

8. Dilemmas of organising public transport in COVID-19 and post-COVID-19 times



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Abstract

Purpose: The chapter aims to identify the most important challenges related to public transport organisation during COVID and post-COVID times. The author asks several questions: How have the restrictions affected (and still affect) public transport? Can economically efficient public transport services be offered in COVID and post-COVID times? And finally: Is public transport safe for users, and will it be safe in the future?

Design/methodology/approach: The chapter is based on the literature review and examination of selected case studies. The analysis is carried out in urban transport, regional and interregional rail transport and international transport (particularly air transport).

Findings: The chapter specifies the “dilemmas”, of which the most important is a contradiction between the essential requirement for the operation of public transport (to transport many people in a small space) and the basic principle of minimising the increase in COVID infections (the avoidance of large crowds of people).

Research limitations: Quantitative methods could further develop and confirm the study.

Practical implications: The chapter diagnoses the main challenges related to the organisation and operation of public transport systems in (socially and economically) uncertain times that lie within areas of interest of both managers and local government authorities.

Originality and value: The study contributes to the ongoing discussion on improving public transport.

Keywords: public transport, pandemia, social services, public management.

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Introduction

Public transport in the COVID and post-COVID era is becoming an interesting area of research. From different perspectives: social and economic. In economics: from the point of view of efficiency but also marketing or microeconomics. The main aim of the chapter is to present selected solutions applied in public transport within the framework of prevention and fight against the COVID-19 pandemic. The title of this paper contains word “dilemmas”: a fundamental contradiction between the basic assumption for the way of functioning public transport (concerning the transport of many people in a small space) and the key principle of minimizing the growth of infections (avoiding large crowds of people). Technical and economic challenges associated with this dilemma were the main research problem. Research methods used by author were: case study analysis and literature review.

8.1. Organisation of the public transport

In general, public transport is based on the transport of passengers in an organised way. The specificity of this form of transport is related to the transport of a large number of people in a short time, in the perspective of short (city, agglomeration) or longer (rail or air) distances. Public transport therefore covers a wide range of different areas of human social and economic functioning.

Increasing mobility needs is the result of, among others, economic development, and mobility is the basis for participation in socio-economic life and determines independence (Kauf, 2013, p. 57). The way public transport operates is, among other things, a derivative of changes in mobility, often defined as sustainable mobility. These changes include, among others, the need to shorten journey times, to make journeys independently, to increase the share of forms of mobility other than passenger cars, to improve the efficiency of vehicle use or urban space (Banister, 2008, pp. 73–80, as cited in Wyszomirski, 2017, p. 29).

These elements form the basis for the functioning of public transport systems. With the emergence of the pandemic, the fundamental pillars of the system were shaken, prompting serious reflection on the future shape of public transport systems.

8.1.1. Public transport in COVID-19—literature analysis

To diagnose the current state of knowledge, the literature of the subject was analysed. Practically since the beginning of the pandemic the topic has been present in the scientific research of both domestic and foreign researchers. These publications

were created, among other things, as the results of observations and analyses of how to fight the pandemic in different countries. Publications include publications addressing the issue from the perspective of challenges observed in different countries, including China (Shen et al., 2020, Tairachini & Cats, 2020); Sweden (Jenelius & Cebecauer, 2020), Finland (Tiikkaja & Viri, 2021), Spain (Awad-Núñez et al., 2021), Great Britain (Vickerman, 2021), Germany (Eisenmann et al., 2021) and Australia (Beck et al., 2020; Hensher et al., 2021). We also have some publications about COVID-19 in public transport in Poland (Przybyłowski et al., 2021; Wielechowski et al., 2020).

In 2020, Ceder (2020) and Koehl (2020) have written about the challenges and future of transport in the perspective of the pandemic. There are also more and more publications about separate problems connected with public transport, such as: public transport planning (Gkiotsalitis & Cats, 2020), satisfaction related to the use of public transport (Dong et al., 2021), safety in public transport (Dzisi & Dei, 2020), shift from public to private transport (Das et al., 2021), or more widely: challenges related to the implementation of public transport services (Gutierrez et al., 2021).

Analysing the above mentioned items, it can be concluded with certainty that the literature of the subject is already quite extensive today. These include publications with approach to the topic in selected countries, case studies on selected cities, but also articles relating to selected problems (such as safety, user satisfaction).

8.1.2. Performance measurement

Efficiency of action is the basis of the essence of the functioning of the system, the imperative of its functioning (Leśkiewicz, 1994, pp. 199–200, as cited in Ejdyś, 2014, p. 49). According to Bertalanffy's general concept of systems, it should be noted that a system has a certain composition, environment and structure, and the individual elements of a system have relations—both among themselves and with the environment, and in the context of social systems, that the components of systems form a system with properties that the elements of systems do not have on their own (Bertalanffy, 1984, as cited in Sękowski, 1988).

Regardless of the above, it is possible to define how to understand efficiency in the context of public transport services. The economic efficiency of public transport has remained an area of interest for many years, among others on the basis of critical analysis of transport operations (Diana & Daraio, 2014), increasing the efficiency of the service provided (Carvalho et al., 2015; Daraio et al., 2016; Georgiadis et al., 2014) or efficiency in the social sense (Tzvetkova, 2017). There are variables that can be considered to increase efficiency, such as: proportion of

drivers, average vehicle age, the presence of tramlines in the city, total vehicle kilometers and population density (Fitzova et. al., 2018).

The main challenge for the efficiency of transport during the pandemic was the sharply reduced demand for transport. The closure of schools and many workplaces has resulted in a significant reduction in the number of passengers. In addition, many companies (as far as technical and business-specific possibilities) switched to remote work. Reduced demand for transport was also associated with the closure of commercial, sport and recreational facilities. All this translated into a global drop in supply, observed both on working days (including peak traffic) and on holidays.

In urban transport, number of passengers and ticket revenues declined by several dozens of percent. In Warsaw: -39.1% and -38.7% , in Krakow: -46.8% and -33.6% , in Poznań: -32.7% and -29.3% (Zajfert, 2021, p. 10). In Warsaw, in March 2020, the number of passengers on public transport fell by 80%, in April the number of tickets sold fell by 92% (Bryniarska & Kuza, 2021, p. 12).

An important area related to the functioning of public transport concerns the broad scope of the analysis of “transport costs”. As a public service, transport has an important social role: it is a good accessible to all concerned, it supports the mobility of the economically disadvantaged, and it is therefore seen as a social policy tool. Thus, the cost structure of public transport should be analysed widely.

Wyszomirski (2002) points out, among the structure of urban transport costs, both own costs (of transport organizer and carriers) and transport infrastructure costs (state or local government costs), but also external costs and time costs—as cost groups for residents and society as a whole (Wyszomirski, 2002, p. 101). It should therefore be noted that the operation of public transport is of general social importance and implies a reduction of the negative impact of transport and cannot therefore be considered solely on the basis of revenues and costs within the meaning of the financial account of the carrier or transport operator.

8.1.3. Technical dilemmas

One of the technical solutions implemented as part of the first stages of the fight against the pandemic was to separate drivers from passengers. This was supposed to increase the safety of people driving vehicles, as they are particularly vulnerable to infection. They naturally have contact with hundreds of strangers every day. This usually meant physically separating the vehicle cabin. However, the enclosure of the cabin proved to be insufficient, which is why the first doors were additionally disabled. Depending on the type of vehicle, this required

interference with the electrical system (e.g., by deactivating the fuse) or the software controlling the door operation (to “deactivate” the door both at the level of the buttons used by the driver and directly by the passengers). Other solutions were also used on an ad hoc basis (e.g., taping half of seats, to omit using this seats by passengers).

Along with the reduction of COVID restrictions, selected restrictions were eliminated from urban transport. However, the question is still actual: what about the future? With the risk of further pandemics, there will be a debate on the need to prepare vehicles permanently for pandemic conditions. The service life of the bus fleet according to various estimates ranges from 10 to 12–15 years. In American cities, it is assumed that the service life of the bus is approximately 12 years (thoughtco.com, 2023). In practice, the replacement of rolling stock in Polish cities is mainly due to budgetary possibilities, and the service life is usually extended by several years. Thus, a complete replacement of the bus fleet with one that is functionally adapted to pandemic conditions would take approximately 20 years old (and even 40–50 years old!) which makes such a direction unrealistic. What remains is the dynamic adaptation of vehicles to the current pandemic challenges and associated constraints—through physical separation of drivers or minor functional improvements (in terms of space use, restrictions on passenger movement or changes to air conditioning systems).

As part of the fight against the pandemic, a number of other measures related to the safety of transport operations were introduced. In particular, the following have been introduced:

- central door opening in vehicles and temporary suspension of stops on demand—these stops have become temporarily permanent—that also eliminates the need to press buttons in the vehicle;
- personal protective equipment for drivers (e.g., disinfectants);
- suspension of ticket sales by drivers—to reduce interaction with passengers;
- disinfection of vehicles and their more frequent (or more thorough) washing;
- ventilation of vehicles on the loops by opening the door during a stop at the final stops;
- deactivation of air conditioning / ventilation systems—to reduce the risk of virus spread due to air circulation in the vehicle system.

In the longer term, it is worth considering whether other elements of vehicle equipment should be consistently implemented in order to ensure the highest possible sanitary comfort while travelling. It is difficult to imagine a permanent reduction in the capacity of transport vehicles, which would contradict the fundamental principles of public transport.

8.1.4. Economic dilemmas

Legal regulations were the basis for supply restrictions in public transport. Regulation of the Minister of Health from 24th of March 2020 (Rozporządzenie Ministra Zdrowia z dnia 24 marca 2020) introduced the obligation to limit the number of passengers in public transport, introducing the provision that “vehicle of public transport (...) may carry passengers, at the same time, no more than half of the number of seats”. This limit was in force from 25th March (originally until 11th of April), which in practice gave public transport operators a very short time to prepare for the changes. Further law regulations extended the duration of the different public transport restrictions, and finally extended indefinitely.

These restrictions have in practice drastically reduced the capacity of vehicles. Thus, given that ticket fees are basic (excluding public funding) group of revenues in public transport systems, this has had a dramatic impact on the profitability of transport. How can we ensure that we operate at the same or comparable level of costs in the face of sharply reduced supply and revenue from tickets? Municipalities faced a serious dilemma regarding the form of the public service provided.

It is also worth highlighting the concept of the so-called “vicious circle of urban transport”. The decline in the quality of public transport affects the development of individual transport. It would therefore be a generally bad idea to reduce the supply of public transport in cities. During the pandemic, the number of lines and frequency of courses was reduced, but this was only a short-term perspective.

8.2. Public transport—a branch perspective

Trends in rail and air transport were also briefly reviewed. A significant decrease in the number of rail passengers was already recorded at the very beginning of the pandemic. In April 2020, the average number of trains operated by PKP Intercity decreased by approximately 60%, another 8% travelled in a shortened routes, and the average drop in attendance (measured by the level of ticket booking) was 94% (Czubiński, 2020).

The rail transport sector carried 335.9 million passengers in 2019. In 2020, it was 209.4 million, then in the next years: 245.1 million and 342.2 million passengers (UTK, 2023). Last year, therefore, the number of transports from the record year 2019 was exceeded. As a result, the rail transport market, both in terms of the number of passengers carried and the transport work performed, recovered to pre-pandemic levels and even improved its results (operating work increased in 2022 compared to 2019: 186.0 and 171.0 million train-kilometres respectively, and transport work increased to 23,766 and 22,065 million passenger-kilometres

respectively) (UTK, 2023). In 2019, Polish railways carried an average of 27.99 million passengers per month. The lowest traffic results of the pandemic were recorded in April and May 2022 (respectively: 6.1 million and 9.8 million passengers). The gradual recovery of the volume of traffic lasted until 2022, only then the average monthly volume of traffic reached 28.52 million passengers—exceeding the pre-pandemic figures (UTK, 2023). Of course, the indicated data show a certain trend and the analysed market at a certain level of generality—there are both inter-voivodship connections (PKP Intercity is responsible for the transport of 15.69% of passengers, 54.2% of transport work and 35.08% of operating work) (UTK, 2023) as well as transport services operated by numerous companies providing regional transport services.

Decreases of several dozen percent (on an annual basis) were also recorded in air transport. In 2019, 49 million passengers were handled at Polish airports, performing 400,000 flight operations. A year later it was just over 14.5 million passengers (156,000 operations), in 2021 it was 19.6 million passengers and 191,000 flight operations (ULC, 2022). The Civil Aviation Authority has not yet published complete data for 2022, but the data for the first three quarters can be compared with the first three quarters of 2019. On this basis, it should be concluded that the scale of air traffic before the pandemic has not been restored. In the first three quarters of 2019, 37.6 million passengers were carried, in the same period three years later: less than 31 million passengers (ULC, 2021, 2023). These two sectors are outlined, emphasising that public transport problems in the pandemic are not just urban transport problems.

8.3. COVID and post-COVID—a macroeconomic context

Macroeconomic factors also influence the current state of the transport industry. Changes to the law introduced in 2022 led to a sharp deterioration in the financial condition of local governments. Specialists of the Union of Polish Cities calculated that the biggest Polish cities will lose the most in these changes. The biggest losses will be in Warsaw: 5.9 billion PLN, Kraków: 1.6 billion PLN, Wrocław: 1.4 billion PLN and Poznań: 1.1 billion PLN (ZMP, 2022). This analysis includes losses associated with lower tax revenues as well as additional equalisation funds, which are, however, much lower than the lost revenues.

High inflation remains a major problem, which also poses a threat to public transport services. Exceeding the inflation target (2.5%) in March 2021 started a long period of almost continuous inflation growth, reaching 18.4% on an annual basis in February 2023 (GUS, 2023). High inflation naturally forces upward pressure on wages, rising labour costs as well as external service costs and rolling

stock maintenance costs. And in the longer term, this poses a real risk of not providing adequate funding for the whole service sector. An additional challenge is the unfavourable exchange rate—a low value of the Polish zloty (PLN) means a higher cost both when purchasing fuels and numerous imported products (vehicles, components, etc.).

Conclusions

Public transport has regained the confidence of passengers, in terms of the scale of transport delivery has generally returned to the levels of 2019. The challenge for the coming years remains limited finances of local governments, which will negatively affect the possibility of developing transport systems, and the priority is to maintain the current level of transport offer.

The limitations of the research were mainly related to the participatory observation conducted locally—for the development of the research in the future it is possible to perform similar analyses also for other urban areas,

Trends observed in the transport industry, for example in terms of traffic autonomy or the search for alternative sources of energy, do not bypass the public transport sector. In addition to the important issues related to functioning during and immediately after the pandemic, public transport is also following industry trends. This means that in addition to risk factors, there are also opportunities factors—especially in the area of increasingly represented new technologies.

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