

TRANSPORT POLICIES AND BUSINESS PRACTICES DURING COVID-19 AND THEIR IMPACT ON THE MANAGEMENT OF NEW TRANSPORT MOBILITY SYSTEMS – INTRODUCTORY PART

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Abstract. The COVID-19 pandemic has had a profound effect on global economies. Transport was a particular sector of the economy that was particularly exposed to the spread of the virus. This has led to many changes in the management and the implementation of various types of business practices in the new mobility companies during the pandemic and post-pandemic periods. The work aimed to analyze the policies in the field of transport in pandemic times and the practices implemented and provided by enterprises in the field of new mobility, including companies sharing vehicles, e.g., car-sharing, bike-sharing, scooter-sharing, and ride-sharing. Furthermore, the article was used to indicate the changes that have occurred in the management of new mobility enterprises in companies operating in Asia, Europe, and America. The work is based on secondary data research and own research. The developed results indicate which operators made the most changes and which continents proposed the most changes to transport policies. The article supports the development of both new policies for the post-pandemic period and new business practices for companies in the new mobility services industry.

Keywords: mobility management, COVID-19 pandemics, sustainable urban transport systems, new mobility, business practices, business models.

JEL Classification: H12, K20, L91, L92, L98, M19, M21, O32, O35, O36.

Introduction

The spread of the COVID-19 pandemic has led to significant changes in all sectors of the economy. This particularly affected the sector, which is considered the bloodstream of the economy, that is, transport. It is the transport area that has become one of the greatest threats to the spread of the virus in society.

The sudden outbreak of the pandemic caused many changes in society's mobility, as well as its existing transportation habits, caused by the introduction of various types of restrictions, isolation, quarantine, or blocks. That kind of change was perceived all over the world. Detailed data on mobility show that the largest decrease in mobility was on average over 50% in the first wave of the pandemic (Apple Incorporation Mobility Report, 2020). For the examples, the changes amounted to 54% in the case of Italy, 51% for England, and 18% in Germany (Apple Incorporation Mobility Report, 2020; Community Mobility Report, 2020).

Restrictions and fear of virus infection in public transport have made society is much more inclined to choose a car for everyday travel. Simultaneously, however, there was a problem with vehicles offered as part of shared transport, i.e., with all forms of so-called shared mobility, i.e., websites that offer the possibility of renting vehicles for a short time. On the one hand, many residents who did not have their private vehicles wanted to use shared transport services; on the other hand, they were afraid to do so due to sanitary safety issues. There were also issues related to the approach of local and governmental authorities to new mobility vehicles.

As the pandemic unfolds, we have identified that authorities are introducing new policies and approaches to transport and new urban and shared mobility are emerging in the world. These behaviors were evident in Asia, America, and Europe. We have noticed that many of these guidelines directly affect the service providers of new mobility and that companies are forced to look for all sorts of new practices to survive in a difficult market.

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This article was dedicated to analyzing the policies in the field of transport in pandemic times and the practices implemented and provided by enterprises in the field of new mobility, including companies sharing vehicles, for example, car-sharing, bike-sharing, scooter-sharing, and ride-sharing. In addition, the article was used to indicate the changes that have occurred in the management of new mobility enterprises in companies operating in Asia, Europe, and America. The work is based on secondary data research and own research.

Due to the large content of the analyzed material, this regular article presents a detailed analysis of policies for transport and new mobility, and the business practices of companies are only briefly discussed. The entire analysis was presented in the extended version of the work.

1. Theoretical background: new mobility

Transport mobility is defined as the activity of society undertaken to meet transport needs (Delso et al., 2018; Hensher, 1979; Mohan et al., 2000). These are all beliefs and opinions about movement (Hensher, 1979; Mohan et al., 2000). Typical mobility includes all classic mobility forms, such as traveling by own vehicle, walking, or transporting by public transport equipped with conventional vehicles (Bieliński et al., 2019). In turn, the concept of new mobility refers to all kinds of activities leading to balancing transport in cities, agglomerations, and indirectly in the region and supporting economic growth, contributing to the improvement of living standards of residents and other transport users, as well as the protection of the environment and the development of urban and regional transport (Bieliński et al., 2019). The concept of new mobility is associated with offering various types of transport forms such as (Okraszewska et al., 2018):

- electromobility and mobility using alternative fuels, including hydrogen fuels,
- Mobility-as-a-Service (MaaS) – booking of vehicles or on-demand journeys made available through mobile applications).

Electromobility and the use of vehicles fueled with alternative fuels apply to urban mobility both to journeys offered using public transport, individual vehicles, and vehicles available in on-demand services. Mobility-as-a-Service (MaaS) describes a shift away from personally owned transportation modes and toward mobility provided as a service (Arias-Molinares & García-Palomares, 2020). The MaaS is offered, among others, by operators of TNC – transit network companies in the form of ride-hailing and ride-sourcing. MaaS includes all types of services provided by operators such as Uber or myTaxi. Shared mobility services constitute a separate group of systems that allow private users to rent a vehicle from the automated self-rental city located in the city for a short time (Sprei et al., 2019). This kind of rental offered vehicles such as bicycles, scooters, mopeds, and cars. Most of them also offered vehicles powered by electric drives.

The main idea of using the services is to provide users with vehicles that can be used only for minutes. Therefore, all of the shared mobility services are called companies that offer “vehicles per minute” (Rinne, 2015). The main advantage of shared mobility vehicles is their availability (Shaheen et al., 2020). It means that when the user wants to rent the vehicle, there is no need to contact the customer service office or participate in the complicated registration (De Maio, 2009). Thus, the main features of shared mobility systems can be considered as their availability to the public by improving transport accessibility and being an alternative to owning a vehicle, especially in economically challenging times such as the crisis.

Shared mobility services in urban areas have begun to appear in transport systems in 1948 in the case of the first car-sharing system and 1965 in the case of the first bike-sharing system (Turoń et al., 2019). However, the most significant development of shared mobility solutions began after 2000, mostly after the crisis in 2007–2009 (Turoń et al., 2019). Currently, shared mobility services are functioning in more than 1000 cities around the world (Svegander, 2019). The fleet of cars in car-sharing reached 332,000 vehicles (Svegander, 2019). There are more than 23.8 million registered car-sharing users (Svegander, 2019). There are also 1608 bike-sharing systems worldwide, with 18 200 000 bicycles available to users (Svegander, 2019). It is estimated that worldwide by 2025, there will be 36 million users using car-sharing services (Statista, 2020). Furthermore, the scooter-sharing system market is expected to be valued at 300 billion to 500 billion dollars in 2030 (Community Mobility Report, 2020). These data indicate that shared mobility services are a significant part of the global transport market and require proper operating conditions.

2. Methodology

To learn about current COVID-19 policies and practices in the new mobility market, two parts of the research were proposed. The first part was related to the performance of the research carried out using the secondary study method and was related to the background of the functioning of transport in selected countries during the COVID-19 pandemic. The second part, in turn, was dedicated to the performance of expert research conducted among new mobility operators to identify the innovations they provided during the pandemic.

The secondary study is the process of analyzing available data sources including their compilation, mutual verification, and processing (Gandhi et al., 2018; Rahman, 2014; Nooraini, 2013). The secondary study involves the collection of data from existing resources and is therefore often regarded as a low-cost technique (Ghandi et al., 2018; Rahman, 2014; Nooraini, 2013). The methodology consists of five continuous steps covering the process of defining the objective of the study and analyzing it. The detailed secondary study process is presented in Figure 1.

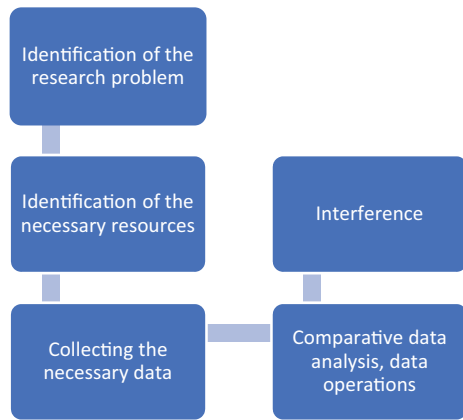


Figure 1. Secondary study process

According to the presented assumptions regarding secondary research, the article refers to checking what types of practices, laws, and orders have been implemented by various countries of the European, Asian, and American continents in terms of transport functioning in a pandemic time. The practices of selected cities around the world were taken into account and compared with each other. The following countries were included in the analysis: China, France, Germany, Italy, Malaysia, Poland, Singapore, Spain, United States of America.

The second part of the study included detailed analyses of business practices implemented in the new mobility activities of companies during the pandemic. This study was based on the own expert research carried out among operators of shared mobility services. This part of the article (introductory part) presents only general conclusions from the research carried out on the practices of companies during the COVID-19 pandemic. The survey was attended by 50 respondents representing companies from the new mobility market that provide bike-sharing, car-sharing, moped-sharing, ride-sharing, and scooter-sharing services. The companies considered in the study operated during the COVID-19 pandemic in the following countries: China, France, Germany, Italy, Malaysia, Poland, Singapore, Spain, United States of America. Detailed results of the expert study are presented in the extended version of the article.

3. Results

3.1. COVID-19 transportation politics in Asia

COVID-19 hit China's public transport system on 23 January 2020. The Central Government of China has imprisoned Wuhan and other cities in Hubei Province to quarantine the center of a coronavirus epidemic (Yuan et al., 2020). Wuhan's lockdown was a precedent for similar measures in other cities in China, including Wuzhou, Hangzhou, Fuzhou, Hubei, and all of Jiangxi (Yuan et al., 2020). In many regions of China, the idea of "closed management" has been implemented at the community level. In most regions, villages, communities, and units are situated in most regions where this is applied would only keep one entrance and exit point

open, and each household was allowed a limited number of entrances and exits (Yuan et al., 2020). In some places, nighttime access was prohibited, effectively a curfew, and in extreme cases, access was prohibited throughout the day (Yuan et al., 2020). In the event of a lockdown, the Chinese state and city finally suspended transit (Xinhuanet, 2020). As the service is restored, riders return to some places but do not reach a full level. According to a survey conducted by the Institute for Transportation and Development Policy in early March in the megacity of Guangzhou, only 34 percent of the last passengers on the subway and buses use public transportation, while 40 percent use private cars, taxis, and taxis, and the rest had resorted to walking and biking. A survey conducted in late March in Hangzhou, southeastern Zhejiang Province, revealed that the municipal bus system has recovered between 50 and 60 percent of regular passengers (The Paper China, 2020). Some buses have introduced new guidelines for passengers' travel distances. Each operating bus must be disinfected at least twice a day, once before leaving the depot and once after returning, and each operating bus must be disinfected more often in key risk areas, such as routes departing from airports. The passenger's temperature must also be checked before entering the cabin. For example, some city bus operators in Beijing and Shenzhen encouraged users to use identifiable payment methods, such as WeChat, Alipay, or transit to payment cards, instead of cash. These payment methods reduce the risk of exposure, assist local authorities in tracking possible contacts, and quickly inform passengers and the relevant communities of the diagnosis of COVID-19. Shanghai bus QR codes are installed and encourage passengers to scan and register contact details (The Paper China, 2020).

During the pandemic, the authorities urged operators to establish new bus lines on demand (The Paper China, 2020). After the user requests a travel trip, the mobile application supports it. These lines are specialized for new travel patterns and support mobile applications. A route is created based on the initial and final location with reserved seats for all passengers after exceeding the demand threshold. In late March, Beijing's public transport group launched 173 custom routes based on a massive survey conducted by companies and the public (The Paper China, 2020).

The epidemic has once again attracted interest in sharing bicycles with free floating systems or dockless systems. It is important to note that this type of system caused growing reluctance among users before the outbreak of the epidemic, causing many problems (The Paper China, 2020). According to Meituan, Hi-Bike and Didi Bike, travel to Beijing increased by 120–183 percent compared to before the epidemic. In addition, the distances used by users with these bicycles have also been extended (The Paper China, 2020). The average distance that users traveled to Beijing increased by about 3 km, a 69 percent improvement on the route before the epidemic (The City Fix, 2020). On the other hand, a study

conducted in Nanjing shows that the pandemic has confirmed the availability of some bicycle sharing stations. The results show that stations near hospitals, medical centers, and religious places are the most frequent (The City Fix, 2020).

The Chinese Center for Disease Control even recommends a form of public transportation with the lowest risk of infection with a virus (The City Fix, 2020). Local municipalities and enterprises also support this trend and take measures to ensure the availability and safety of common bicycles. Meituan has taken initiative to clean up all bicycles in the streets of cities where they drive, regardless of brand, and other companies have followed suit (The City Fix, 2020).

In Singapore, the authorities urged people to avoid unnecessary travel in public transport to reduce the number of people affected by COVID-19 (Land Transport Guru, 2020). Additionally, all commuters who are not feeling well are advised to not use public transport (Land Transport Guru, 2020). All commuters must have a mask. Simultaneously, public transport operators have stepped up cleaning efforts on buses, trains, MRT stations, and bus interchanges (Land Transport Guru, 2020). Eventually, all trains, stations, buses, bus stations, and bus interchanges implemented a safe separation sticker that reads “Please don’t sit here” and “Please stay here” (Land Transport Guru, 2020). The results of the survey confirm the high hygiene standards maintained by only 22 percent of Singaporeans ($n = 459$) stated that they would not like to travel by public transport (Land Transport Guru, 2020). Furthermore, we provide common mobility services and ensure that operators meet the highest standards of hygiene and disinfection of vehicles. In addition, during COVID-19, the authorities of Singapore noticed the need to accelerate transportation and mutual integration faster. The Singapore Mobility Challenge project has thus been accelerated (Land Transport Guru, 2020).

In Taiwan, there was no need for full break time and the epidemic had little effect on everyday life. Additionally, the shared mobility sector is growing steadily (Pandey & Yu, 2022). For example, the local scooter rental company WeMo is generating more than 25,000 daily rides per city than before the epidemic, with a 15 percent increase per month (WeMo, 2021).

3.2. COVID-19 transportation politics in America

New York City is closing 40 miles of roads next month to the automobile to provide more recreational opportunities and expand pedestrian space to maintain social distances (Parker et al., 2021). The ultimate objective of the plan is to provide 100 miles of open roads, mainly near parks, enlarged streets, and permanent bicycle lanes. Police and community organizations will help identify streets and enforce a traffic ban to ensure pedestrian safety (Cho & Park, 2021).

In Bogota, an additional temporary cycling route system between western and central districts has been

introduced for a short period. The mayor of Bogota decided to maintain the bicycle routes permanently on the roads during weekends and holidays (Public Transport, 2020). These include the loading of crowded BRT buses, and above all, improving the environment and reducing air pollution in cities (Public Transport, 2020).

Mexico announced an implementation plan of eight 131-kilometer temporary bicycle and electric scooter routes from 9 a.m. to 9 p.m. (Public Transport, 2020). The proposed system complements existing networks and has radial continuous systems (Public Transport, 2020). It is composed of alternative corridors of the public transportation lines and serves areas where the demand for urban transport is high (Public Transport, 2020).

3.3. COVID-19 transportation politics in Europe

In Europe, the first COVID-19 wave was in Italy, where the activities of coronaviruses were extensive. Since 12 March 2020, the disease has spread across the country and is being closed. Following a total ban on movement and only legitimate absence from the house, short-term rental of vehicles is now being restored (Galeazzi et al., 2021). In addition, a temporary bicycle line was introduced. Turin and Rome announced plans to maintain temporary bicycle lanes as soon as the blockade measures were lifted (Galeazzi et al., 2021). It was proposed to maintain these bicycle lanes to reduce car traffic congestion and to help people maintain social distances.

In response to COVID-19, the city of Bologna launched a program for urban mobility and accelerated the implementation of the cycling network (Barbarossa, 2020). The city’s “Bicipolitana” network is composed of integrated cycle tracks of 493 km in the city (Barbarossa, 2020).

In addition, ten other Italian cities have announced plans to improve mobility after COVID (Barbarossa, 2020). For example, Milan announced a model to reduce car use after lockdown. The city authorities want to introduce one of Europe’s most ambitious schemes, real-locating street space from cars to cycling and walking, in response to the coronavirus crisis (Barbarossa, 2020). On the other hand, Neapel, Geneva, Florence, and Bari want permanent bikeways in traffic-calming areas confined to car-traffic areas to be opened (Barbarossa, 2020). They also wish to focus more on the introduction of shared mobility programs (Barbarossa, 2020).

The United Kingdom is the second largest COVID-19 victim in Europe (Geels et al., 2022). British Transport Minister Grant Shapps admitted that the COVID-19 epidemic caused a huge increase in bicycle traffic (Geels et al., 2022). Due to this trend, London will accelerate creating new bike routes along major thoroughfares and rebuilding pedestrian routes by widening the pavement to allow physical distance and secure queueing in front of stores (Geels et al., 2022). In the UK, driving electric scooters is prohibited, and legalization is planned after developing legislation that would classify the scooter and its technical inspection rules (Geels et al., 2022).

Currently, it is expected to accelerate these procedures to enable the development of the scooter-sharing market. The expansion plan for the country's investment of £2 billion will have an impact on the number of cycle paths (GOV UK, 2021).

In addition, Edinburgh announced an action plan for safe walking and cycling. Among the proposals are street closures for vehicles, widened pavement, temporary cycle lanes, and bus priority measures (Polisnetwork, 2020). Edinburgh has already begun to implement changes to help those who make essential trips and exercise daily by walking or cycling remain 2 meters away from the road closures in some cities (Polisnetwork, 2020).

In the meantime, Dublin has ceased to use load bays and parking lots in the Republic of Ireland to increase social separation space, using removable plastic separation devices (Manzira et al., 2022). In addition, the city has launched the COVID Mobility Program (Dublin City, 2021). The program addresses the idea of improving pedestrian safety by (Dublin City, 2021):

- providing additional space for movement,
- improving pedestrian areas,
- providing safer cycling facilities,
- providing additional space at many bus stops to facilitate social distancing while waiting,
- accommodating a certain level of car use calibrated with other transport needs, including possible additional parking provisions on the periphery of the city core area,
- implementing various bus route changes required to enable the rollout of cycling and walking measures.

In France, the capital's authorities want to build 650 kilometres of bicycle trails after the closure. Prior to the corona virus crisis, the city promised to make all streets bicycle-friendly by 2024 (Shortall et al., 2022). On 30 April 2020, the French Government announced a €20 million plan to promote cycling, removing restrictions on travel (Forbs, 2020). The aim is to prevent large-scale citizen transfers from public transportation to car transportation. According to national data, more than 60 percent of Parisians travel within 5 km, so it is recommended to avoid car travel (Forbs, 2020). In addition, 72 percent of the city's parking lot on the streetcar is being withdrawn (Forbs, 2020).

In order to create more space for cyclists in Austria, the Vienna authorities decided to start temporary bicycle paths on the streets (Gühnemann et al., 2021).

The Belgian capital, Brussels, has announced a number of measures to increase space for pedestrians and cyclists following the COVID-19 outbreak (Beckers et al., 2021).

3.4. COVID-19 transportation practices

The analyzed business practices of companies implemented during the COVID-19 pandemic concerned two areas of conduct – practices related to aspects of enterprise management and related to the issues of increasing the level of safety.

From the point of view of organization and management, the implemented practices were related to a reduced fee for the use of services, free travel offers for essential workers, implementation of new forms of payment, including deferred payments, implementation of service packages, organization of additional stations where it was possible to rent or return a vehicle nearby strategic places, e.g., hospitals, offices, airports, implementation of additional system operation zones.

From the point of view of activities related to increasing the safety level, such practices as additional disinfection of vehicles, including ozonation, appropriate requirements for sitting in the vehicle and transporting third parties, implementing the rules of using the vehicle independently, excluding vehicles from use for a few hours after the last user to eliminate viruses, were taken into account, additional rules for the airing of vehicles, implementation of the rules for the necessity to use personal protective equipment by users in the form of protective masks and gloves.

The conducted research shows that most organizational practices have been implemented in car-sharing systems. On the other hand, most safety practices were implemented in ride-sharing systems. The sector that implemented the least practices in its systems were bike-sharing services.

4. Discussion

As global mobility practices in the coronavirus pandemic show, bicycles are the most important means of transportation in which countries focus. Countries are developing new transport policies for the development of bicycle transport and investing in the development of bicycle routes.

Another proposed transport solution is walking. In this case, individual countries intend to expand existing boulevards or turn roads accessible to cars into places dedicated to pedestrians. This type of trend is in line with the idea of walkability. Both proposed forms of transport perfectly fit into the development of sustainable forms of mobility.

However, it is interesting to note that little attention has been paid to the services of shared mobility and electricity mobility. For bicycles, individual users and public bicycle users are mentioned under bicycle-sharing will be able to move along bicycle paths, they do not focus more on car-sharing services. Another neglected transportation service is taxis, but these are strictly substitutes for vehicles. In this case, it is worth noting the security principles introduced by car rental and ridesharing operators around the world. The practice of the car-sharing vehicle market indicates that operators disinfect their vehicles every day. Disposable seat and steering wheel cover and hygiene gloves are offered, making it possible for the driver to avoid contact with a used vehicle after someone else. It is worth noting that cars from car-sharing can be used by people who, for example, after entering

a given country and recommending quarantine, move home. That will allow traveling without having to contact other people on the bus or subway. In turn, vehicles with ride-sharing and unique plexiglass walls have been introduced between the driver and passengers to avoid contact. Seats are also protected with foil, disinfected vehicles, and drivers are equipped with disposable gloves.

In addition, the provision of ride-hailing and car-sharing services is also part of the trend of sustainable mobility. The use of electric vehicles significantly affects the development of electric mobility and plays an educational role in teaching about electric mobility. The focus of the government and local government on cycling alone can significantly reduce the development of electric mobility, which has been sought by everyone in recent years.

Conclusions

In summary, the conducted research indicates separate approaches to mobility policies on the analyzed continents. Referring to the Asian market, it should be emphasized that there was no complete prohibition of movement there. Moreover, the recommendations made by governments were only recommendations, not orders. In addition, no Asian country other than Singapore has developed specific post-pandemic mobility guidelines.

The An-American market implemented single practices mainly aimed at changing the clothes layout of cities and solutions for pedestrians and cyclists. However, like the Asian market, it did not make any specific plans for the post-pandemic period. The European market was most involved in the remodelling of pandemic mobility. It is there that the most restrictions and bans have been implemented. However, the implemented practices allowed for the development of various types of post-pandemic mobility plans and projects. It should be emphasized that the proposed policies focus on pedestrian mobility and cycling services.

From the point of view of analysed business practices, it can be concluded that the new mobility industry in each analysed market implemented various types of business practices to survive in difficult conditions. Refers to any type of service provided. Most business practices (70%) concerned aspects related to safety, while the remaining part (30%) focused on issues of management and organization of services. The leader of practices in the field of safety were ride-sharing services, while from the point of view of the organization of car-sharing services. The fewest services have been implemented in bike-sharing systems.

To sum up, the difficult time of a coronavirus pandemic, despite the severe consequences for society and economics, can bring benefits after a lockdown time in the direction of more sustainable transport. It is useful to observe the mobility practices proposed by the countries and to draw examples from them. However, it is important to note that cities cannot focus on promoting a single

type of transportation only. Such proceedings could lead to losses for public transportation, or all modes of transportation provided by MaaS services, rather than tangible benefits. It should also be noted that mobility should meet the transportation needs of the residents in its hypothesis. As a result, they must choose different modes of transportation without limiting the available services. Overall, the implementation of the proposed recommendations provides a new way of surviving the market for mobile service providers during the post-pandemic crisis. In turn, cities and users can have an efficiently functioning transport system that supports the economy.

Detailed analyses of business practices are presented in the extended version of this article.

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