Change in Citizen’s Consciousness about Planning of Light Rail Transit in Utsunomiya

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Abstract: Utsunomiya City is a front runner among candidates for introduction of a new LRT system aiming to create an attractive and sustainable city. In recent years, residents' preferences are increasingly reflected in the city planning process in Japan. Therefore, it is crucial to provide residents with appropriate information about LRT. This study is intended to examine the change of residents’ consciousness in the face of better understanding about the future image of LRT. According to the field survey in Utsunomiya, it is clear that the improvement of residents’ comprehension promotes attitude formation about pros and cons related to the planning of LRT. Therefore, it is very important to encourage better communications among various parties involved in the planning process to achieve a successful LRT project.

Key Words: Consensus building, Change in consciousness, Light rail transit

1. INTRODUCTION

1.1 Background and Objective
Light Rail Transit (LRT) is a rail transit designed for the next generation public transport system. It has major characteristics such as barrier-free access, punctuality, high speed, and comfortable ride. LRT usually adopts low-floor vehicles and improved rail system and stations. It attracts a lot of attention worldwide recently as a public transport alternative to automobile that can satisfy the requirements of people and the environment. A large number of cities in Japan are considering the possibility of introducing LRT systems. However, many cities face problems because of difficulties in consensus building among interested parties and hurdles to create mechanism about how to share the cost. Meanwhile in Toyama city, the outdated Toyama-ko rail line was renovated to LRT in 2006. Toyama LRT called Portram has been a great success and attracts attentions from all over Japan, but yet no other new LRT (not even replacing old streetcar line) has been built in Japan.

The Ministry of Land, Infrastructure, Transport and Tourism (MLIT) issued “Guidance for the
planning of LRT introduction integrated with urban development”1) officially in October 2005 and offered technical advice on planning of LRT and consensus building by introducing advanced case studies from Europe and the United States and examination of cases in Japan. However, no city has been successful in realizing new LRT after Toyama city. Therefore, it is important that potential cities should accumulate experiences and continue their efforts toward the introduction of LRT.

Facing the issues described above, we have conducted a field survey about the change of residents’ attitude on LRT plan in Utsunomiya city, where citizens have been discussing about the introduction of LRT for more than ten years. Utsunomiya is widely viewed as the front runner to realize a pilot model of LRT introduction. The purpose of this study is to examine the effectiveness of information tools to understand the process of consensus building in the discussion of LRT planning. This paper consists of three steps. First: historical review (Chapter 2), second: citizen surveys (Chapter 3), and third: change in public awareness by providing information (Chapter 4 and 5).

1.2 Review of Related Studies

Many studies about problems of LRT introduction in Japan have been published. Sorting out problems, institutional hurdles, and the current status of cities in LRT introduction were reported in the feature articles of International Association of Traffic and Safety Sciences (IATSS) Review (2009)2). Among others, Aoyama (2009)3) pointed out the difficulty of consensus building and suggested the necessity for new approaches to consensus building that differ from conventional ones in road construction.

Various studies about building up consensus toward LRT introduction have been conducted. The following papers are reviewed in their respective subject categories. First of all, regarding LRT introduction in Toyama, many papers4) have discussed it as a successful example. They assessed it as a case of considerable importance in LRT perspective in Japan. An example of a paper about new LRT planning (completely new; not a replacement) in Sakai city5) discussed the field survey used only for consensus building. Then, with regard to the LRT planning in Utsunomiya—our study subject—Koike (2009)6) described the discussion related to LRT planning and pointed out top-down decision process by the administration and poor information disclosure as the main causes of the plan stagnation. In addition, Kato et al. (2009)7) conducted hearings with relevant people and analyzed their structure of consciousness. Although much has been accomplished about the consciousness analysis of people with regard to consensus building, few studies have examined the collection of residents’ opinions directly. As one of the few examples of collecting opinions of people, Saito et al. (2009)8) showed residents images of future urban areas with LRT using three-dimensional computer graphics (3DCG), and asked them how they felt about the imaginary landscape. Saito et al. were interested only in the evaluation of the future landscape. Therefore, we do not know much about the effect of information provided by their 3DCG on the changes in residents’ consciousness towards LRT.

The three steps were carried out as follows. First, the historical review, we clarified the situation of citizen participation and the plan review stage to LRT. Second, citizen surveys, we showed residents an imaginary animated video, and conducting questionnaire surveys before and after they viewed the video. Third, analyzing the survey, we understand the change of consciousness by providing information. It was considered that the analysis of data for statistical significance.

It is hoped, according to this report, that we can provide residents with basic information to support their consensus building process. The knowledge base in this field is still limited in Japan, and this research is hoped to add a useful contribution in offering information about
changes in residents’ consciousness with regard to LRT, referring to both supporters and opponents separately.

2. HISTORICAL REVIEW OF LRT PLANNING IN UTSUNOMIYA CITY

2.1 Outline of LRT Plan in Utsunomiya City

Figure 1 shows the provisional route of the LRT plan. It crosses JR Utsunomiya Station and extends westward about 3 km in the direction of downtown and eastward about 12 km in the direction of an industrial park where many factories and commercial sites are located. It connects the JR Utsunomiya Station and Tobu Utsunomiya Station, key junctions of regional transportation network in Utsunomiya city, urban district with high population density, universities, and high schools.

2.2 Framework of LRT Plan in Utsunomiya City

To assist the description of historical review of LRT plans in Utsunomiya city, we divided it into three phases, as shown in Figure 2, and will call the theme of activities in each phase as a framework.

The objective in the framework of the phase 1 (1993–2002) was limited to the alleviation of traffic congestion in eastern areas of the city. It is shifted to the framework of phase 2 (2003–2006) which aimed at the redevelopment of vibrant downtown with new innovative transportation system in Utsunomiya. In this phase, public meetings with local residents on the renewal of city with new transit system was held four times during 2003–2004 inviting many citizens, reflecting on alleged poor information disclosure to them. In phase 3 (2007–present), a framework came from the upper level municipal plan aiming at the promotion of a sustainable city. “Fifth comprehensive urban plan of Utsunomiya city” was adopted to develop a compact city with transportation network that is both sustainable and attractive. Then, in March, 2009, “The second master plan of overall urban design of Utsunomiya city” was formulated and the LRT was positioned in it as the major public transportation system in the east–west direction. At the end of 2007, in parallel with the establishment of “Committee on the formulation of strategic framework of the transportation system in Utsunomiya city and surrounding communities”, two subcommittees—the “Committee on new transportation system” and the “Committee on bus system”—were established. These two subcommittees discussed whether LRT or bus plays the role of major public transportation system.
We were able to know the background of the LRT plans by historical review. And we were able to assume, that citizens are aware of the LRT plan.

3. CITIZENS’ AWARENESS OF LRT PLAN

3.1 Outline of Field Survey
Table 1 shows an outline of our field survey, done on the first day of the Utsunomiya Gyoza (Jiaozi) Festival held on 7–8 November, 2009 in the central downtown area. Before and after showing 3DCG animation video of LRT to people at the booth located in the central zone of the festival venue, we conducted a survey by asking them to answer questionnaires. Questionnaire items asked before showing the animation video included questions about citizen’s consciousness such as; awareness, degree of interest, and pros and cons of LRT. Additionally, we investigated their images on “Urban development of Utsunomiya based on LRT”. A) through C) are evaluations of images related to transportation, D) and E) are those related to urban development, and F) and G) are those related to business activities. After they watched the animation video, we questioned them again about items described above, and tried to assess how their comprehension about LRT has deepened.

3.2 Preparation of Image Animation
The animation video consists of six scenarios showing various life style and city landscape with LRT. The scenario was made to assist residents to visualize LRT. The animation video begins with an image of Mr. A, who lives in the suburbs and commutes by LRT, and ends with an image of the downtown area at nighttime. Table 2 shows examples of two images based on the scenario. To develop the animation video, UC-win/Road software for three-dimensional virtual realities (3DVR) was used.

Figure 2 Phases of Decision-Making of LRT Planning in Utsunomiya City
Table 1 Outline of Our Survey

<table>
<thead>
<tr>
<th>Date of Survey</th>
<th>November 7, 2009</th>
</tr>
</thead>
<tbody>
<tr>
<td>Those surveyed</td>
<td>Those who visited the Utsunomiya Gyoza Festival</td>
</tr>
<tr>
<td>Place of observation</td>
<td>Banba Plaza in downtown Utsunomiya</td>
</tr>
<tr>
<td>Number of people answering questionnaires</td>
<td>312 in total, including 134 urban residents</td>
</tr>
</tbody>
</table>

Questionnaires
- Civil consciousness incorporated into LRT planning, awareness, degree of interest, and supporters and detractors
- Image of and opinions on “LRT-centered urban development of Utsunomiya” (evaluation by seven phases)
  - A) Convenient and comfortable transfer
  - B) Barrier-free vehicles for impaired users of roads (elderly and disabled)
  - C) Environmentally friendly vehicles
  - D) It will revitalize the town.
  - E) It will raise brand awareness of Utsunomiya.
  - F) We must review it reflecting social conditions.
  - G) Urban development by implementation of a bus network, not by introduction of LRT
- Main source of information (choice)
- Personal property (choice)
- Impressions after watching image animation (evaluation by five phases)
  - a) Deepening of image of commuting
  - b) Deepening of image of transfer
  - c) Interest in development of areas along the railway line combined with commercial facilities
  - d) Enhancement of image of urban development (daytime)
  - e) Enhancement of image of urban development (nighttime)
  - f) Enhancement of Image of “LRT-centered urban development of Utsunomiya” as the result of actions described above

Table 2 Two scenes of Image Animation

<table>
<thead>
<tr>
<th>A commuting scenario</th>
<th>A downtown scenario (nighttime)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Commuter A</td>
<td>Town scenery at night</td>
</tr>
<tr>
<td>Punctuality makes him feel at ease.</td>
<td>Spaces where people can enjoy jazz, cocktails, open bars and cafes</td>
</tr>
<tr>
<td>He is leaving home, heading for LRT stop.</td>
<td>Banba Plaza is now a full transit space. People can relax with jazz and cocktails.</td>
</tr>
</tbody>
</table>
4. SURVEY OF CITIZENS’ CONSCIOUSNESS BEFORE WATCHING ANIMATION

4.1 Awareness and Pros and Cons

The number of residents who watched the video and answered the interview was 134, which is a good sample size for this type of survey for a day. However, in order to test the statistical significance, we conducted t-test and indicated 5% and 10% significance levels in the following analyses. Out of 134 local residents who were interviewed, 76% knew about the LRT plan. A breakdown of perceived pros and cons opinion is presented in Figure 3. “In favor” (highly favorable + somewhat favorable) was 19 points greater than “opposed” (strongly opposed + somewhat opposed), as the figure shows.

4.2 Correlation between Awareness and Pros and Cons

The relation between awareness vs. pros and cons is presented in Figure 4. The percentage of “neutral” in the “I know” group is 16%, whereas that in the “I know a little” group is 36%, which is 20 percent higher. By the test of the population rate, we found a significant difference of 5%, which suggests that deepening awareness or understanding of LRT plan contributes helping residents to take a clearer stand and to promote their decision-making.

4.3 Image Evaluation for Pros and Cons

Figure 5 demonstrates the relation between pros and cons of local residents and their image evaluation. From A) through G) in the figure respectively correspond to items tagged A)–G) in Table 1. Here, “highly favorable” is allocated point 7, “neutral” point 4 and “strongly opposed” point 1. The values of the ordinate are averages of these points obtained by each pros and cons groups. Large differences in image evaluation are seen for items A) convenience and comfort, D) community revitalization and E) branding. They contribute greatly to divide between pros and cons.
4.4 Correlation between Source of Information and Pros and Cons

Figure 6 presents the correlation between perceived pros and cons of local residents and their information source. Here we divided information sources into two categories: the local newspaper readers and others. Using an $f$-test with the hypothesis of an existing difference between two distributions, we found a significant difference of 10%. Although a $t$-test of the averages of points by the procedure described above showed no difference between two distributions, this suggests no difference in averages but a definite difference in distributions. The sum of samples including those who were “somewhat favorable, neutral and somewhat opposed” (zone in green frame in the figure) demonstrates the point described above. The sum of readers of local newspapers (upper graph) is smaller than that of others by as much as 26 points. This suggests that readers of local papers have definite opinions of “highly favorable” or “strongly opposed.”

5. ANALYSIS OF CHANGE IN CITIZENS’ CONSCIOUSNESS AFTER WATCHING ANIMATION VIDEO

5.1 Deepened Image of LRT Introduction

Figure 7 presents the relation between perceived pros and cons of local residents and their deepening of image evaluation. Labels a–f on horizontal axis in that figure respectively corresponds to items tagged as a–f in Table 1. The more supportive for LRT, the better evaluation they provide, irrespective of the questionnaire items. Furthermore, “no progress” evaluation of deepening of image was done only by those who were “strongly opposed” to the LRT introduction.
5.2 Analysis of Change in Image Evaluation

Figure 8 shows the change of image evaluations by presenting a comparison of responses made before and after watching the animation video. Here, “highly favorable” is allocated point 7, “neutral” point 4 and “strongly opposed” point 1. The values of the ordinate are averages of these points obtained by evaluations done before and after watching animation video. Only the point of item A) convenience and comfort shows noticeable progress with a significant difference of 5% that was assessed using a $t$-test. The changes in four evaluations for B) barrier-free vehicles, C) environmental friendliness, D) community revitalization and E) branding show no significant difference by $t$-test, indicating little progress in these items from viewing the animation video. One reason for these results might be the tone of the animation video, which was produced with the potential LRT commuter in mind which is distant from the attitude of general public who are accustomed to commuting by car. Although the animation included scenarios of full transit mall and LRT introduction combined with commercial facilities, residents might not feel them as measures to revitalize the town.
5.3 Analysis of Change in Voting Behavior
Table 3 presents the change, showing that some 30% of the respondents changed their votes after watching animation video, and 21 votes of “neutral” before watching animation reduced to as few as 10 votes after watching it. These observations suggest that most residents had no clear opinion about the LRT plan and that further provision of information related to the LRT might change their opinions drastically.

5.4 Relation between Improvement of Pros and Cons and Change in Image Evaluation
In Figure 9, the solid line shows respondents with improved opinions about pros and cons; the broken line shows data for others. Values of the ordinate represent the difference between average evaluations after watching the animation video and those before watching it. Evaluations in item A) convenience and comfort and item D) community revitalization might have caused improvement of perceived pros and cons opinions. However, the $t$-test used to assess these changes revealed no significant difference. The sample size used in our survey is statistically insufficient.

6. CONCLUSION
Main conclusions are summarized below. The change of residents’ consciousness attributable to watching an animation of the LRT can be condensed to the following five points.

- 80% of local residents know the LRT plan of Utsunomiya city, and 50% of them are in favor of the plan.
- Improved awareness of LRT might promote attitude formation among residents who are “neutral” now.
- Those who read local newspapers as a source of information are inclined to have definite opinions of “highly favorable” or “strongly opposed” to the LRT plan.
- Positive and negative votes of residents are strongly dependent on the convenience and
comfort of their commuting by LRT and ripple effects of the LRT to revitalize the city.
• Our image animation video, which was just three minutes long, caused changes in the voting pattern of residents. Some residents do not seem to have a definite opinion of the LRT plan.

Much remains to be learned about methods of providing LRT information and ways to increase awareness that changes residents’ opinions. No established procedure to build consciousness is available at this moment. Therefore trial-and-error approach and careful evaluation of the trial process might be the acceptable action guideline. We must work further to find new procedures of field survey and to collect more data related to consensus building.

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REFERENCES


