(Ⅳ−12) Can Carsharing be the Next Alternative Mobility for Transportation in Asia?

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1. Introduction

The introduction of new alternative mobility of urban transportation - Carsharing to Japan using electric vehicle together with communication technology has called heavily attention whether it can be realistic in terms of economic viability or just a technological demonstration. This paper assesses the pros and cons of "CityCar project" at MinatoMirai (MM) 21, Yakohama and SecondCar project" at Tama Newtown, Inagi City. The estimation of operation and management costs as well as marketing aspects are also involved.

2. Pros and Cons of Carsharing application

MM 21 is a business district (3.5 million population) with a concentration of company offices and also a tourist site. The overall area has parking capacity of approximately 10,000 vehicles. 70 percent of parking spaces devote to visitor use. Therefore, there is always a parking space shortage. Tama Newtown is an undulating residential area surrounded by supermarkets and public facilities with less convenience of buses and taxi. To access to those facilities, a passenger car is needed. Each household generally has one parking space. Table 1 shows carsharing projects in MM 21 and Tama Newtown. Even both cases are physically distinctive, they have identical problem of parking spaces.

Table 1 Carsharing projects in MM 21 and Tama Newtown (as of Jan'02)

Locations	Project/organization	Features	Targeted users
MM 21(1999~)	CityCar:EV+ITS car rental (MIT/NIDA/JEVA/JSK)	rent in business area roundtrip system 50 Evs+13 Sta.+250 monitors	office workers, tourists and visitors
Tama Newtown (1999~)	SecondCar: EV+ITS carsharing (MIT/NIDA/JEVA/JSK)	share in residential area roundtrip system 30 Evs+5 Sta.+30~40 monitors	Housewives, commuters elderly

A ratio of one vehicle shared use by 10 to 20 different users several time a day is an advantage of Carsharing (CS) system. Since carsharing provides short-term rental service, user will pay only time usage and membership fee. No ownership hassles and other variable cost are concerned. CS system stimulates efficient use of vehicle and helps reduce number of vehicle on road as well as parking space.

3. Operation and management costs

A roughly estimation of 1 EV is equal to operation cost (fixed cost: parking fee, control center, insurance and tax) + management cost (variable cost: staff wages, communication cost, etc.) per month = ¥113,675, where fixed cost is ¥24,429 and variable cost is ¥89,246 (noted that variable cost is dependable). Assumed that if 1 EV is shared use by 10 users/month, the cost of usage will be ¥113,675/10 = ¥11,367/users.

Now, a ratio of CityCar sharing at MM 21 is 1 : 9, if we can increase number of users from 250 to 500 with a ratio of 1 : 20, the cost will be reduced to ¥5,683, which benefits to both CS operator and users. However, since the real capital (cost of infrastructure and EV itself) is high, it is hardly to estimate the net return or income within the given time period. Income can be estimated as fixed cost + variable cost divided by revenue that gets from membership fee, timely and mileage used charge. For these two cases, there is no estimation of economic possibility as they are still in the demonstration process.

4. Marketing Aspects of the Experiment

According to Table 1, after SecondCar system collected fee from users (previous users before collecting money were 250 but after fee is collected, the users remain at 30), some targeted users like housewives have withdrawn but gained new targeted users and remain some old users such as elderly. CityCar system will start collecting fee from

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February 2002, the targeted users will probably be the same.

5. Product recognition and acceptance

Table 2 below shows the result of 106 samples survey conducted in MM 21 site, which the CS users are mostly male, 37.74% is salesman professions. The highest correlation coefficient value is 0.443 represents the relations between access time of 3 to 5 minutes to the EV station is the critical factor to consider EV sharing usage.

Table 2 Relationship between determinant factor and EV usage

Item	Category	No. of sample	Average usage	Parametes	Range of usage	Correlation coefficient
Gender	Male	100	14.24	0.4033	7.125	0.126
	Female	6	2.67	-6.7221		
Occupation	Manager	23	12.39	-3.7675		
	Office worke	35	11.74	-1.0551		
	Salesman	40	14.75	2.7072	6.475	0.177
	Shop assistan	8	19.25	1.9117		
Availability to use	Availability	61	13.44	3.1362	7.387	0.22
company owned car	Unavailability	45	13.78	-4.2513		
No. of going	1 - 2	26	7.23	-7.2952		
out	3 - 5	39	19.21	5.1145	12.41	0.344
	6 -	41	12.27	-0.2388		
Access time	~3	32	17.16	7.1782		
to station	3~5	26	17.77	4.9033		
(min.)	5~10	43	9.23	-7.1749	16.912	0.443
	10~	5	6.4	-9.7336		
Access time	5~	4	9.5	-10.8354		
to railway	5~10	39	12.54	0.2927	11.342	0.164
station (min)	10~	63	14.49	0.5068		

Table 3 A comparative EV usage with other modes

Description	Travel by electric vehicle		Travel by other modes	
	Heavy user	Light user	Heavy user	Light user
Sample size	15	77	14	77
Travel time: average (min)	39.07	79.62	72.79	129.99
Travel distance: average (km)	15.61	29.37	30.46	57.05
No. of destination: average(place)	2.4	3.08	1.86	3.02
No. of person: average (person)	1.4	3	1	2.53
Percentage of carry baggages	0.33	0.5	0.07	0.29
Percentage of availbility to use vehicle for this trip	0.2	0.31	0.21	0.7
Percentage of availbility to use company owned car daily	0.47	0.99	0.5	1.01
Percentage of unavailability to use company owned car daily	0.27	0.68	0.29	0.4

The MM 21' s demonstration provides identifying targeted user: heavy and light users as shown in Table 3. Most of heavy users used to drive EV shared use vehicle at average travel time of 39.07 minutes with average distance of 15.61. However, in comparison with other modes, the average of EV usage is still small. This result contributes to the understanding of user behavior on how they perceived or recognized EV sharing. If user has to go out on business in short distance when either reason their company owned vehicle is available or unavailable, they will consider to use EV to travel errands. To drive errands with EV is relatively accepted by CS users.

6. Conclusion and recommendation

The demonstration of carsharing system in Japan including MM 21 and Tama Newtown contributes to a realistic trial reliability of technological experiment and also challenges to identify intermodal connections, appropriate market, and customer packages (fee) to fit local circumstances. However, the costs of 1 EV plus its battery are still high. To gain benefit, the cost of 1 EV should be equal to revenue that earns from EV users. Therefore, thinking in terms of economic reality, internal combustion engine vehicle is more appropriate and applicable as Flexcar, Zipcar, and Car Co-op in Singapore are used currently. Nevertheless, EV produces less emission and saves energy, which contributes to friendly environment. Thus, carsharing can be the next alternative mobility for urban transportation. Only type of CS vehicles should be varied and EV battery should be modified for a lower cost. Also, the more emphasis on marketing is necessary in order to gain more users and get market share. Therefore, the future task of this study will be focusing empirical marketing research on degree of freedom: consumer satisfaction, car availability and car distribution.

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