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MAKING CAR POOLING WORK – MYTHS AND WHERE TO START

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***Abstract*—Car pooling is recognized as an alternative to reduce congestion and pollution on the roads. In fact, leading cities give preference on road occupancy and public parking to car poolers, and recognize organizations whose employees do car pooling. However, organizations seeking to promote car pooling are unsure about what efforts will realize the intended benefits. Often, car pooling is confused with ad-hoc sharing of rides, with the effect that incentives of participants are not aligned with some treating it as a shuttle service and others as an unnecessary drag on their time and resources, scuttling the sustainability of car pooling in that organization. In this paper, we define car pooling; bring out its characteristics and incentives for the participants. Then, we clarify popular myths and suggest areas where organizations can start so that the efforts are more likely to succeed.**

I. INTRODUCTION

Car[1] sharing [3] is desirable because it reduces the number of vehicles on the road and the corresponding pollution that is emitted. Leading cities even give preference on road occupancy and public parking to cars with multiple riders. A related concept to it is car pooling which is prevalent among office goers [1]. Often, car pooling is misunderstood and not distinguished from commercial shuttle companies or ad-hoc hitching for rides [2].

It is well known that car owners will save money if they do car pooling. Many[2] have been car pooling for years without any formal incentive. However, the percentage of car owners who do car pooling is still miniscule [1].

Socially responsible organizations are trying to encourage their employees to do car pooling. However, they are unsure about what efforts will realize the intended benefits. Often, car pooling is confused with ad-hoc sharing of rides, and they spend their efforts on identifying people who are willing to give rides, and those willing to take rides. Further, organizations may give monetary or non-monetary incentives, like preferred parking at work place, to car poolers which may be quickly taken without car pooling actually taking off.

What they miss is an understanding of the incentives at play. For example, given a choice, everyone will want to be riders, and not drivers, in a carpool. Further, people want to reach their destination predictably within specified time frame and travel with known people. When incentives are not aligned, some participants treat car pool as a shuttle service without paying the fare, while others consider it as an unnecessary drag on their time and resources, scuttling the sustainability of car pooling in that organization.

In this paper, we define car pooling and distinguish it from car sharing or a commercial shuttle service. Then we bring out its characteristics and incentives for the participants. Then, we clarify popular myths and suggest areas where organizations can focus so that their efforts on car pooling are more likely to succeed. We end with related work and conclusion.

II. CAR SHARING, POOLING AND SHUTTLES – IS THERE A DIFFERENCE? YES

Since there is no clear definition in literature, we first define the concepts and then explain them.

a) Car sharing: it is defined as a way of commuting where 2 or more persons ride in a car.

[1] We use car as a synonym for vehicles which have a carrying capacity of more than 1 person.
[2] This includes the author who has car pooled for 8 years.

b) Car shuttle: it is defined as a way of commuting where there is a designated driver[3] for the car, and 1 or more persons are allowed to ride it for monetary consideration.

c) Car pooling: we define this as a group of car-owning people travelling together from one region to another region regularly, with a rotating duty of taking their own vehicles.

The relationship among the three concepts is shown in Figure 1. Car sharing denotes any type of car ridership where two or more people are sharing a car. The definition is quite general and spans commercial settings like taxis and shuttles, to public transportation like buses, all the way to social settings like a parent dropping their child to school or a chauffeur driving the employer to work. Many cities give preference on road occupancy and public parking to cars with multiple riders.

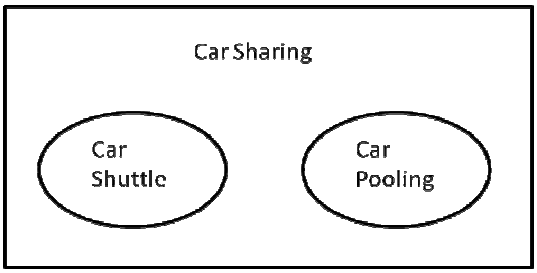

Figure 1: Venn diagram of Car Sharing, Shuttle and Pooling Relationship

Car shuttles and car pooling are specific sub types of car sharing. In a car shuttle, there is a designated driver who always drives. Further, other people riding in the car have to make a monetary contribution to the driver for the privilege of riding. Commercial taxis and shuttles are examples of this, as are company-paid free pickup and drop services by employers.

In a car pool, the participants travel together regularly and rotate the vehicle being used. Usually, the person owning the vehicle will also drive but they may also use a chauffeur to outsource their driving responsibility. There is no monetary transaction between the participants in a car pool.

[3] We consider the car driver to be either the car owner, or a person representing the car owner.

Given that people come together for different reasons to share a car, we next look at the incentives at play next. This will help us clarify the myths regarding car pooling and suggest what will promote it.

III. INCENTIVES IN CAR POOLING

Suppose a person wants to go to his office (destination) from his home (source). Assuming commuting is needed, his choices depend on whether he already has a car at his disposal or he is in a position to pay for the commute.

If the person has a car, the fastest way for him to reach his destination, regardless of distance, is to simply drive if there is no congestion on the road [7]. The cost of driving includes the cost of having the vehicle and the cost of operating it along the commute route, along with the exertion the driving will cause. If the person takes anyone else with him who does not start from his source or does not go to his destination, the person must necessarily spend more time commuting than he would have had, if he had just travelled alone.

Now consider the case if the person did not have a car. He would be dependent on other alternatives that the transportation eco-system around him provides. He has to pay for the alternatives either himself or by someone (like employer) on his behalf. The payment itself can be in terms of monetary or non-monetary mode. His options could be public transportation (like bus or metro) or a para transit option (like taxi, autorickshaw, rickshaw, and shuttle). One could also request a friend to hitchhike a ride but then, the person is using his social capital (goodwill) to convince someone else to oblige, and must return the favor in future.

We now consider the incentives for drivers and riders in car shuttle and car pooling as defined earlier.

A. Incentives in Car Shuttle

In the shuttle case, a driver is always taking the extra overhead of time and cost than he would have, if he had travelled alone. For this, they are monetarily compensated. The driver is not

socially obligated to the group he is driving for future commutes.

As for riders, they are not incurring the exertion of driving and the higher cost if they themselves could take their car for the commute. For this privilege, they are paying explicitly and there is no other obligation after the ride.

As long as the driver is compensated by the riders, there is clear understanding of roles, expectation and alignment of incentives.

B. *Incentives in Car Pooling*

In the car pooling case, the driver is taking the extra overhead of time, and marginally of cost, than he would have, if he had travelled alone. But he knows that that his driving role is rotational, i.e., if there are N people in the car pool, his turn will come after (N-1) days. Further, if the group is compatible to his interests, he would in fact enjoy the company and this would compensate for the extra time spent on the commute.

As for riders, they are not incurring the exertion of driving and the higher cost if they themselves could take their car for the commute. But they return the favor by being the drivers on their turn.

As long as the members of the car pool share the driving role, there is clear understanding of roles, expectation and alignment of incentives.

C. *Mixed Model*

A mixed model of car sharing is possible if one tries to create a group of people travelling together where some are car pooling (i.e., rotational responsibility) while others are treating it as a shuttle. But this disrupts the expectation of the group for future rides. Car shuttlers pick and choose the car while drivers may value the stability of the group more than the monetary compensation paid. Hence, mixed models are not sustainable.

IV. MYTHS IN CAR POOLING

We now list some common myths in efforts by organizations to make car pooling work and argue why they will not work.

A. *Myth #1: Finding drivers and riders will increase car pooling*

Organizations try to create programs which will identify people who are willing to give rides, and those who are willing to take rides. They end up finding more riders than drivers, and even if they could match them, there is no guarantee that the car sharing arrangement actually takes off. What is missing is the alignment of incentives between drivers and riders.

B. *Myth #2: Giving money to drivers will promote car pooling*

People who are driving in a car pool are not seeking money, but (a) the surety that someone else will drive on another day, and (b) the company of the group. Giving them money will not make any impact.

C. *Myth #3: Car pooling can be the low-cost alternative for car shuttle*

If an organization is obligated to provide shuttle service to its employees (e.g., call centers), it may think of car pooling as a way to reduce costs. However, shuttle riders expect timely service with no future obligation, and they can get this by making the monetary payment. To turn them to car poolers needs alignment of interests, not money. Further, if riders do not own vehicles, they cannot be car poolers.

V. WHERE TO START

We now propose steps by which organizations can promote car pooling and give reasons for the same.

A. *Action #1: Identify compatible groups with similar commuting needs*

Since closeness of the group is very important in a car pool, effort should be made to find compatible groups of people. Further, apart from demographics, what helps in an organization environment is the compatibility of schedule. Job

roles are a good indicator of working schedule but more, organization specific, factors should be considered as well.

Once compatible people are found, their commuting needs have to be collected so that individuals can decide on their car pools. Information on where people live, when they commute and how regularly they commute will determine commuting compatibility. If the commuting distance is long and the commute is regular, there is increased incentive for the group to stick together because the overhead of taking their own car becomes higher.

B. *Action #2: Register to recognize car pools*

Once car pools are formed, the group needs to be sustained. Organizations should formally recognize car pool groups, register them and track how long they last. This will help them track the effectiveness of their efforts, and determine what intervention they need to make.

C. *Action #3: Respect a car pool's schedule*

A common challenge for the group participants is to stick to their schedule, especially when it is the return ride (from office). Organizations should recognize the car pool's need to stick to its schedule and support it. This is where monetary intervention can help.

For example, if a participant will be delayed due to business reasons, organizations should support their ride back (if the person was not driving), or his group's ride back (if the person was driving). Nothing breaks a car pool more than a person, with responsibility of driving the car, who delays the whole group stranded for ride back for hours.

D. *Action #4: Give incentives to car poolers at source, destination and en-route*

Car poolers can do with any incentive provided that will make their commute smooth. Some cities provide preference in road occupancy for car sharing, which car poolers use. Organizations can help by providing preferred parking at office and rewarding car pools based on their size and how long they have lasted.

VI. RELATED WORK

A classification of ride sharing is available in TDM encyclopedia [4]. It distinguishes the nature of rides but does not discuss the incentives for road sharing. Hence, it is not sufficient to understand how car pooling efforts can be promoted. There are many portals which provide information about ride sharing – e.g., [6] for US, [8][9] for India. However, they do not distinguish between car shuttle and car pooling.

Megapool [5] is an initiative for car pooling where one must have a car to join. Their software matches people and their routes. It is unique in that it is not promoted by an employer but a third-party entity. Although the tool can find similar commuting patterns, it is not clear if the company will have sufficient data to bring compatible people together, which typically an employer can have.

There are many papers which have looked at the effectiveness of a commuting mode based on distance, time and costs. [7] presents a good summary of the state-of-the-art and points out that the fastest door-to-door commute option for a person is provided by a personal vehicle (e.g., cars), regardless of distance, if there is no congestion on the road.

CONCLUSION

In this paper, we looked at the problem of how an organization can promote car pooling. We defined car pooling and distinguished it from car sharing or a commercial shuttle service. Then we clarified out its characteristics and incentives for the participants. We used it to clarify popular myths around car pooling and suggested areas where organizations can focus so that their efforts on car pooling are more likely to succeed.

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REFERENCES

[1] Sabrina Tavernise and Robert Geneloff. Once Popular, Car Pools Go the Way of Hitchhiking. http://www.nytimes.com/2011/01/29/us/29carpool.html?_r=1&ref=carpools . Last accessed 12 January 2012.

[2] Wikipedia entry for Car pool: http://en.wikipedia.org/wiki/Carpool

[3] Wikipedia entry for Ride sharing: http://en.wikipedia.org/wiki/Real-time_ridesharing. Last accessed 10 January 2012.

[4] Transportation Demand Management Encyclopedia entry on Ride Sharing: http://www.vtpi.org/tdm/tdm34.htm. Last accessed 10 January 2012.

[5] Megacarpool. http://www.megacarpool.com/howwork.php. Last accessed 10 January 2012.

[6] Portal: http://www.commuterpage.com/carpool.htm. Last accessed 10 January 2012.

[7] Mythologies, Metros & Future Urban Transport", Dinesh Mohan, TRIPP, Jan 2008

[8] Ride sharing portal: http://Rideinsync.com. Last accessed 10 January 2012.

[9] Employee route scheduling portal: http://Moveinsync.com. Last accessed 10 January 2012.