Car sharing could halve vehicle use

Transport is the most important source of air pollution in Australian cities. Motor vehicles contribute to noise and a high proportion of air contamination, including smog.

In an effort to reduce vehicle use, a Melbourne company has enlisted CSIRO's help to estimate the viability of an 'instant' car-pooling system. Dynamic Transport Management (DTM) develops computer applications for scheduling and deploying large vehicle fleets. With assistance from the Energy Research and Development Corporation, it is applying this technology to a project called 'Easy Share'.

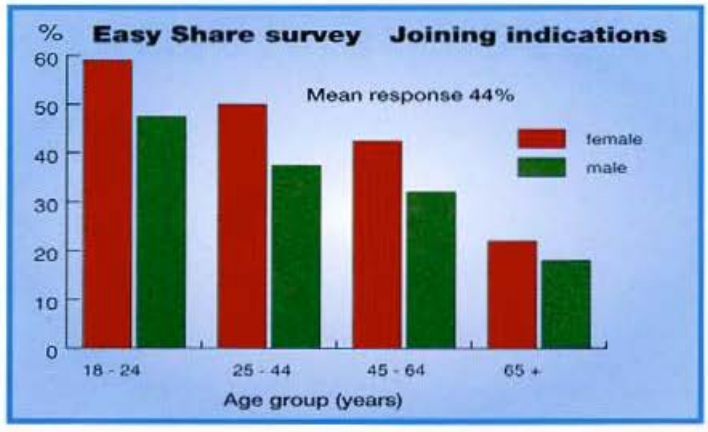
In most car-pools, long-term partnerships are set up between two or three people to share vehicles for regular trips. By contrast, Easy Share aims to cater for irregular trips, where notice could be given shortly before a lift is required or offered. This would involve a club (similar to a babysitting club) where members receive credits for giving lifts and lose credits for accepting them.

To use Easy Share, members would call the central despatcher by phone and register their request or offer using a PIN number. Trip origin, destination, time-frame and an indication of the return journey would be required. The database would then be searched for a match and the caller told the phone number of the matching person. A call would be made to confirm trip details, and the trip would ensue.

For such a system to work, a high proportion of lift requests must be met. To determine how club-membership numbers would affect the probability of satisfying lift requests, DTM turned to CSIRO's Division of Mathematics and Statistics.

John van der Touw and Mohan Krishnamoorthy used a computer model to simulate an instant car-pooling system in Melbourne's south-eastern suburbs. They considered the club would be viable if members wanting to use it could be successful 80% of the time. Success was defined as a request for a lift being matched with an offer, or vice versa.

It was concluded that the number of trips made up by a member offering or requesting lifts would have to be about 2.5% of the total trips typically made by passenger vehicles. For example, for a city the size of Melbourne, with a population of more than three million people, 80 000 trips may need to be matched daily. To achieve this, the best estimate of the viable base membership for the city was 150 000, provided members used Easy Share for at least half of their trips.



How many of us would join a large-scale car pool? Forty-four per cent of respondents to this survey were willing to give it a go: in theory, more than enough to make a viable system.

A survey of people's willingness to join such a scheme was done by Professor Thomas Triggs of Monash University's Psychology Department and Alan Drummond of Drummond Research. Of the 315 survey respondents, 44% said they would take part (see graph). They saw the benefits as: reduced travel and road costs, reduced accidents, congestion, pollution and stress, and a 'more sociable' society.

Easy Share is the brainchild of DTM research manager, Ros Trayford. 'An average passenger vehicle in Australia carries 1.1 persons,' Trayford says. 'If we could get that nearer to three, we could halve the number of vehicles on the roads.'

More research is needed before the scheme is operational. In the meantime, the company is seeking capital investors. So far the only offers have come from overseas.

Bryony Bennett

Unlocking the secrets of flowering

Scientists at CSIRO's Division of Plant Industry are moving closer to deciphering the environmental cues that prompt plants to flower. The cues include day length and low temperature or 'vernalisation'.

Dr Joanne Burn and chief project scientist, Dr Liz Dennis, say that while flowering plants on call are not 'just over the horizon', some giant strides have been made in understanding the triggers to flowering. Their model system is the fast-growing plant *Arabidopsis thaliana*.

Two research directions look promising. One is the application of a demethylating agent, 5-azacytidine, to plant DNA. This chemical removes the methyl groups that normally block early flowering. Burn says methyl groups appear to control gene expression. The chemical treatment works only in plants responsive to vernalisation and has the same effect as a cold spell. A similar response has been shown in winter wheat.

Dr Jean Finnegan has isolated the gene coding for the enzyme that puts the methyl groups on the DNA. She is investigating whether the gene is cold sensitive. If the gene becomes less efficient at low temperatures, it could trigger the vernalisation effect. But which genes are the methyl groups blocking?

Approaching the puzzle from another angle involves deciphering the biochemistry and function of the plant hormone gibberellic acid in relation to flowering. Gibberellic acid is applied to promote flowering in horticulture.

Pierre Bilodeau and Dr Mark Olive are following the trail of one of the enzymes in the biosynthesis of gibberellins, kaurenoic acid hydroxylase (KAH), which can be induced by low temperatures. This enzyme is only induced in the apex of the plant where the cold is sensed and where flowering starts.

One way to visualise these events along the flowering pathway is to imagine the blocking of a garden hose. The plant needs gibberellins to signal it to flower, but the key enzyme synthesising gibberellins is blocked, as if a hose is pinched. Pinching the hose are the methyl groups which are blocking the gene which activates the KAH enzyme.

If the methyl groups are chemically removed by 5-azacytidine, or by cold, it unblocks the gene which makes the enzyme which synthesises the gibberellins which tell the plant to flower.

To enable flowering to be manipulated, Burn and her colleagues want to isolate the gene coding for KAH and genetically engineer its freedom from DNA methylation.

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