THE FUTURE ROLE OF THE MOTOR CAR

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THE FUTURE

The "future" in this paper will be taken as being just beyond the limits of conventional extrapolations - that is, about twenty years hence. In examining the future role of the motor car, it is worth making a few simple and widely acceptable statements about the future as most people currently foresee it. From these statements, it might be possible to develop a prediction about the future of the motor car.

Firstly, we can confidently predict that motor car engines and systems will become more efficient and effective. For example, recent studies have predicted continued engine efficiency improvements of 1 to 2% a year over the next 25 years (Bridle 1981 in the UK; Meyer and Gomez-Ibanez 1981 in the USA; Uken 1981 in South Africa).

Secondly, we can confidently predict that the role of microelectronics in traffic management and control will increase at a dramatic rate, particularly in urban areas. Many applications are already with us. For example, it has been reported (Anon 1982) that automatic systems on Dutch freeways respond within four seconds of an event and activate signals within 20 seconds. In Japan and in Germany the development of in-vehicle guidance systems is already well developed (Canisius 1982) and meeting their objectives of reducing accidents, travel time, operating costs and congestion. The author has presented a further look into the future in vehicle microelectronics in his paper to the recent IRF World Meeting (Lay 1981a).

Thirdly, as travel is an essential need for many people, we can confidently predict that people will continue to travel. The evidence is that they will wish to do so with as little constraint as possible. The current level of travel need is evident in the numerous studies which have indicated an aggregate consistency at about one hour per day in peoples' daily travel time, both spatially and temporally (e.g. Wigan and Morris, 1979). A recent study of US and UK cities (Zahavi 1982) has confirmed the general belief that, as work trip travellers gain access to higher speed travel, they tend to travel greater distances. This is not to say that they want more travel, rather they are trading-off work access against residential accessibility (Bowyer and Biggs, 1982). We will subsequently discuss an historical influence of this trade-off. For the future, the role of the information revolution in reducing the need for some work travel could well be a major change factor, particularly on high density routes.

More generally, predictions indicate that vehicle usage will increase, on the average, by about 2% a year over the next 25 years (Harding 1981) with only overall economic downturns affecting this trend (Pellegrini 1981). In something of a link between this point and the first point on vehicle efficiency improvements, a major US study has predicted a 50% increase in personal travel by the year 2000, but a decrease in the transport energy needed to achieve it (ITE 1982). Developed nations will therefore continue to invest in road infrastructure. The authors of a major US review (Meyer and Gomez-Ibanez 1981) have commented:

> 'Urban transport...is dominated by the private automobile...There seems little prospect that this will change much in the near future' (p.3).

An international survey has recently noted 'the strong propensity of consumers by buy personal transport' and that car ownership levels increase at a rate directly linked to the rate at which personal income increases (Lea and Andrews 1982).

In studying what the future for vehicle travel will be like, it is tempting to be overwhelmed by predictions based on extrapolations of mean trends in current attitudes and technology. However, it is useful to also look at extremes of current behaviour to see how the future might look. In this respect, an interesting sidelight to studies of car poolers in the US was that their average daily work journey distance was 100 km (Altshula 1981). Other work indicates that travel distances of 80 km are common for US workers in rural areas and that 10% of the workers at some rural factories travelled over 30 km (Maggied 1982).

Given the above congruences of events, it seems inevitable that our lifestyle will still be strongly car-oriented in the future, despite any developments which might take place in mass transit and in land-use patterns. A German scenario study of mobility in the year 2000 has predicted that 80% of travel in that year will be in individual vehicles of a car-like nature (Bandel and Plassman 1982). Mass transit will certainly continue to serve travel between major discrete trip generators and attractors and land-use planning will aim to control the location of these generators and attractors to minimise travel. But the economic and behavioural forces that exist in the market place will often exert pulls and pushes that subvert the intentions of transport and land-use planners.

THE USERS

For example, three recent US reviews have suggested that the suburbanisation of the US cities (the 'urban sprawl') was not caused by the car - as is popularly supposed but was merely aided and abbetted by it. In looking where we have been and seeking guidelines for the future, I will place considerable emphasis on the US experience as that country invented the mass-produced car at a time when its cities and countryside were in a period of dynamic change - as later examples will show. It has been said (Anon 1981):

> 'Los Angeles epitomises the carefree mobility of the modern automobile suburb that has proven so seductive in our recent history: it was the Los Angelenos who perfected the peculiarly American way of thinking of space in terms of time, time in terms of route, and of the car as the natural extension of self.' (p.78).

In the first of these reviews, Meyer and Gomez-Ibanez (1981) note that the automobile industry often lagged in its response to urban decentralisation and comment that cities around the world had been decentralising for over a century. The trend continues and acts as a major restriction on developing mass transport, with its heavy reliance on high population densities.

One of the curious features of mass transport which makes its discussion in perspective very difficult is that it attracts a degree of public support which often belies both its usage and its overall relevance.

O'Sullivan (1980) has commented:

> 'Railways exert an attraction which defies logic...they are never without proponents'.

He then went on to suggest something Freudian in the attachment most people showed for trains. Orski (1980) has similarly noted that:

> 'Rail advocates tend to ascribe to rail transit miraculous powers to solve all urban ills, from congestion and air pollution to energy crisis and sprawl'.

Meyer and Gomez-Ibanez (1981) offer a non-Freudian solution when they suggest that:

> 'Many automobile commuters were in favour of public transport improvement as a means of getting other people off the road'.

The second of the reviews - The Anglo-American Suburb - (Anon 1981) stated:

> 'Like the rest of Los Angeles, Beverley Hills developed not in the wake of the automobile but the rail road...it was the extensive coverage of the old (rail) systems that gave the city its modern form and the people their customs of commuting (p.78).
>
> The evolution of the suburb as a widespread phenomenon could not have happened without the railway (p.10)'.

The third of the reviews noted above was into US urban planning between 1900 and 1940 (Foster 1981) which comments (p.177):

> 'Contemporary critics of the automobile culture have been guilty of presentism in condemning early planners and traffic engineers for the decline of urban mass transportation, for failing to build rapid transit systems, and for 'irresponsible' horizontal growth. I believe the early-twentieth-century planners deserve more praise, or at least understanding, than condemnation. Some critics perceive planners' support of suburbanization and automobility as either naivete or as evidence of a conspiracy of realtors, automobile producers, and government officials to fleece the general public. In fact, the majority of planners enthusiastically endorsed both automobility and the suburban movement out of conviction, not greed.
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> In any case, conditions in 1900 were such that rapid horizontal development certainly would have occurred with or without the blessing of city planners. Almost unimaginable core-city crowding had sharpened the demand for livable urban space. Such technological advances as structural steel, the elevator, the suspension bridge, electric traction, and the automobile provided urban decision-makers the tools to alter profoundly the turn-of-the-century cityscape. The challenge to use intelligently so many new inventions was extraordinary and unprecedented, and there were few guidelines to help planners co-ordinate these changes and direct them toward optimum social benefit.'

The point of this quotation is twofold. Firstly, it is intended to illustrate the forces which acted to shape US cities, those pinnacles of

our automobile society, and, secondly, to indicate by example the inevitability associated with such forces.

FORCES AT WORK

As the previous paragraph showed, we must remember that, just as technological and social forces so powerfully shaped the US cities that Foster examines, so another set of forces is at work today producing the cities of tomorrow. Those forces will successfully work and operate quite independently of our perceptions and misconceptions of how the future might be. We will be usefully employed in pondering about transport future only if our intentions are to harness and redirect the change-forcers and change-resisters at work in today's society.

Thus, this paper commenced with a listing of the most obvious of these: improvements in vehicle technology: the intrusion of microelectronics: the need for personal mobility. Casting the net more broadly we could include robotics and other changes in manufacturing technology and the development of information networks. Much of our work pattern and thus of our journey-to-work pattern will undergo radical change as a result of these factors. More than ever the directions of that change, and the new activities that arise to fill the vacuums created, appear either diverse or totally unpredictable.

In this context, any development that we do undertake should surely carry the hallmarks of flexibility and adaptability - both to enable us to adjust to new situations and because one of the distinguishable common characteristics of the change-forcers is their own flexibility and adaptability. It is interesting to note that microelectronics, robotics, information technology and human beings are distinguished by the range and variety of things they can accomplish, rather than by their skills in one unique area. It seems to me that personal rather than shared travel modes are very consistent with this view of the future and that we should therefore enhance this aspect of travel.

Of course, it is also important to remember that transport is a derived demand and will be shaped by larger forces in the community, forces to which we must, by and large, respond. Our opportunity to exercise control is relatively slight. This view applies in both the aggregate sense - for example, the influence of the national economy on overall demand and in the dis-aggregate sense. For an example of the latter, recent studies in France have suggested that an individual's travel behaviour was largely dependent on factors other than transport. According to Bourgin and Godard (1981) the household head appropriating the family car or changes in school or work location usually had a greater effect on travel than did transport service changes. This is admittedly an extreme view as the study in question tended to over-simplify the issue by ignoring, for instance, the influence of transport factors on car availability and appropriation. In this context, recent work by Wigan at ARRB has highlighted the role of lifecycle stage as a travel determinant (Wigan 1982).

ONE SCENARIO

One general scenario that I sketched in Lay (1981a) that is consistent with the above philosophy, with our existing heavy transport infrastructure investments and with the desirable role of mass transit, is that technological and social change will move us towards dual mode

vehicles. These could be operated as small private cars for individual travel and then electronically linked in convey formation whilst travelling on mass haul routes. I have explored similar concepts for freight vehicles in two recent papers (Lay 1981a and 1982) and evidence the Australian 'road train' (Widdup 1981) as an example of this concept already at work.

In the interim, the continued development of the car will see more specialisation and fitness for purpose come into its design. This lack of operational flexibility will be compensated for by a more ready availability of hire vehicles for specialist travel. It is interesting to note that, whereas this will probably mean rural recreational use in Australia (Lay 1982), a European review of the future of the car has seen urban usage being met by hired vehicles (ECMT 1982). Initially this trend will act to put a break on multiple vehicle ownership, but its travel-enhancing effects will then become more widespread.

One other event that will flow from the incursion of microelectronics into road transport is that proper pricing systems will be able to be readily introduced into road transport operations. The distortions resulting from the existing inadequate usage pricing and the benefits possible from a good pricing system have been consistently advocated (e.g. Meyer and Gomez-Ibanez 1981, Lay 1981a, Beesely 1981). Suffice to say that the effects would be both immediate and beneficial.

This discussion has been largely cast around the situation in the developed countries of the world. What of the remainder of the world? I see much of the developing world leap-frogging the stages that we have seen in the 'West', just as the car, the bus and the motorcycle have already been widely accepted wherever they have been affordable. As one instance of this scenario, the widespread urban congestion in third world cities would be an obvious problem to tackle with modern road pricing and microelectronic controls. These controls also hold promise for reducing some of the high accident rates experienced in these countries.

Congestion control measures and a greater use of car hiring may well serve to lessen the trend in third world countries to head towards the needlessly high car ownership levels prevalent in developing countries in recent years. Once a car is available, its relative advantages are so great (Lay 1981b) that its use is inevitable. Many third world countries still have the opportunity to avoid car excesses and step straight into the new travel future. Singapore is well known for its introduction of cordon pricing in that city-state. It is surprisingly less well-known for its successful attempt to hold down car ownership levels through taxes and regulation (Ferguson 1982). Interestingly, Singapore has recently announced plans for a large investment in conventional mass transit. What route should other nations be taking?

CONCLUSION

In both underdeveloped and developed nations, we have yet to tap many of the potential technological benefits available to transport. This paper has suggested that our future transport investment should be in that new technology. Furthermore, it has been implied that any long term view of our transport future must be an optimistic one as we come out of a period in which we have largely adapted old tools to new tasks. Perhaps we are entering an era in which new tools will be used for both old and new tasks.

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