



Sector futures

Balancing conflicting pressures: the automotive sector of tomorrow

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*The first two features on the automotive sector, **The automotive sector: At a crossroads** and **Scenarios for the automotive sector**, explored some of the main drivers affecting the future development of the car industry and presented a range of possible futures for the industry. The sector is a major player in the global and European economy and the car plays a huge role in our society. Over the past 25 years, a wide range of policy initiatives have been introduced in an attempt to counteract the negative impact of the car on the environment and to improve road safety standards. While further measures continue to come onstream, many challenges remain as legislators attempt to balance the competing pressures that impinge upon the sector. This last article in the automotive series explores some of the directions that EU policy could take, which would both safeguard the future of the industry and guarantee a cleaner and safer environment for all citizens.*

Introduction

Most people would agree that the car was the supreme icon of the twentieth century. From the early years of the century, first in the United States (US) and then in Europe, the car – more than any single product – progressively became a central image of the good life available to people: a symbol of the consumer society. Car ownership has grown steadily, especially since the 1950s. From being viewed as a luxury item in the beginning, the car is now a necessity for most people, due to population growth and the expansion of cities and suburbs, which increased the need to travel long distances. Despite the global nature of car production, notably in developing countries, and increasing concerns about overproduction, the number of cars built in the EU continued to grow during the 1990s. The following indicators reflect the importance of the car in today's society:

- The automotive industry and its associated activities employ around 12 million people in the EU15.
- Over 10% of the total EU manufacturing value is attributed to the industry.
- The car offers enormous mobility and this in turn has influenced where people live and work, and where they travel for recreational purposes.
- A driving licence represents a desired qualification for young people – a rite of passage to adulthood.
- In terms of the ageing of the population, loss of automobility threatens to severely reduce the lifestyle of the elderly, who have become accustomed to the freedom and autonomy the car offers over most of their lives.

In Heathcote Williams's poetic diatribe on the influence of the car in modern life, the poet suggests that it tends to satisfy a whole spectrum of desires: economic, social, sexual and religious (Williams, 1991).

But the car has other, more serious and nefarious effects:

- It is a major contributor to CO₂ emissions and hence global warming.
- It is responsible for 40,000 deaths and nearly 2 million injuries on European roads every year, resulting in a considerable burden on health services and both social and economic costs.
- Road traffic congestion, particularly in cities and on major routes, entails enormous costs and increases the everyday stress of individuals.
- The car consumes a huge part of the oil for which the EU is dependent on imports.

Most individuals love their cars, and it is true that road transport has brought about many social and economic advantages. However, as members of the global community, we suffer the huge consequences resulting from wide-scale car use. The challenge for transport policy is to strike a balance between the economic and social benefits of transport

and its negative impact on society and the environment (European Environment Agency, 2003). Balancing these conflicting pressures is far from easy, as opinions will always be divided, whatever policymakers decide: some will back the attempts to tackle the huge issues involved, while others will react strongly against the perceived threat to their individual freedom and way of life.

Policy challenges

Growth of car use and its impact

Car ownership in the EU increased by an average of over 2% per year during the 1990s. While this represented a downward trend from the 1980s figure of over 3%, car ownership is nevertheless expected to continue to rise in the future. By 2000, there were nearly 500 cars per 1,000 people in the EU, more than double the figure of 30 years earlier. Evidence from the US, where ownership levels are around 50% higher, suggests that demand is unlikely to be saturated before at least three-quarters of the population have access to a car. The European Commission's 2003 report on *EU-15 Energy and Transport Outlook to 2030* projects a continuing increase in car use of 1.2% per year up to 2030. Although developments in greater fuel efficiency are expected to lead to a slight reduction in final energy demand over the period, the report forecasts that emissions – which are closely tied to fuel use – are likely to remain close to 2000 levels unless further measures to reduce them are taken.

Factors favouring the growth of car use in the EU over the last 20 years include:

- Growing gross domestic product (GDP) and greater disposable income, which makes car ownership more affordable. People in industrialised countries spend a greater proportion of their income on transport – estimated at between 10-15% – than those living in less developed countries. As higher speeds, by car and plane, have become possible, the average distance travelled by individuals has increased by over 1% a year while the time spent travelling has remained about the same (Commission Expert Group on Transport and Environment, Working Group III, 2000).
- Transport prices have made car use relatively cheaper than public transport in a number of countries. In the United Kingdom (UK), for example, the overall cost of motoring is estimated to have fallen by 5% since 1997, while buses are now 8% and trains 3% dearer (*The Observer*, 2004). Research also suggests that most drivers underestimate the overall costs involved in running a car and are not aware of the alternatives.
- Investment in infrastructure which has prioritised roads over other means of transport.
- The deteriorating quality of public transport in some EU Member States.
- Changes in the patterns of production and consumption, and in the delivery of public services such as health and education.

The European Commission maintains that, in order to bring about a more sustainable transport policy, changes in transport policy must go hand in hand with measures in other policy areas (Commission Expert Group on Transport and Environment, Working Group III, 2000).

The most serious impact arising from the escalation in car use is environmental, particularly emissions of greenhouse gases, and the effects on human health and well-being resulting from accidents, noxious air quality and noise.

Policy solutions

Proposals from the expert group

The Commission's Expert Group on Transport and Environment (Working Group II) outlined a number of recommended policy approaches to tackling the environmental and safety issues around car use, which are shown in the following table.

Table 1: Policy instruments and criteria for choice (rough estimations)

	Potential					Time scale for implementation		Obstacles		
	CO ₂	Air pollution	Noise	Safety	Natural and cultural assets	Short/medium	Long term	Costs	Institutional	Political acceptance
General instruments										
Internalisation of external costs	+	+	(+)	+	0	X			X	X
CO ₂ tax	++	(-)	(+)	(+)	0	X			X	X
Emissions trading	++	?	?	(-)	0	X			X	
Remove market imperfections	+	(-)	?	?	0	X			X	X
General information	+	+	+	+	+	X				
New technologies and fuels										
Voluntary agreements with industry	+	+	+	+	0	X				
Labelling	+	+	+	+	0	X				
Environmental classification of vehicles	+	++	++	?	0	X				
Differentiated vehicle taxes	++	++	++	?	0	X			X	
Limit values for emission of CO ₂	++	(-)	0	(-)	0		X	X	X	
Limit values for other emissions	0	++	0	0	0	X			X	
Differentiated charges aviation	++	++	++	0	0	X			X	
Differentiated charges shipping	++	++	0	0	0	X			X	
Public procurement	+	+	+	+	0	X		X	X	
Differentiated fuel taxes	++	++	0	0	0	X		X	X	
Reduced tax for alternative fuels	++	(-)	0	0	0		X	X	X	
Targets for public vehicle fleets	+	+	0	0	0		X			
Environmental classification of fuels	+	++	0	0	0		X		X	
Fuel standardisation	?	+	0	0	0	X				
Limit values for fuels	?	++	0	0	0	X				
Corridors for filling stations	+	(-)	0	0	0		X	X		
The use of the transport system										
Information/education for eco-driving	++	++	+	+	0	X				
Design of infrastructure	?	?	?	+	+		X			
Lower speed limits	+	+	+	+	+	X				X
Enforcement of speed limits	+	+	+	+	0	X				X
Speed limiters for light vehicles	+	+	+	+	0	X				X
Intelligent speed adaptation	+	+	+	?	0		X			
EMAS	+	+	+	0	0	X			X	
ITS	+	+	+	++	0		X	X		
Transport demand and modal choice										
Land use planning	+	+	+	?	+		X			
Supply of public transport	+	+	+	+	?	X		X		
Supply of walking/bicycle paths	+	+	+	?	+		X	X		
Environmental zones	+	++	+	(+)	(+)		X	X	X	X
Road pricing	+	+	+	(+)	0	X			X	X
Infrastructure investment funding	+	+	+	+	+		X			
Shift to railway	+	+	+	+	(+)		X	X		

EMAS: Environmental Management and Auditing Systems that encourage companies to review the impact of their transport activities.

ITS: Intelligent Transport Systems

Note: + indicates positive effect; 0 indicates negligible effect; - indicates negative effect; symbol in parenthesis indicates no significant effect.

Source: Commission Expert Group on Transport and Environment, Working Group II, 2000, p. 24

Financial measures

It is increasingly clear that current transport prices, particularly those relating to car use, do not reflect the full costs incurred. These external costs are most generally those relating to the environmental impact and accident costs of transport. The burden imposed as a result of accidents, pollution, noise and congestion has been estimated at 8% of EU GDP (European Environment Agency, 2003). It is estimated that internalising these costs would increase the average costs of transport by 15-30%. At the same time, this would be likely to reduce demand and affect choice of different transport modes. Furthermore, this would support efforts to reduce the impact on the environment and improve safety. However, it should only be viewed as a long-term objective because of the wide gap between the present structure of costs and prices in transport markets (Commission Expert Group on Transport and Environment, Working Group III, 2000).

According to the Commission Expert Group on Transport and Environment, Working Group II (2000), economic instruments will, if the market is favourable, be the most cost-effective means of influencing demand. Some of the most common measures available are listed here.

Fuel taxes

This is an important policy instrument that provides a direct incentive to improve energy efficiency and, in consequence, reduce emissions. Such taxes can, however, be politically sensitive as the impact on prices is clearly apparent and the distributional impact is often regressive, or unduly burdensome on certain groups.

Fixed charges

These are usually charges in the form of sales and annual vehicle taxes, which can be varied according to weight, engine size, energy use and efficiency, and type of emissions.

Parking charges

These can bring about a shift in mode of transport use and reduce environmental impacts and congestion, provided they do not encourage a change in land use which results in an increase in car usage.

Direct charges for road use

This is becoming an increasingly attractive option. It can take a number of forms, such as:

- Road tolls – already used in some Member States as a means of offsetting the infrastructure costs. Tolls can be differentiated according to time, vehicle occupancy, and the specific characteristics of each vehicle in order to more closely reflect the costs involved.
- Congestion charging – for example, the system introduced in central London in 2003. In operation between 7 am and 6.30 pm on weekdays, this charge has in the first year cut the number of vehicles in the zone by 16%, reduced congestion by 40%, improved traffic flow by 37%, cut journey times by 13 % (Deloitte Research, 2004) and reduced CO₂ emissions by 19% (Transport for London, 2004).
- Electronic road pricing – an increasingly attractive option, in line with technological developments in miniaturisation, satellite positioning systems and on-board electronics. Charge levels can vary according to distance driven, vehicle type, road type, time of day and degree of congestion in order to correspond to the marginal costs of each trip (Commission Expert Group on Transport and Environment, Working Group III, 2000). While technical constraints and introduction costs are currently proving a barrier to implementation, this system appears to be the best instrument for the internalisation of local external costs (Commission Expert Group on Transport and Environment, Working Group III, 2000).

Strategies to reduce traffic

In addition to financial measures, efforts to reduce vehicular traffic are likely to focus around three areas:

- Land use – strategies such as planning for mixed-use development, the use of brownfield rather than greenfield land, the concentration of development along transport corridors, and the development of user-friendly public transport systems and pedestrian and cycling facilities are all likely to result in a reduction in car use.
- Information technology – this may have some potential, as yet unproven, to substitute for physical movement.
- Behavioural change – considered the most challenging of all options. This would principally take the form of publicity campaigns to inform the public about the wider issues involved.

Environmental measures

Cleaner and more efficient vehicles

Environmental standards have been extremely effective in reducing air pollution from transport: the latest vehicles to roll off the production lines are a vast improvement on cars manufactured during the 1980s. The replacement of older vehicles by newer, more efficient ones has certainly resulted in a reduction in emissions but the increasing number of vehicles on the road has meant that the overall impact is limited. The Commission Expert Group on Transport and Environment (Working Group II) has put forward a number of proposals for the introduction of measures to encourage the development and use of more fuel-efficient vehicles:

- Further modifications to the existing agreement with EU-based car manufacturers to reduce CO₂ emissions of new cars by 25% from 1990 levels to 140 g/km by 2008.
- A labelling scheme to provide consumers with standardised information based on tests which reflect normal driving conditions better.
- Environmental classification of vehicles, including fuel consumption and emissions, which could be linked to financial incentives for more environmentally friendly vehicles.
- Mandatory limits for fuel consumption or emissions.

Other measures that could reduce emissions include:

- An increased percentage of diesel-powered vehicles which, because they consume less fuel, may reduce CO₂ emissions, although the carbon content of diesel is higher and diesel cars tend to be larger.
- Reduced vehicle weight, although there could be concerns about safety in relation to heavy goods vehicles.
- Reduced engine power would cut down on fuel consumption and emissions, but this could meet with resistance from consumers who would not favour a lower performance.
- Reduced air resistance, friction and rolling resistance, which could be achieved through vehicle design and developments in road surfaces.

Alternative fuels

Transport is a major consumer of oil and any sustainable transport system cannot rely on exhaustible fuel sources, which contribute significantly to greenhouse gas emissions and depend on imported resources. Although in the long term new technologies such as hybrid electric and fuel cell vehicles seem to offer the most potential for significant improvement,

there are a number of alternatives. In many cases these alternatives can be combined with existing fuels with beneficial results, including:

- Natural gas – this has a lower carbon content than conventional fuel.
- Biogas.
- Methanol.
- Ethanol.
- Vegetable oils.
- Hydrogen.

There are a number of measures that could be introduced in order to promote the use of alternative fuels, such as:

- Reduced fuel taxes for alternative fuels.
- Differentiated taxes on vehicle purchase and use.
- Targets for transfer to alternative fuels.
- Supporting corridors for the provision of filling stations for alternative fuels and introducing zones, such as city centres, where only vehicles using alternative fuels are permitted.
- Grants for research into alternative fuels.

Driver behaviour

It is a well known fact that driver behaviour can have a negative impact on the environment and is a major factor in the incidence of road accidents. Irresponsible driving behaviour on the roads can have the following consequences:

- Excessive and improper speed: the cause of about a third of fatal and serious accidents, and a major factor in determining the severity of injuries. A recent Dutch study, for example, indicated that if all drivers kept to existing maximum speed limits the number of fatalities would be cut by 21% (Commission Expert Group on Transport and Environment, Working Group II, 2000).
- The consumption of alcohol and drugs or fatigue: driving while under the influence of alcohol is responsible for about 10,000 deaths each year.
- Failure to wear a seat belt: this is a major aggravating factor in accidents. It is estimated that if the rate of seat-belt use was raised to the optimal international level, more than 7,000 lives would be saved each year (European Commission, 2003).

Driver behaviour can also affect the environmental impact of vehicles. Good behaviour in the following areas can have positive effects:

- Keeping to existing speed limits – this would decrease emissions by 10-15%.

- Driving economically by using the highest gear and avoiding hard acceleration and deceleration – this can save on fuel and reduce emissions.
- Proper maintenance and using the correct tyre pressure – both of these can cut down on fuel consumption.

A number of measures aimed at influencing driver behaviour are outlined here:

- Information – this can play a key role in helping drivers understand how to drive in a fuel-efficient and safer way. In-car instruments, similar to speedometers, which show fuel consumption and on-board warning devices could help, in addition to established campaigns such as those against drink-driving.
- Effective enforcement of speed limits, either through policing or monitoring by on-board or remote equipment.
- Reducing the level of driver control, for example:
 - through devices that monitor driver reaction and prevent individuals under the influence of alcohol, drugs or fatigue from driving;
 - incorporating collision avoidance or speed limiting systems that override driver actions;
 - developing automated highways that take over the control of vehicles.

Each of these measures would, of course, attract political opposition, because they would undermine the perceived freedom of individuals as drivers.

Conclusion

This article shows that there is a wide variety of possible measures that could be taken to reduce the damaging effects on the environment of car use and the number of deaths and injuries on the road. The economic and social role of the car in our society, however, makes their introduction politically sensitive. Balancing the conflicting demands for mobility, safety and sustainability will remain a significant challenge for policymakers in the future.

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