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ТАРИФНА СИСТЕМА ПАСАЖИРСЬКОГО ТРАНСПОРТУ У МІСТАХ СВІТУ

Проведено аналіз залежності використання тарифу від площі міста і кількості його населення (дані за 2014 р.). Для аналізу було відібрано 46 міст, які мають як спільний тариф на усі види транспорту (тобто увесь міський транспорт оперується єдиною компанією-перевізником), так і ті, де різні види транспорту оперуються різними перевізниками. Усього до розгляду було прийнято 80 різних тарифних планів.

Більшість великих міст світу (особливо з чисельністю понад 1 млн осіб) відштовхуються від простого, але неефективного єдиного тарифу на користь більш складніших. З одного боку, це зумовлює наявність додаткових засобів контролю за безквитковим проїздом, а з іншого, – усуває "зрівнялівку" і дає змогу пасажирам самим визначати оптимальну для себе вартість поїздки за критерієм швидкість (час, відстань)/ дешевизна. Крім того, гнучка тарифікація дає змогу уникнути покладання на водія додаткових функцій касира, що унеможливлює приховування виручки, з одного боку, і відволікання від дорожнього руху, – з іншого.

Ключові слова: тариф, рухомий склад, тарифікація, пасажирські перевезення, транспортна компанія, перевізник, квиток.

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URBAN PUBLIC TRANSPORT FARE SYSTEM IN DIFFERENT CITIES

The growth of inflation in our country, depreciation of UA hrivna and the further impoverishment of the population make an acute problem of conformity the payment for a transfer in a urban passenger transport to a degree of quality of these carriages, such as the means of transportation, quantity of trips and their distance.

The purpose of the article is the search of dependence between quantity of the population (area) of city, system of tariffing a passenger transfer, means of transportation and the document which confirms the implementing a passenger transfer.

It is conduct the analysis of dependence of the tariff use from the area of city and quantity of its population (the data for 2014). It was selected 46 cities for the analysis, which have both the blanket tariff for all types of transport (all urban transport is operated by the one company the carrier), and where different means of transportation are operated by different carriers. In total there are 80 different tariff plans were accepted into consideration

The majority of the big cities of the world (especially with population above 1 million person) depart from simple, but the inefficient blanket tariff for the benefit of more complex ones. On the one hand it stipulates the availability of additional means of the surveillance of a stowaway transfer, and with other – removes the leveling and allows to the passengers to

determine for himself the optimum cost of trip by criterion speed (time, distance) / cheapness. Besides the flexible tariffing allows to avoid putting on the driver the additional functions of the cashier which makes impossible the concealment of receipts on the one hand and derivations from traffic – from other.

Key words: the tariff, a rolling stock, tariffing, civil passenger traffic, transport company, carrier, ticket.

Problem statement. The main problem for tourists visiting another country (or even a city within one country) is to get accustomed to the new method of payment for their transfer, new method of transfer validation and to understand a principles of city fare system in urban public transport.

Analysis of recent studies and publications. The development of fares system on the transport enterprises become more popular subject over the last years among Ukrainian researchers. Yu. Barash and O. Pinchuk conducted a comprehensive analysis of the differentiation of tariffs, find profit from the transportation and the price distribution by the qualitative criteria [1]. T. Grigorova paid attention to the formation of prices and demand elasticity for suburban rail passenger services. However studies on this subject have been carried out in the context of other problems (in particular, the overall improvement of railway transportation, as well as within the overall analysis of the urban passenger transportation) [2].

Among English-writing scientist the problem of passenger transfer tariffing was held by V. Vuchic [3, 4].

Aims of the article. The aim of the article is the search of dependence between quantity of the population (area) of city, system of tariffing a passenger transfer, means of transportation and the document which confirms the implementing a passenger transfer.

Exposition of the basic research material. All modern passenger fare systems in public transport can be divided into several groups:

1. Single fare set a single price regardless of travel distance, travel time and the number of changes using the same type of transport (e.g., subway without outside exit, but the exit from the land transport for changing to another or the same is the considered as the end of the trip).

2. Zone fare is designed for a trip within a certain distance (if the trip distance exceeds the limit, then the fare increases). Zone centric fare is generally set in urban traffic, i.e. the size of the 1st zone with a minimum fare is calculated as the radius of the city centre, but distant suburbs, satellite cities or airports are related within the 2nd, 3rd or special tariff zone. A transfer from one mean of transportation to another (in most cases, except subway) is considered as the end of a trip.

3. Sectional fare uses the distance limitation (as well as the zone fare, but it is not centric) or the trip time limit, and the passenger can change the means of transportation certain times within this distance or time.

Advantages, disadvantages and examples of cities using each type of fare are listed in Table.

Taking into account the list of cities above it is clear that the most of the world big cities (especially with a population over 1 million people) depart from the simple, but inefficient single fare in favour of the more complex ones. On the one hand this leads to necessity the additional means of control for ticketless trip, and on the other, it allows to the passengers to determine for themselves the optimum cost of a trip on the criterion of speed (time, distance) and cheapness. In addition, a flexible fare avoids laying the additional cashier functions on the driver, as it makes impossible to disguise the proceeds on the one hand and the distraction on traffic – from the other.

There were selected 46 cities for the analysis. Among them there were cities with common fare for all types of transport (i.e., all public transport operated by a single carrier), and cities where different transport types are operated by different carriers. Totally 80 different fare plans were considered. The criteria for city selection were: the internet data availability, a representation of different continents and a presence of extensive urban transport system. For example, the African cities (Johannesburg, Algiers, Cairo, Lagos) were removed from the selection because of the urban transport clear system lack (the majority of urban transportations are conducted without a clear fare system by route taxi).

Advantages, disadvantages and examples of cities using each type of fare

A fare type	Advantages	Disadvantages	Examples
Single	– Clarity for the passenger (including foreigners); – Easy passengers calculation and control in the transport; – Use a single ticket (token or other means of validation); – Ability to sell tickets by a special machine (a special person), and also by a driver with the minimum lack for its vehicle control.	– Injustice in terms of transfer distance (1 stop trip and the full route have the same price); – A change from one vehicle to another needs an additional payment.	Ukraine (all cities), Russia (all cities except Moscow), Belarus (all cities), Moldova (Chisinau), Turkmenistan (Ashgabat).
Zone	– Clarity for the passenger (including foreigners); – Allows to save money to the local residents and make money on visitors; – Correctness to the distance terms; – Ability to sell tickets by a special machine (a special person), and also by a driver.	– Good for centre residents, but not good for suburbs residents or tourists; – More difficult to calculate and to control a number of passengers; – A need to print different tickets for different zones.	Spain (Madrid, Barcelona), Italy (Rome, Florence), Thailand (Bangkok), Turkey (Istanbul), Germany (Berlin, Munich).
Sectional	– Allows to save money for locals and to make money on visitors; – A change from one vehicle to another does not require additional payment within the distance (or time) limit; – The most correct to the passengers in terms of distance.	– Hard to understand for non-native (especially foreigners); – Difficult to calculate and to control the number of passengers; – A need to print different tickets for different distances or trip times; – Ability to sell tickets only by machines.	Austria (Vienna), France (Paris), Hungary (Budapest), Czech Republic (Prague).

It should be noted that in the most of the examined cities all passenger transport (subway, buses, etc.) are operated by a single carrier that allows to use a single fare with a single validation mean (ticket). However, we must highlight cities such as Bangkok, Tokyo, Hanoi, Harbin, Rio de Janeiro, Buenos Aires, Moscow, Saint-Petersburg, Minsk and some other mostly non-European, where, as in Ukraine, every type of transport is managed by a separate company, which uses its own fare and validation system (tickets, electronic cards, tokens).

There was done an analysis of dependence the transfer fare on the city square and the number of its population (by data for 2014). To do this, all fares were divided into groups depending on the number of visits or the time of tickets action: for one trip, 24 hours, month etc. As it is difficult to consider all possible means of charging in one article there were considered only the data for one trip (minimum distance, the minimum number of minutes of the rating trip), travel on separate lines to the airports considered separately. Data were obtained from public sources in the internet. The conversion of national currencies to a common currency analysis euro was held via the Universal Currency Converter (xe.com).

According to the analysis of all the cities, depending on the characteristics of their fare system can be divided into 3 groups.

Group 1 - Moscow, Minsk, Beijing, Shanghai, Harbin, Hanoi, Baku, Tbilisi, Novosibirsk, etc. These cities mostly use a single rate for each transport type separately. A feature of the fare in these cities is the low cost of travel (up to 1 Euro), regardless of the city area and population. It is based on the economic condition of the country, where the main feature of this city group is low purchasing power of the population. It should be noted the presence of diversification in the fare policy of these cities, i.e. the line in Beijing which connects the city to the airport, and which is mainly used by foreigners and people with high incomes, is charged separately at the level of countries with high income of population. All fare plans in Moscow, despite the effort to diversify them are in one group.

Group 2 consists of cities with a relatively small population and area, however, they use a flexible pricing system based on zone or sectional fare. Fares in these cities ranges from 1 up to 2 Euros, but the ticket in these cities is valid for all kinds of urban transport for some time (in passage area). In spite the higher price in comparison to the Group 1 the passengers in Group 2 cities are capable to use more types of transport and make more changes of the same spent money amount. Advantageously, European and North American cities are in this group.

Group 3 consists of the Nordic cities with high fares of transfer – Oslo, Stockholm, Amsterdam, Copenhagen, The Hague. Despite the small area of these cities and the relatively small number of people the minimum fare is extremely high in these cities. Also, this group includes the Australian cities with a large area where the presence of high fare is compensated by the great distances. However, it should be noted that these fares are greater only when buying a ticket directly during the trip, that is, they are designed for newcomers. Fares for locals are much less using electronic ticketing system where the fare is reduced.

Conclusion. The following conclusions can be done by reviewing all possible transfer types in the cities:

– in the cities that use the zone (and especially sectional fare) despite the fact that the cost of transfer is more, the passenger actually pay less using several means of transportation than using a single fare;

– the majority of cities in the world develops protectionist measures for local residents – travel e-tickets, etc., and the main burden of transport fares relies on non-residents, who do not need to purchase tickets, designed for long term use;

– in European, Australian and North American cities both paper tickets and reusable plastic electronic cards are popular; the cost for one trip with a card is cheaper than with the single-use ticket;

– in Asian cities (Bangkok, Beijing, Shanghai) a greater effect for the transfer cost pays not the distance, but the quality (comfort) of transfer (i.e., the air conditioning, speed, etc.);

– routes, which are designed for newcomers, or non-residents (i.e., at the airport) in most of the world's cities are charged according to individual criteria.

Perspectives of further research. The ne[t stage of the research is connected with the search of dependence between the between the cost of passenger transfer and an average salary in the country (or in the city if data are available).

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