besides, with a limited number of exceptions it has been mainly the property market that has benefited from transport development and not vice versa. Still it is worth consideration since “first and foremost, truly sustainable communities need access to jobs – and we are concerned that transport remains the missing ingredient in the plan” – as the British Property Federation echoed early this year. Transport investments can act as a catalyst for private sector led development, as is the case with building the rail line from the Channel Tunnel to Fawkham Junction and from Southfleet Junction to London’s St Pancras Station: the 5.2 billion pound government investment has attracted a further 8 billion pound private sector investment in properties surrounding the key transport nodes [Financial Times].

There is a price for the right of way that the road sector is paying in case of new construction (e.g. land expropriation). This cost usually is not recovered at all or in a rather limited way from the other utilities (e.g. telecom, electricity, water) that benefit from the existence of the road. How to reasonably harvest the external benefits back to the road sector is an area for future examination.

The third pillar: private sector funding

Between 1990 and 2000 2,500 infrastructure projects involved private participation in the developing and transition economies [World Bank PPI Project Database]. This generated an investment commitment of US\$750 billion. Out of these transport did not have the largest share, but its presence was sizable. In terms of value it amounted to 18% of all PPI projects in the developing and transition economies and was accounted for 27% of projects;

Figure 2: Public-Private Investment Projects in Infrastructure



Source: World Bank Public Private Investments (PPI) Database.

In transport infrastructure, toll roads are the most attractive for private capital, followed by the ports and airports.

Since 1997, the private interest in infrastructure has fallen fairly steadily. Several projects have been re-negotiated and some even cancelled. The big wave of cancellation was triggered by the failure of the Mexican toll road program. However the water and sewage sector, or the electricity (particularly in distribution) projects have been hard hit, too.

The regional distribution of the flow of private capital infrastructure shows that Latin America managed to attract close to half. In Central and Eastern Europe most of the infrastructure projects were part of divestiture and sale of assets and companies (e.g. big telecom and power privatisations). The transport infrastructure sector did not particularly participate strongly in this wave and many projects were cancelled or re-negotiated.

Interestingly private funding of new transport infrastructure was used for many large scale investments in developed countries, like for example the Channel Tunnel, Dartford Bridge in the UK and the Oresund bridge/tunnel, between Sweden and Denmark. Due to the famous cost overruns in the Channel Tunnel project, there are also lessons for improved project financing and management.

The boom in private infrastructure investment stopped in 1997 and a steep decline can be observed since then. Nevertheless, in the first half of the nineties it was seen that there is a private sector that can be interested in funding infrastructure development. The recent downturn however highlights the shortcomings in present arrangements and calls for careful analysis of the lessons, i.e. (i) private funding is not available free, there is a risk element that needs to be shared and paid for; (ii) in some countries sector reforms should precede the issue of a concession or any other PPP arrangement; (iii) the willingness to pay for the use of transport infrastructure is lower than originally assumed. Besides different sectors and sub-sectors have different intensity to attract private funding and this should be duly respected (see Figure 3).

Despite the recent slowdown of private funding there is scope for the growth of privatisation, in the areas of transport services and particularly in the non-core services. In the vast field of non-core services some activities remain to be privatised and exposed to international competition, like locomotive and rail wagon/coach repair. Several traditional ancillary services that were incorporated in the railways or ports SOEs can easily be contracted out, as competition for a long term contract could make the service quality higher and drive the costs down. In the field of engineering and construction services, contracting out is an obvious “must” for the same reasons. In these cases, however, the private sector funds only its own existence and cannot be seen as the source of off-budgetary funding of infrastructure maintenance or expansion.

In some specific cases the private sector looks to be the financier (e.g. BOT concessions). However, it is the user who in the end pays.

A more balanced approach is called for to judge and facilitate the growth of public-private partnerships, as it is not feasible to expect large-scale private participation in all sub-sectors and areas of transportation. Where it is possible however, the governments are to play the role of the facilitator. Otherwise private services will not develop or only at a very high price.

Box 3. Hungary M1/M15 Motorway Concession Project

The M1/M15 project was the first toll motorway project tendered and implemented in Central and Eastern Europe. Following a successful tender and financing, construction was largely completed on time and within budget even though the construction period was ambitious and Hungary underwent a period of high inflation.

M1 traffic at opening and traffic growth during the first three years was substantially below expectations, rendering debt servicing impossible. The level of toll rates was among the highest in Europe, mostly un-affordable to the Hungarian public. Thus they became politically unacceptable. The court judgement on the case initiated by the Hungarian motor club, ruled against the high toll, that based on the concession contract was at the discretion of the concessionaire. The low traffic and the reduced toll rate made the financial situation untenable. Attempts to restructure company finances were unsuccessful and the government and lenders agreed on a substitution process after three years of operation.

The government brought the infrastructure back into Hungarian State ownership while accepting part of the debt. Tolls were reduced (and abolished) and a nationwide vignette system prepared. Taking on the M1 debt also meant that the motorway construction budget for at least one-year was completely exhausted. In addition, private funding sources for the road sector seem to have become more cautious. Of the ambitious motorway programme of Hungary outlined in 1991, only parts were realised by the end of the century and the early completion of other parts remains doubtful.

The M1/M15 experience shows that sound traffic projections and prudent economic evaluation of projects are essential. While the lack of adequate traffic was the key reason for the private concessionaire's failure, the complexity of the issues and the confidence lost made the Hungarian government decide against trying to find a viable PPP solution. With the benefit of hindsight a positive lesson from the first BOT project in the region is:

- The construction was completed on time and within budget.
- Its operation and maintenance during the short period thereafter were effective and on highest standard.

It is worth noting that the subsequent M5 motorway construction was designed by taking account of the lessons learned and there the PPP arrangement made the concessionaire's operation viable.

More information on PPPs in Highways can be found on the interactive CD sponsored by the World Bank

Figure 3. **Why Transport Infrastructure is Less Amenable to Private Financing than Power Generation or Telecommunications?**

<i>Potential for</i>	<i>Local Facilities</i>			<i>National Facilities</i>			<i>Power Generation</i>	<i>Telecom</i>
	<i>Local Roads</i>	<i>Urban Rail</i>	<i>Local Ports</i>	<i>Trunk Roads</i>	<i>Main Ports</i>	<i>Freight Rail</i>		
Competitive market	Low	Medium	Low	Medium	Medium	Medium	Medium	Medium
Large efficiency gains	Medium	Medium	Medium	Medium	Medium	Medium	Medium	Medium
Minimal transfers	Low	Low	Low	Low	Low	Medium	Medium	Medium
Few externalities	Low	Low	Low	Medium	Medium	Medium	Medium	Medium
Profits from user charge	Low	Low	Low	Medium	Medium	Medium	Medium	Medium
No spatial planning effect	Low	Low	Low	Low	Low	Medium	Medium	Medium
Overall success	Low	Low	Medium	Medium	Medium	Medium	Medium	Medium

Low
 Medium
 Strong

Source: Developed from J. Meyer and J.A. Gomez-Ibanez. 1994. *Going Private: The International Experience with Transport Privatization*. Table 15-1. Washington, D.C.:Brookings Institution and Lincoln Institute.

Table 2. **Expanding the Scope for Private Sector Finance and Management in Transport**

	<i>Infrastructure</i>	<i>Services</i>
Urban Road	Usually free	All can be private
Inter-urban Road	Private concessions possible for major roads	All should be private
Rural Road	Contracting out of construction/maintenance	All should be private
Urban Rail	Concessioning possible but not fully proven	Concessioning possible but rare
Inter-urban Rail	Privatization/concessioning for freight; commercialization always desirable	Privatization or concessioning encouraged
Waterborne	Largely concessioned; ownership public for strategic	Private operation desired. Abandon protection
Air	Usually public ownership; concessioned facility	Private or commercialized operation

Table 3. **Options for Private Involvement**

Option	Ownership	Financing	Management
Service contract	Public	Public	Public/private
Management contract	Public	Public	Private
Lease	Public	Public	Private
Concession	Public/private	Private	Private
– BOT	– First private, then public	– Private	– Private
– BOO	– Private	– Private	

An external pillar for the EU members and candidates

EU funding is becoming an important external source of revenue (see Box 4). However, “no rose without a thorn”. This extra-territorial pillar entails a change in the decision-making power structure. In the transport sector the obvious impact is the increased support to the projects that enhance regional integration and inter-connection. Strong governments that are conscious of the regional and sub-regional disparities can off-set this impact by pooling national and local resources to the needs of urban and rural transport. Thus the gains of the external pillar are high.

This is unfortunately not yet the case in several EU accession countries that have a low absorptive capacity of the EU funds partly due to the lack of counterpart funding. As a result very little is left in the budget for the lower level transport network.

Box 4. The different forms of EU support to transport

- Trans-European Network projects within the EU.
- European Investment Bank (EIB) and European Investment Fund (EIF) grants and loans.
- Structural funds (ERDF) and Cohesion Fund for the Member States.
- Instrument for Structural Policies for Pre-Accession (ISPA) for the accession countries and mostly for the TINA projects (Transport Investment Needs Assessment – TINA).
- Phare for the CEEC.
- TACIS for the CIS countries, TRACECA along the Silk Route.
- South East Europe: Stability Pact a, TIRS (Transport Investment Requirements Study in South-east Europe) and Rebis projects; the European Reconstruction Fund for project preparation.

The more developed transport policy and investment planning are in a country, the more likely that the use of EU support will help the selection of the most feasible projects that have a regional impact and at the same time serve local interests, too. They will then generate economic growth not only within one country, but also across the borders.

In case of the EU accession countries, there is also a concern that the sudden increase of grants will result in the perception of “free” money. This can easily lead to less scrutiny in project selection and implementation, as well as to a dependence on the external funding for transport development. More than usual supervision and continued rigor in investment planning is therefore in the interest of both the beneficiary countries and the European Commission. In addition to the structural issues with regard to the quality of spending, there are also macro economic issues to be born in mind as a result of increased access to grants. Most of these grants are to make IFI lending concessional, hence ISPA can be used in connection with IFI (mostly EIB) lending. This can increase the indebtedness at a faster rate than the government otherwise would like to let it happen. The increased external funding may lead to exchange rate appreciation and that can reduce international competitiveness (“Dutch disease”). Since a big part of the external funding concentrated on transportation infrastructure, there is going to be less pressure to make infrastructure management more efficient. In the medium to longer term, however infrastructure cost recovery is to be achieved by the greater application of *users pay principle* (rail access charges, road pricing etc.). If the provision of transport infrastructure is more costly in the accession countries, than in the EU, the users will find it even more difficult to compete on the enlarged *single market*.

In addition to the availability of EU funds, there are other external sources of financing, like the Bid Facility for South-east Europe initiated and supported by USAID or the Central European Infrastructure Fund that is designed to foster PPPs in municipal utilities.

Summary

Transport funding is expected to change in a revolutionary way, as the reliance on public expenditure transfers is to decrease and the contribution from the users and beneficiaries increases. With a trend of improved cost recovery for several transport services and some part of transport infrastructure, private entrepreneurship and the opportunities for public-private partnership are likely to grow. Private funding of traditional transport infrastructure however is to be seen as a borrowing facility that works well if the public sector shares the risks and guarantees the enabling environment particularly for an increased cost recovery from users. This is also an off-budget solution on the short term that has a higher cost (if not more than the interest rate of the commercial loans) and implies contingent liabilities throughout the lifetime of the project.

Table 4. Summary of the four pillars in transport funding

External Pillar: EU Grants	Public Expenditure	User contributions	Private Sector funding
Available not only for Members and candidates, but also for other countries in Europe, Africa and the Middle East	Main Issues: Competition for scarce resources Transparency Efficiency Investment planning	Main issues: Accessibility Affordability subsidies	Main issues: Un-realistic expectations on both sides Lack of conducive environment Interest of strategic investors has recently shrunk
Aim: to serve regional (EU) goals	Likely to have a shrinking share	Likely to have a growing share	Likely to have a growing share, but not as fast as expected and more in the form of PPPs

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MAIN TRANSPORT POLICY ISSUES IN TRANSITIONAL ECONOMIES IN CENTRAL AND EASTERN EUROPE

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Introduction

Central and Eastern European countries (CEEC) are in varying stages of the process of transition from a centrally planned to a market economy. Orientation and priorities of transport policies should be differentiated taking into account economic, social, cultural and other differences between group of countries. These differences are significant even within European Union countries (e.g. in population density). But when considering all ECMT Member countries, differences are much greater. In many non-EU countries, distances are much larger, population densities much lower and average incomes sometimes many times lower than even in the poorest regions of EU countries. This is illustrated in Table 1.

Table 1. **Basic characteristics of groups of the European countries**

Group of countries	Area (000 km ²)	Population (000)	Density per km ²	GNP per capita (US\$1998)	GND at PPP* per capita
UE+CH-S-SU	2 463	367 115	149	22 299	20 302
Scandinavia (N, S, SU)	1 112	18 430	17	27 292	20 857
CEEC I (accession countries - Baltic states)	611	70 968	116	4 341	7 762
Baltic accession countries	175	7 640	44	2 618	4 230
CEEC II: Albania, Belarus, Bulgaria, Moldova, Romania, Ukraine	1 224	99 902	82	1 121	3 023
Russian Federation **)	17 075	147 100	9	2 300	3 950

*. GNP converted to U.S. dollars by the purchasing power parity (PPP) exchange rate.

**. Including Asian provinces.

Source: World Bank. World Development Reports 1998/1999, 1999/2000.

Main problems and priorities in transport policies

In the European Union countries, weaknesses and imbalances in the transport system have been summed up in two White Papers (1992 and 2001). To alleviate identified problems, the objectives of Common Transport Policy have been formulated and measures to meet them identified.

Central and Eastern European countries are in a more difficult situation. Transport systems are less developed and/or of lower quality and financial means much more limited.

In most CEECs, the density of railway network is relatively high. However, in the past emphasis was on the quantitative development of the railway transport with little attention to the quality of services provided. Poor technical conditions of tracks, outdated traffic control systems, poor quality of rolling stock and low operational efficiency have caused low quality of service and productivity. Differentiation of track gauge and power supply systems has made interoperability difficult. Generally, railways were not competitive in terms of speed, costs and convenience. If they played important role, it was to a high degree caused by the low level of motorization and policies (for example, in some countries it was not allowed to use road transport for longer distances). Political changes further reduced the efficiency of the railway transport. With a larger number of countries, national fragmentation of services and increased number of border crossings have created additional operational problems.

Road networks had several shortcomings as well: (1) there were very few motorways and expressways; most roads, including international roads, did not have access control and were used by mixed traffic - long- and short-distance motor traffic and slow traffic; (2) many sections of main roads were of mediocre quality; this includes geometric design and bearing capacity of the pavement¹; (3) many sections of major roads were going through built-up areas; (4) the rates and severity of road traffic accidents were much higher than in OECD countries; (5) road maintenance was neglected because priority was given to the upgrading and development of networks.

In the period of transition, a process of changes has started. Co-operation between Western European countries and CEECs has been developing. On the other hand, some new barriers have been created as a result of division of the former Soviet Union.

Great changes in volumes and directions of passenger and goods transport have occurred. Economic reforms and reduction of inefficiencies in freight transport in the early 90s caused considerable reduction in transport intensity of economy. There was a shift of demand from the need to transport raw materials and products of heavy industries to lighter consumer goods, from demand for low quality services to high quality services, and from international traffic among the countries of the "eastern bloc" to traffic between CEECs and EU countries. Modal shift - from rail to road - was observed. Differences between trends in group of countries are clearly shown in Table 2. While in most accession countries a rapid growth in road transport has been observed during recent years, in several remaining CEECs and CIS countries freight road transport is still decreasing.

1. Only a limited part of the network was prepared for 100 kN axle load and very short sections for 115kN (compulsory in the EU).

Table 2. **Freight transport 1990-1998** (thousands million tonne-kilometres)

Group of countries *	Rail		Road		Total ***	
	1990	1998	1990	1998	1990	1998
Western Europe	236	260	968	1 338	1 434	1 859
CEE countries**	292	159	130	164	470	371
CIS	3 120	1 218	348	131	6 481	3 304
Total	3 648	1 637	1 446	1 633	8 385	5 534

* ECMT classification.

** Including Baltic States.

*** Including inland water and pipelines.

Source: ECMT. Trends in the Transport Sector - 1970-1998, Paris 2000.

In passenger traffic (Table 3) a reduction in the share of public transport can be seen. This was caused by reduced subsidies but first of all by the rapid growth of motorization. In spite of a relatively low income level, the number of private automobiles is rapidly increasing and rates of car ownership per unit of GDP per capita became much higher than in more developed countries. For example, in Poland, in 1997, with GDP *per capita* equal to 3,700 USD, there were 220 cars per 1 000 inhabitants. This level of car ownership was passed in Germany in 1970 (GDP = 11 400 USD), in Spain in 1985 (GDP = 9 700 USD) and in Ireland in 1990 (GDP = 7 470 USD).

Table 3. **Passenger public transport 1990-1998**
(thousands million passenger-kilometres)

Group of countries *)	Rail		Bus/coaches		Total	
	1990	1998	1990	1998	1990	1998
Western Europe	272	304	345	386	617	690
CEE countries **)	137	67	201	102	338	169
CIS	514	217	388	193	902	410
Total	923	588	934	681	1 857	1 269

* ECMT classification.

** Including Baltic States.

Source : ECMT. Trends in the Transport Sector - 1970-1998, Paris 2000.

Even when compared with GNP *per capita* converted to U.S. dollars by the purchasing power parity (Suchorzewski, 2000) car ownership rates in countries such as Poland, Hungary and Ukraine are much higher than could be explained by the income level (purchasing power); 1.5 to 2.6 times higher than in highly developed countries such as Denmark, Germany, UK and USA, and 4 times higher than in Turkey. Only part of this difference can be explained through lower average value of cars (elder and of lower class) and sociological and psychological factors are probably the main cause of overspending on the automobile.

Transport policies in accession countries

In the last decade, CEE accession countries made a great effort to move from centrally planned economies to market economies. Restructuring transport systems is to a large extent influenced by prospective enlargement of the EU. While there are some differences in progress made by various countries, there are some common features of transport policies²:

- National and EU resources and loans from IFI's are used, first of all, for the upgrading and development of road and railway infrastructure in Pan-European corridors; only recently reducing backlogs in maintenance of existing roads started to be considered as important objective.
- Liberalisation and deregulation in road transport takes place; commercialisation and privatisation of this sector has been close to completion; in case of railways the process is much slower.
- Very limited support for public transport is provided; this concerns mostly regional and local transport; in some countries (e.g. in Poland), the State has almost totally withdrawn from dealing with transport in urban areas.
- With growing motorization and alarming traffic safety records, there is growing interest in safety and environmental aspects of transport.

In spite of action taken, differences in the quality of transport systems of the EU and CEECs are only a little less acute than ten years ago. Differentiated standards, bottlenecks and lack of interoperability are still reducing the capability of the transport system to serve national and international traffic. And congestion is rapidly growing, especially in larger cities.

Policies in other CEECs and CIS countries

Generally, these countries are less advanced in the transition to a market economy. Legal regulations are still different from those in UE. It is, however, almost certain that in a few years they will start the process of harmonisation of law and principles of transport operation. If the present plans of the UE enlargement are implemented, in the middle of the decade the Union will have 25 member states and it is very probable that remaining ECMT Countries will become even more interested in functional integration of transport systems.

As regards present Transport Policies, because of low quality of infrastructure, acute transport problems and backlogs in maintenance, safety and environmental aspects of transport are not at the top of the list of priorities. It is, however, highly probable that - with growing awareness of the public - this question will get more importance.

Main policy issues

In the complex situation described briefly in earlier points, the governments of CEECs are forced to make difficult decisions. The most important issues are briefly discussed.

2. While in most countries national transport policies have not been clearly declared and formally adopted, they are expressed in day-to-day decisions and actions taken at various levels.

Conflict between objectives of sustainable development

Finding a satisfactory balance between conflicting social, economic and environmental objectives of **sustainable development** is not easy. In many countries with urgent social problems and emphasis on economic development, environmental objectives are often considered as less crucial. Nevertheless, several governments have been making attempts to formulate national transport policies within the broader framework of national development policies. In most cases they accept the concept of sustainable development. While this is reflected in some transport policy documents, implementation is often very slow. The most important, however, is lack of consistency in economic, environmental and transport policies. Economic policy is generally favouring the growth of motorization (e.g. through taxation policy) not taking into consideration social and environmental consequences.

Decoupling economic growth and transport demand

After the periods of decline and then stagnation in several CEECs, personal mobility is increasing even faster than national income. Car ownership is rapidly increasing and the use of vehicles (measured by annual mileage) is growing. Freight transport is growing less rapidly but modal shift from rail to road continues. Reversing these trends will not be easy because reducing differentials in mobility is a clear objective of growth and convergence. In transition economies, using land-use planning and development control as a tool to reduce demand for travel and dependence on car is more difficult than in, for example the Netherlands, United Kingdom or Switzerland. One of the reasons is that after decades of goal-oriented central planning, the role of planning was dramatically reduced. Urban sprawl is observed with dozens of major commercial centres developed at the edges of central cities.

On one hand, if the present trends of dematerialization of the economy continue it may be expected that the growth in freight transport volumes in CEECs will be slower than it is assumed in transport demand forecasts prepared in recent years. On the other hand, the liberalisation of trade as well as technological changes and decreasing relative costs of transport have strongly loosened the linkage between material production and a specific territory and have resulted in larger markets and an increase in freight transport. And these trends will most likely continue in the future.

Reducing the spatial range of the circulation of material is difficult but extremely important for peripheral countries where population is dispersed and distances are long. Among sub-strategies which are considered by planners and economists, the following seems especially promising: (a) enhancement of regional consumer markets (for example, in food and building industries); (b) strengthening of regional production networks and (c) 'Glocalisation'³.

In summary, there is no doubt that there are large potentials of slowing down the growth of freight transport intensity in CEECs. It is essential that full transport impact assessments are made not only for transport programmes and projects but also for all major economic, spatial and social policy decisions which may affect the demand for transport. However, it has to be remembered that, in some regions of CEECs, there are strong social and economic reasons to enable higher mobility and improve accessibility. In this conflict situation there is a need to find a right balance between strategies reducing transport demand and mobility and accessibility enhancing strategies.

3. *Glocalisation (Glocal production)* can be characterised by large network firms which combine economies of scale and scope and maintain a network of local and global organisational units with close communication links. Material flows can be decentralised without jeopardising the efficiency of a European or global company.

Assisting governments in finding solutions appropriate to conditions of specific countries is one of the main challenges for ECMT.

Controlling modal shift

In practically all CEECs, public passenger transport is still playing an important role, especially in urban areas. And, in spite of rapid growth of the share of road transport in freight transport, railways still carry considerable part of goods. However, as it was mentioned earlier, there is rapid modal shift from rail to road and air transport and from public to individual transport.

Slowing down this trend is one of the main challenges confronting governments of CEECs. This is especially important in metropolitan areas and large cities where the provision of efficient and effective public transport is crucial for solving congestion and environmental problems. But it does not seem to be so essential and appropriate in more remote and less densely populated areas of CEECs and CIS countries with a sparse network of public transport with low levels of demand. In such places, it may be more efficient to travel around in an “environmentally clean” car, rather than in a public transport vehicle. Consequently, promotion of sustainable transport policies (by ECMT) does not have to be unconditional, it should take into consideration local conditions.

Investing in international routes (networks) or in national/regional/local systems

With scarce financial resources, finding an optimum balance between investing in transport infrastructure and operation serving international, national, regional and local transport is probably the most difficult task.

In many cases present focus on Pan-European transport corridors⁴ is well justified by high volumes of international traffic. However, when considering international traffic and its intensity in relation to national/local traffic in CEECs, it is necessary to take into account different spatial and economic characteristics. The economic potentials of these countries are much smaller than of the EU countries and average population density much lower. There are few large urban centres and the distances between them are large. Consequently, when one moves east from the borders of the present UE, the share of long-distance international traffic is decreasing.

Allocation of large amount of money to projects in Pan-European corridors may, to some extent, reduce investments into other national or regional roads and railways, in spite of the fact that their importance may be often comparable, or even higher than links belonging to the international corridors. Deterioration of regional and local railway systems is among the least desirable results. And the backlog in road maintenance and rehabilitation of secondary networks may be growing.

In conclusion, in CEECs the needs of international transport alone not always justify costly investment in new transport infrastructure; the most viable projects are those which serve both medium/short (national/regional/local) - and long-distance movements. In limited resources situation, necessity for the government to participate in covering costs of main projects of international importance (matching funds) may lead to neglecting other competing construction, upgrading and maintenance project which, in many instances, may be more economically viable. This issue should be considered as one of leading priorities in research and studies undertaken or stimulated by ECMT.

4. E.g. in Lithuania “about 2/3 of all transport infrastructure investment (resources) are and will allocated to Lithuania’s TINA network”.

Maintenance - rehabilitation/modernisation - development

Compared with other options for resource allocation, maintenance has the best benefit/cost ratio. Unfortunately, in most countries there is a tendency to give priority to new investment projects. In such cases, it may be useful to earmark for maintenance a part of funds allocated in the budget to transport sector.

Rehabilitation and modernisation of existing infrastructure is another efficient strategy. Increasing the bearing capacity of roads is probably one of the most challenging questions in optimum allocation of resources. The EC Directive 96/53 requires that for primary road network a maximum axle load of 115 kN should be applied. In countries such as Poland, national roads are prepared for traffic of up to 80 – 100 kN/axle. The cost of bringing the whole national networks to higher standard would be enormous. This problem is a subject of ongoing screening exercise of accession countries and EU legislation on road transport.

Investing in rehabilitation and upgrading of existing infrastructure can be also highly efficient in case of railways and tramways where, for instance, through rehabilitation of tracks and modernisation of power supply and traffic control systems and improvement of management a radical improvement of operational effectiveness has been achieved.

As in case of earlier points, ECMT should assist CEECs in finding the right balance between investing in new infrastructure and rehabilitation/modernisation and maintaining existing systems.

Development of infrastructure or improvement of operation

In many countries, governments concentrate on the upgrading and development of infrastructure leaving aside exploitation of existing facilities and operation. This does not take into account that investment, for example, in road, railway and air traffic management enables better use of existing infrastructure and equipment. Usually, costs of traffic management projects are relatively low and the rates of return are exceptionally high⁵. This should place management of traffic and operation among topics dealt with by ECMT.

Balancing expenditures on infrastructure and operation concerns also public passenger transport which in most cases requires operational subsidies. The question of how much the government should get involved in improvement of operation through provision of better services deserves wider discussion within the ECMT framework.

Safety or efficiency

Because of extremely high road accident rates in several CEECs, radical measures have to be applied. From the experience of the EU countries it is obvious that the quickest and most effective in cost terms are measures modifying behaviour of road users such as legislation, enforcement and education. Speed control is the first on the list of concrete measures but in many CEECs speed limits are still higher than in the UE countries. For example, a speed limit of 60 km/h in built-up areas is still commonly used. In spite of recommendations of OECD, ECMT, IFI's and other international bodies, it has proved very difficult to get political approval of proposals made by professionals and institutions dealing with traffic safety. ECMT can play an important role in the process of transferring experience of highly motorised countries in traffic safety to CEECs and CIS countries.

5. For Urban Traffic Management systems IRR may be as high as close to 100%.

Role of technological innovations and use of the best available technologies

The role of technological innovations is obvious. However, in countries with limited resources and competing needs **the best available technologies are not always viable**. Choices have to be made taking into account the marginal costs of adopting a particular standard confronted with social and economic benefits and taking into consideration opportunity cost of the capital which in CEECs is still very high. For example, in the difficult situation of railways in CEECs which urgently need restructuring and rehabilitation of existing infrastructure and immediate improvement of the quality of service, there is no justification for planning new high-speed lines in the next of 15-25 years. Making better use of existing dense network is certainly much more viable and should be promoted. Generally, ECMT could help in selection of appropriate technologies, e.g. technologies which are relevant and viable for a given country.

Decentralisation, commercialisation and privatisation

In the period of transition, in countries concerned varying progress has been made in:

- Separating functions and activities related to provision and management of transport infrastructure from that related to government (regulation and administration).
- Decentralising transport according to geographical structure (central, regional, local).
- Introducing accountability of the transport administration as regards the use of public resources allocated to transport infrastructure.
- Privatising existing (publicly owned) companies.
- Creating separate governmental entities dealing with eventual public-private-partnership (ppp) deals in the sector.
- Implementation of transparent and competitive procurement rules for transport services and infrastructure.
- Organising transport services considered as public services provided by private companies under commercial contracts with special emphasis on competitive procurement.
- Introducing mechanisms allowing due participation of the interested public (including non-governmental organisations) in the formulation of transport policies.

Continuous review of the situation and exchange of knowledge and experience between countries being in different phase of transition could accelerate the progress of transformation.

Threats and countermeasures

Guidelines on directions of desirable policies for the region have been defined by EU, ECMT, ECE-UN and IFI's. In some countries such policies have been formulated by the governments. However, there are threats which if not avoided may cause serious difficulties in transport and overall social and economic development in some countries and the whole region. The most important of these threats are:

- Lack and/or inefficiencies of long-range policy and development planning which can mean that scarce resources are used in inefficient ways; selection of projects is often based on political premises rather than technical and economic ones, in many countries there is a need to create a proper legal framework and strengthen the planning capacities, starting with formulating national transport policies.
- Weaknesses of project preparations and execution; in many cases projects are often over-scaled and not well prepared and mismanaged in the execution phase; this often leads to misuse and wastage of resources; an evaluation of the full range of options should include comparing potential benefits of new investments with benefits of improving existing infrastructure and equipment.
- Financing - short-term (often annual budgets only) planning is still common; at the same time too ambitious, unrealistic short - medium - and long-term plans and programmes are not related to financial means which can be expected.
- Inefficient management; it is essential that management systems are improved through introducing pro-effectiveness mechanisms.
- Personnel - lack of qualifications and difficulties to adjust to changing conditions and growing efficiency and quality requirements; continuous education of personnel to prepare it for new tasks is one of the most important tasks of the government.
- Trade unions - opposition against streamlining, restructuring, commercialisation and privatisation, often against the own interest.
- Opposition of green movements and local communities against some crucial investment projects; improvement of communication with the public (including NGO's) is needed.

The above listed threats should be taken into account when developing short and long-term programmes for ECMT. This could help CEECs to overcome barriers and speed up transition.

Conclusions and recommendations

Reviews of the situation and development prospects in CEECs and CIS countries have shown that there are several issues and threats which require international co-operation. ECMT can play a unique role in assisting governments of these countries through bringing to one table representatives of countries belonging to different groups: present and future members of UE, and remaining countries of Eastern Europe and CIS. ECMT has at its disposal various forms of activities facilitating the search for appropriate solutions of existing and future problems as well encouraging their promotion. The list of issues discussed in this paper is not exhaustive but, according to the author, these issues deserve to be included as priorities in the ECMT programme. They are summarised in the following points.

1. Sustainable development of the transport systems is one of the major challenges for transitional economies of CEECs and CIS countries. But meeting urgent social and economic objectives is often considered as more important than protection of the environment. Finding the right balance and convincing all stakeholders is not easy. Meeting this challenge is a task of the whole society and its representatives (parliament, central and local governments) and not simply a task of transport ministers. But they have to be armed with sound solutions and arguments.

2. Controlling transport demand and modal split are crucial tasks. This can be done by regulatory and fiscal measures but also by decoupling economic growth and demand for transport through dematerialization of the economy and consumption. However, in some regions of CEECs and CIS countries enhancing mobility and accessibility is necessary if the present inequalities in living standards and economic development are to be reduced. This requires further analysis and exchange of experience between peripheral countries and regions.
3. Fostering harmonisation, intermodality and interoperability is essential for developing an integrated and balanced European transport system. A few years ago it was expected that by the year 2010 the European Union will have an integrated transport system⁶. Now it is obvious that this plan was overambitious. It is still even more uncertain how and when this can be done with regard to accession and remaining ECMT Countries. Further studies similar to TINA for eastern regions are desirable.
4. Making better use of existing road and railways infrastructure and equipment is the most effective way to improve the quality of the system. Nevertheless, because of structural deficiencies in the existing transport systems in CEECs, investing in well-selected new infrastructure is no less important. Finding the right balance between these two ways of spending scarce resources is one of the most challenging tasks.
5. In some cases, concentration on projects of international importance may lead to draining scarce national resources even if they are assisted by the EC and/or IFI's (the need of matching funds). Other competing projects may be neglected which, in many instances, may be more economically viable. In international transport corridors priority should be given to projects which serve both long-distance (Trans-European) movements and the needs of national, regional and local transport. In addition it may be advantageous if international assistance (EC, IFI's) is directed also to improving regional networks. This will be in conformity with one of the principles of the EC transport policy which calls for improving secondary network connections to link up disadvantaged regional areas⁷. As with point 4, the right balance has to be sought.
6. Governance and management of the transport sector should be adapted to both the evolution of international integration and changes in the administrative structures of the states. In most cases, decentralisation, commercialisation and privatisation help to increase effectiveness and quality. Promotion of restructuring is necessary, but also analysis of situation in different CEECs and CIS countries which may require individual solutions.
7. Financing transport is still the most difficult problem. While there is almost common agreement that pricing and charging systems are needed which are clearly and fairly related to the value of infrastructure and external costs caused by its use, practical application of this principle is still a matter of many years. Definitely, progress in this area depends on how successful the EC will be in introducing "users pay" principle and in levying appropriate charges for access, use and occupancy of transport infrastructure. Nevertheless, the CEECs and CIS countries should start working on the concept as it will take time to get political approval for wider application of charging. ECMT assistance could speed up the process.

6. Guidelines for the development of TEN, Doc. 1692/1996.

7. Reinhard Rack. Draft report on enlargement, transport policy and tourism. European Parliament. Committee on Regional Policy, Transport and Tourism. Doc. Provisional 2000/2124(INI). 9 June 2000.

8. The reduction of the state involvement should not mean total withdrawal from dealing with sub-national (regional/local) transport systems. Desirable involvement of central government includes: legislative initiatives, regulations, recommending urban/local/ regional transport policies, financial support of strategic investment projects and, generally, pilot/demonstration projects, providing loan guarantees, developing sector databases, research and development, training/education. There is also need to preserve public transport services which are of fundamental socio-economic and environmental value. Exchange of information and promotion of sound solutions by ECMT may avoid mistakes made in some countries.

There is no doubt that the creation of an integrated transport system in Europe is an urgent need and challenge for at least one decade. Finding a critical path which takes into account differences between groups of countries is difficult but possible. Discussion on the occasion of ECMT's 50th Anniversary should identify policy proposals and options common for the whole Europe and specific for groups of countries, such as accession countries and remaining CEECs and CIS countries.

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TRANSPORT POLICY DEVELOPMENT IN EUROPE 1950 – 2020

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1. The general picture is one of success

Overall, the developments of transport policy in Europe in the last 50 years have been rather successful: there have been extraordinary gains in the ease, cost and safety of movement for persons and goods over this period, to the point where we now ask ourselves whether some artificial constraints or surcharges on that movement should be imposed.

In the process, the road became the clearly dominant support of movement of persons and goods, possibly to a large extent because of the independence of movement and flexibility it provides.

This ease of movement has considerably widened the vital spaces and experiences of Europeans, possibly making them more tolerant to differences of taste, opinion and lifestyles. On the side of freight, it has helped increased intra-European trade, promoting efficiency of production and quality of the goods brought to the markets, along with much greater uniformity of many of the goods available across the European space. Even on the safety side, where substantial progress remains to be made, particularly on the road sector and in some countries, there are reductions in the frequency and severity of accidents per transport unit. Safety levels in other modes, always better than on the road, have also improved considerably, especially considering the rise of traffic densities.

On the environmental dimension, which was not an issue 50 years ago, very considerable progress has been made, roughly over the last 25 years. When we look at it at a micro scale, it may seem that decision processes are very slow and subject to excessive interference from commercial interests of the parties involved, but a change of time scale provides a different view, with an impressive path of rather successful answers to problems, once they are identified and accepted as critical.

2. An evolving agenda

If we look behind, we see very different dominant issues along time, as well as across the geographical space, basically in alignment with the level of economic wealth of the different countries and regions.

The overall dominant wave has been the spread of high quality road networks, starting in the regions of greater concentration of population and economic activity (thus also of traffic generation), but systematically spreading to all regions of the richer countries as proximity to the motorway network and the easy, independent movement it provides becomes a quasi de facto entitlement. While some countries even started this process in the 20's with public investment, others coming later tried to catch up through solutions involving private or mixed investments. Economic results have not always been as expected but the pressure for network expansion has been steady and systematic

innovation of the financial solutions has been available to provide at least partial answers to that pressure.

In parallel with this public-led investment on infrastructure, the private side has played its side of the equation, by dedicating significant parts of families' savings to the purchase of vehicles, in what can almost be seen as a tit-for-tat game strategy: the response to better roads is the purchase of more and better cars, which creates pressure for more better roads.

Central and Eastern countries are now clearly at the point where there are strong expectations that this "game" should begin soon, in replication of what has previously happened in successive replays across Western Europe.

But in spite of this permanent strong presence of road infrastructure expansion in the agendas of governments, this has not been the only strong concern of national governments: As car ownership and traffic volumes grew, for most countries mostly between the 60's and 80's, accompanying a strong growth in the part of the population living in urban areas, road capacity and safety became clear concerns, and are still high in the agenda. Road congestion is now a part of everyday life in urban agglomerations, although some relief may be observed in many interurban links, due to continued investments, on the congested links as well as on the creation of alternatives. Road safety has had significant gains, although several tens of thousand deaths per year are still accounted to this problem in Europe. Apparently, much can be gained through dissemination of best practices, but this has been found to be rather difficult [OECD, 2002].

By the mid and late 70's the environmental issue came to the fore, largely through the item of acid rain and emissions of nitrous oxides. Since then, an interesting process has been going on, with successive discovery of new types of environmental aggressions and associated risks, followed by technological responses and their introduction in the market. Although by no means it can be said that problems are solved, the situation is improving in general, and in many respects the question of accelerating fleet renewal is now dominant. The pressure from ONG's for modal shift in segments where railways could provide at least comparable service still makes itself felt, but the inefficiency of terminal conditions and the poor reliability in keeping with timetables in freight services lead to firm refusal of that shift by many industrial companies. Governments are aware of the loss of competitiveness of those firms if a modal shift was somehow imposed upon them and refrain from adopting tougher positions.

In the meantime, economic formulations gained ground in the policy discussion, and the search for efficiency of transport systems was gradually adopted, albeit through different tickets: already in the 70's there were calls for intermodal transport solutions, trying to gain better use of resources in each of the modes; then the 80's brought the winds of deregulation and liberalisation of access to the markets; and in the 90's recommendations of policy intervention through pricing became very common. This search for efficiency is clearly unfinished, but it is interesting to note that the vectors of technology and organisation, competition and pricing have all been called upon, albeit largely in an uncoordinated manner and with a relatively low degree of success.

Seamless intermodal solutions are still the exception, which is due as much to technological as to organisational and institutional (almost cultural) barriers. One of the main items is the transfer process at the interchange station. Both from the point of view of the haulier and of the cargo itself, this should not take much longer than the usual time to fill or empty the truck, which implies that the transfer process must be made much more in parallel than in series, as it is mostly done today, and with a short time lapse in relation to the moment of arrival or departure of the train. This implies transfer technologies which are not so expensive as to restrain the existence of such transfer stations to only a

few and very far apart, and organisation and documentation processes that allow time losses for the truck and for the cargo of roughly half an hour. While the technologies start to be available, current practice is still rarely under two to three hours for the truck and six to eight hours for the cargo.

But there are several other hidden barriers to intermodal transport besides those visible at the transfer stations: international conventions for freight transport are largely aimed at unimodal transport, and based in non harmonised definitions, liability limits, time thresholds for filing complaints, and so on. Intermodal transport rules exist, dating from 1975, and a UN convention has been drafted but not approved by many States. Clearly, a “conflict of conventions” exists, which clearly imposes additional costs for the shippers in case something goes wrong. Moreover, documentation for the various modes involved in an intermodal operation will vary from mode to mode, creating higher costs and risks of error in all transfer operations.

Liberalisation of access to markets has been fully implemented in road haulage and long distance passenger transport by road, but these tend to be door-to-door solutions and the level of competition resulting from this liberalisation has pushed the threshold for profitability of intermodal transport even higher. Especially in the road haulage sector, the questions related to fair competition have surfaced with great visibility: since margins tend to be quite low, any distortions made available to a part of the suppliers are felt as very dangerous to others active in the same markets. Some of the main issues are drivers’ working hours, environmental standards of the trucks, fixed costs imposed on the hauliers registered in the various countries, and even the road charges applied in competing corridors serving the same long distance connections.

On pricing, there are clear normal practices in these modes where fierce competition exists, but the introduction of publicly led pricing policies pushing for higher efficiency (marginal social cost pricing) has been much advocated but not exercised.

Liberalisation has also occurred in maritime transport and to some extent in aviation, although here significantly constrained by the practice of grandfather rights in access to airport slots. But in the very recent and turbulent past, low cost airlines have been able to gain significant market share by offering their passengers services to smaller airports in less convenient locations and virtually no integration with other flights. This is being applied only in dense traffic routes, but is forcing the major airlines to fight back.

In the railway sector things have moved in rather different directions. What was once the leading mode of transport in Europe has been declining since the end of World War II, with the only significant exception of high speed interurban services, and in some cases of passenger services in dense agglomerations. In spite of the overall improvement of comfort conditions for passengers, and of the introduction of technical innovations in the field of control of separation between trains, the sector has largely behaved as if it only recognises internal stimuli, ignoring the wider markets where it is a part of the supply.

The policy debate on the railways has therefore been dominated by this gradual loss of market share and the alternative courses of action to contain the associated flow of public funds. The relatively recent legally imposed separation of accounting and management between infrastructure and transport services has led to greater transparency, but also greater complexity in the production process and associated managerial tasks. So far it has not brought visible reversals of the trends of market share decline and dependency on public money. New EU directives approved in 2001 have not yet produced visible changes on the levels of performance.

The fact is that in many countries and market segments, competitive pressure is not yet felt, to some extent because a unique institutional solution was prescribed in the Directives. Given the variety of market dimensions and relative strength of the various modes in the EU countries and regions, a wider diversity of institutional solutions should be encouraged, possibly with separation of traffic management functions from the hardware functions of the infrastructure manager. But also in the railways there are many hidden barriers to the introduction of new operators in the market: one of the most prevailing is poor connectivity of the networks, which causes most Origin / Destination pairs to have only one possible path. If a bottleneck exists along this path, even in a very reduced length, non authorisation for operation of a new train on a line that passes that location is easily justified...

The debate on the justifiable amount of public subsidy to the railways is frequently marred by the issue of externalities left unpaid by road transport, mostly leaving aside the questions of internal efficiency of production and the mechanisms that might promote it. The debacle of the fully private model adopted in the UK (even if still receiving substantial amounts of public money) shows how difficult the question really is.

But it should be clear that, in parallel with significant increases in quality of service in several (freight and passenger) market segments, the railway industry has to develop and present a business model for each type of service, including consideration for social and environmental costs and benefits. Subsidies may be justifiable in several cases, but there is no reason for permanent subsidies from the States without clear connection to the business models they are supposed to support.

On public transport in urban areas, there has been some success in the efforts to revert the trend towards decreasing patronage and increasing subsidies that were visible in the early 80's. These efforts were led at that time by France and the UK, with regulatory reform in different directions: Whereas France opted for organisational change on the local authority side and a limited opening of operations to private companies, the UK went to a model of almost complete deregulation with free access to the market and a strongly reduced intervention of local authorities. Other countries have also introduced some regulatory changes, generally in the sense of increased competition for supply of services but all of them preserved a strong role for local authorities in the specification and supervision of that supply [ISOTOPE, 1997], [MARETOPE, 2002]. The cycle is not complete and an attempt by the European Commission to introduce new regulation in 2001 has been facing difficulties in its discussion between the Parliament and the Council.

3. Key challenges for the coming years and main instruments to address them

One of the major challenges for the near future is arising outside the transport sector, and has a far wider political setting: How to ensure continued progress in the construction of the Trans-European (transport) networks, which are considered vital for the consolidation of the EU concept and of the internal market? The main source of difficulty in this front is the financing of such construction.

Although some of the links included in the first set of approved corridors have been built, the pace of advance has been very slow, partly because some of the links are of low national priority, partly because public money has been scarce with the obligations defined in the Stability Pact. This challenge naturally gains increased relevance with the eminent accession of ten central and eastern countries as new members of the EU, since the standards of their road and railway networks are generally much lower than those in the west.

A second challenge to the transport sector but generated outside it is related to the general situation of public accounts: the increasing pressure coming from social expenditure is forcing even the "rich" states to stop financing other expenditures from the general budget. Transport infrastructure

is an obvious candidate for generation of direct revenue, covering at least its maintenance and renewal costs, and this is beginning to happen in countries where a few years ago the notion of road tolls would be unmentionable. Since the purpose now is to cover maintenance costs, only heavy goods vehicles are to be charged, but other logic arguments may easily be found to introduce charges to private cars as well, thus bringing substantial additional revenue.

A third challenge that is coming to transport policy with origin outside the sector is the above mentioned problem of distortion of competition caused by different rules (or different application of the same rules) concerning the production factors of freight transport. But great care has to be exercised in addressing this challenge, since geographical (thus immovable) factors may imply that fair competition between corridors through adequate pricing in one region induces very unfair negative discrimination of one or various regions whose external trade needs to cross that former region. The case of the transport pricing in Alps and of Italy possibly blocked by those possibly high prices comes immediately to mind.

These three challenges together are forcing an evolution from national transport policies to wider territorial scales, sometimes through bilateral agreements on corridor alignments, construction calendars and tariffs, other times through global agreements at the EU level. In virtually all cases agreements are difficult, because so many interests and economic advantages are connected to particular distortions of transport supply, but all sides eventually agree that all countries have more to lose by not converging and opening access than to gain with those distortions.

For the challenges related to the performance of the transport sector, it is possible to define a simple and permanent framework: we can speak of the search for Quality, both Internally to transport activities, and Externally in the territorial space of which it is a component and in the environment.

Regarding internal quality in transport, we can decompose it in terms of accessibility, safety, fluidity, reliability, diversity and efficiency. Although there are generally good levels of these attributes in many regions in Europe, there are still weak areas for each of them, and some of them even have a frequent occurrence of poor levels. The most prevailing weaknesses are in fluidity (i.e. congestion) and safety.

In the domain of external quality, the recent formulation of the concept of sustainable transport systems and of the strategies to achieve them [OECD, 2002b] shows the complexity of the approaches needed.

Under the umbrella defined by these high-level topics a long series of items may be referred, each of which presents in itself significant challenges: de-coupling transport and economic growth, improving market share for the railways and intermodal transport, fair competition between modes, integrated planning of land-use and transport, adequate consideration of external costs, etc.

It is easy to see that, while all of these challenges deserve good attention, the instruments available to address them will force interactions between them, not always in a synergistic sense: improving performance in one dimension may be better achieved with instruments that create problems in another dimension.

Three main families of instruments are known to address these challenges:

- Supply-side instruments: within this family, the most applied instrument has been expansion of infrastructure, and this will probably continue to be so at the European scale, but there are regions and local areas where it is no longer considered a viable option, both for reasons of

cost and of popular acceptance. In complement to infrastructure we must also cite technology, which allows us to make better use of an array of resources (our own time, space, energy, information, etc.) and produce less undesirable outputs. An often forgotten contribution in this family is that of organisation and management, without which efficiency levels in the various fronts of the transport activity may be severely deteriorated.

- Regulation instruments: in this family, there is ample evidence of the use of laws and regulations defining what is allowed and what is not. This is done both at the technical level, typically forcing introduction of technologies in new vehicles and limiting the remaining time for use of old technologies, and at the economic level, defining conditions for access to markets and thus managing the levels of competition in those markets. But also in this family there has been one forgotten dimension: the effectiveness of regulation of private entities may be jeopardised if it is not adequately framed by good institutional design, i.e. the conflicts between public agencies competing for power may seriously hamper the intended effects of regulations, both through interpretation, poor monitoring or enforcement.
- Pricing and taxation instruments: there is ample tradition of use of these instruments, since transport is a relatively capital intensive sector and people have shown great willingness to pay to have access to better transportation means. An interesting variety of pricing instruments in transport have been applied in Europe over the last 50 years, some in the form of general taxes, others in the form of charges related to some service. What is now found is that, given the challenges that have to be addressed, what is inadequate is the array of points of application of these instruments, more than the total monetary value collected. In general there is a call for variabilisation of transport prices, which means increasing the price level associated with the actual use of transport systems, and possibly decreasing its incidence on possession of vehicles and on the abstract right to use them.

The complexity of the challenges and the multidimensionality of the instruments and of the institutions responsible by one form or another of attack to those challenges obviously define a very difficult problem of policy design and evaluation. Systems dynamics concepts and tools would certainly be in a position to play an interesting role in these areas, but there is very little evidence of their application in the transport policy domain.

One of the main difficulties of transport policy derives from the fact that transport is a vital component of many of our long-term decisions in life, both for citizens and for companies. This is of course especially true with respect to location of housing and of industrial estates.

And so, when significant changes occur in the transport system in the sense of limiting access or increasing prices, many people may feel severely limited in comparison to what they previously experienced or expected. Strong reactions of non-acceptance are to be expected in such cases.

And there is a wide difference of perception between the case of increasing congestion in a motorway, which is rightly felt as jointly caused by all drivers (so it is the fault of nobody in particular), and the imposition of road charges or access limitations to fight that congestion, which is felt as a unilateral decision by Government, who should either have found other means to solve the problem, or given proper advance notice of that to the people and companies who recently located in the vicinity.

In such cases, it is not acceptable to simply consider the statistical dimension of policy measures, saying that there will be a reduction of so many%. The quality of the alternatives for the various user groups has to be seriously looked at, and possibly improved, so that those who stop using the

congested link do not feel “kicked out”. This is the reason why in all acceptability studies [PATs, 1999; AFFORD, 1999], the hypothecation of revenues from pricing measures to the improvement both of the affected system and of its alternatives is found to be so important for acceptability.

In general, what we can observe is that policy makers prefer to rely on instruments from the supply-side family: even if they are relatively expensive, they tend to offer an expansion of the possibilities to the citizens, and so no one feels constrained in his or her previous behaviour. Sometimes they are combined with an element of technical regulation, for instance forced adoption of some cleaner technology until a given date. As long as this is done only for new vehicles, no significant protest arises, and the only disputes will be among manufacturers who may feel that they gain or lose competitive advantage vis-à-vis their competitors.

One of the vehicles that is being strongly used for acceleration of investment in transport infrastructure is private financing through public-private partnerships. These are bound by very complex contracts with a long lifetime (typically 30 years), in which the contracting parties try to specify the consequences for each party under most foreseeable future circumstances. There is still little experience of such contracts, most having started in the 90’s, but it is already possible to say that their rigid text is sometimes creating significant constraints for the normal development of transport policies by governments and their adjustment to changing circumstances. Shorter contract lives, explicitly recognising only partial amortisation of the financed infrastructure, would allow lower margins of error in the revenue forecasts but also greater sovereignty of governments in managing the conditions of use of their infrastructure.

In the presence of such a complex system of challenges, it is natural that each national government develops a differentiated point of view, strongly affected by the problems that are more pressing in his own society. The role of multilateral institutions like the ECMT becomes very important not only for promotion of the awareness of points of view of the other parties, but also of the inter-relations between policy goals, which are dependent on the instruments chosen to pursue any of them.

4. The special case of peripheral regions

Peripheral regions pose a special type of problems in relation to transport: by definition they are farther away from the larger dimension markets, thus increasing the time and cost of bringing their products to their markets (as well as on importing goods from suppliers close to those markets).

But the protection against imports may be very thin: because they also frequently have relatively low density of population and economic activity, they lack the economies of scale to produce sophisticated goods efficiently for their own markets, and thus are subject to importing those goods anyway, with the cost aggravation of the longer transport component.

Since there are very high political and social values attached to continued occupation of those regions, pricing of the use of transport infrastructure cannot be based on the same degree of cost coverage in dense central regions and in low density peripheral regions. In many cases, that would render those infrastructures simply unused.

The principle of non distortion of competition through harmonised pricing rules (for example on similar cost coverage levels) is well applicable in the case of *transversal harmonisation*, i.e. in the case of competition among a group of parallel corridors basically serving the same long distance connections. But it should not be applied in the case of *longitudinal harmonisation*, i.e. along the various regions in a single corridor. In such case, consideration must be given to the prevailing traffic

volumes and their capacity to bear such costs without the risk of killing the industries they are supposed to serve.

But it must be clear that the principle of territoriality prevents positive discrimination of (i.e. lower tariffs applied to) vehicles from peripheral countries when they are using infrastructure in central regions.

Considering the higher unit costs of road transport, these peripheral regions should depend less on this mode of transport, but the critical areas of intervention in that direction may well be beyond their powers.

If the long distance connections are to be done by rail instead of road, they depend on the performance of the railways along the way, possibly through various other countries. The eminent open access to the TERFN (Trans European Rail Freight Network) in 2003 is important in that it suppresses one of the main barriers to this possibility, but much more needs to be ensured of good performance throughout. Also of critical importance is the existence of performance regime contracts, linking payment for infrastructure use to the effective availability of that infrastructure in the contracted conditions, i.e. at a certain time and level of operability. This will still take some years to be well implemented in all European countries in a transparent and effective way.

And in parallel, the pricing rules of access to the railway infrastructure should also avoid discrimination in favour of very long trains, by having the price set by train-km, instead of axle-km. Lower density regions can be hurt by such rules, since they generate lower volumes of traffic and can only produce long trains if they consolidate loads for very different destinations – which will force multiple marshalling operations with heavy time losses - or produce trains with less dispersed destinations but much lower frequency, which considerably lowers the levels of competitiveness versus the road.

At least for some peripheral regions, maritime transport is a real alternative in terms of journey time to the central markets in the EU. The main problem is one of freight volume, similar to what has been described for the railways: competitiveness of a transport option depends critically on its frequency (or flexibility to depart on call at any time), but the dimension of ships requires significant volumes to create a regular operation, and in the current circumstances these volumes are not within reach.

However, if the total transport market on goods susceptible of being served by short sea shipping with destination to some central regions is found to be of a dimension compatible with a regular service of good frequency, there is room for support of a kick-off subsidy of limited duration (2 to 3 years maximum), which could take the form of a guaranteed traffic volume to the shipping line. Prices paid for the transport of goods would be the normal ones, but shippers would have a guaranteed frequency of service. The shipping line would be selected by the minimum level of traffic required and the unit price charged for the gap between the real transported volume and that minimum.

The dilemma is that by geography peripheral regions should rely less on the road and more on rail and short sea shipping, but their lower density naturally pushes them to road transport with its smaller lot sizes.

Probably no good answer for the long term can be found solely within the transport policy dimension, and these peripheral regions must also consider that, since the new realities – prices and constraints - of long distance transport probably are here to stay, there should also be some adjustment

on the nature of goods on which they specialise for production and export to the rest of Europe, as well as on the set of their trading partners.

5. Technological evolution, and complements in other fronts

As already mentioned, political decision makers always prefer that problems be solved by technology so that no new behavioural constraints are introduced. In a period of such strong rhythm of technological innovation, there is hope that also the transport sector could benefit from that rhythm.

The two areas where more is promised from technology are related to cleaner vehicles and road traffic flow management (Intelligent Transport Systems), the latter with strong implications on traffic safety.

Emissions by vehicle-km will continue to diminish by adoption of better controlled combustion engines and hybrid traction vehicles first, and of fuel cell based traction later.

It will still be possible to drive road vehicles independently of each other in non congested roads, but roads where traffic density regularly goes above a certain level will be prepared to allow co-ordinated management of the movements of all (equipped) vehicles, with strong gains of capacity and safety. Like in all hierarchical systems, the main problems will be faced at the points of transition between hierarchical levels, for instance at the transition between the “intelligent” road and the normal road.

But application of electronics to road safety could have a much greater impact if oriented towards a special area of active safety, namely that of preventing hazardous behaviour by the driver. Careful monitoring of the surrounding (traffic and weather) parameters and of the physiological condition of the driver would allow definition and enforcement of acceptable intervals for variables like distance to the car in front, speed, acceleration and overtaking gaps that would strongly reduce the possibility of accident caused by human error. Similarly, accident causes like alcohol and sleep could be avoided through appropriate use of technology.

Also in the railways there is ample room for improvement. Besides emerging progress in truck-to-train transfer operations, allowing parallel processing and much shorter terminal times, there is also big potential for improvement in marshalling operations, when trains are decomposed and recomposed. Availability of self-motion capacity of freight wagons – with limited range and speed – would allow complete automation and significant time compression of these operations.

Recent international agreements on railway traffic management systems (ERTMS) also promise significant productivity gains on the running phase of international trains.

Alongside these technological improvements, other important instruments for revitalisation of railways in the freight sector are in the regulatory and institutional front. Separation of traffic management and infrastructure ownership and management (similar to airports) would allow better exploitation of available infrastructure and identification of investment needs for improved, reliable service. This would be especially true in cases where there are traffic conflicts between passenger and freight trains and the network configuration allows for re-routing of freight trains [IMPROVERAIL, 2002]. In such conditions it would be much easier to really open the market for competitive railway freight operations.

Great reductions of the inconveniences associated to all transfer points are possible, across all transport modes, thanks to telecommunication and computing advances. These should allow

cross-information about all relevant items for proper synchronisation and planning of next-step operations. Real progress in this front is showing to be slower in coming than technology would allow, mainly due to different cultures in the various modes and institutions, as well as to the difficulties of sharing the costs of the required investments.

6. The need for inter-instrumentality

Although the three families of instruments referred above are recognised and well known, we frequently find cases in which it appears that policy makers, as well as scientific researchers, only consider one family at a time.

This may be caused by temporary prevalence of one group of scientists over the others, and has been happening in the last few years, with long discussions about the ideal pricing policies against road congestion, both at urban and interurban levels. (This would suggest that economists are the leading force today, whereas engineers were at the top until the 80's or so).

The arguments in favour of each position are developed in such a way that the pricing instrument alone should achieve the optimum results considered most important, ignoring possible co-ordinated interventions with the other instrument families, that would allow similar levels of success with weaker doses of the pricing instrument, and ultimately with higher levels of acceptance and chances of political approval.

The same can be said of technology introduction, where supporting measures from regulation and institutional design instruments can be vital for success, and vice-versa.

The basic idea is that there is much better hope of good policy design if we make joint and co-ordinated use of the various types of instruments available, considering their synergies, as well as the effects of the application of one type of instrument in an area of policy where it is not the usual dominant instrument. This too, calls for a more systematic role of multilateral institutions capable of grouping multidisciplinary talents in an organised reflection.

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