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ANALYSIS OF COMMUTER RESPONSES TO EXTENSIVE CHANGES IN THE SUPPLY OF PUBLIC TRANSPORT – A CASE STUDY OF DOL PRI LJUBLJANI/SLOVENIA

ABSTRACT

Public passenger transport in the Republic of Slovenia has been characterized by a steep decline in supply and demand for the past 15 years. Some local communities have made an attempt to increase the use of public passenger transport in the past few years by reducing fares or by introducing free public transport. In the municipality of Dol pri Ljubljani, the reduction of fares was also connected with a significant improvement in the supply of public transport. The effects of these municipal steps were analysed by means of counting and interviewing the passengers.

1. INTRODUCTION

Public passenger transport in the Republic of Slovenia has been characterized by the fact that both supply and demand have been more or less steeply declining for the past 15 years. A vicious circle was created: the reduction in supply resulted in a reduction in demand, which in turn caused a reduction in supply. Of 643,278 persons who use motorized transport for traveling to work, a private car is used by 88%, while only 12% or 76,881 persons, respectively, use public transport (10.5% go to work by bus and 1.5% by train). One of the reasons for such unfavourable conditions is the unattractive nature of the public passenger transport system (Plevnik, Lep 2004). Three systemic characteristics have been recognized as key deficiencies in Slovenia:

- public passenger transport in the Republic of Slovenia is not integrated with respect to fares, organization and physical links. There are no unified tickets and no central management or coordinated financing;

- the demarcation of competences between the municipal and state authorities has not been adjusted to the goals of both authorities;
- public financing of the public passenger transport system is unbalanced and irrational.

2. THE SITUATION BEFORE MEASURES WERE TAKEN

The municipality of Dol pri Ljubljani lies to the east of Ljubljana, in the Sava river valley. According to a population census in 2002, 4,341 inhabitants lives in this municipality. Owing to the process of suburbanization, recent decades have been marked by a constant increase in the municipality's inhabitants; between 1991 and 2002 the number of inhabitants increased by 16%. The center of the municipality lies 12km from the capital of Slovenia, and individual villages are from 9 to 19 kms distance from one

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KEY WORDS

- *public passenger transport,*
- *counting and interviewing,*
- *reduction of fare*

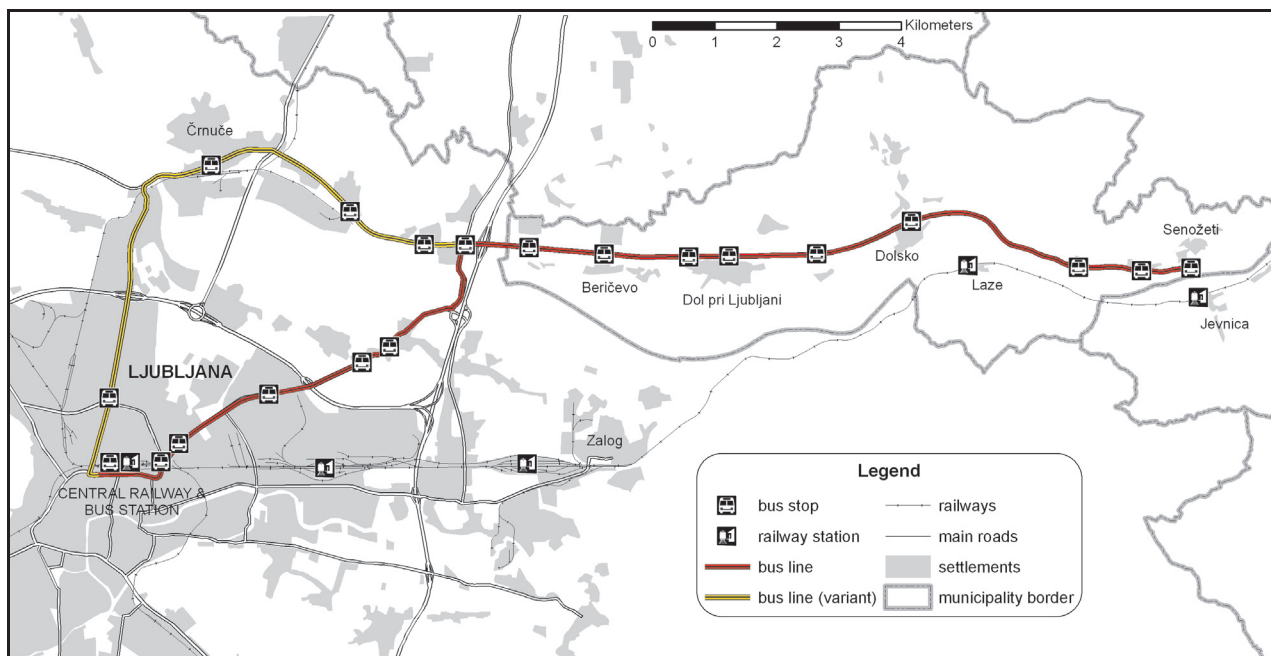


Fig. 1. A schematic view of the situation

another. The municipality is linked with the Ljubljana–Zidani most trunk road, along which 80% of the inhabitants live at a distance of 1 km from the road. Public bus services are operated along this road. The majority of the active population (approximately 80%) are employed in Ljubljana, and almost all the secondary school and university students attend courses there. A railway station is also located in the municipality, along the Ljubljana–Zidani most railway line. Another railway station is located in the neighbouring municipality of Litija, at a distance of less than 1 km from one of the villages of the municipality of Dol pri Ljubljani. Only 10% of the inhabitants live at a distance of up to 1 km from either railway station.

The municipality of Dol pri Ljubljani experienced a radical decline in the supply of the public bus transport in the past 15 years, which is related to the intense decline in demand. This decline is significantly sharper than the typical decline in the entire state or in the Ljubljana region. The cause lay in the fare policy of the various public transport lines. Three bus companies provided suburban bus transport, but offered no monthly tickets. Besides, the railway fares in this period were about one third cheaper than the bus fares. Because of the significantly lower fares, secondary school students changed from bus transport to the railway, despite the greater distance to the railway station. Similar competition to the suburban bus lines was

also offered by a city bus line that connects two settlements in the west of the municipality with Ljubljana (Brinje and Beričevo) (see Fig. 1). The fares of the latter were half the fares of the suburban buses, once the frequency of the daily connections was greater, but the travelling time was twice as long. Therefore, many secondary school students from the municipality of Dol pri Ljubljani chose the city bus for travelling to Ljubljana, although the bus stop was 2 km or even farther from their home. In the first phase, passengers began to change from the expensive public transport available at nearby stops to cheaper ones from more remote stops (trains and city buses), and due to the ever poorer supply in the second phase, they abandoned the public transport and travelled by car instead. The number of suburban bus routes declined from 27 daily round-trip commutes on working days in 1990 to 6 daily round-trip commutes at the beginning of 2006. In addition, the Saturday and Sunday routes were completely abandoned. The municipality of Dol pri Ljubljani thus became the one with the worst connections supplied by public transport (except for the settlements lying along the railway and those connected with the urban transport) of all the municipalities in the Ljubljana region.

With respect to potential demand, the municipality of Dol pri Ljubljani is below the Slovene average and features an extremely low number of public transport users. Using the model equation

Table 1. Modal split for travels from Dol to Ljubljana (source: Population Census 2002, Statistical Office of the Republic of Slovenia)

	Private car as driver	Private car as driver (%)	Private car as pass.	Private car as pass. (%)	Bus	Bus (%)	Train	Train (%)
Employed	975	81	91	8	79	7	49	4
Pupils	12	5	58	23	126	50	53	21
Students	92	57	13	8	37	23	19	12

developed in Slovenia for calculating potential demand from the regular usage of public passenger transport (Gabrovec, Bole 2006), the number of regular commuters using public passenger transport on the Dol–Ljubljana route should equal 700. Because the number of commuters is actually much lower (see Table 1), this indicates that there is "something wrong" with the supply and that adequate measures should be taken to achieve better results.

2. MEASURES

For the first time in Slovenia, drastic measures, not only cosmetic repairs, were taken in the municipality of Dol pri Ljubljani to improve public passenger transport services. It was the municipality that provided the incentive for these measures, which is not unusual. What is unusual is that the municipality was ready to assume the complete financial risk. Three-party agreements between the state, the municipality of Dol pri Ljubljani and the operators who held concessions for the supply of bus transport services on the Dol – Ljubljana route were signed, which had not happened before in the most recent history of Slovenia.

The price of the monthly tickets was reduced by 60%, and the one-way fare was reduced by 50%. The measures were carried out starting on 1 May 2006. Concurrently with the reduction in fares, the supply significantly improved; the number of bus lines per day increased approximately threefold.

3. USER RESPONSES TO THE MEASURES

The user responses were anticipated, yet they did not achieve the theoretical potential. The number of transported passengers can be seen from Figure 2. The period investigated coincided with the summer break and Christmas holidays, but the number of passengers was in accordance with the expected response curve. The asymptote of the process for increasing the number of passengers was approached.

The structure of the tickets sold was not completely satisfactory, because a greater purchase of monthly tickets had been expected due to the exceptionally attractive fares.

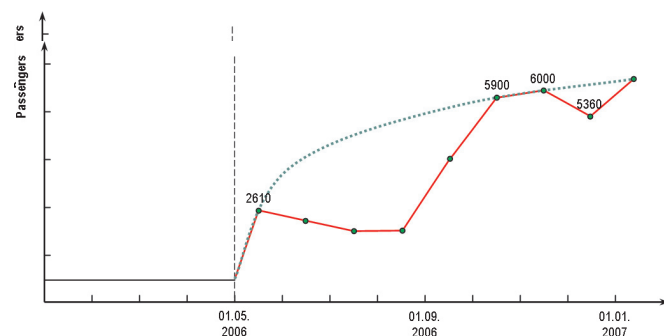


Fig. 2. Number of passengers before and after the measures carried out

In order to understand the true effects of the improved public passenger transport, not only are the number of passengers but also their structure and the motives for their use are important. To get an insight into this information, passengers on suburban buses were questioned on 14 March 2007. More than 95% of the passengers were questioned. They were residents of the municipality of Dol pri Ljubljani who travelled to Ljubljana on suburban buses, whether to work, school or any other errand. Most of the passengers were questioned during their ride to Ljubljana, while those who used some other type of transportation on their way to Ljubljana were questioned on their way home. In order to get a more comprehensive picture of the daily mobility of the inhabitants in the municipality discussed, we also counted passengers at both the city bus stops and the railway stops in the municipality of Dol pri Ljubljani on that same day. People were questioned about the purpose and frequency of their travels, the distance their home or place of work/school was from the bus stops, the mode of payment, the possibility of using a private car and their usual mode of travelling the previous year, i.e., before the supply was improved.

Altogether we processed 207 questionnaires. Probably the most interesting answers are those the last of the above-mentioned questions. Of key importance for the assessment of the effects of the measures taken is whether the new passengers just changed one type of public transport for another or if the improved supply of public passenger transport also attracted those who had previously travelled to Ljubljana by car. The results of the survey show the

following picture: one quarter of the passengers had travelled by suburban buses even before the improved supply; one quarter travelled by train the year before; one quarter rode a city bus; and one fifth travelled by car. So the effect of the measures taken was not as positive as it seems at first glance in Figure 2. However, it turned out to be more promising to analyse employees, secondary school and university students separately. The university and secondary school students turned out to be the most dynamic group; on the day they were questioned there were as many as six times more students on the suburban buses than the previous year. One third of the secondary-school students regularly travelled by city bus the year before. For this group of passengers, it was the fare that played the key role in their decision. After the reduction of fares for the suburban buses, which is when the fares of all types of public transport were approximately the same, they chose the more comfortable and nearby transport. This is also corroborated by the survey results; secondary school and university students stated the cost of the fare was the first reason for their use of a suburban bus, and comfort as the second.

The modal split of the commuting workers before the implementation of the measures significantly differs from that of the secondary school and university students. 38% of the employees already commuted by suburban buses the year before; the fare was less important for this group, while the first reason was mainly comfort and proximity to bus stops. A fifth or 13 employees travelled to work by car the year before; half of them still had the possibility of traveling by car. According to the population census (see Table 1), about 1000 private cars come on a daily basis to Ljubljana from Dol pri Ljubljani. Improvement of the public transport brought only a minimum

result regarding reduced road loads in Ljubljana, since the number of vehicles declined merely by 1% (without considering a possible change in the total number of commuters in the previous year). Nevertheless, even the turning point in the trend can be assessed as a success. The improved accessibility of public passenger transport is most vital for secondary school students, who formerly depended on transport with their parents or had to walk to a faraway city bus stop. However, satisfaction with the public passenger transport during the schooling years are a precondition for its possible use later on, when these people become employed.

Most of the passengers have adequate access to bus stops in the municipality of Dol pri Ljubljani, 80% of them have less than 1 km to the nearest bus stop. The situation is different in Ljubljana, where half of these passengers have to walk more than 10 minutes. Their commuting would be made easier in the case of the physical and tariff integration of the suburban transport line with the Ljubljana urban transport. Because of the absence of such integration, the majority of the residents of Beričevo, where both city and suburban buses are available, tend to use city buses.

4. FINANCIAL ISSUES

The total revenue obtained from the sale of tickets increased from 1500 € monthly to 4400 € in November (Figure 4). Figure 4 shows the financial state after the mentioned package of measures had been carried out. A high increase in the supply resulted in the reduction of the production price (by 10%, from 1.62€ to approx. 1.33€ per vehicle kilometre), yet the total implementation costs have risen to

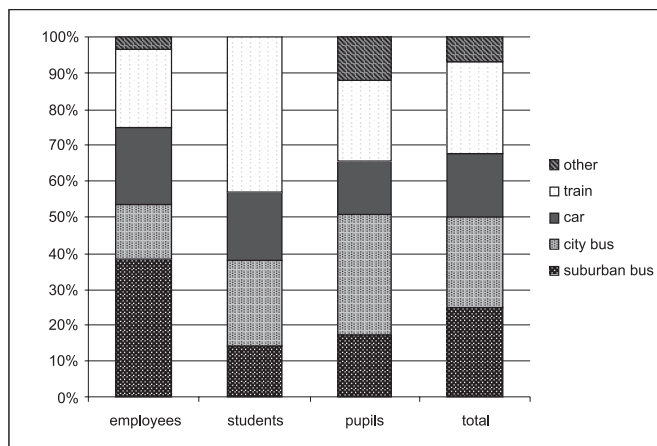


Fig. 3. Modal split of passengers riding a suburban bus on 14th March 2007 before the implementation of the measures.

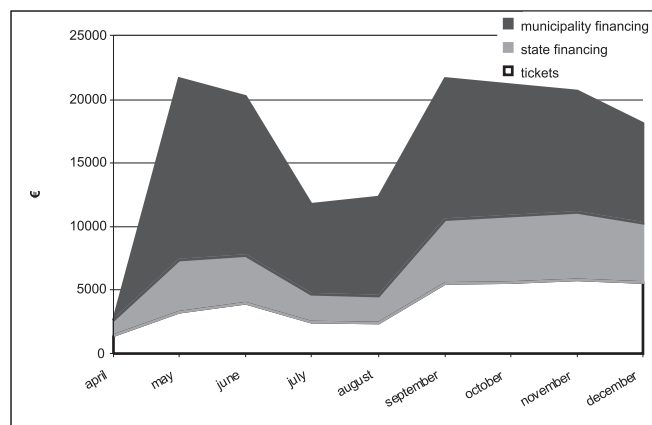


Fig. 4. Financial results of the measures taken (source: Veolia Transport Ljubljana)



21,400€ monthly. The share of public funds required for covering the implementation and operation of the system has increased. The municipality of Dol pri Ljubljani covered most of these costs, while the state covered a smaller portion.

The number of transported passengers increased by ten fold (6000 in the month of November), which is a success. The price to be paid for this success, however, is the enhancement of the required public (or the so-called "third") funds, which rose to at least 9,000 € per month. Whether the effect is satisfactory is the matter of political opinion. The analysis shows that not only the internal costs but also the external costs and effects should be considered to justify the increase in public funding.

5. CONCLUSIONS

The case study of Dol pri Ljubljani shows that passengers only responded to extensive changes in supply. The attempts in which only the supply was optimised or in which attractive fares were introduced did not yield satisfactory results. It is true that the response of commuters is rather high, yet it lags behind the theoretic assumptions. The demand has been stabilized at a higher level. The implementation of such measures inevitably requires additional public funds. The need for a high degree of public funding decreases over time. In the case analysed, we were unable to increase the number of passengers to such an extent that the public funding would drop to a level that would equal the level before the implementation of the measures.

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