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DIRECTIONS OF TARIFF AND TICKET INTEGRATION OF PUBLIC TRANSPORT IN THE METROPOLITAN AREA GDAŃSK-GDYNIA-SOPOT THE POMERANIAN VOIVODESHIP

Abstract

In the process of urban and regional public transport integration in the urbanized areas, the tariff and ticket integration is of fundamental importance, despite the fact that the price is not perceived as the basic transport postulate deciding on the choice of the way of moving. Public authorities of cities located in the metropolis Gdańsk-Gdynia-Sopot and the Pomeranian voivodeship have been undertaking attempts to integrate this transport for almost 30 years, so far without the desired results. This article presents general assumptions of tariff and ticket integration of urban and regional public transport, previous processes of integration of this transport in the Tri-City metropolis and the Pomeranian voivodship, as well as necessary directions of its tariff and ticket integration in this area in order to provide attractive transport offer.

Keywords: public transport, integration, tariff and ticket offer, Gdańsk-Gdynia-Sopot metropolis, Pomeranian Voivodeship

Introduction

In the conditions of strong motorization development, which is noted in Poland, the high share of public transport in urban and regional transport is conditioned by its attractiveness. To achieve the appropriate level of attractiveness, determining the implementation of sustainable mobility policy objectives, it should be integrated. Integration of public transport is of particular importance in metropolitan

areas in the form of conurbations, within which there are several cities, strongly connected with each other socio-economic ties. In a situation when these cities organize public transport themselves and at the same time operate rail and bus transport as separate non-integrated subsystems, there are significant barriers to the implementation of metropolitan and voivodeship travel. The main objective of the integration of public transport is to increase its competitiveness in relation to individual motorization by offering higher quality services than in the conditions of disintegration. Its tangible result should be to facilitate the use of all means of transport in a given area by:

- introduction of a convenient charging system,
- providing comprehensive information on transport services,
- reduction of travel time,
- facilitating the change of means of transport during the journey.

The conurbation area is the metropolitan area Gdańsk-Gdynia-Sopot located in the Pomeranian Voivodeship. Passenger transport in both the metropolis and the voivodeship is not sufficiently integrated. Activities focused on its integration, especially in the metropolis, have been undertaken for almost 30 years, so far without any major results. It is necessary to take more decisive measures involving the metropolis and the region, in particular in the field of tariffs and tickets. The aim of the article is therefore to present the necessary directions of tariff and ticket integration of public transport in the metropolitan area of the Tri-City and the Pomeranian Voivodeship.

1. The assumptions of tariff and ticket integration of urban and regional public transport

The municipality's own objective is to provide residents with public transport services. The fulfillment of this obligation is of particular importance in the teams of cities functionally connected with each other (Klimczak and Starowicz, 2010). From the point of view of the inhabitant of such an area, it is desirable that the public transport offer should be integrated. This postulate is fulfilled if there is one transport organizer in a given area. However, in a situation in which there are more organizers, they should cooperate with each other, striving to present the passengers the integrated offer. One of the most important aspects of cooperation is the integration of the offer in terms of tariff and ticket.

Manifestation of the presence of the community in the role of regulator and organizer of the market, shaping transport offer, is to pass tariffs covering prices for the public transport services, the rules of their application and a list of groups of people entitled to discounted and free travells. Through prices, the local governments achieve transport, social, political and economic objectives. Simultaneous realization of all these objectives, with the satisfaction of the residents, as a rule goes beyond the capabilities of the budget (Bąkowski, 2017). The budgets of local governments burden capital expenditures, refund allowances, covering the deficit

on the lines of low demand, as well as expenses for the introduction of integrated tariff and ticket systems.

Tariff issues are complicated by the presence of two or more public transport operators on the same, highly urbanized area. Then there are problems of tariff coordination in various cross-sections and price competition between the offer of particular organizers. These tariffs may be varied due to the distance of the journey, taking the form of a single, sectional or zone tariff (Wyszomirski, Ed., 2008).

In the single tariff the charge is independent of the distance and travel time. A passenger travelling the entire length of the route pays the same amount as a passenger travelling one stop. This tariff is simple to use, but passengers travelling for shorter distances, express dissatisfaction with charging them with the same fee as other passengers carrying out longer journeys.

Section charge makes the amount of the charge dependent on the number of sections covered to which the communication routes are divided. Isolation of routes can be based on distance (kilometers, number of stops) or time. The level of the tariff charge for each section, of the same or different dimensions, can also be diversified. The rule is the use of digressive fees, which means that the fees for each subsequent distance are getting lower. In practice, when it comes to section tariffs, in the situation of an advanced electronic ticket system, the division of the route into spatial sections is applicable, while in the absence of such a solution – for temporary sections recording only the travel time.

In the zone tariff, the fee depends on how many and in what zones the journey is carried out, with a uniform tariff in the single zone. Therefore, it is necessary to divide the urbanized area into zones, while the isolation of which often takes into account the administrative boundaries of districts or cities. The size of individual zones can be varied. In monocentric agglomerations, the division into two zones – urban and suburban – is often used.

It often happens that the tariffs are mixed. An example of this is the zone-time tariff. A ticket under such a tariff is valid in a particular zone or for a particular time (Dydkowski and Pietrzyński, 2010).

Price formation in monocentric and polycentric agglomerations is characterized by specificity. In the case of a strongly urbanized area with one center, it is easier to identify zone boundaries and introduce tariff digressivity. On the other hand, in the polycentric agglomerations the diversity of character and strength of connections between particular centers makes it difficult to designate zones in their areas, which causes considerable difficulties, in particular as regards the introduction of digressive tariffs.

It is important to adapt the tariffs to the conditions of integration. It primarily involves the introduction of appropriate tariff solutions, enabling travel by various means and modes of transport on the basis of a single ticket. It is therefore necessary to ensure the so-called correspondence of the tariff, enabling transfer between various means of transport during the travel on the basis of one ticket (Dydkowski, 2009).

The tariff for public transport services in cities and regions should be a compromise in pursuit of transport, social, political and economic goals. In this context, the basic functions of the tariff include:

- obtaining a specific division of transport tasks between collective and individual transport in relation to the policy of sustainable development of urban transport;
- achieving the rate of payment for transport services enabling, in connection with the funds from the commune's budget, to provide an adequate offer in terms of quantity and quality.

The way of fulfilling these functions affects the residents' assessment of the standard of living in the city, and thus the implementation of social and political goals. The reflection of the social function of the tariff is giving specific groups of people the right to discount and free travel, as well as the introduction of free transport in cities (Tomanek, 2017).

2. Previous processes of integrating public transport in the metropolis of the Tri-City and the Pomeranian Voivodeship

The current level of integration of public transport in the metropolis of the Tri-City and the Pomeranian Voivodeship is the result of:

- organization of this transport before introducing socio-political changes which started in 1989;
- transfer of responsibility for the organization of passenger transport in the area of voivodeships to local governments;
- administrative changes introduced by the laws of 1990 and 1998;
- actions taken by central authorities defining the principles of functioning of public collective transport, including in particular the introduction in 1997 of regulations changing the scope and amount of concessions in rail and regional bus transport;
- actions taken by local government in 1991–2017, leading to the integration of individual subsystems of public passenger transport.

The level of integration of transport offer of the passenger public transport in the Tri-City metropolis and the Pomeranian Voivodeship can be considered unsatisfactory, both from the point of view of passengers and the goals of sustainable mobility policy. The travel structure is an objective measure of the effectiveness of the integration of public transport. In the two largest cities of the metropolis – Gdańsk and Gdynia, the share of collective transport is 32.1% and 35.6% (Gdańskie Badania Ruchu, 2016; Preferencje, 2016), respectively, and as in other Polish cities it shows a declining trend towards private passenger cars. Undertaking activities in the scope of tariff and ticket integration of public transport in the Tri-City metropolis and the Pomeranian voivodeship should be considered in relation to functionally connected areas, serviced simultaneously by at least two organizers of collective transport, when their offers are substitutable with each other and/or complementary. The basic legal act regulating the principles of organization, financing and contracting public transport services is the Act on public transport from December 16th, 2010. It introduced the principles of organization, operation and financing of regular passenger transport in public transport carried

out on the territory of the Republic of Poland. Unfortunately, this act completely ignores the issue of integrating public transport.

In the Tri-City metropolis, the most important role in the organization of public transport is played by two separate transport boards being the budgetary units of Gdańsk and Gdynia, i.e. the Public Transport Authority in Gdańsk (ZTM) and the Public Transport Authority in Gdynia (ZKM). In addition, the organizer is the Town Hall in Wejherowo along with the Municipal Communication Plant Wejherowo (MZK) and the Municipal Office in Pruszcz Gdański. Municipal public transport in the Pomeranian Voivodeship, outside the metropolitan area, operates in Tczew, Słupsk, Malbork, Chojnice, Kościerzyna and Starogard Gdański.

The only organizer of rail transport in both the Tri-City metropolis in the form of the S-train (SKM) and the Pomeranian Metropolitan Railway (PKM), as well as the whole Pomorskie Voivodeship is the Government of the Pomorskie Voivodeship.

Regional bus transport functions as a deregulated one, which means that it is organized by the operators themselves. The Marshal's Office redistributes only funds from the central budget for the refund of legal concessions for this transport.

Activities in the field of public transport of passenger transport in the Pomeranian Voivodeship have been undertaken so far mainly within the metropolitan area. It resulted from the specific character of the metropolis as a polycentric agglomeration (with a few centers responsible for the organization of collective transport) and accumulation of problems resulting from the functioning of disintegrated passenger transport in a relatively small area inhabited by 1 million people.

In 2007, on the initiative of the Marshal of the Pomeranian Voivodeship, the Metropolitan Union of Communication of the Gulf of Gdansk (MZKZG) was established, formed by 13 municipalities (currently the union forms 14 municipalities). Initially, the MZKZG was to take over all the organizer functions carried out in relation to urban transport in the areas of these municipalities. Due to political reasons, the role of the MZKZG was reduced to the introduction of an integrated ticket as an additional offer in relation to local tickets, coordination of some local organizing activities, performing specific marketing research and educational activities in the field of so-called communication education.

From the beginning, the process of integrating public transport in the metropolis was not conducive to effective formal, legal and financial solutions. The introduction of one integrated ticket, replacing the tickets of various organizers, requires the use of a relatively high price discount, ensuring the attractiveness of its price to passengers. The communities forming the MZKZG have assumed the obligation to co-finance the tickets offered by the association in such a way as to refund to individual organizers reduced revenues from tickets before and after their introduction. Formal and legal solutions applied in Poland prevented the S-Train from obtaining reimbursement of discounts in relation to metropolitan tickets. Fiscal and legal solutions in this area require that the railway carrier uses its own ticket. In this situation, MZKZG decided to formally separate metropolitan tickets for a railway and commune ticket valid in buses, trams and trolleybuses. In the MZKZG offer, the metropolitan ticket was replaced with a combined ticket. There was a physical separation of carriers – the S-Train ticket is a paper ticket,

the municipal ticket is an electronic ticket. The possibility of buying a combined ticket on one electronic carrier occurs exclusively via the Internet. Also the scope and amount of entitlements to discount journeys were disintegrated in comparison with the previously developed offer, because their other catalog is valid in S-Train, another in the municipal public transport. The situation that occurred in the metropolis is a great example of the primacy of formal and legal solutions on the effectiveness and lack of willingness to adapt the existing legal provisions to passenger expectations and create conditions for a sustainable transport system. In the era of information economy, maintaining such a state is incomprehensible.

To a limited extent, construction or modernization of interchanges and stops was implemented in the metropolis. Most of the city bus stops have specific barriers resulting from the arrangement of the tracks on the embankments elevated above the street level, hindering their integration with local transport organized by the municipalities.

3. Necessary directions of tariff and ticket integration of public transport in the Tri-City metropolis and the Pomeranian Voivodeship

The essential direction of tariff and ticket integration of public transport in the metropolis of the Tri-City and the Pomeranian Voivodeship is full integration, i.e. a situation in which in the particular area there is a common – for all organizers, operators and carriers of public transport – tariff and a ticket system. This means that the organizers, operators and carriers do not use their own tariffs. The entitlements to concessionary and free travel are also unified as part of the tariff.

As part of full integration, it would be appropriate to transfer responsibility for the tariff and ticket policy for rail transport and ticket sales, depending on the spatial scope of integration, to a separate voivodeship or metropolitan transport organizer. The way of contracting rail operators should also change. Gross contracts should be concluded with these operators. They would then receive only payment for services rendered (operational work carried out), while revenues from the sale of tickets would go to the organizer of transport. Such a way of contracting would eliminate the barrier of integration in the form of differences in the financing of services.

The offer of a tariff assuming full integration in the metropolitan area was developed at the MZKZG. It would result in the simplification and unification of tariffs in this area. All means of transport, regardless of the form of ownership, would be treated equally. There would be one issuer of all tickets – the Metropolitan Transport Board (MZT), whose integrated tariff would apply in the territory of the association.

In a similar way as for a metropolitan area, a common tariff can be constructed for the entire voivodeship. However, it would require providing a uniform carrier for a joint ticket, which could be used by passengers in all means of urban and regional public transport in the voivodeship.

The introduction of a fully integrated tariff would also mean the need for a significant increase in subsidies from the budgets of local government units

at various levels. For the metropolitan area, taking into account the prices and types of tickets proposed by the MZKZG (Table 1) and unification of entitlements to free and discounted travells, this figure would amount, according to calculations related to 2015, to approximately PLN 67 million per year (Kołodziejski, Ed., 2015).

Table 1. Fare schedule for the full tariff and ticket integration of public transport in the Tri-City metropolitan area

One-way and time tickets	Price(PLN)
One-way ticket being also a 1-hour (change-over) ticket valid in: S-Train, PKM, buses, trams and trolleybuses in the area of two neighbouring communes	3
One-way ticket being also a 1-hour (change-over) ticket valid in: S-Train, PKM, buses, trams and trolleybuses in the area of four neighbouring communes	6
One-way ticket being also a 1-hour (change-over) ticket valid in: S-Train, PKM, buses, trams and trolleybuses in the area of the whole metropolis	9
Day ticket (24 h) valid in: S-Train, PKM, buses, trams and trolleybuses in the area of two neighbouring communes	12
Day ticket (24 h) valid in: S-Train, PKM, buses, trams and trolleybuses in the area of four neighbouring communes	16
Day ticket (24 h) valid in: S-Train, PKM, buses, trams and trolleybuses in the area of the whole metropolis	20
Season tickets valid in S-Train, PKM, buses, trams, trolleybuses	
Valid in one municipality without Gdańsk and Gdynia	60
Valid in two neighbouring municipalities	90
Valid in three neighbouring municipalities	120
Valid in four neighbouring municipalities	160
Metropolitan	220

Source: (Kołodziejski, Ed., 2015)

In the case of incomplete tariff and ticket integration, its different variants can be considered, both with regard to tariff, ticket and tariff-ticket integration. One of the examples of such incomplete integration is the solution already implemented in the Metropolitan Transport Union of the Gulf of Gdańsk. However, urban and railway fares were not liquidated – the MZKZG fare is an additional, complementary offer addressed to people who had to buy at least two tickets from various issuers. Such a solution, being an incomplete tariff and ticket integration, was introduced due to financial, legal and organizational conditions that prevented the implementation of the full integration model.

The conditions mentioned above still constitute a significant barrier limiting the applicability of full tariff and ticket integration throughout the entire Pomeranian Voivodeship. The size of the region, the differences in the density (availability) of the collective transport network and the large number of entities that should participate in the tariff and ticket integration are also important. For this reason, in the first stage of the process aiming at full tariff and ticket integration, the following solution can be considered:

- extension of the MZKZG tariff (one ticket and monthly rail-communal combined tickets) to the area of communes functionally connected with the Tri-City

- metropolitan area, such as: Kartuzy, Pszczółki, Tczew and Tczew commune, by joining these municipalities to MZKZG;
- introduction of an additional integrated (combined) tariff for monthly rail-communal season tickets (monthly and 30-day), valid in public transport in individual cities of the voivodeship and rail in related transports, similar to the solution functioning in the MZKZG;
 - supplementing the MZKZG tariff with 1-hour rail and municipal tickets;
 - implementation of an integrated ticket system, as a tool for tariff and ticket integration of public transport enabling the extension of the scope of tariff and ticket integration, and ultimately the introduction of a common tariff and, as a result, full tariff and ticket integration throughout the entire voivodeship.

The introduction of an additional integrated (combined) tariff for rail-communal monthly tickets valid in public transport in individual cities of the voivodeship and rail in related transports, similar to the solution functioning in the MZKZG, would be based on agreements concluded between the organizer of urban transport and the organizer of railway transport. The monthly combined rail and communal integrated ticket would consist of the selected combined monthly ticket for the public transport organizer (e.g. from Słupsk, Lębork, Malbork, Chojnice) or the MZKZG and the selected train and/or regional bus transport (organized by the Regional Transport Board). Each integrated ticket would be sold with a discount granted by the organizer of the urban transport and the organizer of the regional rail and bus transport respectively. The total amount of the discount should have both marketing characteristics and resulting from the transport policy. In other words, the final price of the ticket should take into account the payment threshold for the purchase of such a ticket by the passenger, as an alternative to travel by car. The discount would be covered by the generated additional demand (the marketing part) and budgets of local governments (the part connected with the implementation of the transport policy). In the case of regional rail and bus transport tickets, it would be possible to obtain a refund from the state budget for honoring the statutory entitlements to discount journeys.

In the tariff of monthly combined tickets valid in the voivodeship, there could also be combined tickets for more than two issuers of tickets. In justified situations, one could consider the introduction of valid tickets, for example in urban transport in Słupsk, in urban transport in the area of the MZKZG and in railway transport on the section from Słupsk to the MZKZG. In addition, regional bus transport operators could participate in the integrated voivodeship integrated ticket.

In formal terms, the voivodeship integrated ticket would consist of separate tickets, which would correspond to the specific tariffs of the given organizer / operator / carrier of the discount. The ticket price would be reduced by the discount increasing its attractiveness, however, the marketing rule should be followed: the wider the scope of services, the higher the discount for the passenger. Before the journey, the passenger could declare the scope of their travel, including the travel relation and entities from the services they will use. Data entered into the system at the time the ticket was purchased would be the basis for the settlement of integrated tickets.

Independently, it would be possible to extend the MZKZG tariff (one ticket and the monthly rail-communal combined ticket) to the area of communes functionally linked to the Tri-City metropolitan area after their accession to the MZKZG. Such a solution would significantly increase the attractiveness of the public transport offer for passengers performing travel from these communes to its central area and in reverse relation.

In addition, it is recommended to supplement the MZKZG tariff with a 1-hour rail-municipal ticket. This ticket would provide the opportunity to carry out a journey requiring a change of means of public transport for people incidentally using public transport. However, it would require significant subsidies from budgets of local government units of various levels.

The tariff integration should be accompanied by ticket integration. Initially, it can be used to save paper and electronic media tickets in the form of electronic cards. However, the fundamental change in this matter, which will also be the foundation for the next stage of tariff integration, will ensure the implementation of the new integrated ticket system. Such a system should make it possible to extend the scope of tariff integration, and finally to introduce a common tariff throughout the whole voivodeship. Under this system, the so-called electronic purse could be introduced. The passenger would pay by registering in each vehicle at the beginning and end of the journey (this operation would be automatically performed at the entrance and exit of the vehicle in case of equipping the vehicles with the “be in – be out” system). The discount should be charged by the system when using the second and subsequent vehicle. Appropriate modifications should also be made to applications enabling the purchase of tickets by mobile devices and the Internet. Thanks to specialist software, settlements between service providers would be carried out automatically by the system.

The introduction of integrated combined tickets, in the event of a discount resulting from a transport policy, requires defining the rules for refinancing this discount from the budgets of local government units. However, one should look at this issue comprehensively considering the negative financial results of the continuation of the trend of decreasing the number of public transport passengers. Counteracting this phenomenon allows to limit budget expenditures to cover the current costs of maintaining public transport due to the increase in revenues from tickets, as well as for the construction, modernization and maintenance of road transport infrastructure intended for a systematically growing number of individual motorization users.

The introduction of a common electronic carrier of integrated tickets will enable a much wider development of the tariff and ticket offer and will automate the process of their sale and settlement. In the widest scope, the voivodeship integrated ticket would enable the use of:

- public transport in the metropolis;
- public transport in the cities of the voivodeship outside the metropolis;
- railway transport in the area of the voivodeship;
- regional bus transport in the area of the voivodeship.

The issue of unification of free and discounted travel entitlements and determination of their rational scope remains to be solved. Integrated tickets require

a standardization for all participants of the integration of the list of groups of people entitled to free and concessionary journeys and the amount of concessions. This can be ensured at the initial stage of integration. Lack of coordination of the policy of granting entitlements to concessionary and free journeys makes it difficult to develop a single catalogue, which will be necessary in the conditions of full tariff and ticket integration. Each new entitlement reduces revenues from ticket sales and increases the need for additional funds from the budgets of local government units to cover the difference between the revenues from the sale of tickets and the costs of functioning of public transport.

The tariff and ticket integration should be accompanied by the integration of information on the functioning of public transport in the voivodeship. Each passenger should be able to plan trips using various public transport with the help of mobile devices and the Internet. Travel planning should be possible both in a static and dynamic system, i.e. taking into account the actual implementation of the timetable.

The introduction of an integrated tariff in the Tri-City metropolis requires preparation of a financing model. As in other EU agglomerations, integration should be financed by authorities at various levels: local, regional and governmental.

Conclusions

In a situation when cities located in the metropolis organize public transport themselves and at the same time non-integrated rail and regional bus transport operate, significant barriers to the implementation of metropolitan and voivodeship journeys appear. The integration of public transport plays a special role in metropolitan areas in the form of a conurbation. The metropolitan area Gdańsk-Gdynia-Sopot located in the Pomeranian Voivodeship is the area of conurbation. In this area, it is necessary to take measures to integrate public transport covering the metropolis and the voivodeship, in particular in the field of tariffs and tickets.

As part of the activities integrating public transport in the metropolis of the Tri-City in 2007, the Metropolitan Transport Union of the Gulf of Gdańsk was established. This entity was to overtake all organizational functions carried out in relation to urban transport in the areas of these communes. Political issues have, however, led to the situation that its role was only to introduce an integrated ticket as an additional offer in relation to local tickets.

The essential direction of tariff and ticket integration of public transport in the metropolis of the Tri-City and the Pomeranian Voivodeship is full integration, ensuring that all organizers, operators and carriers have a common tariff and ticket system. Full integration can be achieved in stages. The introduction of modern payment carriers for journeys, facilitating tariff changes and settlements between entities providing transport services is of great importance in the integration process. The unification of the entitlements to free and concessionary journeys and the establishment of their rational scope are to be solved. Lack of coordination of the policy of granting allowances for discounted and free journeys makes

it difficult to develop a uniform catalogue, which will be necessary in the conditions of full tariff and ticket integration.

The condition for obtaining fully satisfactory results of the integration of public transport in the metropolis and the voivodeship is the change in the existing statutory regulations regarding the entitlements to concessionary and free travel and the refund of lost revenues due to their granting. The current regulations hinder the integration process and constitute a serious barrier on its path.

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