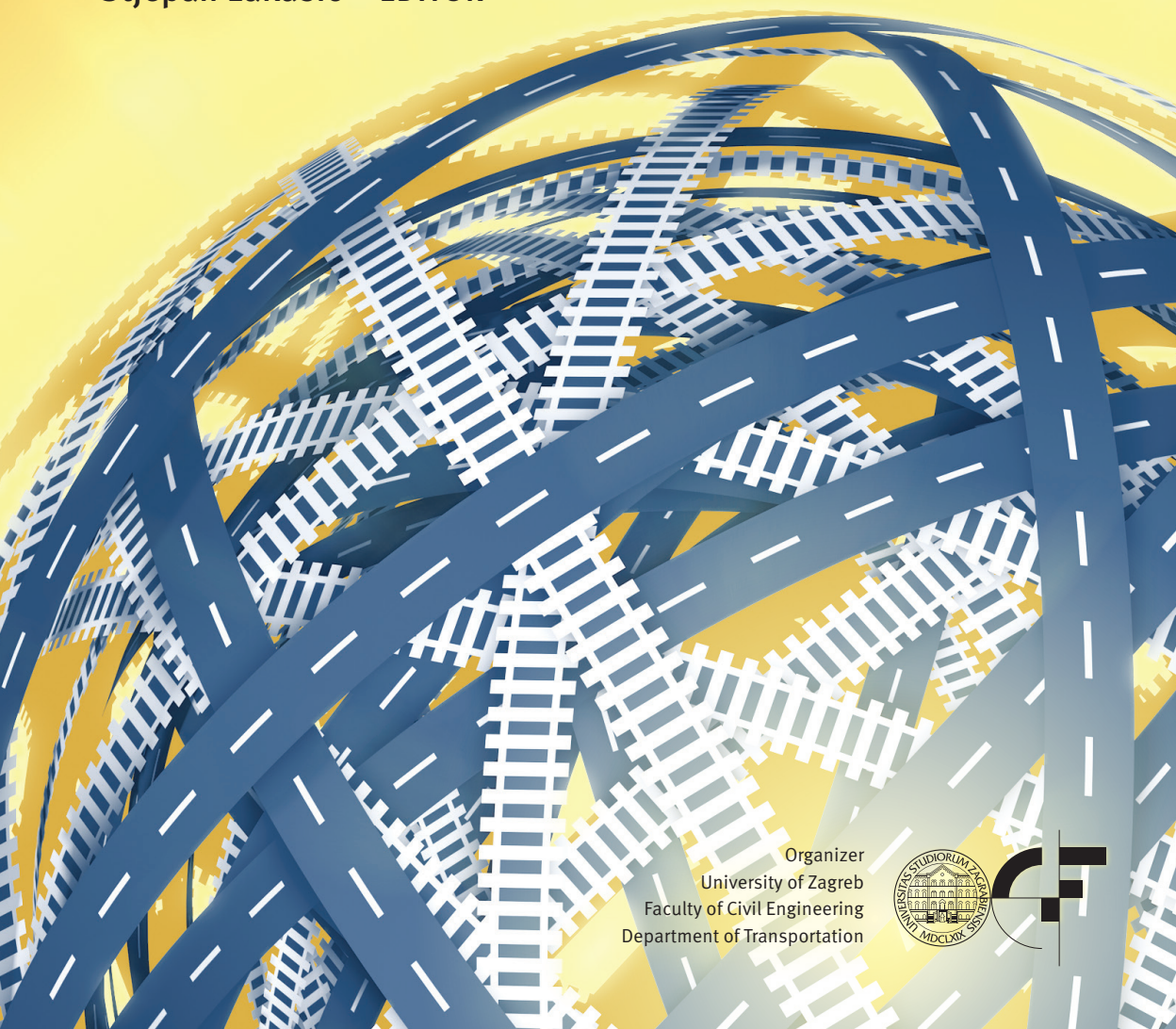
CETRA 2016

4th International Conference on Road and Rail Infrastructure
23-25 May 2016, Šibenik, Croatia

Road and Rail Infrastructure IV

Stjepan Lakušić – EDITOR



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EDITOR
Stjepan Lakušić
Department of Transportation
Faculty of Civil Engineering
University of Zagreb
Zagreb, Croatia

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EFFICIENT RAILWAY INTERIORS – EXPERIENCES BAGGAGELESS – BAGGAGE LOGISTIC SYSTEM

Bernhard Rüger[1], Petra Matzenberger[2], Volker Benz[2]
[1] *Vienna University of Technology & St.Pölten Univ. of Applied Sciences, Austria*
[2] *Vienna University of Technology, Austria*

Abstract

Luggage is one of the main reasons why people choose their car instead of public transportation. In order to support more sustainable and active forms of mobility, it is necessary to develop ground-breaking logistic systems not only for travellers themselves but also for their luggage. Due to the complexity of efficient and customer-oriented independent "public luggage transport" and as a first step, an exploratory project "GepäckLoS" (founded by the Austrian Ministry for Transport, Innovation and Technology and the the Austrian Research Promotion Agency) considering all reasonable, possible and thinkable options was launched. In order to minimise the development risks it was first necessary to survey and define all requirements. Therefore, extensive customer surveys were conducted. With the data assembled there is now a secondary project with the purpose of developing a goal-oriented and efficient system.

1 Introduction

For future-oriented, attractive and also economically realisable service features concerning the transport of luggage and goods independently from passenger traffic, it is essential to know the needs and demands of potential users. Moreover, it is necessary to define scenarios in the context of which there is a need for the transport of luggage.
The purpose of this paper is the inquiry into, and the analysis and interpretation of the needs and demands of different potential users. First of all, the relevant scenarios, groups and with them the connected chains of transportation were defined. Basically, there are two groups of users in the project "GepäckLoS", travellers and people on their daily travel routes.
The group of "travellers" is made up of people who are on a journey with luggage to a certain target destination. All opportunities for transportation are included. But you have to be careful as journeys with public transport are multimodal by definition. As a result, luggage handling is also more time-consuming. Multimodal transport will substantially profit from a system such as "GepäckLoS". The "daily travel routes" include for example, different shopping tasks (shopping for food, electronic equipment, etc.) or travel in the context of which a person must carry a certain piece of luggage over a longer period of time. This could be a sports bag for example, which the person has to take to the office because he or she needs it to go to the fitness centre in the evening. Daily travel routes describe a very heterogeneous group of routes, on which one or more pieces of luggage have to be taken from or to a residence. The system developed in the project "GepäckLoS" is going to make the transport of these pieces of luggage substantially easier. Moreover, in many cases it will make it possible to use environmentally sustainable means of transportation such as public transportation or a bicycle.

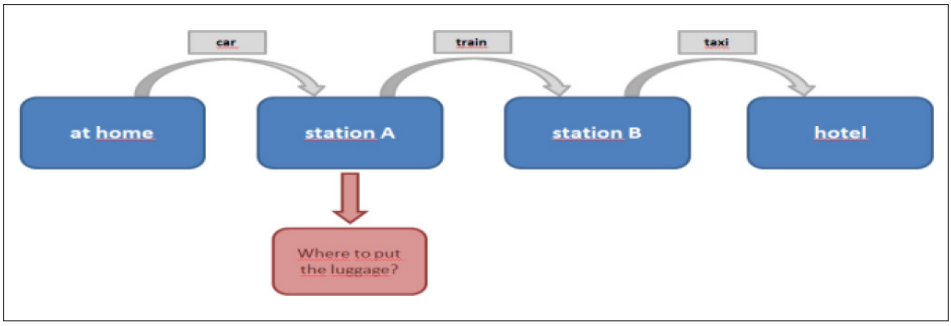

Figure 1 Example of a (multimodal) chain of transportation with luggage

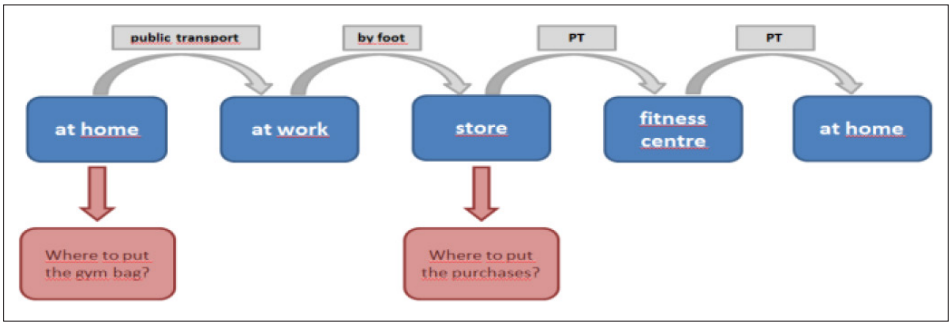

Figure 2 Example of a (multimodal) chain of transportation with luggage of daily life

The demands and specifications of these two groups are estimated very differently. For this reason the survey tried to go into the demands and specifications to find a fitting solution. Five different questionnaires were developed for data collection to get a good overview of all the different groups of potential users. The questionnaires include demographic information, questions about actual or general habits and situations concerning shopping or travelling. The five different questionnaires were used to question potential users:

- on their journey in trains,
- in shopping malls or shopping streets,
- during their stay in rehabilitation centres,
- online about shopping and
- online about travelling.

With the help of the results of the surveys, it was possible to get detailed information about the special interests the survey groups have in a luggage logistic system as well as their needs and demands. Additionally, qualitative surveys were done with business proprietors to determine their interest in and demands for a luggage logistic system. They also showed an interest in the service, especially to oppose the online trade. The results of the surveys provide a basis for the design of the whole system and for the evaluation of the new system and currently operating systems. This paper only includes the results of the survey concerning luggage transport.

2 Interest in baggage services

Altogether, 8,800 passengers were questioned in long-distance trains in Austria, Germany and Switzerland. Most of them (78%) were between 18 and 59 years of age. The age group between 18 and 26 made up with 26% of all passengers the largest group. The gender relationship was balanced; 51% were female and 49% male. One fourth of all passengers stated as the purpose of their journey, travel to or from work, school or other training programmes. Other travel purposes were longer holidays (18%), short getaways (17%), private issues (16%), business trips for one or more days (12%) and day trips (10%). The passengers are rarely weekly commuters or on a shopping trip. Ninety-eight percent of all passengers had some baggage with them. Handbags and shopping bags also counted as baggage. Large pieces of luggage such as medium and large suitcases as well as travel bags and backpacks were carried by 37% of all passengers. One third of them felt hindered by their luggage. Most difficulties occurred upon boarding the train, finding a seat and stowing their luggage.
In addition to direct questioning in the trains, there was also an online questionnaire. Patients of the rehabilitation centres in Weyer, Saalfelden, Bad Schallerbach and Bad Hofgastein also participated in the survey. The reason for the survey in the rehabilitation centres was that there is a similar service in Germany, which is often used by patients of such centres.
By direct questioning in trains in Austria, Germany and Switzerland 12% of the participants said that they would use the service "GepäckLoS" during their current journey. Ten percent of them said that they would likely use the service. In addition, persons who answered "likely no" or "no" were asked if they would use the service in general, for example during another journey. Twenty percent answered this question with yes and 27% with likely yes. Twenty-five percent of the respondents of rehabilitation centres, who usually have a lot of luggage because of their long stay, said that they would have used the service for their current stay. Twelve percent said that they would have likely used it. All patients were also asked if they would use the service for general journeys or other rehabilitation stays. Thirty-one percent answered that they would generally use it and 21% would generally likely use it. In the online questionnaire people were only asked if they were interested in using the service in general. "Yes" was the answer of 37% and "likely yes" of 40%. Through specific analysis of the direct surveys in the train, the parameters influencing the use were determined. Following is a ranking of the top influencing factors concerning the use during the current journey:

- **Hindrance because of the luggage**
  The service would be used by:
  - 56% of the passengers who feel hindered at the train station because of their luggage,
  - 53% of the passengers having problems boarding the train,
  - 49% of the passengers having hindrances during their journey to the train station,
  - 42% of the passengers having problems directly in the train.
- **Travellers with babies and infants (between 1 and 6 years)**
  The service would be used by:
  - 50% of the travellers with a pram
  - 47% of the travellers with babies
  - 44% of the travellers with infants between one and six years of age.
- **The larger the pieces of luggage**, the more likely the service would be used. Forty-nine percent of all passengers with three large pieces of luggage would use the service.
- **Forty-eight percent of passengers** with physical disabilities, which may cause them to have problems with luggage transport, would use the service during the current journey.
- **Forty-three percent of passengers** who arrived by taxi at the train station would use the service.

3 Willingness to pay

The willingness to pay for the service asked of passengers in the train can be seen in the next chart (Figure 3).

- Travellers with babies and infants (between 1 and 6 years)
  More than 10 Euros would be paid for the service by:
  - 57% of the travellers with babies,
  - 46% of the travellers with a pram,
  - 45% of the travellers with infants.
- Forty-eight percent of the passengers taking a bicycle with them would pay more than 10 Euros for the service.
- The willingness to pay increases with the number of large pieces of luggage. Forty-seven percent of the passengers with at least three large pieces of luggage would pay over 10 Euros for the Service.
- Passengers who arrived by taxi or motorcycle had a higher willingness to pay. Forty-thee percent of the passengers arriving by taxi and 43% of the passengers arriving by motorcycle would pay more than 10 Euros. But 40% of the passengers arriving by motorcycle thought that the service should be included in the ticket price.
- Passengers who were travelling first class had a higher willingness to pay. Forty-two percent would pay more than 10 Euros.

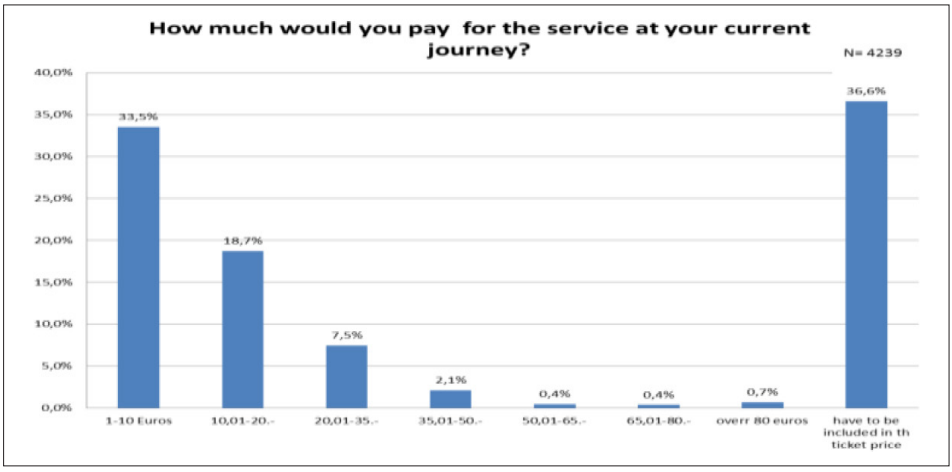

Figure 3 Representation of the willingness to pay by train passengers

4 Reasons for not using the system

It didn't matter whether they would use the system or not, but older passengers had more apprehensions concerning the luggage logistic system. They had for example, fear of a high price, luggage arriving late or not at all and theft or damage. Passengers with physical disabilities, which may cause them problems with luggage transport, had fewer fears than the overall average.

5 Discussion and conclusion

In principle, these surveys showed that the points "shopping" and "travelling" couldn't be considered as one system. There must be a separation between "shopping" and "travelling" to find and develop the best system for each.
On the whole, regardless of pieces of luggage, age and other points, 22% would have used the described system for their luggage during their current journey. If people felt uncomfortable because of their luggage, they would definitely use the service more often. Fifty-six percent of the passengers who felt hindered at the train station would use the service. Accordingly, the question was, which passengers felt hindered at the train station because of their baggage. The hindrance at the train station was independent of age, gender, nation, travel class, physical disability and baggage. What mattered was if the passengers were travelling with a baby, an infant or also a 7 to 14 year old child.
However, what is dependent on gender and to some extent on age were the problems in boarding the train. Fifty-three percent of passengers with problems in boarding would use the service. Women (15%) had more problems boarding the train with their luggage than men. Also, older passengers showed a few more difficulties concerning boarding the train. Thirteen percent of the passengers between the ages of 60 and 74 had problems boarding the train.
Forty-two percent of the passengers who had hindrances directly in the train would use the service. There were many differences between certain groups. For example, there were country- and travel-class-specific differences. Austrians had fewer problems stowing their luggage in comparison with the Swiss (14%) and Germans (25%). Passengers who were travelling first class had fewer problems stowing their luggage than passengers travelling second class.
Passengers who arrived by taxi were often travelling with large pieces of luggage. At this point environmentally-minded thoughts should be introduced. If travellers could check in their luggage at the residence door or a check-in terminal, they would not have to take a taxi but could instead use public transport.
According to the direct survey, other groups, which would like to use the service, were travellers with a baby (47%), an infant (44%) or a pram (50%).
Although the difference wasn't that clear (29%), people travelling with another adult or teenager would likely use the service. Especially interesting were the country-specific differences. Passengers who were asked in Switzerland would use the service least(16%). Twenty-three percent of people asked in Austria and 28% of those asked in Germany would use the service.
In addition to the questions about their interest in using the service, passengers were also asked about their willingness to pay. An economically realistic price wouldn't be under ten Euros. Due to this which groups had a higher willingness to pay and which factors had an influence on this was more closely examined.
The group which had the highest willingness to pay were travellers with a baby (57%) or an infant between the ages of one and six (45%). Also the elderly would pay a higher price. Thirty-eight percent of passengers between the ages of 75 and 84 would pay more than ten Euros. With 38% they placed only sixth in willingness to pay. More influencing factors on willingness to pay can be found in 2.3. There are three, possibly four, main user groups deriving from interest and the willingness to pay:

- Travellers with a baby or an infant between the ages of one and six,
- Elderly travellers (at least 60 years old),
- Travellers with large pieces of luggage.
- People with physical disabilities would surely be an interesting target group. However, their willingness to pay was relatively low. More consideration would be necessary concerning funding a developed system for this group.

According to the results of this survey, the following table shows the needs and demands of the main user groups. In the first column are the results for the general public. The differences of the main user groups are described in the subsequent columns.

Table 1 Needs and demands of potential users in general and particularly for certain user groups

	The general public	Travellers with a baby	Elderly travellers	Travellers with large pieces of luggage
Earliest pickup of the luggage	under 1h 36%, 6h 27%, 12 h 12%, 1 day 21%	as late as possible. 42% under 1h	75- 84 years – 22% under 1h	–
Latest delivery of the luggage at the target location	same time as the person 72%, same day 26%	55% at the same time as the person	48% at the same time as the person	from 3 pieces of luggage: 56,8% at the same time as the person
Location for the pickup of the luggage (actual journey)	45% directly at the residence door, 47% at the train station	50% directly at the residence door, 33% at the train station	The older the person the more they opt for "directly at the residence door" (between 75 and 84 years of age – 69%).	without large pieces of luggage ⇢ train station; with large pieces of luggage (from one piece) ⇢ directly at the residence door.
Location for the delivery of the luggage at the destination (actual journey)	38% at the Hotel, 50% at the train station	40% hotel, 40% train station, 17% another address	The older the person the more they opt for "at the hotel".	–
In which part of the day the pickup and delivery should take place?	57% in the evening, 49% at the weekend, 45% in the forenoon	58% in the forenoon; at the weekend 56%; less in the evening 47%, thereby more in the afternoon 38%	–	The bigger the pieces of luggage, the more there is the wish for a delivery time slot in the forenoon or in the afternoon.
Set or chosen time slot	75% chosen time slot	63% chosen time slot	–	70% chosen time slot (from 2 large pieces of luggage)
Size of the time slot	1h 36%, 2h 51%	–	–	–

In summary, the survey showed that fringe groups were especially interested in using the service. Concerning needs and demands, the results showed that people who would likely use the service were willing to assume compromises and made smaller demands on the service. For example, all interest groups expressed less demand that the luggage had to be at their destination at the same time they themselves arrived.

With regard to the location for the pickup and delivery, the main groups would particularly like a pickup or delivery directly at the residence door. That would certainly be a sensible configuration since the online survey of people not travelling by train as well as the survey of those in the rehabilitation centres showed pickup or delivery directly at the residence door as being the favourite choice.

In conclusion, one more positive remark about the system should be made. The wish of the public for a pickup/delivery time slot of two hours would certainly be accomplishable.

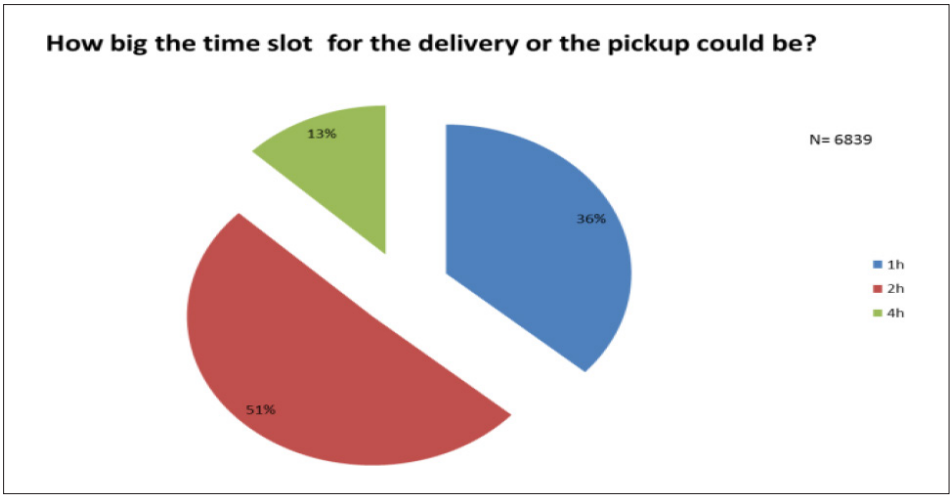

Figure 4 Size of the time slot for the delivery or pickup

References

There are no external references. The whole paper is based on the internal project results including surveys (project "GepäckLoS" ⇢ http://GepaeckLoS.netwiss.at)