



## ANALYZING THE ASPECTS OF ORGANISING PARATRANSIT SERVICES IN VILNIUS

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**Abstract.** The main objective of the paper is to analyze some aspects of organising new paratransit services in Vilnius. The main presented scientific problem is the creation of a new transportation system integrating it into the existing one. The system in Vilnius is not well adapted to people with disabilities, and therefore special transportation services for people having impaired physical mobility do not meet the requirements established for paratransit services. To solve this problem, an objective of researching demand for new services in Vilnius, the impact of such service for the whole transport system and potential problems that could arise during the organisation and installation of new services have been set. In order to create such system, one needs to know the values of specific parameters identified with the help of an expert survey. Scientific literature and information obtained from the expert survey allow making a conclusion that new paratransit services are required and can be integrated into the existing system in Vilnius.

**Keywords:** paratransit, demand, responsive transport, vehicle routing, vehicle scheduling, transportation system.

### Introduction

The need for transportation is one of the most important daily needs for the majority of people. Thus, the main objective of public transport is to provide transportation services that are equally accessible to all of them. In order not to hurt socially vulnerable groups of the society (e.g. people with disabilities, pensioners, etc.) having troubles when reaching and using traditional public transport, paratransit services are being established all over the world.

Paratransit is a type of a public transport system that provides transportation services mostly to people with disabilities or those with special needs (the elderly, children, etc.). It is a type of flexible transport service (FTS). Paratransit helps with the formation of an integrated multimodal urban public transport system having a wider range of services and filling the gap between traditional public transport services and personal automobiles (Loo 2007). Researcher claims that paratransit refers to urban transport services 'somewhere between private passenger transport and conventional public transport in terms of the cost and quality of service'. Grava (2002) lists vehicles, drivers, stops, terminals, garages, communication systems, the structures of ownership and property as the main parts of paratransit services. The

number of the required vehicles and their efficiency depend on their size (Fu, Ishkhanov 2004).

The growth of demand for paratransit services has been playing a noticeable role for the last twenty years (Bearsse *et al.* 2004). On the other hand, the survival of FTSs such as paratransit is obstructed by the rapid pace of motorization in the world (Joewono, Kubota 2007). Increasing the quality of services is one way to stimulate its demand. Due to the specificity of services, there are some problems impeding its provision. Joewono and Kubota (2007) identified the factors defining client's understanding of the quality of the provided service and determining the choice of the transport type. These include usefulness, accessibility, reliability, information, services offered to the clients, comfort, security, fees and effect on the environment. Transport dedicated to people with disabilities must be adapted to their needs (Ferreira *et al.* 2007). Fitzgerald *et al.* (2000) raise another problem – instructing people with disabilities in running paratransit services and stimulating them to use paratransit responsibly. The objective of the instruction is not to change the users but to provide them with information on how to act so that paratransit is more effective (along with saving costs of the provider).

One model of FTS is demand responsive transit (DRT). The main problems of DRT investigated by

scientists cover the formation of routes and schedules, the effective use of vehicles and the formation of a fleet. Palmer *et al.* (2003) investigated the effect of computer dispatcher systems, the provision of dedicated transport services, effective telecommunication and financial support on an increase in the effectiveness of services. Computer planning programs that allow increasing an optimal number of passengers in one vehicle, decreasing a negative effect on the environment, the formation of traffic jams and reducing the price are used for ensuring the flexibility and effectiveness of services (Xu, Huang 2009). The productiveness of DRT service is measured by the following indicators: the size of the fleet, total run and empty run (Quadrioglio *et al.* 2008). Advanced public transport systems, financial support and fines for violating commitments are also important. Other authors investigated a dynamic pickup and a delivery problem of time windows (Mitrović-Minić *et al.* 2004). Time for waiting is called waiting strategy and is divided into four groups: drive-first (DF), wait-first (WF), dynamic waiting strategy and advanced dynamic waiting strategy. Using this data and specialised software (*L2sched*) provide a possibility of controlling the location of vehicles (Horn 2002).

Gupta *et al.* (2010) suggested two approaches to increasing the effectiveness of paratransit services. The first approach re-optimizes the routes developed at the end of each day. The second approach evaluates the benefit to the state agencies of selectively using non-dedicated service providers such as taxis. The problems related to forming schedules are caused by the uncertainty of the moment when a service is needed and external obstructions are created (traffic congestion, traffic accidents, etc.) (Karabuk 2009). The latter paper develops a nested column generation method that integrates clustering and routing decisions, thus extending the applicability of the column generation approach in the context of the subject problem. Fu and Ishkhanov (2004) formulate a solution to the same problem by combining stochastic models of the travel time and models depending on time. They also claim that improving information technologies allows the providers of paratransit services increasing its productivity and reliability. Automatic vehicle location (AVL) devices, digital telecommunication and computer software are being used. Cremers *et al.* (2009) address the choice between using own and rented vehicles. This article finds this question the problem of day-ahead paratransit planning proposed to be solved by a non-standard two-stage model. Loo (2007) analyses an alternative request – a reply transport system adapted for paratransit, the so called resident coach. This privileged system is adapted for people living in the districts of private houses. Cevallos *et al.* (2009) analyses innovative decisions in order to increase the efficiency of paratransit. The driver's task of finding the location of a client is alleviated by using modern devices for global positioning system (GPS). The author investigates a potential possibility of reducing the number of missed clients with the use of GPS devices.

Although the benefit of public transport to the society has been broadly studied in literature, the creation and implementation of a financial model raises many questions and is a real challenge to local municipalities (Vassallo *et al.* 2009). Buehler and Pucher (2011) suggest that a unique possibility of increasing social and environmental indicators is provided by increasing the financial stability and benefit of public transport services.

Having done the analysis of scientific literature and having defined the main features of paratransit, the main factors influencing the quality of determined services and the main aspects of organising paratransit have been identified. However, not all of those are important in Lithuania. The problem of choosing the fleet, solutions to financing public transport, the aspects of planning services, the creation of a model for flexible transport services remain topical issues in the area of Vilnius city. The main objective of this investigation is to collect data needed for creating a new system and integrating it into the existent transportation system. In order to achieve this objective, an expert survey allowing determining the main features of the paratransit system that can be integrated into the transportation system in Vilnius city has been carried out.

### 1. Short Review of Special Transport Services for People with Disabilities in Vilnius

A part of Vilnius public transport is adapted for people with disabilities; however, it is suitable only for those who can travel to the station independently and board the vehicle helped by the driver. In all other cases, special transportation services are needed. The following will examine some features of special transport services for people with disabilities offered by several companies/institutions in Vilnius.

Vilnius City Social Support Centre (SSC) provides transportation services for people with disabilities. Depending on the type of the service provided, the price can vary from 6 to 10 litas (1€ = 3.45 Lt). Long – distance shipments are charged for the cost of fuel. SSC is a budget office of Vilnius city municipality. Transportation services are provided four hours a day, five days a week. In order to get an adequate service, one needs to be eligible for it. The time of completing the request is three working days before fulfilment. Currently, SSC is the largest provider of special transportation services for people with disabilities in Vilnius.

Every year, Lithuanian Association for People with Disabilities, which is a non-profit organisation, implements National Social Integration Program for persons suffering from different disabilities. Special vehicles adapted for people with disabilities are used for providing special services at home. As has been mentioned by the head of the organization of transport services, the association has a specially adapted minibus with a lift for people who are sitting in wheelchairs.

Special transportation services are also provided by rehabilitation hospitals, for example by the Valakupiai Rehabilitation Centre. Their services are aimed at those

undergoing treatment at the Centre. The price of such service is 1.82 litas per kilometre. The author is aware of other institutions providing such services but not publishing information publicly.

The above introduced facility services are partly consistent with the concept of paratransit but still need to improve the pricing model, service conditions, etc. Thus, it can be concluded that an exact match of paratransit services does not exist in Vilnius.

## 2. Target Groups, the Sample and Main Aspects of the Survey

The maximum diversity of the cases of the made choice and selection based on certain criteria were used in the conducted survey. The heads of organisations and departments were accepted as potential respondents. The experts residing in the largest cities, including Vilnius, Kaunas and Klaipėda were selected. Although the survey is dedicated to the implementation of paratransit services in Vilnius, the location of experts has no effect on

the quality of the provided service. Table 1 shows five main groups of respondents (a total of 10 surveyed participants) – interviewed experts.

The questionnaire included 14 questions most of which were structured (listed in the Table 2).

The survey consisted of six main parts. The questions of the first part had the purpose of finding out the experts' opinions on the need for paratransit services in Vilnius and the factors that would have the biggest impact on demand for the services provided. The second block of questions should help with determining the effect of the new system on the existent one. The question of the third block was related to the fees of services. The fourth part dealt with the main organisational principles of services. The fifth block asked about potential problems that could arise when organising new transport services in Vilnius. In the last part, an open question was presented in order to let the experts express their positions on important aspects not mentioned in the questionnaire.

**Table 1.** Groups of respondents

Groups	Company/ Institution	Respondent
Public transport operators	PE 'Klaipėda Passenger Transport' ( <i>Klaipėdos keleivinis transportas</i> )	Director
	ME 'Transportation Services' ( <i>Susisiekimo paslaugos</i> )	Director
	ME 'Transportation Services' ( <i>Susisiekimo paslaugos</i> )	Head of operations and research division
Public authority	Ministry of Transport and Communications	Public Adviser on Transport Environment Safety Issues
	Ministry of Transport and Communications	Acting Head of Development and Innovations Division
	Ministry of Transport and Communications	Chief Specialist of Emergency Prevention and Environment Protection Division
Municipalities	Klaipėda Municipality	Head of Transport Department
Providers of special transport services	Social Support Centre in Vilnius	Deputy Head of Social Services at Home Department
	Lithuanian Association of Disabled Persons	Head of Organization of Transport Services
Research institution	Transport Research Institute	Adviser

**Table 2.** The questionnaire

Main parts	Questions
The need for new services	Is public transport sufficiently adapted to the needs of people with disabilities?
	Do people need new paratransit services?
	The main factors affecting demand for paratransit services (matrix).
The effect of the new system to the existent one	What effect should new services have on the whole system of transportation? (matrix)
	What effect should new services have on the public transport system? (matrix)
Fees	What model of pricing should be used?
	Is the DRT model for paratransit services applicable in Vilnius city?
The main organisational principles	How many days before travelling should the passengers make the request?
	What should be the size of vehicles?
	How many days a week should paratransit services be provided?
	What is the maximum waiting time at one stop or inside the vehicle?
	Who should provide new paratransit services?
Potential problems	What are the problems of the project of new services during the implementation process?
Expert opinion	Comments of the experts

### 3. Analysis of the Surveyed Results

#### 3.1. Possible Demand and Data on the Factors Having an Impact on Demand

45 (20% of all trolleybuses) low floor trolleybuses and 204 (69% of all buses) buses adapted for people with disabilities provide public transport services in Vilnius. The first question of the questionnaire focused on discovering if public transport was sufficiently adapted to the needs for people with disabilities. Most of the respondents (8 experts) agreed that the system was partially adapted, although sometimes it was impossible to use a low floor vehicle due to various reasons. However, two respondents representing the group providing services for people with disabilities accept that the system is not adapted. This means that those who more often encounter passengers having a disability agree that the rate of 50% adapted vehicles does not ensure proper mobility.

The second question addresses the topic to the need for new paratransit services. There were no experts who should strictly oppose the need for such services in Vilnius. However, there was also no unanimous opinion on the necessity of paratransit. Having asked sceptical experts to comment on their opinion, the following arguments were presented:

- the project should not be prospective;
- demand for such services is not publicly expressed;
- services provided by the social support centre, the association of people with disabilities and other special transport forms are sufficient.

The third question contained a matrix with the main factors affecting demand for public transport services. Every factor is assessed on a scale from 1 to 4, where 1 means the lowest impact and 4 – the biggest. In order to calculate the impact of each factor, the rating average of the experts was derived. The purpose of this question was to identify fields that should gain the most attention when organising paratransit services. The linear diagram (Fig. 1) indicates that effect on the environment, i.e. the level of pollution (due to the use of the service) should have the lowest impact on people's choice. However, in order to decrease damage done by gas emission to the environment, vehicles in a good technical condition and causing as minimum pollution as possible should be used. This decision should also in-

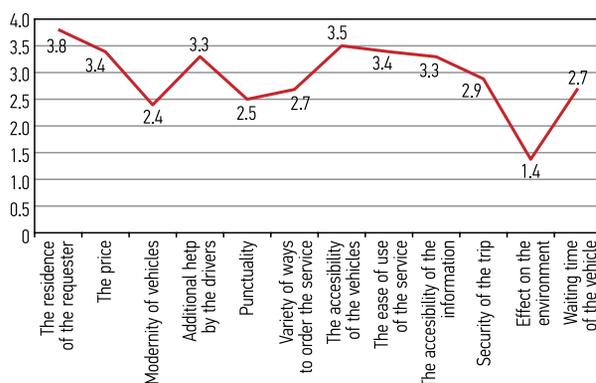


Fig. 1. Demand for service dependence on different factors

fluence another factor affecting demand – the modernity of vehicles having the assessment of 2.4. Modern vehicles (having the latest equipment) should also solve similar problems, for instance accessibility (graded 3.5) and trip security (graded 2.9). It should also have an impact on the waiting time of the vehicle (graded 2.7). The residence of the requester should have the biggest impact on demand, rated 3.8. Therefore, we can conclude that service should be directed to the surrounding blocks of the city (this partially confirms the answer to the second question given by three experts who claimed that services were only needed in certain areas). Data on the survey show that the price should be important to the clients (rated 3.4). Thus, a solution that the price is optimal and competitive must be found. Another field the drivers took a significant part was graded accordingly: additional help offered by the drivers – 3.3, punctuality – 2.5. The field affected by the means of communication and the methods of presenting information is data presented by the clients on the possibilities, execution and ordering of services. These factors were graded by the experts as follows: the variety of ways to order services – 2.7, the ease of using services – 3.4, the accessibility of information – 3.3.

#### 3.2. Data on the Effect of Paratransit on the Existent Transportation System

Every new part of a system, no matter how small it is, will have an impact on other parts and the whole system at the same time. The impact should be positive otherwise it is illogical to implement a service that would harm the existent ones. For integrating a new service, one needs to examine the conditions that would have to be adapted to. In other words, if the new system has no effect on the existent one, i.e. does not change any of its parameters of operation, it means that the new system will have to adapt to the present conditions. Therefore, it is important to figure out how paratransit will look in the context of the whole transportation and public transport systems. The fourth question is devoted to investigate the effect the new service would have on the whole system of transportation. The parameters such as street load, pollution, improvement on infrastructure, an increase in capacity and the number of road accidents were examined (Fig. 2). These parameters were

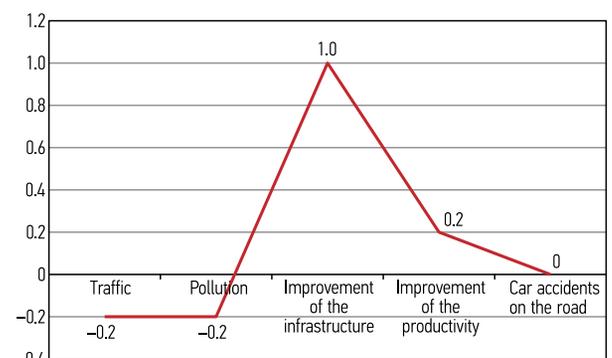


Fig. 2. The impact of a new system on the existing transportation system

estimated using the following grades: – 2 – very negative effect, – 1 – slightly negative effect, 0 – no effect at all, 1 – small positive effect, 2 – will change the whole system dramatically. In order to calculate the impact of each factor, the rating average of the experts was derived.

The graph shows that the only area capable of potentially significantly improving the whole system is the infrastructure of the transportation system. The other parameters are also close to zero and appear at a distance of 0.2. In that case, that we can conclude they will have no effect in the context of the whole system. Paratransit services could have a positive impact on improving the infrastructure after it starts functioning properly. This service could contribute to improvement in stops (information stands, better access to the vehicle, i.e. special hills etc.), connections between sidewalks and streets, adaptation of traffic lights, etc.

On the other hand, considering the effect paratransit could have on the public transport system, more affected areas can be noted. Thus, the investigated fields cover the price and quality of transportation, attractiveness, competitiveness, accessibility, security, flexibility, reliability and the installation of ITSs (intellectual transportation systems) in public transport. The grade system and calculation of data are similar to those discussed in the fourth question. The price was noted by the experts to be the only parameter having a negative impact.

Having researched conditions for providing services and considering the current situation, it is clear that the price of such services in Vilnius will not match those provided by the bus and trolleybus tickets since the service will be offered to a relatively smaller number of people (there will be no economies of scale) and transportation from door to door will be required due to the fact that people with disabilities need extra services resulting in additional costs for the staff etc. (Fig. 3).

It seems to be clear, however, that due to various reasons, the price of this service should not reach the level of the prices provided by taxi service, which is, when properly organised, should be attractive to passengers even with a larger price than that offered by traditional public transport. Introduction of partially analogous services would increase competition in the

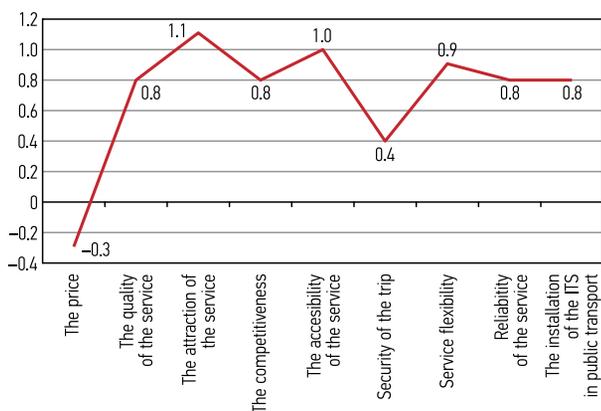


Fig. 3. The impact of a new system on public transport

market. Other parameters should also be improved for the following clear reasons:

- transportation quality – due to more comfortable and specially adapted vehicles, the number of seats, cleanness and comfort inside the vehicle, proper lighting, available means of communication, etc.;
- attractiveness – due to additional services, more comfortable usage, lower costs (compared to those of private transport and taxi service);
- accessibility – a vehicle can be requested to drive home when needed, getting on the vehicle is guaranteed, a larger area of service;
- security – the stability of passengers would be ensured inside the vehicle due to special equipment, a smaller possibility of an attack in a public or waiting place, comfortable access to the first aid kit in the vehicle, a possibility of controlling the risky behaviour of the driver;
- flexibility – service is provided not only to the sick but also to other people having impaired mobility (not necessarily physical, e.g. mothers of many);
- reliability – waiting time in the first stop, time spent in the vehicle, time for the trip is known, punctuality of drivers, informing clients about holdbacks due to vehicle failure or other unexpected situations;
- installation of ITS in public transport – means of communication (driver – dispatcher, passengers – the exterior, driver – passengers), possibility of entertainment equipment, e.g. monitors presenting information to the passengers.

The system providing services to a relatively small part of passengers (about 15%) will certainly have to adapt to the existent conditions rather than to change them. However, it has the potential for improving practically all main parameters of passenger transportation inside its environment (public transport system).

### 3.3. Data Related to Service Pricing

There is a single model of pricing in Vilnius and Lithuania as a whole, i.e. a fixed charge for single trip on one route independently of its duration. Vilnius is the largest city of Lithuania by its area and the nature of travelling greatly differs. Therefore, such a model is criticisable. If a distance can be overcome with a single vehicle, the cost is smaller than in the case when one needs to change vehicles. The price does not depend on the distance. In order to avoid this inequality, pricing solutions to a new service are suggested according to global practice:

- A – keep the current method of pricing when the trip price is fixed (in case the experts unanimously decide that this model is the most appropriate in the current situation);
- B – the price of the distance – pricing is similar as for taxi service, i.e. a fixed price for a kilometre;
- C – the price depending on an area – the city should be divided into areas having different prices of entry, i.e. the closer it is to the centre, the larger is the price;
- D – other variants suggested by the experts.

Variants B and C shared an equal amount of votes and two experts suggested variant A, which is logical under an assumption that clients will not be going on short distances and that most requests will be similar with respect to the distance of the trip. The experts did not suggest any other methods of pricing. Thus, we can conclude that choosing prices for the distance and area pricing should have to be made when organising paratransit services.

### 3.4. Data on Organising a New Service of Transportation

The principle of DRT service is most frequently applied in practice and used for the already existent services provided for people with disabilities. Thus, it should be chosen when a decision on the principle of operation of a new service has to be made. The experts agreed that this model was applicable.

The next five questions were formed in order to research certain aspects of operation. The vehicle is one of the most important parts of providing service. Therefore, it is important to know the size of the vehicles to be acquired. Having in mind that some people would have to be taken from their homes, the experts were inquired about the size (the number of seats) of vehicles that would form the major part of the fleet. A conclusion based on their replies is that the vehicles of a certain type should not dominate since the flexibility of services allows organising trips for small and large groups of passengers thus competing with traditional providers of transportation.

The following question is related to time required for completing the request, i.e. how many days before the trip should the passengers make the request in order to receive transportation services on time demanded. According to regulations, paratransit services should be orderable a day before its fulfilment. Most of the experts (7) suggested a traditional way of completing the request – a working day before fulfilment (next day planning).

According to ADA regulations, paratransit services should be provided on a similar time scale as traditional public transportation, which means providing services on all days all day long (certainly, paratransit services are not required from the early morning till late evening, however, people having impaired mobility should be guaranteed to have the possibility of travelling on weekends and festal days). This statement is confirmed by the fact that 8 experts suggested that services should be provided 7 days a week with no exceptions.

Yet another aspect of organising services and forming a schedule is waiting time at one stop or inside the vehicle, i.e. the maximum duration of one stop to pick up and disembark a passenger when there are other passengers inside the vehicle (group transportation). Most experts chose a minimal waiting time of 2–5 minutes. This is logical since the shorter are the stops, the shorter is the duration of the trip and the passengers more satisfied. On the other hand, if passengers feel good on the vehicle, have a way to spend time (monitors, means of

communication or press mentioned before), are tolerant and helpful to each other, the prolonged duration of the trip should not decrease the attractiveness of that service.

The structure of financing services depends on the type of a provider, i.e. a representative of a private or state sector, etc. The municipality should only organise the provision of public transportation and the provider should be chosen by means of a contest (in case there are several potential providers of that service). In this case, we are discussing the process of creating a new firm or additional services provided by the existing one. Most experts advocate the idea of a firm of private capital. Three experts suggested other variants, including ‘*all answers are possible*’, ‘*it depends on the model of financing*’, ‘*free choice by means of a contest*’. These propositions lead to the summarised opinion of the experts that services should be provided by a firm that best suits the criteria needed for a provider of such a service independent of the founder of the firm. The answers to this question show that the experts are more supportive of the idea of services offered by a private firm. This conclusion is likely due to the fact that such a service could be started by attracting financing private subjects since the municipality of Vilnius has problems paying the providers of public transport at the moment and equipment needed for paratransit is costly.

### 3.5. Data Related to the Problems of Implementing a Project of New Services

When starting a new business, one needs to analyse its inner and outer environment. Thus, it is useful to research the aspects of organising activity as well as to pose the problems that could arise during the integration of new services into the existent system. At the beginning of this research, the members and components of the transportation system directly connected to the service that could possibly intersect with activity or paratransit were indicated. They can be called technical aspects. Another area that could impact the operation of paratransit is difficult to define and can be hardly tangible, but the consequences of the made decisions are clearly visible. These are more theoretical subjects that may vary all the time – municipality, government, managers of the firm, providers of transportation and passengers. Apart from five areas were submitted to the experts, three more were added (Fig. 4):

- **An impact of a political situation on organisational decisions** is a common situation in Lithuania when during changes in the government, hasty and too optimistic decisions are made and then cancelled, or the decisions are taken deliberately forming and reconciling the projects beforehand. However, then, the new government cancels them with no reasonable explanations. A young public service that has not had stable ‘foundations’ and income yet and experienced strong competition can easily become a hostage of political ‘games’ (3 experts).

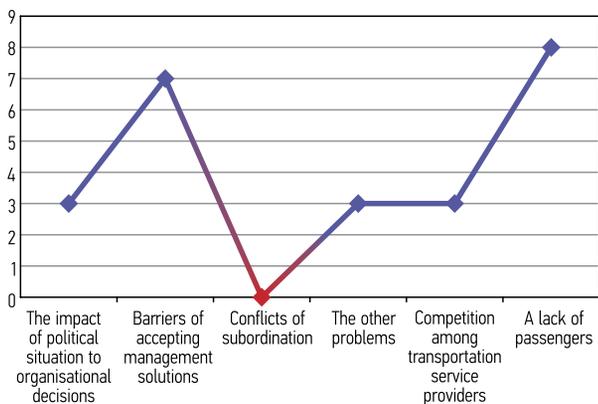


Fig. 4. Problems that might rise during the installation of the new system

- The problem considering **barriers to accepting management solutions** would arise if the ME ‘Transportation Services’ (*Susisiekimo paslaugos*) had the right to accept the most of the management solutions. A threat would arise municipal enterprise (ME) limit the operation of a new service according to the needs for providers of large transportation service (7 experts).
- A **conflict of subordination** is an aspect similar to the previous one; it is possible it was separated incorrectly, i.e. in principle, it repeats the second one, thus no experts have chosen it.
- **Competition among transportation service providers** is an obvious problem and its emergence is almost guaranteed since at present effort is made to eliminate minibuses from Vilnius although they are widely used in global practice. The main argument for this move is unclear operation and duplicate routes. Nevertheless, the author accepts these problems should be attempted to be solved in a way different from terminating services.
- **Lack of passengers** is an indicator that should be determined before organising services. For creating a new project, one needs to precisely identify the amount of and demand for a new service avoiding abstract and immeasurable objectives. Thus, a precise group of clients should be determined.
- **Problems presented by the experts:**
  - Organisational obstructions and a lack of competence is the first part of the already discussed problem. While discussing the competence of the service provider, one needs to take into account that although paratransit is the transportation service it will be provided to physically impaired people requiring special attention. Therefore, services should comprise both transportation and, to some extent, social help (assistance in using service not hurting the dignity of people). In this case, special education of driver training is necessary.
  - Long period of time for creating a system, advertising, a lack of computer literacy achieved by people with disabilities, etc. The implemen-

tation of this project has a real threat to being postponed for a long time because of many reasons: hard economic times, poor understanding of the government and society, harsh competition, a narrow group of clients, etc. As such service successfully operates in other countries, a model suitable for Vilnius has to be created. The problems of complicated advertising and the use of services due to low levels of computer literacy acquired by people with disabilities can be solved in the following ways: advertising services in printing press, organising training for people with disabilities in ordering services on the Internet, a possibility of making orders by phone or directly from the driver, etc.

- Financing problems is the issue relevant to every new business since no one can guarantee it will be successful. As there are no examples, thus, it is hard to forecast the parameters of performance. Knowledge of the situation on public transportation in Vilnius clearly shows this project is not a priority in the context of social integration of people with disabilities (the number of low floor vehicles must be increased etc.). Hence, ways to attract private investors have to be found.

### 3.6. Comments of the Experts

The last question was intended to receive experts’ comments related to the questionnaire dealing with the organisation of new paratransit services and making remarks on important aspects of creating this service that have not been mentioned (remark: the experts were not acquainted with the analysis of scientific literature and the current situation that had been carried out). The respondents submitted the following notes:

1. ‘The target group has no name, i.e. who are the receivers of services – those registered beforehand, only people with disabilities, or both pensioners and people having temporarily limited mobility’. This question has been partly answered by the concept of paratransit – preference for people with disabilities and other interested groups can be served when possible; however, clients are one of the main aspects that should be taken into account when creating such services.
2. ‘Financing structure has not been discussed’. The structure has already been a part of the model.
3. ‘People with disabilities face a very delicate problem – escort (most of them must have an escort (assistant) to be able to travel in a vehicle due to their health issues; it can also be difficult for them to go downstairs to the car because some of them live on the fifth floor in a block of flats that does not have an elevator). These and alike problems should be a serious obstacle to using transportation services’. This issue is enlisted into the principles of organising paratransit services, i.e. drivers perform the role of assistants that help to get on and off the vehicle.

4. ‘Training drivers and other staff is related to servicing people with impaired mobility’. This comment partially repeats the first one, though the necessity to train drivers as they also do the job of assistants is mentioned. Moreover, they should be aware of the methods and measures of the first aid, have knowledge about the symptoms of various illnesses and sudden worsening, know the basics of psychology and be at a certain level of a physical shape.
5. ‘How will the service provider be chosen? Will the ME ‘Transportation Services’ (*Susisiekimo paslaugos*) provide the service itself or will a contest for buying services be announced? A question about financing: will services be funded by the general ticket system or by a special government/municipality program? Will services be pure paratransit services or a mix with PD, i.e. in case of free seats, other passengers could be serviced for a higher price?’ Choosing the service provider has already been discussed in question 13 dealing with suitability for providers. There should be no competition in this area since the offered service is new. Therefore, only the type of the firm providing this particular service has to be chosen. The financing structure and groups of possible clients will be discussed in the recommended model.

## Conclusions

1. The expert survey provided the following information: the public transport system in Vilnius has to be complemented with salable special services to people with disabilities. The living place of the requester and vehicle accessibility have been determined to have the most significant impact on demand for services. Paratransit could mostly affect the infrastructure of the transportation system. However, it could negatively influence public transportation in respect of ticket prices and positively – in respect of the attractiveness of the provided service. The pricing system should be as follows: the price for a kilometre of the trip or the price for the entry at different areas should be defined beforehand. The experts suggested the vehicles of two types: 2÷5 seats (4 experts) and 5÷10 seats (4 experts). Most of the experts agree that paratransit services should be provided on the same days as traditional public transport – 7 days a week (8 experts). Ordering services should be at least a single working day before the trip (7 experts). The duration of one stop should not leave an interval of 2÷5 minutes. Paratransit services should be provided by a firm of a private sector. These problems were identified as possibly being the most important when organising and implementing services: barriers to accepting management solutions, a lack of passengers, an impact of a political situation, competition among transportation service providers. The experts additionally agreed on the following problems: a lack of competence to provide transportation services, long implementation time of the project, financing problems.
2. This paper lacks the main aspect of research – the estimation of the number of people having impaired mobility and their ability to use the offered services. On the other hand, such investigation should only be carried out when certain plans to employ special transportation services have been set up. This type of data would allow discussing the size and composition of the fleet and calculating payback more specifically. This direction of investigation is recommended for the authors of a specific project.
3. The demand and impact of services on the existent system are the main indicators showing that the paratransit system can be integrated into the existent system of transportation.

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