

An Analysis on Influence of Regional and Individual Conditions to Intended Needs and Actual Demands of Bus Service

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Synopsis

Recently, the vicious circle of decline of bus service and decrease of bus passengers has become remarkable, as the automobile-based life style has popularized with progress of motorization. On the other hand, the mobility of aged people has become important and serious problems because of progress aging society. Therefore, many local governments tried to introduce bus services depended on public subsidy into the inconvenient areas on public transport service¹⁾. However, as the bus passengers must be limited, there are not few cases that were not sustainable due to increase of subsidy.

In this study, the influence of regional and individual conditions to intended needs and actual demands of bus service was analyzed through the experimental case study^{2), 3)}. As a result, some interesting findings came out as follows; 1) the number of actual bus passengers may be estimated as a half of the number of persons intended needs for bus, because many residents did not consider the cost subsidized by tax, but 2) some intended needs with obligated purpose and/or without any alternative modes must be actual demands, and also the service level as the distance to bus stop must influence to actual use.

KEYWORDS: Bus service, Social experiment, Needs and actual demands, Questionnaire survey

1. Introduction

In order to secure the mobility of vulnerable people, some of bus services have been supported by the cooperation of bus company, local government and academic staff. In such cases, it is general that an experimental bus service may be introduced based on the intended needs of bus use which will be obtained by a questionnaire survey. And also, it is true the number of actual demands may be a half of the number of intended needs. Therefore, it is not easy to continue the experimental bus service. That is, it must be important to correctly evaluate the actual demands based on the estimation by analyzing the intended needs from the questionnaire survey.

Then in this study, the relation between the intended needs and the actual demands was analyzed through the before-after analysis, as a case study of the experimental bus service in Kawachi-nagano City located at the south-east area of Osaka Prefecture, Japan. And also, the estimation method of the actual demands of bus use was referred based on the results of the questionnaire survey.

2. Case study

The case study area was the mountain area located at the suburb of the city. This area has 900 population including 26% aged people, and was divided into three zones as shown in Figure-1.

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As the longest distance between residences and bus stops of the existing bus route was 1.1km, this area was defined as the inconvenience on public transport service. Therefore, the local government intended to introduce the experimental bus service with no fare to improve the inconvenience of this area. Then the questionnaire survey was executed to estimate the needs before introducing this bus service. As the average number of the intended needs for bus use was 40%-80% according to the location of zone, the circular service to connect the existing bus route was introduced during the limited period. The concern of local government must be put on the actual demands in order to evaluate this bus service. That is, it should be important to reveal how many persons of intended needs became the actual passengers of this bus service.

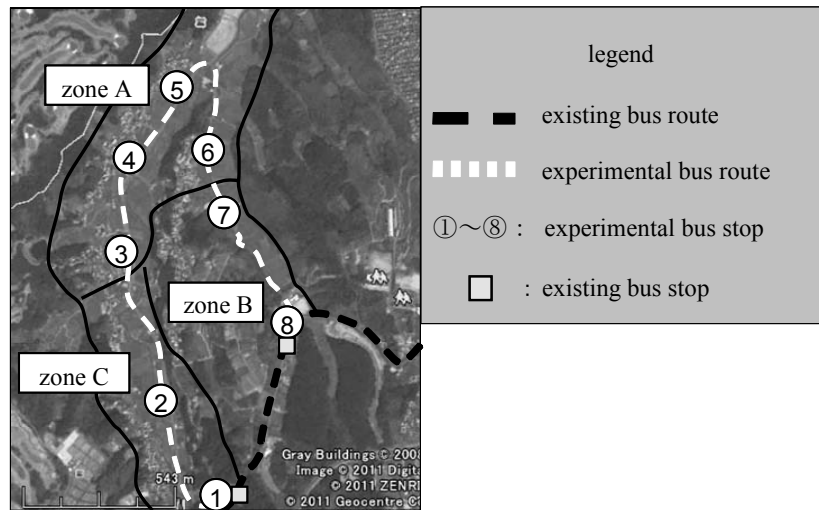


Figure-1 Case study area and bus route

Questionnaire surveys were planned twice before and after introducing the experimental bus service as shown in Table-1. Questionnaires were distributed to residents over the age of primary child, 38 and 64% of respondents were obtained. At the before survey, the ratio of respondents was lower because of the lack of reality for this bus service.

Table-1 Outline of questionnaire survey

	before survey	after survey
implementation	December, 2009	June-July, 2010
distribution/collection	posting	
target	residents of primary school children and older	
distributed	880	1000
repondents	289	640
collected ratio	32.8%	64.0%

3. Analysis of relation between intended needs and actual demands

Here, in order to understand the results of analyses after this section, we define the difference between the intended needs and the actual demands, as follows.

- 1) The intended needs mean the number of respondents who show intention of use after introducing the bus service.
- 2) The actual demands show the actual users as passengers of bus service.

It is clear that the actual demands were 60-80% of the intended needs and both number are

depended on the location of zone as shown in Figure-2. Then, in order to estimate the bus passengers (actual demands) based on the intended needs before introducing the bus service, these differences must be investigated by using some factors which influence to bus use.

Table-2 shows the shortened distance from residence to bus stop of the experimental bus service. From Figure-2 and Table-2, it should be clear that both ratio of actual demands and intended needs were higher in zone-A where is far from the existing bus stop.

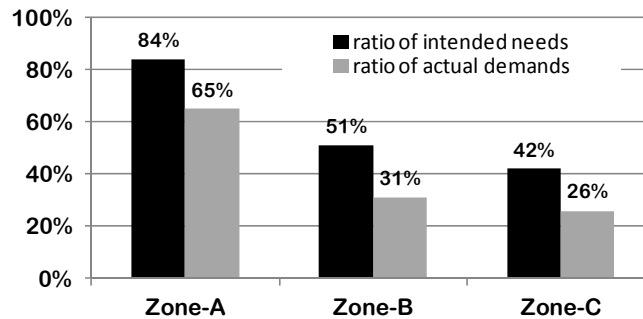


Figure-2 Intended needs and actual demands by each zone

Then, we analyzed the relation between the shortened distances as the improvement level of convenience and the ratio of realization of intended needs, as shown in Figure-3. As a result, some major findings came out of this analysis as follows.

- 1) The larger the shortened distance become, the higher the ratio of intended needs and actual users become.
- 2) The ratio of actual users (demands) realized from intended needs must be high in case of 300m or over of shortened distance.

Table-2 Shortened distance by using experimental bus use

Zone	Location of residence for bus stop	distance to existing bus stop(m)	distance to experimental bus stop(m)	shortened distance(m)	average (m)
A	most far	1050	170	880	600
	nearest	520	200	320	
B	most far	720	160	560	280
	nearest	120	120	0	
C	most far	530	290	240	200
	nearest	380	220	160	

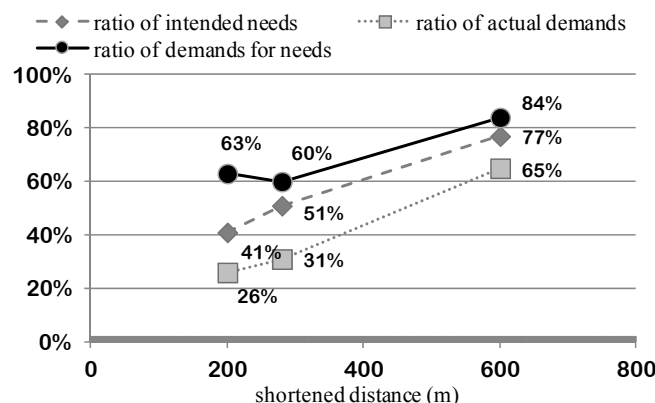


Figure-3 Change of needs and demands according to shortened distance by using bus service

Next, the relation between the intended needs and actual demands was directly analyzed as shown in Figure-4. It is easy to distinguish the difference of results between zone-A and others. That is, the result of zone-A shows the linear relation of them. On the other hand, the relation of them in zone-B and C is not correlative and rather constant in spite of the ratio of intended needs. Here we have to note the peculiar point of zone-C which is the value of respondents for school children who need bus services for going to school.

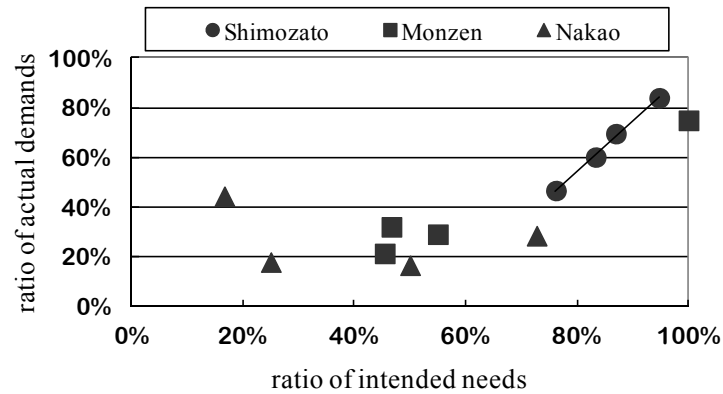


Figure-4 Relation between intended needs and actual demands

Then the relation between the shortened distance and the ratio of intended needs and actual demands were analyzed, as shown in Figure-5, 6. From these figures, three major findings came out as follows.

- 1) The needs of school children for bus service are remarkably high, because they have to go to school.
- 2) The results of elderly people show the high necessity of bus service, because many of them have to go to hospital.
- 3) Most respondents except school children and elderly people show the intention according to the shortened distance.

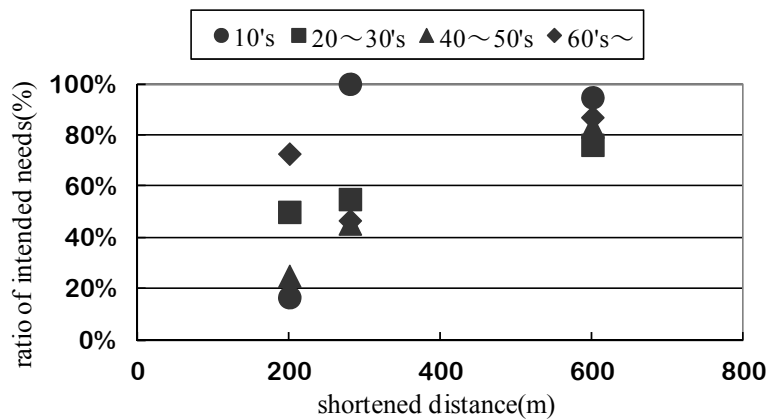


Figure-5 Intended needs according to shortened distance by age rank

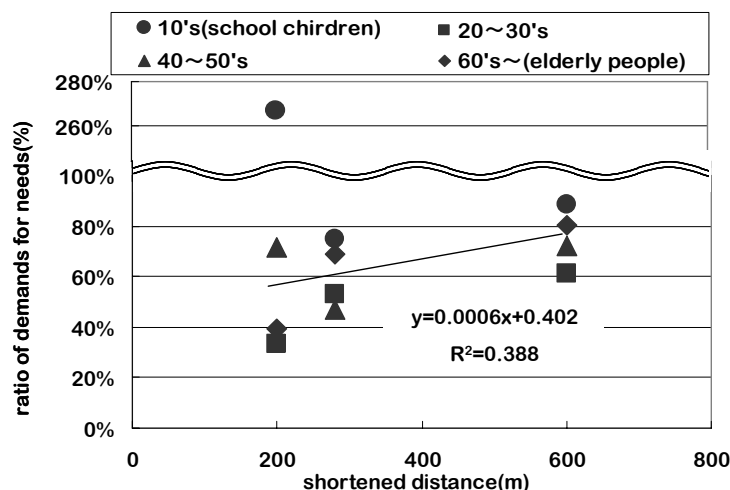


Figure-6 Ratio of demands for needs according to shortened distance by age rank

4. Actual demands for necessity of school children and elderly people

Generally, the public service with no charge may be acceptable for many people. However, these needs must be depended on the intention to only keep the service, as shown in some results mentioned above. On the other hand, it was revealed that there were some cases with the high necessity for bus service according to the specified purposes by age rank.

Table-3 shows the cases of relatively high ratio of needs and demands. Here, we can confirm the necessity for bus in case of going to school. However as for medical use, both needs and demands are not always high. This trend may be depended on the possibility of alternative modes and the lower convenience than expected convenience. On the other hand, the ratio of actual demands for shopping was higher than the ratio of intended needs. This trend means some people may evaluate the importance of convenience for shopping use.

Table-3 Comparison of needs and demands for school children and elderly people

	purpose	1) shortend distance (m)	2) ratio of intended need (%)	3) ratio of actual demands (%)	3)-2)
10's as school chirdren	school	600	72.2	80.6	8.4
		280	100.0	100.0	0.0
		200	0.0	75.0	75.0
60's and more as elderly people	hospital	600	42.9	25.0	-17.9
		280	40.0	23.5	-16.5
		200	50.0	45.5	-4.5
	shopping	600	36.7	43.0	6.3
		280	40.0	41.2	1.2
		200	25.0	36.4	11.4

5. Summary and next step

Some major findings concerned with the relation between intended needs and actual demands of bus use came out of this study as follows.

- 1) It is clear that the actual demands were 60-80% of the intended needs and both number are depended on the location of zone. That is, both ratio of actual users and intended needs were higher in the zone where is far from the existing bus stop.

- 2) The larger the shortened distance become, the higher the ratio of intended needs and actual users become. Especially, the ratio of actual users (demands) realized from intended needs must be high in case of 300m or over of shortened distance.
- 3) It is easy to distinguish the difference of the relation between the intended needs and actual demands among zones. That is, the result of zone which was located far from the existing bus stop shows the linear relation of them. On the other hand, the relation of them in other zones which were near the bus stop is rather constant in spite of the ratio of intended needs.
- 4) The needs of school children for bus service are remarkably high, because they have to go to school. And elderly people show the high necessity of bus service to go to hospital.
- 5) Although the public bus service with no charge may be generally acceptable for many people, these needs must be depended on the intention to only keep the service.
- 6) It was revealed that there were some cases with the high necessity for bus service according to the specified purposes by age rank. However, this trend may be depended on the possibility of using alternative modes and the level of convenience in comparison with the expected convenience

These findings may be useful not only to introduce an experimental bus service but also to consult with residents who need bus service. That is, these data will be able to help residents to understand that the actual demands will not always expected even if the intended needs are observed in the questionnaire survey before introducing bus service. On the other hand, local government will be able to make plans for bus services to improve the inconvenient areas on public transport.

6. Acknowledgement

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7. References

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