

Environmental evaluation of traffic side space for urban development by collaborating management between government, transportation operators and residents

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ABSTRACT

Nowadays, the number of railways has been increasing in this Japan modern society. It is thought that Japanese city would be able to make it more activate. Also, it has strong effect on the surrounding areas. However, the roadside has not been effectively used, and has been left as the shadow side of the city. This research suggests that the space of rail traffic can be used as the regional resource. In addition, in order to clarify a role of roadside space as a place for urban development by residents. Thus, the research aims to show the relationship between the roadside space use and related evaluation in this survey. There are two different types of researches. First, Performing the classification of traffic roadside space in Japan with MDS method, and selecting the investigation. Second, using a questionnaire survey for the government and railway operators, environmental assessment and attractiveness survey are investigated. In conclusion, we got two facts. First, four classifications were turned out in the relation railway and the city. Second, the governments and transportation operator's problems with human resources and funding. Assigning the work, roadside spaces would be actively utilized. I regard the idea of cooperation by the government and businesses as a solution. Therefore, future issue is clarifying the effects and techniques.

1. INTRODUCTION

Major factors in urban design are the renovation projects and local service contributions of transport operators. The activities of transport operators can be categorized into two types. The first type is large-scale enterprises that work from a macro perspective, as represented by the redevelopment of spaces in front of train stations. The second type is small- and mid-sized enterprises that work from a micro perspective closely tied to local residents. Although in recent years more attention has been focused on the issue of the use of space along transportation routes, illegal bicycle parking and unlawful dumping of garbage are still visible realities. In light of the shrinking society, we can expect a reduced demand for large-scale services that require enormous financial investments, and the reduced strength of operating entities. Therefore, by treating the space along transportation lines as a local resource, we can also expect an increase in activities in which transport systems are managed in close cooperation with residents.

The aim of this study is to report the current state of the use of space along transportation lines, and to understand "the relationship between the use of space along transportation lines and evaluation of that space." By considering spaces along railway lines as places of cooperative neighborhood development carried out by various actors including transport operators, government administrations, and residents, the spaces along transportation lines may come to be viewed as local resources.

2. RESEARCH METHODOLOGY AND CONTENT

In this study, to identify the current state and characteristics of Japan's rail transportation system, in addition to evaluations of spaces along railway lines, two types of surveys were conducted in sequence:

1. An MDS typological survey of rail transportation in Japan focusing on the relationship between transportation and towns,
2. A paper questionnaire targeting government administrations and transport operators who own transportation systems located close to residents as revealed in the typological survey.

2.1.1 Typological Survey of Rail Transport: A Focus on the Relationship between Transportation and Towns in Japan

To avoid bias based on particular operators, the operators of 21 of the 505 railway lines in Japan and 14 streetcar lines were selected as survey respondents.

As an indicator to show the relationship of each selected railway line to communities, the “average distance between stations,” “average amount of space for walking,” “average running speed of trains,” and “average distance of the sidewalk” were measured using the Geospatial Information Authority of Japan's (GSI) electronic map and arranged two-dimensionally using MDS. In addition, on-site field surveys and studies were conducted for each type, showing typological trends in transportation and spaces next to railway lines.

2.1.2 Four Types of Transportation and Characteristics Thereof

As seen in Figure 1, the MDS arrangement produced four types of transportation. Looking at the axes, we see that axis I is heavily concentrated around the “average distance between stations,” and axis II is related to the “average distance from the railway line to the sidewalk.” The characteristics of each type of transportation are listed below.

- a) Much of the space along railway lines is used.
- b) Urban design is occurring between residents and government administrations.
- c) The operators are mass transport operators.
- d) Transportation is aimed at landscape trips by rail, which is helping to invigorate areas.

Based on each tendency, the four types were named: a) street transportation, b) city transportation, c) commuter transportation, and d) sightseeing transportation. Judging from on-site field surveys, it seems likely that studies on the use of areas along railway lines where the “distance between stations” is short, such as in a) street transportation and b) city transportation, and environmental assessments of this use, will promote the practical use of areas along railway lines in the future.

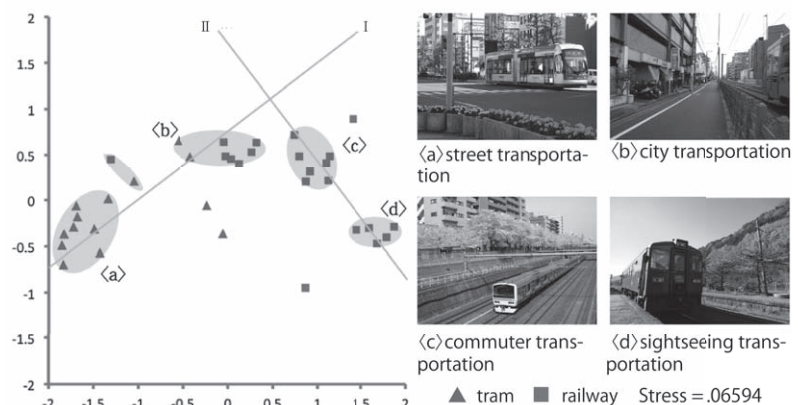


Figure 1: Types of transportation arranged by MDS

2.2.1 Paper Questionnaire for Governments and Transport Operators

A paper questionnaire regarding the current use of space along railway lines and evaluation of this use was conducted with government administrations and transport operators who own transport systems with a short “distance between stations” used daily by residents, as revealed in the MDS typological survey.

Overview of the Questionnaire

Question format: Paper questionnaire directed at government and transport operators

Survey target: In total, 141 / “government” (91) and “transport operators” (50)

Survey format: Paper questionnaires sent and received by mail

Response method: A six-point scale evaluation and multiple choice questions

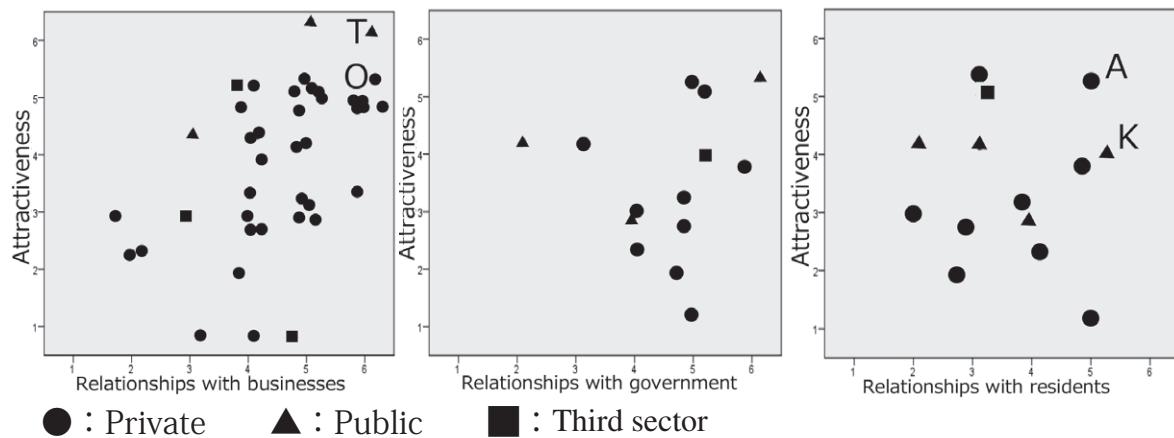
2.2.2 Relationship between the Evaluation and Practical Use of Space

Multiple regression analysis was conducted separately for government administrations and transport operators to consider the influence of the use of “space along transportation lines” on self-evaluation of the spaces. Government administrations and transport operators completed the evaluations, which were measured on a six-point scale, on the attractiveness of space along transportation lines. These represented self-evaluations for the criterion variable. For the variable, a six-point scale evaluation of the degree to which Place making, Planting, and Event had been created in the area was used.

For government administrations, the standard partial regression coefficient (β) is significant for the degree of attractiveness of spaces along transportation lines due to greenery. On the other hand, there is no significant difference in the degree of attractiveness as a result of the creation of relaxation spaces, and the findings were the same for transport operators. Both government administrations and transport operators view the use of greenery as important in evaluating the degree of attractiveness. On the other hand, the existence of relaxation spaces had little bearing on evaluations, showing that “spaces along transportation lines” were not considered places where people can enjoy spending time. Thus, although it takes time for the results of the creation of relaxation spaces to appear, it will be necessary henceforth to proactively promote the creation of these relaxation spaces, while continuing to press forward with greening activities.

2.2.3 Relationship Between Actors and Effect on Self-Evaluation

A correlation analysis was conducted to evaluate the attractiveness of “spaces along transport lines” and the degree of relationships developed between evaluators and other groups. For government administrations, there was a strong correlation between the attractiveness rating and relationships developed with transport operators (Figure 2). However, for transport operators, there was no correlation with the relationships developed with government administrations (Figure 3). On the other hand, for transport operators there was a strong correlation between the evaluation and relationships with residents (Figure 4). While relationships between governments and transport operators are currently unidirectional, the promotion of mutual relationship-building in the future is desirable. Furthermore, sample cases of areas where the attractiveness rating increased (T=Toyama-shi, O=Ota-ku, A=Tōkyū Dentetsu, K=Tokyo Metropolitan Bureau of Transportation) as a result of the positive relationship-building seen in Figures 2 and 4 will be taken as models and targeted for future surveys to explicate methods for the use of space along lines.



Left: Figure 2: Correlation between the relationship of governments/transportation operators and attractiveness evaluation by governments

Middle: Figure 3: Correlation between the relationship of transport operators/government and attractiveness evaluation by transportation operators

Right: Figure 4: Correlation between the relationship of transport operators/residents and attractiveness evaluation by transport operators

3. RESULTS AND DISCUSSION

According to the involvement of railway traffic and the city, four types were revealed.

“Planting” has a great impact on attractive valuation of roadside than the other elements.

Cooperation of principal organizations affected the attractive valuation of roadside space. In particular, the strong correlation was shown between the railway operators and resident cooperation, compared with the government.

Both the governments and transportation have faced problems of human resources and funding. Therefore, roadside would be effectively planed by cooperation on these matters.

4. CONCLUSIONS

The problems in the utilization of roadside of the current situation have been raised, such as capital deficiency and staff shortage. As the solution, we proposed that government and operators should cooperatively assist residents with the management of public space.

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