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**YEREL YÖNETİM REFORMU
PROJESİ (YR III)**
LOCAL ADMINISTRATION REFORM
PROJECT (LAR III)

DEVELOPING PUBLIC HEALTH STANDARDS IN PUBLIC TRANSPORT SYSTEMS COMPARATIVE ASSESSMENT REPORT

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Abbreviations

Türkçe Açık Hali	TR-Ks.	EN-Abbr.	Full Form in English
Avrupa Birliği	AB	EU	European Union
Desibel	dB	dB	Decibel
Partikül Madde	PM	PM	Particulate Matter
Dünya Sağlık Örgütü	DSÖ	WHO	World Health Organization
Azot Emisyonu	NOx	NOx	Nitrogen Oxide Emissions
Portatif Emisyon Ölçümü Sistemleri	PEMS	PEMS	Portable Emissions Measurement Systems
Etablissement Public a Caractere Industriel	EPCI	EPCI	Etablissement Public a Caractere Industriel
Plan Estrategico de Infraestructuras y Transportes	PEIT	PEIT	Plan Estrategico de Infraestructuras y Transportes
Union Internationale des Transports Publics	UITP	UITP	International Association of Public Transport
Azienda Trasporti Milanese	ATM	ATM	Azienda Trasporti Milanese
Societe d'Economie Mixte	SEM	SEM	Societe d'Economie Mixte
Avrupa Çevre Ajansı	EEA	EEA	European Environment Agency
Kara Taşımacılığı Kanunu	LOTT	LOTT	Land Transport Act
Transports Bordeaux Métropole	TBM	TBM	Transports Bordeaux Métropole

1. Introduction

Under the Local Administrations Reform III (LAR III) Project, it was envisaged to prepare a report titled “Public Transport Services and Public Health”. It was aimed to assess public transport systems among the cities selected as part of the study and prepare a comparative assessment report.

Most of the daily trips across the world and in our country are made through public transport systems. Public transport systems have become one of the most important elements of urban life. In order to eliminate traffic jam experienced in big cities, many road investments, large and small scaled, were made in various periods. When looking at the experiences obtained, it is understood that road investments made in order to eliminate access problems in cities are inadequate; integrated public transport systems should be developed.

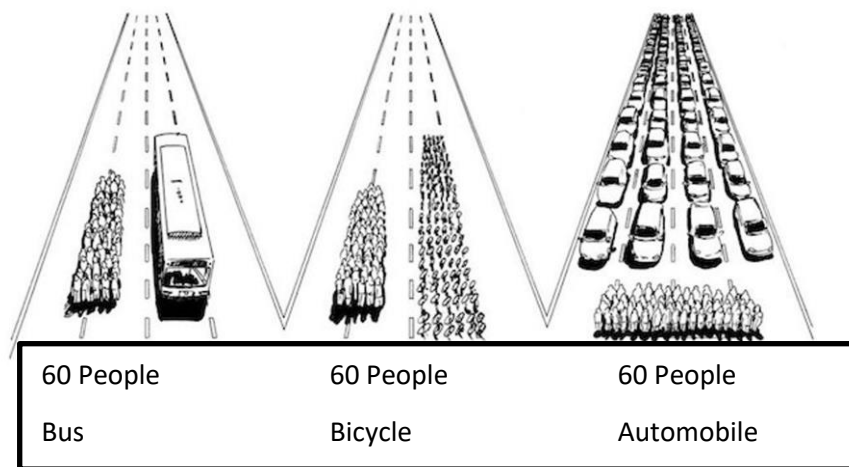


Figure 1. Importance of public transport

There is substantial decrease in public transport trips due to the COVID-19 pandemic against which the world and our country are still fighting. Local administrations make various decisions of restrictions according to the course of the pandemic. Sharp measures such as capacity reduction in public transport should be taken in order to prevent people from staying in closed areas for a long time and enable compliance with social distancing requirement. Those steps taken to protect human health in public transport systems resulted in the increase in the use of private vehicles during the pandemic.

This part of the study aims to assess guiding practices by analysing the existing practices through standards or regulations being implemented internationally for developing standards to support local administrations. It is aimed to assess public transport systems in the cities selected in the context of this study and prepare a comparative assessment report. Other studies were reviewed for this purpose; the following cities and countries were selected by considering primarily the population and practices in public transport. However, good practices were identified at times from other cities and countries to contribute to our study. Certain population ranges were taken into account for the selection by considering the practicality in terms of standards planned to be developed in the future for the cities in Turkey. The following countries/cities were selected by groups of approximately 500,000 people.

- 1) Milan, Italy
- 2) Bordeaux, France

- 3) Berlin, Germany
- 4) Barcelona, Spain
- 5) Gdansk, Poland

The COVID-19 pandemic hit rapidly and devastatingly the cities across the world as a global problem. Within three months following the first case recorded, many big cities were locked down and people were compelled to stay home. From the early days of COVID-19 crisis, scientists and researchers continuously worked to identify the way for various topics such as mechanisms causing the spread of virus, environmental and socio-economic impact, required prevention and adaptation plans and policies.

Considering high population density and economic activities, cities are generally determined as hot spots of COVID-19 infections. Accordingly, many researchers try to discover the dynamics of pandemic in urban areas in order to understand the impact of COVID-19 on cities. In the early days when adequate data were not available, public transport systems were rapidly blamed for the increase of risk and spread of the disease and several measures were taken such as capacity reduction in public transport systems and ban on public transport. Thereafter, it was found out in studies that public transport was safer, on account of certain basic measures taken, than other spaces where people gathered. However, it is observed that people living in the cities tend to commonly use private vehicles, if possible, and this trend partly continues.

Public transport has been one of the most affected areas during the COVID-19 pandemic; central government and local administrations made many important decisions of restrictions and measures.

“COVID-19 Pandemic Management and Practice Guide”, which is published and constantly updated by the Ministry of Health in our country, serves as a basic guide presenting the measures which should be taken in public transport. In this context, basic rules are presented, which should be obeyed in public transport vehicles. Efforts have also been made to contain the pandemic through short- and long-term restrictions in cities hit hard by the pandemic.

The following measures were taken in the selected cities discussed under this study.

Italy

As of 13 March 2020, inter-regional non-scheduled bus services were rationalised due to restrictions on the mobility in Italy because of the COVID-19 pandemic. This measure comprised of changes and reductions made in non-scheduled services authorized by the Ministry of Transport and Infrastructure. Services were provided on minimum level. As of 13 March 2020, railway passenger transport was also rescheduled in order to protect passengers and railway employees by reducing the traffic. For each route, connection was guaranteed with at least one other scheduled train.

Milan introduced bicycle and pedestrian priority on the streets by closing the streets with 35 km/h speed limit to automobiles and increasing the road network boundaries with 30 km/h.

France

The COVID-19 pandemic had significant impact on public transport. Many countries advised that public transport should be used only when it is necessary; number of passengers significantly decreased and services were reduced. Providing reasonable service for very few fare-paying passengers resulted in huge financial losses. According to the data published by Trans-it, France experienced the biggest decrease in the use of public transport, e.g. by 92% in Lyon and 85% in Nice.

There are no restrictions on travel within France. In the context of the present COVID-19 crisis, some traffic bans were partly removed for the vehicles above 7.5 tonnes. Removal of this ban was limited to certain categories of goods and certain days. Transport for supplying food products (human, animals), hygiene products and pharmacies along with garden products was permitted for certain days and hours.

The curfew imposed between 18:00 and 06:00 every night in France was firstly updated such as to be between 23:00 and 06:00 and removed on 20 June 2021. Face masks are obligatory in closed and public areas. Moreover, wearing masks was made obligatory for everybody older than 11 years old in all public areas, public transport vehicles, crowded areas, taxis, restaurants, cafes, bars (it is obligatory for personnel and customers when they are moving), schools (it is obligatory for teachers). This obligation was removed in open spaces as of 20 June 2021; however, it continues in closed areas. An exception is envisaged for people with disabilities provided that a medical certificate is presented.

Germany

Germany took the lockdown measures under the COVID-19 response on 22 March 2020, which affected the mobility of people and goods on the road and accordingly the exposure to road accidents. According to preliminary data, traffic volume decreased approximately by 11% in 2020 compared to the average of 2017 and 2019 while the deaths in road accidents decreased approximately by 12%.

Road traffic data for 2020 were obtained from approximately 1600 permanent count stations on Federal Highways of Germany (highways and national roads). Based on such data, motor road traffic on Federal Highways decreased as of March 2020 compared to average monthly traffic in 2019.

Heavy motor vehicles (in other words, buses, trucks and semi-trailer trucks with the maximum permissible total weight of more than 3.5 tonnes) were affected lightly and showed a moderate decrease in the traffic in April and May. In October 2020, bus traffic decreased much more than all other motor vehicles which had relatively a low rate.

There were sharp decreases in the traffic for light motor vehicles (in other words, passenger cars, small trucks the maximum permissible total weight of 3.5 tonnes or less and motorcycles) from March to May with the biggest decrease in April. The impact was perceived more strongly on highways than national roads. The highway traffic of light motor vehicles decreased by approximately 60% in April 2020.

The measures taken regarding travel by public transport are as follows:

- According to IFSG, those who use public transport vehicles, should wear a FFP2 medical face mask or a similar standard mask,
- If passenger cars are used for passenger transport, the driver should wear a medical-grade face mask,
- Physical distance requirements are valid unless restricted unless restricted by spatial conditions. Those who suffer from respiratory illnesses should not enter into the facility; this shall not apply to rescue services,
- Operators of public transport vehicles and facilities remind passengers through written or verbal notices or images that they should comply with the requirements, and through verbal warning in individual situations where they refuse to comply with,
- The personnel also have the right to refuse to serve those who refuse to comply with the requirements; taxi drivers and people who own similar means of transport are obliged to refuse to

serve such a person. It is obligatory to collect the contact information for the transport by bus; this shall not apply to school buses.

Spain

The curfew is imposed between 23:00 and 06:00 in Spain, except for Canary Islands. Autonomous regions have the right to start curfew earlier or later.

Face masks are obligatory in public areas, indoors and outdoors. Moreover, wearing face masks is obligatory in all public transport vehicles and in private cars unless all passengers live in the same house. There are exceptions for children under the age of six and people with disabilities or respiratory illnesses.

It is made obligatory to wear masks for people older than six years of age in public transport vehicles, in the areas where safety distance of at least 1.5 metres among people cannot be guaranteed, public streets, public airports and any closed area open to public use. Moreover, public transport services were reduced by 50% of the normal capacity. Cleaning activities were enhanced in transport vehicles.

Spain implements EU “traffic lights” approach which is jointly adopted for travel restrictions.

The measures on mobility limited freedom of movement of individuals except for essential activities such as grocery shopping, pharmacy and commuting. Mobility between provinces was limited to work.

The critical objective of the Ministry of Transport was to ensure transport of goods within national borders and guarantee the supply. Corridors were created to allow entry and exit of raw materials or end products into facilities where food is produced including farms, markets, fodder plants and slaughterhouses.

Poland

In December 2020, approximately 20 million passengers in Poland (12% less than the previous month) were carried by public transport. Compared to the previous month, there was a significant decrease in all passenger transport vehicles except for air transport.

The government in Poland took the following measures for transport in the context of COVID-19:

- A distance of 1.5 metres should be kept among pedestrians.

The following people are exempt from the restrictions:

- Parents with children who need care (younger than 13),
- Persons who live in one household or run a household together,
- People with disabilities, those who cannot move on their own, those having a statement of special educational needs and their caregivers.

It is obligatory to wear masks in such places as:

- Streets, roads and town squares, cemeteries, promenades, boulevards, car park areas, forest car parks,
- Busses, trams and trains,
- Stores, shopping malls, banks, markets and post offices,
- Cinemas and theatres,
- Physician’s offices, outpatient clinics and hospitals, massage parlours and tattoo studios
- Churches, schools and universities,

- Government offices (when going there to deal with a certain issues) and other civil centres.

The number of passengers is limited in public transport vehicles:

- By 50% of the seating capacity or,
- By 30% of combined capacity for seated and standing passengers, by leaving at least 50% of the seats unoccupied.
- These limits shall not apply to the vehicles aimed at carrying passengers with disabilities.

Particularly the situation emerging with the COVID-19 pandemic shows that a regulation directly titled as public transport or public health does not exist in most of the countries including EU countries and Turkey. However, measures are taken by relying on the legislation which regulates various matters relating to the health of passengers and employees. This topic is discussed together with climate, environment, health, social arrangements and road safety; various practices were introduced by individual countries and even by cities.

Public transport stakeholders responded to this pandemic or crisis with the sense of responsibility toward their employees and the communities they serve even though they have not experienced a similar situation before and have no experience to deal with such a situation. Many scientific studies and empirical analysis showed that public transport was far less risky than public places and private meetings; however, they could not overcome the perception that it is the source of spread. Many articles based on scientific findings and practical experience showed that appropriate measures were taken to reduce the risks to a manageable and acceptable level for users in public transport vehicles.

The COVID-19 pandemic showed that the measures to protect public health in public transport should be presented as a body of rules. By turning the crisis into an opportunity and looking at the upside of present practices, studies should be conducted to establish several definitive standards in our country. In this study, current regulations for this purpose in various countries and in our country will be reviewed and will serve to develop standards.

It is aimed to review the selected 5 countries and cities by grouping as follows:

1. Roles and responsibilities of the central government and local administrations in the provision of public transport services and their applicability to Turkish municipalities and good practices,
2. Public transport operation models, standards, regulatory processes, financing and control systems (based on EU Acquis).
3. Legislation and implementation of public health standards (particularly, on noise, gas emissions, prevention measures for communicable diseases) in local public transport services (by taking into account of protocols on crisis management on this topic).
4. Experiences, practices and problems relating to the development and implementation of public health standards for public transport system:
 - a. Regulations and practices for bringing the vehicles in public transport services in compliance with public health standards,
 - b. Financial impact of the implementation of health standards in local public transport services,
 - c. Effective data sharing and information flow regarding public health policies in the provision or public transport services among relevant agencies at local level,

- d. Awareness and level of implementation of municipalities on public health regulations and guides prepared by international organisations (Union Internationale des Transports Publics, EU etc.),
- e. Experiences in public health emergency response to the COVID-19 pandemic and applicability of local service delivery standards on this issue,
- f. Experiences regarding the COVID-19 pandemic in terms of public health service delivery in public transport vehicles.

When one speaks of safety in public transport, mainly road safety comes to mind, and it is generally measured with the number of accidents and deaths. It is expressed as injuries and material damage per kilometre or risk of serious injuries in percentages or qualitatively perceived safety. Safety and public health in public transport is an issue of high priority in the transport sector as in all other modes. By presenting certain directives to achieve similar goals, all member states in the European Union aim to provide:

- Safer transport systems,
- Technical standardisation,
- An advanced level of education.

The type of transport, transport infrastructure and human performance and behaviour (in operation/management) are the main factors for safety in transport systems. Human factor may be categorised by affected user groups and non-user groups as follows:

- Safety of users
 - Drivers,
 - Passengers.
- Safety of non-users
 - Other drivers and passengers,
 - Other modes,
 - General public,
 - High-risk groups.

The key policy objectives and main policy issues of the European Union in this respect are given below:

- In order to improve the safety of each mode of transport and combination of modes, vehicles and infrastructure; e.g. improvement/implementation of driver support systems;
- Reduce the negative impact on non-users with the improvements in vehicle design,
- Promote a change in modal distribution towards safer modes of transport, e.g. encouraging public transport instead of private transport,
- Promote safe driving behaviours.

2. COVID-19 Pandemic

The COVID-19 pandemic hit rapidly and devastatingly the cities across the world. Within three months following the first case recorded, many big cities were locked down and people were compelled to stay home. From the early days of COVID-19 crisis, scientists and researchers continuously worked to identify the way for various topics such as mechanisms causing the spread of virus, environmental and socio-economic impact, required prevention and adaptation plans and policies.

Considering high population density in the cities and economic activities, these are generally determined as hot spots of COVID-19 infections. Accordingly, many researchers try to discover the dynamics of pandemic in urban areas in order to understand the impact of COVID-19 on cities. In the early days when adequate data were not available, public transport systems were rapidly blamed for the increase of risk and spread of the disease and several measures were taken such as capacity reduction in public transport systems and ban on public transport. Thereafter, it was found out in studies that public transport was safer, on account of certain basic measures taken, than other spaces where people gathered.

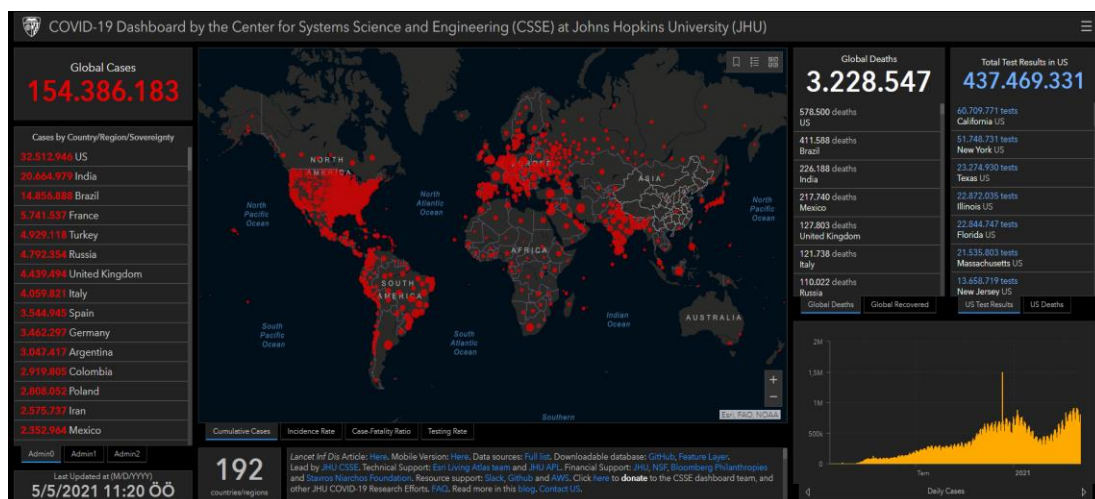


Figure 2. Number of COVID-19 Cases

Throughout the pandemic, it has been understood how necessary the public transport is to guarantee access to basic services and continuity. All over the world, supply of public transport was maintained in order to ensure the mobility of those working in vital sectors.

The demand for mobility of people who would want to go to work by public transport showed an increase particularly with curfews during the pandemic when the use of private cars increased. Public transport businesses were substantially affected; their income decreased during the pandemic and their costs increased with dramatic decrease in the number of passengers and additional sanitary measures.

All over the world, public transport providers made new technological investments in such areas as enhancing operational capacity, providing accurate and concurrent information to public transport users, managing occupancy rates, on the network where they serve. Globally, significant safety measures were generated regarding public transport. These measures will be described in the following Chapters.

3. EU Common Transport Policy

The aim of the European Union common transport policy can be defined as ensuring the creation of a common market by removing all different practices among present transport policies implemented in member states and creating a standard infrastructure in transport services in the European Union. Its main theme is to bind activities and infrastructure of the transport sector to common rules within EU.

3.1. Urban Transport in EU Countries

More than 75% of the European Union population lives in cities. Therefore, problems caused by urban transport form a large part of environmental damage. The predominant use of motor transport vehicles in urban transport underlies carbon monoxide pollution in cities. Total kilometres covered on urban roads in EU are expected to increase by 40% by 2030.

Kyoto Protocol envisaged a reduction of 8% in carbon monoxide for EU in the period between 2008 and 2012, relative to the level of 1990. However, it is estimated that in 2010 carbon dioxide pollution caused by urban transport will increase by 40% compared to the level in 1990 where traffic continues without interruption and the data obtained showed that the pollution recorded was higher than expected. The European Union develops a series of strategies to overcome this problem such as supporting environment-friendly vehicles, prevention of traffic density, creation of alternative ways, promotion of intense use of urban railway system, development of information systems to reduce emissions. Railway systems used in urban transport in EU (metro, suburban train), have an important place in urban life. They are intensely utilised in metropolitan areas for public transport purposes. However, they cannot fully respond to the urban transport needs in general terms.

3.2. Noise and Air Pollution

The recent figures in Europe show that more than 400,000 premature deaths occurring every year may be attributed to air pollution caused by all sources despite the substantial reduction in emissions in the last ten years.

Air pollutants may separately lead to various impact on health. Nitrogen oxides, particulate matter (PM10 and PM2.5), sulphur oxides, carbon monoxide and heavy metals such as cadmium, lead and mercury are released from exhausts of vehicles. Additionally, precursor chemicals in exhausts may react in the atmosphere, leading to forming of ozone. Lastly, particulate matters and heavy metals are emitted as a result of wearing of tires and brakes and they may suspend in the air by flying again because of the passing cars once accumulated on the surface of the road.

Exposure to these pollutants may have various impact on health but it may generally affect organs, nervous system and blood; leading to diseases such as pulmonary disease, breathing problems, heart attacks, asthma, anxiety, dizziness and weakness or deterioration of such diseases if already present.

Noise has also significant impact on health. Exposure to noise at night affects health adversely, causing sleep disorders. Exposure to long-term noise in an ordinary day leads to increase blood pressure and other diseases and cardiovascular diseases. 80% of Europeans are expected to live in urban areas by 2020 most of whom are close to intensive transport infrastructure and transfer centres such as airports and highways.

Approximately 125 million Europeans (or one in four people) are affected by noise levels caused by road traffic with day, evening and night levels exceeding 55 decibels (55 dB L_{den}). Taking account of underreporting, these figures are deemed to be possibly higher.

Measuring the disturbance caused by noise

L_{den} is the definition of noise level based on the energy equivalent noise level (L_{eq}) averaged over a whole day. It is established to assess disturbance.

The Environmental Noise Directive determined L_{den} as 55 dB for noise mapping assessments and action planning. The Directive recommends implementing 50 dB threshold value and L_{night} indicator in assessing sleep disorders in an exposed population.

The recent figures show that such exposures cause 20 million Europeans to be uncomfortable with the noise; 8 million of them to experience sleep disorders; 43,000 hospitalised and at least 10,000 died prematurely. In addition, noise caused by airplane movements in and around airports, affect many people including school children; at least 8,000 of them experience reading disorders as a result of high noise levels.

Combating air and noise pollution

Currently, European countries address air pollution and environmental noise from a perspective of transport, air quality and noise regulations and improving human health and environment. European Emission Standards (European Standards) regulates emissions of pollutants from various vehicle types. For example, the present Euro 6 standards, which have been in force for new vehicles since 2014, sets particulate matter emission limit of gasoline-fuelled and diesel-fuelled cars as 5 milligrams per kilometre (mg/km). This limit is 5 times less than the 2005 levels. Similarly, NO_x emission limits were set as 80 mg/km for diesel-fuelled vehicles and 60 mg/km for gasoline-fuelled vehicles; however, there is a substantial reduction since 2005.

European standards involve vehicle test specifications. But there are substantial differences between the official vehicle emissions (in other words; those recorded under testing conditions) and emissions under real driving conditions. In order to fix this, measures are taken, involving the development of new test specifications and provision of Portable Emissions Measurement Systems (PEMS) which can be located in vehicles to measure the conditions on roads.

In order to reduce the harm of noise pollution, EU took various measures involving technical standards which will limit the noise emissions at source (e.g. EU tire label for consumers to recognise “quieter” tires). The Environmental Noise Directive complements similar standards. They aim to improve the quality of data collected in terms of managing the relation between the residents of the region and traffic better. The Directive requires preparing action plans for main transport resources and broadest urban areas. The goal of this is to protect quiet areas, in other words the areas where there are no noise pollution as well as to reduce the impact of the noise on the affected population and reduce the noise itself where required.

In parallel with EU efforts, many local and regional initiatives seek for innovative solutions air pollution and noise problems related to transport. “Ljubljana Step by Step Approach” and “Big Bang in Seville” implemented between 2006 and 2013, are two initiatives supporting bicycle infrastructure. Both of them successfully reduced traffic congestion; improved air quality and reduced greenhouse gas emissions. In Seville, the number of daily trips by car to town centre fell from 25,000 to 10,000 during

the project; a decrease of 29% in NO₂ and a decrease of 19.5% in PM concentrations were measured. Similarly, the modal share of biking as the ratio of total traffic increased by 20% during the project. These figures show impressive results. There are no official data regarding the improvements on health or decrease of noise; however, anecdotal evidence shows that noise levels in both towns fell substantially.

3.3. Public Transport in EU Countries

Regulations and institutional arrangements regarding local public transport are driven by a series of basic development priority such as especially urbanisation trends, mobility concerns, economic development, open competition for transport concessions, climate change and sustainability concerns and integration of means of transport into a coherent system. EU regulations play an important role in all of these areas; for example, the fact that EU general procurement regulations require competitive tendering of public service contracts, regulations regarding data exchange among transport service providers and regulations regarding public subsidies for public transport services on railway or road.

One of the cross-cutting topics in EU regulations regarding public transport is intergovernmental cooperation among various modes of transport and connecting public transport at municipal level with inter-regional and country-wide transport systems. For example, the Framework Directive for the Deployment of Intelligent Transport Systems (2010) authorises the European Commission for adopting the six obligatory directives for public transport. Accordingly, the first directive was adopted in 2017 which established binding rules for dissemination of common travel information systems between data sharing among the stakeholders of public transport systems and modes of transport service. This directive presents a common information sharing format including data types and sharing methods for all Member States. In rural, more distant regions, another topic to consider is the maintenance of service inclusiveness in the event of population decrease and it is predicted that efforts will combine subsidies such as on-call share taxi with service innovation or ensure the connection between individual and public transport modes as in rural municipalities.

In many countries, although the responsibility of local public transport is assigned to municipalities, it is observed that management and powers are increasingly delegated to the inter-municipal cooperation regulated by law. Inter-municipal cooperation is based on voluntariness in the default system; however, minimum requirements for inter-municipal transport cooperation at municipal-regional level are specified by law in many countries, particularly Germany. A trend is observed towards legalised inter-municipal regulations which also govern public transport in France and a metropolitan framework has been developed for public transport in the largest metropolitan areas such as Madrid and Barcelona in Spain.

There are local administration and central government subsidies in many EU Member States and they are generally 50% of the fare. In parallel with supporting open transport market in EU, private operators are involved in the process in all of the five countries and efforts are made through national legislation in order to divide procurement and operation responsibilities and tendering of transport concessions regularly. However, private sector participation varies substantially. For example, German municipalities continue to provide most of the local transport services through in-house execution and re-municipalisation trends are observed in local transport in all countries due to budgetary cuts in recent years, low service quality and labour disputes in some cases (France).

3.4. Safety in Public Transport

The World Health Organisation (WHO) warned on air pollution levels all over the world which threaten health in metropolitan areas recently. As of the end of 2015, various European countries including London and Paris were severely affected from pollution. Citizens are called for changing their behaviours by using public transport networks or sharing private cars in order to prevent the problem from aggravating. Pollution cases are expected to be observed more frequently, taking account of large emission of pollutants, certain meteorological conditions and excessive heating due to climate change.

There is clear and growing evidence regarding health problems occurring due to exposure to several air pollutants. Although only high pollution cases make headlines in the newspapers, long-term and continuous exposure to air pollutants even in low concentrations is in fact much more harmful to human health.

The European transport sector experienced substantial decreases in certain major air pollutant emissions with establishment of emission standards, financial measures and partly alternative fuels and transport avoidance measures. However, more efforts are needed to maintain the reduction of pollution levels and meet the European Union objectives for 2030 and beyond. Although the transport sector has the largest share in terms of emission increase, it is not the only sector which should reduce emissions; airways, seaways and railways also cause air pollution and they should not be ignored.

Similarly, noise pollution threatens human health and welfare and the share of road traffic in noise pollution is significant. Although there are decreases in air pollutants caused by transport in urban areas of Europe in the recent years, exposure to noise above acceptable limits has not changed.

4. Transport System Policies in Selected Cities

4.1. Milan, Italy

The structure of government of Italy is a Republic operating with parliamentary democracy with a multi-party system. The executive power rests with the Council of Ministers and the President of the country presides at this Council. The legislative power is wielded jointly by the national assembly and council of ministers. Judiciary power is independent from the legislative power and executive power. Italy has been governed as a Democratic Republic since 2 June 1946. The monarchy which was once in force was abolished as a result of referendum. The Italian Constitution was promulgated on 1 January 1948.

The President of the Republic of Italy is elected by the national assembly and a small number of regional representatives every seven years. The presidents in Italy are obliged to objectively symbolise the unity and integrity of the country. They are vested with a large part of the rights which were once given to kings of Italy. The President is in the centre of legislative, executive and judiciary powers and in charge of ensuring their functionality. The President also performs tasks such as appointing executives, presiding at judiciary and being the commander-in-chief. The President also appoints the Prime-Minister to be from the parties which came to power by election and delegates formation of the cabinet to the Prime Minister. The approval of the cabinet depends on the vote of confidence in the national assembly.

A bi-cameral system operates in Italy and its assemblies are elected by popular vote. The chamber of deputies has 630 members while the senate has 315 members. There are a small number of senators for life in the senate. Any Italian citizen who is eighteen or older may vote in the elections to elect the representatives in the chamber of deputies in Italy while voting age for the Senate of the Republic was determined as twenty-five. Both houses are elected for 5 years. But the President has the right to dissolve the parliament in certain states of emergency. This was experienced in 1972, 1976, 1979, 1983, 1994, 1996 and 2008.

Milan is the second most crowded city in Italy with 1.35 million people in the city (approximately 7,400 people per km²) and approximately 3.2 million people in the metropolitan area (approximately 2,000 people per km²).

850,000 people enter into Milan every day and 270,000 people leave the city; this results in a total 5.3 million trips a day. In the city centre, 37% of the trips are made by private cars (0.52 cars per person) while 57% of them are made by public transport. The entire transport network is operated by Azienda Trasporti Milanese which is mostly recognized as ATM.



Figure 3. Milan, Italy

The public transport system in Milan involves:

- Subway lines,
- Suburban railway connection, mostly underground (AKA “Passante”),
- 70 surface lines operated with trams and buses.

4.1.1. Institutional Arrangements

Milan City Council (Consiglio Comunale di Milano) is the top-level administrative organ of Milan Municipality. It is comprised of the elected Mayor of Milan and an elected assembly of 48 members. At the same time, it represents a legislative organ which may control policy directives of the Mayor and remove the Mayor with a motion of non-confidence.

The City Council is elected for a five-year period and based on a direct preference for the candidate receiving a preferential vote. The candidate having most of the preferences is elected. The number of seats for each party is determined by a majority bonus mechanism.

Milan has a broad internal transport network and it is, at the same time, an important transport interchange which is one of the biggest centres of the country for airway, railway and road networks in Italy. It involves urban public transport network, subway, suburban railway, tram and bus network as well as taxi, car and bicycle sharing services.

4.1.2. Mobility

It is expected that the share of urban public transport will increase up to 63% and the share of automobiles will decrease by 24%. It is aimed that the bicycle network, currently constituting 9% of the urban road network, will be increased to 25%. It is expected that average travel time measured by appropriate network indicators decrease by 8.3% (9.5% within the city) and road congestion will decrease by 10%. It is expected that public transport service delivery (seat-km) will increase by 20% and commercial speed of public transport will increase by 17.5%.

The public transport network comprises of four subway lines and 154 surface lines which are of 1,286 kilometres and produce nearly 120 million kilometres of vehicle mileage per year. Mobility and transport system problems of Milan are listed as growing demand for private transport due to functional separation between the city centre and sub-centres, failure to plan transport and logistics activities, road congestion and inefficient allocation of public areas.

4.1.3. Environmental Quality

While air pollutant emissions are expected to decrease by 10% up to 17% (particularly a decrease in CO, NO_x and PM₁₀ respectively by 14%, 10% and 14%), greenhouse gas emissions are expected to decrease by 13% to 15% (particularly a decrease in CO₂ emission by 15%), energy consumption is expected to decrease by 12%.

4.1.4. Human Safety and Health

Citizens' average rate of exposure to air pollutants is expected to decrease by 13%. With respect to citizens' average exposure to noise pollution, it is envisaged that 37.4% of the population will experience a decrease in noise levels; 14.1 of the population will experience a decrease and rest of them will experience no change. Number of road accidents is expected to decrease by 75% between 2013 (approximately 10,000 accidents/year) and 2024 (approximately 2,500 accidents/year).

4.2. Bordeaux, France

The French administrative system dates back to the Revolution of 1789 and there has been a small number of changes since then. As a key feature, it aimed to divide competences among a large number of local actors responsible in various regions. The Decentralisation Law of 1982 tries to re-arrange the division of responsibilities in a clearer system but the transitions will take time.

It is a unitary state; its governmental system is named as "semi-presidential governmental system" and has the characteristics of a unique example of mixed government model which was introduced after 1960. According to the Constitution of 1958, the executive body is two-headed as the executive power is divided between the President and the Council of Ministers. The principal power is vested in the President; the President is the head of government as well.

The decentralisation structure of the country tended to shift to decentralisation from centralised structure with the decentralisation reform initiated in 1982 with the effect of EU process. There are local units in France such as Communes (Municipalities), Departements (Provinces) and Regions (Régions). In this regard, France is one of the countries with the most levels of government within EU for its three-level governing structure in local administration (region, provincial local government, and municipality).



Figure 4. Bordeaux, France

In this framework, local units in France are divided as regions (régions), overseas provinces, provinces (départements) and towns/communes.

4.2.1. Regional Administration

The basic level is the “commune” (a village or a town) dating back more than two centuries and based on the Catholic flock organisation. Currently there are more than 36,000 communes. While some are rather large (such as the City of Marseille with more than 1 million residents), some have only 200 people. Every commune has a mayor and municipal council, and is responsible for the management of public services in all aspects. The Mayor is responsible for road works and traffic management in the field of transport and can operate his/her own public transport system.

Looking in this context, local public transport in France is a devolved function and institutional responsibility regarding public transport was presented in the regulatory framework for local administration and clarified in the regulatory framework for public transport.

Regulatory framework for public transport is under the responsibility of the Ministry of Transport and the Law on Transport (1982) is a key legislative act in terms of public transport in France, including the transport in municipalities. The law introduced the new Transport Administration (Autorités Organisatrices) in charge of not only public transport but also local transport policy including car traffic, parking and “soft modes” (bicycling and walking).

The following are among the responsibilities of the Transport Administration:

- Determination of bus routes, locations of bus stops, frequencies and time schedule; punctuality, cleanliness, user information (it depends on performance measures and financial incentives in operator contracts).
- Determination of fare systems including fare reductions for students, old persons and unemployed people; the Transport Administration must pay the gap between operation costs and fare revenues (if a private operator wants to offer other commercial reductions, it is his/her responsibility).

- Making and financing investment plans for development or improvement of transport network: e.g. renewal of a bus fleets or fare collection systems, park and ride areas in structures or transfer stations).
- Establishment of multi-modal transport policies in all Urban Transport Areas and Urban Transport Main Plan designed for 10 years and revised after 5 years; this plan involves all aspects of transport conditions such as developing public transport supply, traffic and parking conditions, pedestrian and bicycle routes and urban products logistics plan for a couple of years and commuting planning.

4.2.2. Institutional Arrangements

While regions are responsible for the transport outside of urban areas (inter-city buses, regional trains, school buses for high schools), provinces are responsible for non-urban bus networks and school buses. Every municipality is responsible for delivering all features of public transport within its region and can operate their public transport system. By this way, it becomes the de jure Transport Administration.

In order to adapt administrative structure to functional regions, EPCIs (Etablissement Public a Caractere Industriel) adopted many laws, in other words, for the purpose of establishing inter-municipal unions having limited authority. Particularly, participation in EPCIs is on a voluntary basis although financial incentives are provided by government for EPCIs to be further developed. Today, almost all French communes participate in EPCIs.

The National Regional Administrative Law (1999) created three types of EPCI:

- 1) Metropolitan Agglomeration for large populations (more than 500,000 residents): Member communes may benefit from a delegation similar to an obligatory full delegation;
- 2) Union of Agglomeration of Communes for mid-sized cities (More than 50,000 residents with a commune of more than 15,000 residents): While primary authorities (economic development, land use planning, including public transport and housing policy) should be delegated, others such as streets and parks, public infrastructure services, water supply, environment, sports and cultural equipment may be delegated or remain under the responsibility of every commune;
- 3) Union of Communes for smaller municipalities: While the responsibilities which should be delegated are only land use planning and economic development, delegation of public transport is optional. Accordingly, if the responsibility of public transport is delegated to EPCI, EPCI in all cases becomes the Transport Administration and today hundreds of Transport Administrations are the delegated authorities of EPCI.

The Transport Administration may decide to operate public transport on its own (as public monopoly) or may procure such service from a private company. In the event of outsourcing, two basic approaches are implemented:

- 1) A public/private company is established and more than 50% of this company belongs to the Transport Administration. This is called Societe d'Economie Mixte or SEM and equipment and building belong to this company or
- 2) A contract is signed with the private company and depending on the type of contract; equipment and buildings belong either to the Transport Administration or to the private company. In general, contracts are signed for a period of 5-6 years. In any case, the operating company becomes a monopoly in the designated transport area. For example, non-urban bus companies may not have bus stops

within urban area except for the cases where the Transport Administration agrees to permit certain number of bus stops.

The recently emerging trend of re-municipalisation of services led to in-house execution of public transport services in an increasing number of municipalities and regions due to cost savings and quality concerns. When doing business with private companies, tendering and monitoring processes generate certain operational costs. The tendering process and need for monitoring performance of certain companies may add 10% to contract costs and a number of local administrations clearly expressed by numbers the savings and cost advantages of not tendering or re-tendering such services as the rationale for in-house execution of public transport services.

It is determined that municipalities may manage service delivery on their own in a simpler way instead of negotiating continuously with private companies to fulfil their service responsibilities.

However, worker disputes also drove re-municipalisation trends. Workers directly employed by the municipality can have different employment status and rights than those employed by another enterprise owned by the municipality. This became the subject of disputes and strikes for restructuring and re-municipalisation of public transport (and water services) in France.

4.2.3. Mobility

Metropolitan Bordeaux is one of the largest urban areas of France which hosts 720,000 people and serves to a larger metropolitan agglomeration area of 1.1 million. Although its average travel distance to the city of Bordeaux is 4.6 km, 26% of total trips are made for distances of 12 kilometres and above. Although the transfer rate in public transport is 31% for one trip, the rate of those who transfer at least two times is calculated as 49%.

Bordeaux Public Transport System Metropolitan Agglomeration (Transports Bordeaux Métropole, TBM), manages 65 standard bus and tram lines. These tram and bus lines include:

- 13 high frequency (every 10-15 minutes) service (LIANES)
- 9 main routes whose service frequency varies between 15 to 30 minutes
- 6 suburban services (COROL)
- 8 local services (CITÉIS)
- 2 express services
- 16 lower frequency services
- 11 special services (e.g. school services)
- 4 Daily Flexos (flexible services following the routes fixed to a location and then collecting and dropping off passengers upon request)
- 6 Evening Flexos (flexible services following the routes fixed to a location and then collecting and dropping off passengers upon request)
- 1 Night Flexo (flexible services following the routes fixed to a location and then collecting and dropping off passengers upon request)
- 3 Résago areas.

4.2.4. Environmental Quality

The transport sector represents an increasing share of final energy consumption in France (32% in 2020 vs. 29% in 1990 and 18% in 1970) and accounts for approximately 70% of petroleum products

consumption. In total emissions, CO₂ is determined as the main emitter with a rate of 36%. While road transport accounted for more than 80% of the consumption in the transport sector in 2020, followed by air with 15%; railway and inland water transport have a low share (respectively 2.8% and 0.8%). Private cars account for more than 60% of road transport consumption; followed by light commercial vehicles with 20% and trucks with 15%; buses and two-wheelers have a low share (respectively 2.4% and 1.5%).

Since 2006, the energy/CO₂ label has been attached to all new vehicles for sale or rent in order to provide information on oil consumption and specific CO₂ emissions, thereby providing guidance to consumers in choosing vehicles.

Since November 2012, labelling for tires has been also made obligatory in France. In 2008, France preferred to implement an ecological fine/reward system which rewards customers of new automobile emitting the least CO₂ through an incentive discount against the purchase price.

Reward varies between €200 and €7,000 for 105g CO₂ (2013 scale) per km for vehicles emitting less than 20g CO₂. A fine is imposed on any vehicle emitting more than 135 g CO₂/ km (€100 to €6,000 fine for a vehicle emitting 140 to 231 g CO₂/km and more).

For urban passenger transport, the same law stipulates the establishment of transport infrastructure including urban public transport lines of 1,500 km (except for Ile-de-France) and expansion of high-speed rail network, development of transport in its own field. "Soft" modes of transport and new mobility services are emphasized (bicycle, walking, company travel plans, car sharing and car-pooling). The law reveals the possibility of creating urban transition fares for aggregation of more than 300,000 residents having urban travel plans. Rail transport is the most energy-efficient method for long distances and it saves nearly six times more than the carbon emission of a truck.

4.2.5. Human Safety and Health

Air Quality and Human Health

The French framework for air quality management is based on a combination of international treaties, EU directives and local legislation. The first important local legislation on air pollution was introduced in 1961. French laws have given the right to the citizens to breathe air which is not harmful for their health since 1996. Air quality is managed with various regulatory measures at national and local level.

An extensive air quality monitoring system comprising of a network of licensed non-profit groups coordinated by Air Quality Monitoring Centre Laboratory is implemented across France. This air quality monitoring system gives information on the implementation of air quality improvement measures.

Emissions of certain matters was prohibited or limited by means of obligatory technical standards including on production, sale, storage, usage, maintenance and/or disposal of various products and goods. Pollution is also prevented through "atmosphere protection plans" which all urban areas with more than 250,000 residents should implement to meet air quality standards specified by the government. In addition, emergency measures may be taken when air quality limit of a certain region is exceeded or the risk is exceeded. Under these circumstances, the local governor may restrict or fully suspend the activities contributing to the increase of pollution. This, if necessary, may include complete prohibition of running certain vehicles in the affected region. Additionally, a law of 2015 conferred the authority to local administrations to establish restricted traffic areas in urban areas and other areas subject to atmosphere protection plan.

France air quality control is also based on national objectives regarding various air pollutants, including a national carbon budget which is the general limit of greenhouse gas emissions for a five-year period. National objectives for other emissions are medium-term and long-term reduction objectives for sulphur dioxide, nitrogen dioxide, non-methane volatile organic compounds, ammonia and light particulates. It is aimed to achieve these goals through the implementation of National Low-Carbon Strategy (for national carbon budget) and National Plan for Reducing Emissions of Atmospheric Pollutants (for objectives regarding other emissions). These two plans overlap in many areas although they have certain differentiating points. They provide details of a series of different measures including taxes and financial incentives to reduce emissions, establishment of more traffic restrictions area, development of infrastructure for clean alternative fuels, development of new technologies, change of agricultural practices, development of alternatives to waste incineration, making the buildings more energy-efficient and raising the awareness of the public.

French government published national objectives regarding the emissions of various air pollutants in May 2017. At the same time, the government published a National Plan for Reducing Emissions of Atmospheric Pollutants (Plan national de Réduction des Emissions de Polluants Atmosphériques, PREPA) which is required by the Law on Environment. This plan consists of the measures for research, innovation and the improvement of the participation and coordination between government entities and authorities as well as a long list of measures to be implemented in industry, transport, construction and agriculture sectors in the time frame of 2017-2021. This plan aims to be in compliance with the objectives of Gothenburg Protocol and Directive (EU) 2016/2284 and is operated in parallel with the National Low-Carbon Strategy. In the context of this plan, in the field of transport.

Measures and proposals were brought forward for increasing tax convergence between gasoline and diesel, incentives for riding a bicycle, measures and recommendations for more traffic restrictions areas, replacing or transforming the existing vehicles, developing infrastructures for clean alternative fuels, limiting sulphur amount in marine fuels, verifying real-world vehicle emissions and an attempt to establish a low-emission area in Mediterranean countries and Mediterranean region.

Traffic Accidents

Traffic accidents cause the loss of thousands of lives in France every year. In 2014 there was an increase in the number of deaths in road accidents: +120 (3,338 deaths) compared to 2013. The most affected group was identified as pedestrians and bicyclists. Thus, personal injuries increased by 1.7% and there were 35,000 serious injuries in total. France showed an unprecedented decrease of -11% in the number of deaths in road accidents. It was recorded as the first year to show a decrease after the record-breaking 2013 when more than 400 lives were saved. In France, 3,500 people were killed in road accidents in 2019. In 56,016 traffic accidents in total, 3,244 people were killed, including 483 pedestrians, 10 personal mobility device users (such as electric scooters), 187 bicyclists, 134 moped riders, 615 motorcyclists, 1,622 drivers, 98 utility vehicle drivers, 36 drivers within 30 days following the accident. 66 children under the age of 14 were killed; 87 young people between the ages of 15 and 17, 549 young people between the ages of 18 and 24 and 849 old people aged 65 and over were killed in traffic accidents.

Government continues its efforts to reduce the deaths and prepared an action plan involving various measures for that purpose. Some of them are as follows:

- **Awareness, prevention and training to “better protect young drivers”:**

Reduce legal blood-alcohol level from 0.5 g/L to 0.2 g/L for inexperienced drivers; allow 15+ years of age to drive cars under adult-driver supervision; the opportunity to take license-driving tests at age 17 and a half; train all registered doctors on early diagnosis of drug and alcohol problems; strengthen the inspection of managers of facilities serving alcoholic beverages.

- **Protection of the most vulnerable:**

Reduce the speed limits from 90 km/h to 80 km/h particularly on the two-way roads which are prone to accidents in eleven departments; prohibit car parking within 5 metres of pedestrian crossings (except for two-wheeled vehicles) in order to improve visibility between pedestrians and drivers; standardisation of size and format of two-wheeled motor vehicles' registration plates in order to facilitate controls.

- **Combatting road offences:**

Make a decision on the prohibition of any headphones which may distract drivers' auditory attention; explanation regarding the regulation on automobile window tinting to guarantee that roadside vehicle checks are carried out properly in case of certain dangerous behaviours; trials on mouth swab drug detection tests;

- **Improvement of road infrastructure safety:**

Prevention of losing the way by increasing the number of road signals on highways; modernisation of a fleet of 4,200 radars.

4.3. Berlin, Germany

Germany is country with federal structure, governed by a parliamentary system. The country has 3-tier local administration system. The largest unit in this system is states. There are 16 states each of which has their own constitution and laws. Other two tiers are respectively regions and municipalities. Today, there are 401 regions (kreise) (Der Bundeswahlleiter) and approximately 11,500 municipalities (Federal Ministry of Economic Cooperation and Development -Bundesministerium für wirtschaftliche Zusammenarbeit und Entwicklung).



Figure 5. Berlin, Germany

Non-motor transport is of great importance in traffic planning in Germany. According to “Mobility in Cities - SrV 2018/19” survey, 49% of Berliners travels by foot or bicycle. Berlin focuses on pedestrian and bicycle network strategies in order to adapt this. Berlin Mobility Act entered into force in 2018 and it is the first mobility act aiming at ensuring safer, more reliable and environment-friendly mobility future in the capital of Germany.

Local administrations in Germany (municipalities) have obligatory functional responsibility for all local public transport services in their own areas. In the context of the system of other tiers outside of urban areas, districts (Kreis) have the functional responsibility for public transport. While traditionally transport by bus and trams are the modes of transport used for short distances, public transport services for long distances are based on rail systems. Among those, light rail systems (a German innovation: train-tram) provide public transport services in rural and urban areas.

Federal responsibility for arranging local public transport in Germany lies with the Ministry of Federal Transport and Digital Infrastructure. The Passenger Transport Act (Personenbeförderungsgesetz) is the basic regulatory framework for urban public transport and focuses on transport services for the distances shorter than 50 km and/or less than one hour. The act integrates railway and road services but it divides them into sub-groups as two types of urban public transport having different regulatory frameworks:

- 1) “Urban Public Transport” by trains, including regional trains and S-Bahn transport (according to Railway Act),
- 2) Other “urban public transport” systems: trams, trolleybuses and buses. Trams are also elevated railways, underground and cable railways but this does not include suburban railways (S-Bahn transport).

Generally, German local administrations themselves organise and deliver public transport services, i.e. through in-house execution, for a very long time without private competition. However, public transport services have experienced large-scale changes since 1990s in line with the aim of introducing traditional public transport services to private competition. This is particularly driven by liberalisation in EU and open market directives and created huge impact on management of public transport services by municipalities.

Particularly, the German Federal Railway (DB) was transformed into a private company belonging to German federal government from an administrative unit of federal government in the 1990s and planning and operating responsibilities for public transport based on regional rail system were divided between the government (planning and financing) and new company (DB Regio) belonging to federal government. Federal government also devolved the planning and financing responsibilities of regional rail systems to federal states and meanwhile public transport acts of states established a new framework for public transport in each state and then these allocated financing and planning responsibility for public transport within the state.

Municipalities and provinces (in the context of rural two-tier system) became responsible for planning and financing for local public transport (except for regional railways). In practical terms, most of the cities (and certain provinces) combine two roles:

- 1) Financing and planning agency for public transport,
- 2) The owner of public transport organisations operating public transport services.

Essentially, all big public transport organisations in Germany belong to the city. In most of the states, state or regional associations of provinces and cities (Zweckverbände) are responsible for planning and financing regional railway services. In addition, provinces and cities or regional province and city associations are responsible for planning and financing of bus, tram and U-Bahn services in most of the states.

As a result of being oriented by EU domestic market regulations, German federal laws differentiate between subsidized public transport services and profit-seeking ones in order to promote more competition among operators where public transport services are subsidised. The real meaning of the law and its results became the subject of long court cases. However, German public transport companies finally decided that all subsidized public transport services should be liable to obligatory public procurement calls and public transport companies should compete for the right to deliver subsidized services. As a result, financial efficiency of German organisations increased in the expectation of competition. In any case, if no public transport organisation can deliver this service without subsidy, municipalities may subsidise public transport without a call for tender and may assign a public transport provider.

4.3.1. Institutional Arrangements

Urban public transport is divided as “demand” side (recipients/users) and “supply” part (service provider). Accordingly, institutional infrastructure of short-distance public transport is divided into three levels in Germany: Regulatory, management/recipient and provider/operator:

The inter-municipal cooperation (Zweckverbände) decides which concessions will be awarded. In addition, it decides on prices and quality of services.

- 1) A procurement unit (Aufgabenträger), for example transport networks (Verkehrsverbund) or often a separate inter-municipal cooperation, coordinates the planning of ticket system and broad coverage area. Plans for short-distance transport (made by inter-municipal Aufgabenträger) define the requirements for actual service. All provide an environment for approvals of inter-municipal cooperation.
- 2) Services on transport routes are operated by public or private companies. These compete for the concessions for routes subject to tender awarded to companies for a certain period.

While most metropolitan areas also operate their own public transport providers, tenders where the competition was fierce, were carried out for regional bus and railway services. Although the private sector participation is low, German municipalities have recently shifted the public transport service back to in-house execution (with waste management and housing management). This trend originated from reduced private services and excessive increases in fares.

Cost recovery rate of public passenger transport companies (except for trains) was 71.9% for West Germany and 65.6% for East Germany (2004). In addition to revenues earned from passenger fares, operators may receive federal subsidies, tied state grants for people with disabilities, school-aged children, apprentices and students and social cross-subsidies between profitable and non-profitable services.

4.3.2. Mobility

- Every Berliner covers a distance of 3.7 km every day and spends 80 minutes in travel.

- Average length of the route is approximately 6.0 kilometres per person and average travel time is 24 minutes.
- When compared to other cities, Berlin has substantially low rate of car ownership. 43% of households in Berlin do not have a car.
- There are 1.6 bicycles per household.
- While the number of routes covered by bicycle continues to increase, driving has been gradually decreasing since 1998.
- In Berlin, travelling on foot is more common than travelling by car.

Evaluating in terms of public transport systems, Berlin has a strong public transport network. Subways, suburban railways, regional trains, trams and buses have more than 3,300 stops and a network length of more than 2,000 km. Approximately 80% of subway, suburban railway and regional trains stations are convenient for wheelchair access and approximately 75% of the stations has guiding systems for visually handicapped. More than 1.1 billion passenger use transport network of Berlin ever year and 485 million passengers use suburban railway.

Berlin has both nationally and internationally good train connections. It is possible to expeditiously access many major economic centres of Europe through Hauptbahnhof, the largest mushroom station of Europe. Many towns in Brandenburg are connected to the capital regularly through regional express routes. High-speed rail line between Berlin and Munich was commissioned in 2017.

- It serves as 485 million passengers, 16 lines, a line length of 340 km, 168 station, 650 two-car train sets, and suburban systems.
- It serves as 600 million passengers, 10 lines; line length: 153 km (day), 173 stations, 8 night lines subway systems with 142 km.
- It serves as 466 million passengers (including drivers), 159 lines, 6,511 stops, 64 night line wheeled public transport system.
- It serves as 208 million passengers, 22 lines; a line length of 300 km (day), 803 stops, 9 night lines (subway lines) 109 km light rail system (tram).

Evaluating in terms of transport by bicycle, an integrated network of bicycle paths and routes offers an attractive alternative to bicyclists in Berlin. There are more than 1,000 km of bicycles paths for bicyclists. Traffic surveys show that there has been recently an increase in bicycle traffic in many regions. It was estimated that there were approximately 21 million of bicyclists in 2018. This accounts for a growth of nearly 9% compared to the previous year.

4.3.3. Environmental Quality

The transport sector generates a substantial part of global greenhouse gas emissions. In 2009, 153 megaton (Mt) CO₂ emissions were generated in the transport sector in Germany. 95% of all transport sector emissions were generated by road transport with equivalent of 146 Mt of CO₂. The German government set a goal of an emission reduction of 40% by 2020 (compared to 1990 levels). High emissions showed that the country would miss the goal by far and caused the government to initiate climate action plans for additional reductions over the years.

However, the substantial decreases in 2018 and 2019 brought Germany to its target closer than expected. Emissions were further reduced in 2020 due to the economic impact of the measures for controlling the spread of COVID-19. However, Germany still struggle for reducing the emissions in transport and heating sectors and the rate of increase in renewable energy significantly slowed down.

These trends show that Germany should make continuous efforts to meet future climate goals even if there is serious recession due to the pandemic and correspondingly a sudden decrease in emissions.

Germany made substantial progress in terms of expanding renewable energies. Since support payments in the Renewable Energy Act of the country were initiated in 2001, renewable energy has become a dominant player in the mixture of powers rather than a niche technology. Germany met more than 40% of energy consumption of the country through renewable energy in 2019 and 35% of the 2020 goal was achieved one year in advance. The government aims 65% by 2030 as stated in 2030 Climate Action Plan. After all, its share in the gross final energy consumption of the country remains relatively low with 17.5% although it is too closer the 2020 goal of 18%. The government aims a share of 30% by 2030.

4.3.4. Human Safety and Health

Air Quality and Human Health

Pollution control has been pursued by Germany since 1980s. In July 1989, the West German government of the time announced an assertive plan to help East Germany to reduce nitrogen oxide (NO_x), sulphur dioxide (SO₂) and mercury levels caused by burning coal. This caused that Germany filter chlorinated hydrocarbons and mercury in waste water to dump into rivers. Since then, Germany has become a global leader in green technology export with a market share of 400 billion dollars. An assertive energy transition plan (Energiewende) was prepared in the country, aiming to win the Germany's on-going fight with air and chemical pollution.

Currently, one third of the electricity in Germany is met by wind, solar or bio-mass. Emission of greenhouse gases causing harm to climate was reduced by 27% by 2016 compared to 1990. The last three German nuclear power plants will be de-commissioned in 2022. It seems impossible for Germany to accomplish its goal of 40% of reduction in greenhouse gas emissions by 2020 compared to 1990 levels despite the regulations and measures.

Climate protection plays an important role in German and international environmental policies. In Paris Climate Agreement, the states promised to reduce temperature rise due to climate change below far more than two degrees Centigrade. To achieve the goal, this induced Germany to develop strategies for the topics such as adaptation measures in power generation, agricultural production and industry, a change in traffic regarding electro-mobility, changes in heat supply in buildings and electricity usage in private households.

Particularly after the emission scandal of Volkswagen in 2015, the German automotive industry was suppressed heavily by the international community. A huge program was introduced to change the operating software which provided fake data on vehicle emissions and also strengthen the present commercial and municipal fleets with modern catalysers. Germany along with several other important automobile producers which were challenged at the European Court of Justice for Germany violated emission regulations, worked hard to reach clean air goals with. In August 2019, the European Commission provided 479 million dollars in aid to Germany to renew diesel engines of garbage collection trucks, buses and other municipal vehicles. According to the Federal Ministry for the Environment, Nature Conservation and Nuclear Safety, it is aimed that modern catalysers and software updates will reduce particulate matters by 2020.

“Eco-tax” of 65 cents for oil per litre was first introduced in 2007 but it consistently remained in force with the money invested on green technologies including wind and hydroelectricity power. The Renewable Energies Heat Act aims to encourage both businesses and public sectors to invest in new buildings and reduce heat loss by 14% by 2020. The national network is expanded to help people in need to provide energy across the country.

The concept of free public transport was put on the agenda in 2018; costs were designated and people were encouraged to avoid using their cars, justifying the investment; therefore, they were encouraged to reduce emissions. Although it does not seem possible that this plan will be adopted soon, it shows the resoluteness of Germany to overcome the air pollution problem.

Although Germany violated European air pollution limits in 2018, the country seems determined to overcome the problem. The number of German cities with particulate matter levels of above 40 mg per cubic metres has decreased since 2017.

Traffic Accidents

In Germany, there were 3,046 deaths in road accidents in 2019 with a decrease of 7% compared to 2019. The death rate was calculated as 3.7 per 100,000 people. Since 2000, the number of deaths on roads has been decreased in all age groups except for those over 75. Older German road users constitute the age group under highest risk in traffic. In the context of 2011-2020 Federal Road Safety Program, it is aimed to ensure a safe, ecologically sensitive and sustainable mobility for all road users in Germany. A new road security program is under development, covering 2021-2030.

As seen the indicators above, there are several impact factors on road safety performance of Germany. Long-term progress results from various changes in all areas of road safety. These include infrastructure and vehicle safety as well as various behaviour and training on traffic safety. The prominent points among various measure taken in the last 10 years and regulations put into force are as follows:

- Road safety trainings in schools
- Accompanied driving program and alcohol prohibition for inexperienced drivers
- Road safety inspections
- Treatment of accident black spots
- Improvements in passive and active vehicle safety
- Determination of specific road safety areas and need for child safety systems, preservation of the roadside trees and findings solutions for safety fences such as adding bottom barriers in order to prevent serious motorcycle accidents.

The responsibility for organisation of road safety at national level in Germany rests with Federal Ministry of Transport and Digital Infrastructure. Federal Ministry develops National Road Safety Strategy, including National Road Safety Action Plan and determines and monitors national objectives.

Each of 16 German federal states (Bundesländer) has their own Ministry of Transport. These may formulate independently the road safety programs and they are generally responsible for the improvements in road infrastructure in their own states. Police forces are organised at state level and each federal state is responsible for the enforcement of traffic laws.

2011-2020 Federal Road Safety Program was initiated in 2011. The main goal of the program is to ensure a safe, ecologically sensitive and sustainable mobility for all road users in Germany. It has a

wide range of road safety problems for users, vehicles and infrastructure. Program deals with new challenges such as demographic change and mobility of elderly population. It also aims to protect the efficiency of road network of Germany. Program, reflects the latest technologic developments in vehicles such as driver assistance systems, cooperative vehicle systems and new motor concepts. The focal point in these last fields is to ensure that developments of vehicle technologies do not pose safety risks.

In addition, activities focus on rural roads and decreasing the number of serious injuries and deaths. Road safety objective of Germany is to ensure 40% reduction in deaths compared to the level in 2011.

4.4. Barcelona, Spain

As a unitary country, Spain has a tripartite structure in government: central government, autonomous governments and local governments (provinces and municipalities). In this regard, it is possible to discuss an administrative structuring similar to a federal system (quasi-federal). This tripartite administrative structure is a general structure created with clear lines and a system of sophisticated interconnections in itself.

Spain has a three-tier local administration system characterised by an asymmetric organisation. The regional level consists of 17 Autonomous Communities (Comunidades Autonomas, CCAA) at regional level and 50 Provinces (Provincias) at local level, 8,117 Municipalities (Municipios) and two Autonomous Cities (Ceuta and Melilla). Structure of municipalities and provinces varies from region to region.

The Law on Local Administrations (1985) lists local public transport among obligatory services provided by municipalities with more than 50,000 residents (the ratio of such municipalities is less than 2%). In all other cases, Provincial Councils (Diputaciones Provinciales) must deliver local public transport services on behalf of smaller municipalities. In parallel with political localisation process of Spain, authorities regarding routes operated within the boundaries of a region were delegated to 17 Autonomous regions (Comunidades Autónomas). This was realized by dividing the regional prerogatives along regional routes delegated to regional governments, and keeping the remaining inter-regional routes under the control of the central government.



Figure 6. Barcelona, Spain

While the sectoral arrangement regarding public transport is under the responsibility of Ministry of Development (Ministerio de Formento), general coordination is ensured by the National Transport Conference which is a consultation and negotiation organ in which regional and local administrations participate.

The key legislative act is the Land Transport Act (LOTT), detailed by each Autonomous Region. LOTT set forth that local transport services are subject to be provided through concessions and the contract regarding these specifies the complete travel schedule, number and locations of stops, maximum prices and frequencies and also guarantees exclusivity rights of service providers during the concession. The service can be provided by an operator from public sector or private sector and local administrations are allowed to subsidize where service revenues are below production costs regardless of whether the service provider is from the public or private sector.

For metropolitan areas, a multi-modal public transport system is promoted through the Sustainable Mobility Act, aiming to a coherent urban transport system and integrated payment systems instead of old non-connected modes.

4.4.1. Institutional Arrangements

Generally, every local administration can provide public transport services through in-house execution or through private operator concessions. Local transport authorities are increasingly delegated to voluntary inter-municipal cooperation which have procurement or operating authorities and/or are the recipients of the services awarded specially.

In terms of inter-municipal cooperation, the key innovation in Spain is related to the new Public Transport Institution (ATP) which is responsible for planning and managing public transport in metropolitan areas. Regional administrations may also participate. ATPs also transfer central or regional government subsidies to urban and metropolitan transport operators.

ATPs provide an institutional solution to promote multi-modal transport concepts in metropolitan areas of Spain. This concept is still under development and is not subject to a special regulatory framework. Accordingly, functional responsibilities given to ATPs vary and six types of functions have been assigned to the most complete ATPs such as ATPs in Barcelona: spatial planning, financial planning, tariff arrangements, infrastructure building, service delivery and evaluation. One of the most successful ATPs is CRTM (Consortio Regional de Transportes de Madrid) in Madrid metropolitan areas and provides public transport services to residents of all Madrid regions and affiliated municipalities. Functions of CRTM are as follows:

- Planning public transport infrastructures: subway extensions, transfers, bus routes etc. It is responsible for studies and mobility models.
- Planning public transport services and granting their permissions: Routes and stops within network, determination of time schedules and controlling service level.
- Determination of ticketing policy and price framework for public transport system. Management of monthly and annual travel cards (Abono Transportes) and multi-modal tickets.
- Public transport information, marketing and branding.

Establishment of ATPs, improved the mobility in metropolitan areas and led to new approaches such as underlining the importance of subways, establishment of new tram and light rail systems and adding natural gas and hydrogen-fuelled buses.

There are also other transport services which connect metropolitan area to exterior and consequently do not constitute a part of integrated fare system. These services are out of the scope of this document. These are as follows:

Regional rail services: they cover Catalan region, are managed by Catalan Government and operated by Renfe, public operator.

- a. Regional bus services: they operate in Catalan region, are managed by Catalan Government, run by a couple of private companies.
- b. Long-distance railway services (traditional and high-speed trains): they connect Catalonia to the rest of Spain, are managed by the central government of Spain and operated by Renfe.
- c. In contrast to those mentioned before, these are not public services but commercial services; therefore, according to EU directives, they should be more profitable in economic terms regardless of subsidies.
- d. Long-distance bus services: they connect Catalonia to the rest of Spain, are managed by the central government of Spain and operated by Renfe.

4.4.2. Mobility

Barcelona metropolitan area has a strategic location in the south of Europe as it is in the middle of Mediterranean corridor which connects Spain to the rest of the country. Ports and airports stand out with their increasing impact on national and international mobility in the Southern Europe.

When it comes to mobility, data from 2016 show that those living in the metropolitan area make 9.1 million trips a day (3.3 daily trips per person).

52% of these mobility data belongs to residents of Barcelona. Main reasons of trips are business trips (12.7%), shopping (10.7%) and accompanying others (8.2%) (44.1% in total). When looking at model

distribution of trips, 43% of trips are made by foot; 28% of them are made by public transport and 29% of them are by private cars.

4.4.3. Environmental Quality

Barcelona Municipality Public Transport Enterprises Agency aims to reduce CO₂ emissions by 27,900 tonnes in 4 years by replacing diesel-fuelled buses with hybrid and electric vehicles. When the reduction of fossil fuels and economic decarbonisation are concerned, specified in Paris agreements, public transport guides climate change response of Barcelona.

Barcelona Metropolitan Transport (TMB) is replacing diesel-fuelled and first generation compressed natural gas-fuelled buses with hybrid, electric and more developed natural gas-fuelled buses to reduce carbon dioxide emissions (CO₂), one of the global reasons. For four years from 2017 to 2020, this second environmental transformation of the bus fleet will save 27,080 tonnes of CO₂ and this is predicted to be more than 50,500 tonnes in total by 2023. In 2017, 593 tonnes were saved. When compared to CO₂ emissions in the previous years, it was predicted that saving would vary between 7% in 2018 and 15% in 2020.

The increased investment which Public Transport Enterprises made in its fleet (30.6 million euros in 2016, 38.2 million euros in 2017 and 42.3 million euros in 2018), also aims not only to reduce the age of fleet vehicles and improve their safety but also minimise their environmental impact.

The bus fleet of Public Transport Enterprises was transformed into vehicles with the environmental category lower than Euro 3 by making first stage environmental changes from 2011 to 2014. To achieve this, 70 diesel-fuelled buses and 13 compressed natural gas-fuelled buses was put through transformation. In addition, 425 diesel-fuelled buses were equipped with SCRT filters catching nitrogen oxides and fine particles which are two pollutants having the biggest impact on local environment and public health. With these measures, using environmental qualifications of compressed natural gas powering 35% of vehicles and focusing on more environmentalist procurements, (always choosing the most sustainable vehicle among the vehicles provided by the automotive industry), bus fleet of the Public Transport Enterprises regarded itself as the cleanest enterprises in Europe. In 2015, the International Association of Public Transport (UITP) awarded this title.

4.4.4. Human Safety and Health

Air Quality and Human Health

As a regional centre, daily trips of goods and people in Barcelona cause problems related to air quality. When evaluated according to air quality standards of the European Commission in 2015, Barcelona was given a D-grade by Friends of Earth. This score was adopted as promoting to reduce air pollutant levels in Barcelona and the emissions in the city. In Barcelona, the pollutants thought to be the most hazardous to human health are fine particulate matters (PM_{2.5} and PM₁₀) and nitrogen dioxide (NO₂) attributable to urban and regional traffic.

High NO₂ and particulate matter concentrations has been an on-going problem for Barcelona. In 2019, the European Commission referred Spain to the European Court of Justice in 2019 on the grounds that it recurrently did not comply with EU air quality standards (one of the cities responsible for illegal air pollution levels was Barcelona).

World Health Organisation (WHO) set annual limit values for PM₁₀, PM_{2.5} and NO₂ respectively as 20 µg/m³, 10 µg/m³ and 40 µg/m³. Although the European Union (EU) air quality standards for particulate matters are less stricter than WHO's recommendations (40 µg/m³ for PM₁₀, 25 µg/m³ for PM_{2.5} and 40 µg/m³ for NO₂) Barcelona recorded NO₂ levels above the thresholds introduced by EU at air quality monitoring stations in 2019 which is such a recent date.

Many cities fight against the air pollution caused by urban transport and Barcelona is not an exception. However, air pollution also results from the ship traffic and port activities in Barcelona, the biggest metropolitan area of the Mediterranean. Emissions arising from the port caused that total nitrous oxide levels in Barcelona to increase by 55%. Port activity was also associated with other common air pollutants; in a study conducted in 2016, port emissions were determined to contribute up to 12% of PM₁₀ and 15% of PM_{2.5} in Barcelona. Therefore, Barcelona City Council became a member in an initiative aiming to create an Emission Control Area (Med-ECA) in Mediterranean.

In recent years, air pollution in Barcelona shows an improvement in certain regions. While 80% of air quality monitoring stations in Barcelona exceed average annual NO₂ levels determined by EU, this rate decreased to 29% of the stations in 2013. At the Port of Barcelona and across the city, average annual NO₂ levels remained below the 40 µg/m³ threshold recommended by WHO (the levels were 32 µg/m³ in the city and 37 µg/m³ at the port). However, average annual PM_{2.5} levels in 2019 exceeded the 10 µg/m³ limit recommended by WHO. While average annual PM_{2.5} concentrations reach to 17 µg/m³ at the port of Barcelona, PM_{2.5} levels at the stations in the city were above the 25 µg/m³ level which is the hourly recommendation of WHO for 26 days in total throughout 2019.

A new Action Plan was approved in 2014 to reduce NO₂, PM₁₀ and ozone levels and improve air quality in Barcelona. The city set a goal to reduce the emissions related to traffic by 30% in 15 years and by 10% in the next 5 years. A profit-seeking group in environmental subjects in Spain launched a campaign calling for stopping the enlargement of the port and airport of the city on the grounds that there was a significant decrease in using private cars during the initial lockdowns of COVID-19.

Following the previous case of Madrid, Barcelona created a Low-Emission Area of 95 square kilometres, where there is no environmental classification and vehicles are prohibited in January 2020. The Law on Climate Change and Energy Transition stipulates that all municipalities with more than 50,000 residents establish low-emission areas by 2023 across Spain. Low-emission areas in Europe gained success in reducing air pollutant levels.

Traffic Accidents

In 2020, 5,715 traffic accidents occurred in Barcelona, in which there were injuries and deaths (average 15 accidents per day). 155 of the accidents more than 5,000 resulted in people with serious injuries; it was 30.8% lower than the previous year and the lowest figure of the last six years. Most of the seriously injured people were motorcyclists (73) or pedestrians (32). While the number of vehicles involved in traffic accidents were 18,975 in 2019; it dropped to 10,841 (42.87%) in 2020.

On the most solid commitments of the Barcelona City Council is to continue working in line with the main goal for reducing the number of traffic accidents in the city. One of the most important tools to achieve this is the Local Road Safety Plan of 2019-2022. The plan is based on the previous update (2013-2018) to overcome the new challenges in mobility without affecting road safety. For this purpose, it considers the changes which urban mobility underwent with the introduction of various new transport roads. Plan also recommends making more efforts in the subject of traffic calming for

coherence among various road users, appropriate use of public area and traffic regulations and ensuring the obedience to speed limits. The goal of the plan is to continue the study specified in the previous plan to reduce the number of the people passing away in the traffic accidents. The study depends on four main areas in order to achieve this goal:

- Priority study to prevent the accidents which cause the most serious injuries among victims.
- Determination of specific measures for vulnerable users: pedestrians, bicyclists, motorcyclists, little children, elderly and persons with reduced mobility.
- Priority study to solve the problems causing a wide range of accidents every year or the reasons of accidents; a specific action here may produce results for many users and accidents types.
- Specific and temporary study in the cases including deaths.

Plan has four main action areas with the measures organised in ten different areas:

Training: Training initiatives for the improvement of road safety, training and publicity action.

1. Prevention: projects and actions to reduce accidents and reduce the number of casualties in road traffic accidents.
2. Training: actions, sessions and meetings related to road safety.
3. Communication: action to emphasize the importance of road safety.
4. Research: actions, studies and agreements to help creating knowledge and intelligence on accident rates.

Engineering: technical measures for vehicles and related elements.

5. Organisation: organisational measures.
6. Technology: technological projects and improvements. Review of the present various technologies to solve periodical disputes and take appropriate measures in critical environments.
7. Urban planning: action on road safety.
8. Regulations: proposals and internal procedures on road safety.

Sanctions: measures regarding correcting the behaviour => planning of enterprises, implementation of regulations and control.

9. Action: process and action to correct and improve road safety. The effectiveness of road safety policies substantially depends on the compliance with intensity of the observance and safety requirements. Control campaigns continue to be the key factor in creating conditions for substantially reducing the number of people passing ways or injured.

Emergency: measures regarding care and support for the victims of traffic accidents.

10. Care: actions and projects to improve care for victims and their families.

The action plan consists of 95 measures and 124 specific measures designed to achieve the goals determined in each area.

4.5. Gdańsk, Poland

Poland is a unitary state and governed by semi-presidential governmental system. However, the country gradually strengthens local administrations particularly under the influence of EU process despite its unitary state structure. In the context of developments, the law entered into force in 2019,

which is a part of reform process imposing broader responsibilities on local administrations and expanding the authorities of local administrations.

There are 2,477 municipalities (gmina), 380 districts (powiat) (including 66 provinces with district status) and 16 voivodeship (województwo), constituting three-tier local administration system in Poland.

Urban transport represents the large part of passenger transport in Poland in terms of number of passengers and the transport is one of the most important sectors of national economy. In 2010, the revenue generated from sales in all transport companies reached 124.9 billion PLN (Polish Zloty).



Figure 7. Gdansk, Poland

There are approximately 260 cities and municipalities inhabited by 17 million people. Urban transport enterprises carry 3.7 billion passengers a year in the region and this figure represents approximately 80% of total number of passengers in the public transport sector.

Bus service in towns and cities are the main means of urban transport. These are mostly provided by municipal operators running a total of 11,500 buses. There are 3,342 trams in total in 15 cities, running through 2,342km of tracks. In the cities of Lublin, Gdynia and Tychy, there are 215 trolleybuses in total and approximately 180 km of tracks. The only subway system in Warsaw, comprises of two subway lines with 28 stations and a total length of 29,2 km.

4.5.1. Institutional Arrangements

In Poland, the aspects of urban transport development are determined by EU and national strategic documents, for example:

- White Paper on Transport (COM [2011] 144);
- Transport Policy for 2006-2025;
- Transport Development Strategy by 2020;
- 2010-2020 National Regional Development Strategy: Regions, Cities, Rural Areas and National Urban Policy 2023.

- The main actions include Regulation (EC) No 1370/2007 and Act of 16 December 2010 on public transport (PTZ Act) of 16 December 2010 and other laws.

The public transport sector in Poland is also influenced by the operational programmes co-financed by the European Union. Between 2000 and 2013, Poland used the opportunity to improve the quality of public transport services, obtaining nearly €3 billion. Thus it became the most active country using the funds for developing bus, trolleybus and particularly tram systems.

Public transport systems are administered by the following institutions:

- PKP Intercity – Qualified Passenger Trains (express, intercity, eurocity, hotel and TLK)
- Przewozy Regionalne – Regional Passenger Trains (normal and high-speed train)
- Koleje Śląskie – Regional Trains in the Silesian Voivodeship
- Koleje Mazowieckie – Warsaw-centred Local Trains in Mazovia
- Szybka Kolej Miejska (Tricity) – high-speed urban railway of Gdansk, Gdynia and Sopot, serving in the Tricity region
- Szybka Kolej Miejska (Warsaw) – suburban railway in the Warsaw agglomeration
- Warsaw Suburban Railway – suburban railway in Warsaw cluster
- Arriva RP (owner: Deutsche Bahn) – part of the local train traffic in Kuyavian-Pomeranian Voivodeship
- Koleje Dolnośląskie - part of the local trains traffic in Lower Silesian Voivodeship
- Łódzka Kolej Aglomeracyjna – suburban railway operator in Łódź Voivodeship

4.5.2. Mobility

Gdansk is the capital of Pomeranian Region; biggest city of north Poland and the most important economic, scientific and cultural centre of this part of the country. According to the data of the end of 2017, the number of residents of Gdansk reached to 464,254. This number implies an increase of 0.1% compared to 2016 and an increase of 1.9% in the last 10 years. The most crowded group is working age (60.1%), post-working age (23.2%) and pre-working age (16.7%). Similarly, post-working age people is systematically increasing across Poland.

A Comprehensive Traffic Survey was conducted in 2016 by the order of the city of Gdansk. The survey included transport behaviours which provided data on mobility methods of residents. In Gdansk, it included the administration of questionnaires to each group representing the residents capturing traffic volume measurements and information on public transport vehicles to be needed in building of a traffic model. The survey covered the responses of Gdansk residents on transport habits, an assessment of the existing transport system, problems in road traffic density and other mobility issues.

According to results of the survey:

- 67.2% of the households in Gdansk have private cars.
 - More than a half of the households (51.2%) have a vehicle,
 - 14.3% of the households have 2 private cars,
 - 1.7% of the households have 3 private cars or more,
 - 32.8% of households have no car.

The main reasons why the residents prefer cars in their daily city trips: more comfort (40.4%), shorter travel time (25.9%) and carriage of goods (20.2%). The main reasons of preferring public transport

vehicles in daily inner city trips: low travel costs (21.8%), avoiding parking problems (15.5%) and avoiding traffic congestion (12.7%).

The public transport in the region includes:

- 11 tram lines
- 74 daily bus lines
- 11 night bus lines
- 2 tram lines (operates seasonally)

Gdansk is one of the first cities where the projects corresponding to intelligent transport systems were introduced in Poland. Intelligent transport systems implementation project was started here. One of the first modules implemented is the TRISTAR sub-system, currently operating in most of the cities of Poland. It is an intelligent route monitoring and passenger notification system which consists of screens attached to public transport stops and showing how many minutes the determined transport vehicles will depart. The system runs according to the principle of sensors and transmitters attached to transport vehicles and traffic lights.

4.5.3. Environmental Quality

In 2014, Poland released approximately 310 million tonnes of CO₂ or a share of less than 1% of global CO₂ emissions (0.9%). This ranked Poland as 21st among 195 countries just after the top twenty carbon releasing countries in the world. Poland is the fourth biggest emitter in the world, followed by Germany (sixth place across the world), France (17) and Italy (20). CO₂ emissions in Poland reached their top level in the late 1980s (496 million tonnes in 1987); however, they started to decrease after 1989. This substantially resulted from economic and political transformation of the country.

Poland has become one of the biggest economies of EU and the biggest economy in Central and Eastern Europe since its accession to EU; however, Polish economy also continues to be one of economies with the highest energy density and one of the least carbon efficient economies among the member states in EU. Even though industrial sector is regarded as the main greenhouse gas emitter in Poland and is responsible for more than half of 323 tonnes of CO₂ generated (2012), the transport sector is the second biggest emitter and it releases approximately 15% of this to atmosphere. Without appropriate regulations, annual CO₂ emissions of the transport sector are expected to double by 2030.

4.5.4. Human Safety and Health

Air Quality and Human Health

According to the new report of European Environment Agency (EEA), Poland is remarked as the country having the most polluted air. In addition, Poland is the leading country among the countries having the least reduction in air pollution during the COVID-19 pandemic. Air Quality in Europe – 2020 Report reveals that both PM₁₀ and PM_{2.5} concentrations are higher in Poland than other EU countries.

The report based on 2018 data, shows that pollution in nearly all regions of Poland exceeds European air standards. It is observed that PM-10 concentrations in south-western coal reserves is 50% higher than the EU daily limit.

European Environment Agency also determined that air pollutants caused approximately 50,000 premature deaths in Poland in 2018. Most of them resulted from PM2.5. Across EU, PM2.5 caused premature death of 379,000 people. This means that one in eight of them were Polish.

Only Germany (63,100) and Italy (52,300), which both of them has larger populations than Poland, recorded the highest number of premature deaths attributable to PM2.5.

According to the report, Poland is also in the worst country in EU in terms of benzopyrene (BaP) pollution levels which is generally caused by burning coal and wood at home.

European Environment Agency also analysed the impact of lockdown measures to prevent the spread of COVID-19. While some countries reported a temporary decrease in emission levels, it is found that Poland has one of the lowest reduction rates in April 2020 and even reported higher NO₂ pollution levels in certain regions.

At the beginning of this year, Air Quality Life Index (AQLI) also found that Poland has the most polluted air in Europe. In 2018 World Health Organisation determined that Poland has 36 of EU's 50 most polluted cities.

Traffic Accidents

Every year, thousands of people die and tens of thousands of people get injured on the roads of Poland. Traffic accidents are the top reason of deaths for men up to 44 years old in Poland. Among the most common, permanent reasons of road accidents, there are violation of the rules of road traffic, low driving skills with evaluating situation on road poorly, inadequate road infrastructure and poor technical conditions of vehicles.

In 2013, the new National Road Safety Program 2013-2020 was developed, aiming to decrease the deaths by 50% and serious injuries by 40% in 2020 compared to 2010.

The New National Road Safety Program 2013-2020, emphasizes the problems of seriously injured people as well as the goals related to decreasing the deaths. Two main goals were determined to be achieved by 2020 in order to implement long-term vision:

- Limiting annual number of deaths by 50% at least by 2020,
- Limiting annual number of serious injuries by 40% at least by 2020.

Decade of Action for Road Safety 2011–2020 and Transport Development Strategy by 2020 2011-2020 created by UN, National Road Safety Program 2013-2020 and the structure of response depend on the following five pillars:

1. Safe behaviours of road traffic users.
2. Safe road infrastructure.
3. Safe speed.
4. Safe vehicles.
5. Rescue and medical assistance system.

Effective implementation of activities on the bases stated above is conditioned with the improvement of management system for road safety. Therefore, the Program also undertakes the activities need for planning, implementation, coordination and monitoring activities on its own basis. Priority instructions (priorities) reflecting the main problems of road safety in Poland and the conditions for implementing

these are differentiated in each column, based on the diagnosis of the current situation of road safety. However, each priority aggregates the activities involving the following:

Engineering: Refers to the road network and drivers which increase road safety and “compensate for” human faults on roads, technical solutions for vehicles protecting other passengers and decreases the possible damages of an accident as well.

Compliance: Refers to visible inspection and control aiming at implementing the present regulations and preventing non-compliance.

Training: Refers to increasing road safety awareness by determining and understanding the risk. Goal of the training is to change attitudes and behaviours not only at individual level but also at the level of certain communities or at organisational level.

Priorities and action directions are set for each heading.

1. Safe road user.

- Priority 1 – Affecting safe behaviours of road users.
- Priority 2 – Protecting road users.

2. Safe roads.

- Priority 1 – Implementation of the road safety standards eliminating the most serious risks in road traffic.
- Priority 2 – Development of safety management system of road infrastructure.

3. Safe speed.

- Priority 1 – Affecting the behaviours of drivers on driving at a safe speed.
- Priority 2 – Increase the effectiveness of speed management system.

4. Safe vehicle.

- Priority 1 – Development of activities regarding technical inspection of vehicles.
- Priority 2 – Improvement of vehicle safety systems.

5. Rescue service and post-accident assistance.

- Priority 1 – Integration and development of National Rescue System.
- Priority 2 – Re-arrangement of the assistance system for traffic accident victims.

Road safety management system

The process of road safety development requires the compliance with the following three interrelated factor: functions of institutional management, specific actions (responses) and results. Main functions of institutional management include:

- Coordination,
- Legislation,
- Financing and resource procurement,
- Publicity and communication,
- Monitoring and evaluation,
- Research, development and knowledge transfer.

Each of these functions requires an improvement in terms of the performance of the actions defined for each pillar of Road Safety Program. These functions are performed at various rates depending on the institution and the level of the public administration. The program explains the activities in the following areas:

- Improvement of organisational structures and coordination of road safety.
- Introduction of a consistent system of legal regulations regarding road safety.
- Stabilisation of financing system for road safety.
- Introduction of standardised monitoring and communication system.
- Implementation of research system for road safety and knowledge transfer.
- Systemic actions.

Instructions for the implementation of the program

The program is aimed to work with connections to other related areas such as transport, infrastructure, public finance, health, training, rescue system, energy sector, environmental protection, scientific research, jurisdiction, trade exchange and spatial planning. The coordination among public administration, local administrations, business, non-governmental organisation and local communities is of utmost importance.

5. Comparison between Turkey and EU Member States [here]

While municipalities are responsible for local public transport in most of the EU Member States, this responsibility is delegated to provinces or municipalities where more than 50,000 people reside in Spain. In Turkey, the responsibility for local public transport depends on the type of the local administration because the responsibility delegated by the Law No. 5393 on Municipality is different from the one delegated to MMs subject to the Law No. 5216 on Metropolitan Municipalities. In MMs, this responsibility is vested in the MMs, leaving MDMs aside.

Special subsidiary companies such as EGO, İETT, ESHOT etc. were established to manage and operate public transport systems in some of the MMs in our country. Since the establishment İETT Operations in 1939 with the Law No. 3645, model seeking has also continued to date, establishing more metropolitan organisations specialising on delivering certain services. From 2004 onwards, new laws on special provincial administrations, municipalities and metropolitan municipalities were enacted in respect of local administrations, and the later entry into force of the Law No. 6360 on 31 March 2014 increased the number of special purpose metropolitan organisations to extend services to cover provincial boundaries; therefore, the concept of rural municipalities was included in the literature and a centralist localisation venture accelerated. All these transformations will be chronologically reviewed in the following sections; special purpose institutions in the field of transport have been established, which have protected their existence from past to present.

The first public authority which was established at local level in the field of transport in Turkey is the General Directorate of Istanbul Electric Tramway and Tunnel (İETT) Operations. This institution was followed by the General Directorate of Ankara Electricity, Gas and Bus Operations Organization (EGO), General Directorate of Izmir Electricity, Water, Coal Gas, Buses and Trolley Buses (ESHOT), which would later assume the responsibility for transport services.

If an evaluation needs to be made over the example of the General Directorate of İETT, it is observed that it currently continues its limited activities as a special purpose metropolitan organisation; the only independent general directorate having a separate budget and vested with public legal entity is İETT among the organisations which İETT inspects and are in the context of (public) transport service. Other organisations (Ulaşım A.Ş.; Otobüs A.Ş.; Şehir Hatları A.Ş.) are the companies established in the form of Municipal Subsidiary/Municipal Economic Enterprise.

General Directorate of İETT Operations is formed as a special purpose metropolitan organisation established without giving enough place to organisational structure in its special law unlike the others. The organisational structure was shaped with a Regulation in violation of the principle of Administrative Law in the sub-norms, based on the Law No. 3645 on Transfer of Organization and Installation of the Istanbul Electricity, Tramway and Tunnel Administrations to the Istanbul Municipality. Regulation on General Directorate of Istanbul Electricity, Tramway and Tunnel Operations, adopted with the Municipal Council Decision No. 43 of 6.5.1941 is still in force; many matters which were not laid down in the Regulation in question and the relevant law were finalised based on this law. Looking at the organisational structure of General Directorate of İETT Operations after the legislative amendments in the process, it is observed that there are (Metropolitan) Municipal Council, controllers elected by the council and General Director and Administrative Executive Committee. On the other hand, it is observed that the bodies of General Directorate of İETT Operations are comprised of General Directorate, Administrative Executive Committee and the units under the

hierarchy of General Directorate, pursuant to Article 5 of the Directive on the functions, powers and responsibilities of General Directorate of IETT Operations.

The complexity of the service area has substantially increased and various concerns should be taken into account, such as mobility problems in service delivery and urban and rural areas, environmental and climate change, the transformation towards harmonised multi-modal transport systems from isolated methods as a result of health, supporting infrastructure and technologies and increase in public-private cooperation.

These types of topics are subject to various regulations both in Turkey and EU. Due to the complexity of the services, organisations and operations are increasingly and more commonly transferred to inter-metropolitan or inter-municipal traffic entities in compliance with the national laws. A common challenge is the maintenance of service levels in urban areas in the face of the pressures caused by urban migration. Another challenge is the maintenance of public transport services in rural areas in the face of the decrease in the population. As a solution for this type challenges in six EU Member States, new service solutions such as multi-modal suburban systems, internet-based travel planners, or joint ticketing systems were made; on-call share taxi services were implemented as an innovation in remote areas.

While re-municipalisation trends are observed in EU, private operators are used commonly both in EU and Turkey. Germany generally outsources services at a lower level.

As mentioned before, local public transport is a much complicated service area and this study involves the establishment and operation of multi-modal local public transport systems, including buses, maritime and water transport, subway and rail systems. The definition made for this service complies with the relevant legislation in Turkey.

Both EU and European regulations and institutional arrangements regarding local public transport also reflect the complexity of this service area. This area is driven by a series of basic development priorities such as primarily urbanisation trends, mobility concerns, economic development, open competition for transport concessions, climate change and sustainability concerns and integration of modes of transport into a coherent system. Supranational EU regulations play an important role in all of these areas; for example, that EU procurement regulations require that public service contracts be awarded on competitive tendering, regulations on data sharing among transport service providers and regulations on public subsidies for public passenger transport made by rail or road.

In most of the EU Member States, municipalities are responsible for local public transport services; however, these services are started to be gradually delegated to inter-municipal cooperation. Although private operators are observed in the entire five countries, privatisation levels of services vary and privatisation of services is less preferred in Germany. In Turkey, municipalities partly privatise local public transport with concession agreements and subways and other rail services are built by using the build-operate-transfer model.

In our country, local administrations deliver important services such as:

- Prepare and implement the main plan of metropolitan transport; plan and coordinate transport and public transport services,
- Determine numbers, fares and tariffs, timings and routes of all kinds of services and public transport vehicles operated on land, sea, water, railway and taxis,
- Operate stops and parking areas on highways, roads, streets, streets, squares etc.,

- Deliver services such as building, maintenance and repair of boulevards and streets and main roads of municipal area,
- Build, operate and grant permissions for passenger and cargo terminals and closed and open parking areas,
- Provide metropolitan public transport services; operate these types of facilities and granting permissions for public transport vehicles, including taxis and shuttles on road and sea within the boundaries of metropolitan area etc.

Public transport has been one of the most affected areas during the COVID-19 pandemic; central government and local administrations made many important decisions of restrictions and measures.

“COVID-19 Pandemic Management and Practice Guide”, which is published and constantly updated by the Ministry of Health in our country, serves as a basic guide presenting the measures which should be taken in public transport.

As minibuses, public minibuses, privately-operated public buses, municipal buses are public transport vehicles, they are significant for the spread of COVID-19. Therefore, the following measure should be taken. The rules to be obeyed for COVID-19 should be visibly posted in vehicle and driver and passenger should be required to comply with these rules. A hand sanitizer should be placed near the entrance door in vehicles.

Measures to be taken for drivers

- Drivers should be informed on COVID-19 by relevant chambers/unions of profession.
- Drivers who have COVID-19-related symptoms (fever, cough, nasal flow, shortness of breath) should not work and go to health institution.
- Drivers should comply with social distancing rule while waiting in the queue at final stops.
- Drivers should act in compliance with personal hygiene rules and definitely use mask inside the vehicle. Drivers may be allowed not to wear mask in vehicles with transparent barrier shields between driver and passengers.
- Masks should be changed when moistened. One should take off the mask by holding its elastic bands, not touch its exterior surface and wear also by holding elastic bands. Used masks should be thrown in tied waste bag. It is necessary to use hand sanitizer while changing mask.
- In order to reduce hand contact while making payment in these vehicles, money should be exchanged through a box.
- It is necessary to comply with measures to be taken at stops, taxi stands with a closed rest area for drivers.

Measures to be taken for passengers

- Passengers should comply with social distancing rule while waiting in the queue.
- Passengers should comply with social distancing rule while getting on and off the vehicles.
- All passengers getting on the vehicle should wear masks and not take off during travel.
- Passengers who are not wearing any mask should not be admitted to vehicles.

- Passengers should be admitted to vehicles according to the number of seats, standing passengers should not be admitted at all.
- Only two of four face-to-face seats should be used by sitting diagonally as not being face-to-face. There should be special regulations regarding seating rules and social distancing for vehicles of different features or specifications. There should be alcohol-based hand sanitizer or eau-de-cologne containing at least 70% alcohol in vehicles to be enough for the use of every passenger getting on the vehicle. Accordingly, every passenger should use hand sanitizer or eau-de-cologne when s/he gets on the vehicle.
- Passengers who have COVID-19-related symptoms (fever, cough, nasal flow, shortness of breath) should not be admitted to the vehicles and directed to health institution.
- No one should speak or yell in the vehicle as it will cause droplets.
- No one should consume food and beverage including water in the vehicles unless utterly necessary.

Measures on ventilation, sanitation and disinfection in vehicles

- Internal air circulation button of vehicles should be shut-off.
- Maintenance for air conditioner filter of vehicles should be conducted regularly.
- Windows should be opened whenever possible and thereby the interior air of the vehicle should be cleaned.
- General internal cleaning of vehicles should be done with water and detergent at the end of the day.
- Interior surface of the vehicle should be wiped with water and detergent.
- After the completion of every trip between first and last stop, frequently touched surfaces (door handles, armrests, handles, window operation switches, seat belt buckles) should be in priority cleaned with water and detergent, then disinfected with 1% diluted bleach or at least 70% alcohol. For this purpose, it is possible to use disinfectant licensed by the Ministry of Health. Doors and windows should be open while cleaning the vehicle. The vehicle should be cleaned when there are no passengers inside and ventilated for one minute after disinfection.

Measures for Taxi stands

- Information on COVID-19 should be provided in taxi stands and posters relating to rules on COVID-19, hand washing, wearing mask should be posted at stands.
- Social distancing (3-4 steps, 1 metre) should be preserved in taxi stands.
- Drivers should not be allowed to work when they have fever, cough or respiratory distress, are infected with COVID-19 or have contacted with COVID-19 patient in the last 14 days.
- Cleaning of taxi stands should be done with water and detergent on a daily basis.
- It is necessary to pay special attention to the cleaning of frequently touched surfaces (door handles, armrests, handles, window operation switches, seat belt buckles) in the stand. For this purpose, after cleaning with water and detergent, it is possible to use 1% diluted (half a small tea glass of bleach for 5 litres of water) bleach (sodium hypochlorite Cas No: 7681-52-9)

or at least 70% alcohol. It is necessary to use 1% diluted bleach (sodium hypochlorite Cas No: 7681-52-9) to clean toilets in the stand.

- Bleach should be used when nobody is inside and then the stand should be ventilated until dry and odour-free.

Measures for Customers in Taxis [here]

- All customers getting on the taxis should wear medical/fabric masks and should not take them off during travel.
- Those showing symptoms matching with COVID-19 (fever, cough, runny nose, difficulty in breathing etc.) should be required to wear medical masks; referred to a healthcare organisation.
- There should be alcohol based hand sanitizer or a eau-de-cologne containing at least 70% of alcohol in taxis which should be provided in adequate quantities to be used by every customer getting on the taxi all day long; an alcohol-based hand sanitizer or eau-de-cologne should be offered to the customer as soon as they get on the taxi.

Measures for Taxi Drivers

- A maximum of 3 people should be admitted in taxis at the same time.
- Taxi drivers should act in accordance with personal hygiene rules.

Measures for Employee Shuttle Buses

As employee shuttle buses are public transport vehicles, they are significant for the spread of COVID-19. Employee shuttle bus drivers should be informed on COVID-19. The rules to be obeyed for COVID-19 should be visibly posted in vehicle and driver and passenger should be required to comply with these rules.

- A hand sanitizer should be placed near the entrance door in vehicles.

The following measures should be taken:

Measures for Drivers

- Drivers should act in accordance with personal hygiene rules and should absolutely wear a mask in the vehicle.
- Masks should be replaced if they become damp. While removing the masks, their elastic bands should be hold; the outer surface of the masks should not be touched; masks should be worn again by holding their elastic bands. Worn masks should be placed on a waste bag and closed firmly and then disposed. If masks would be replaced, a hand sanitizer should be used.
- If possible, the driver's seat should be separated from the passengers with an appropriate material.

Measures for Passengers

- Passengers should comply with social distancing rules (>1 metre) while getting on and getting off the employee shuttle bus. Measures should be taken in order not to violate social distancing rule.
- Passengers should use a hand sanitizer or eau-de-cologne containing at least 70% of alcohol before getting on the employee shuttle bus.
- Passengers showing symptoms matching with COVID-19 (fever, cough, runny nose, difficulty in breathing etc.) should be required to wear medical masks and should not admitted to the employee shuttle bus and they should be referred a healthcare organisation by informing the employer.

- All customers getting on the vehicle should wear a mask and should not take it off throughout the trip.
- Personnel using the employee shuttle bus should be seated starting from the window seats from the front to the back based on their order of picking up.
- The passengers getting on the bus after the window seats were occupied, should be seated on corridor seats diagonally starting from the back row to front row. Personnel getting on after diagonal seating arrangement is occupied will be seated on unoccupied seats starting from the back rows and front rows.
- Seats should be enumerated; the seat of every personnel should be fixed according to the order stated above and the order which they are picked up from home.
- The seating list should be created according to the seat number and posted in a visible way and every personnel should travel on the fixed seat allocated for them.
- No one should speak and shout in the employee shuttle bus due to avoid droplet evaporation.
- Unless there is an obligation, food and beverages, including water should not be consumed in Employee Shuttle Buses.

Ventilation, cleaning and disinfection in vehicles

- Interior air circulation button of the air conditioners should be turned off.
- Air conditioner filters of employee shuttle buses should be regularly serviced.
- Indoor air of employee shuttle bus should be cleaned by opening windows whenever possible.
- General internal cleaning of the employee shuttle bus should be done by using water and detergents at the end of the day.
- While cleaning the employee shuttle bus, cleaners should wear gloves not touch their faces while cleaning and at the end of the cleaning gloves should be thrown into waste cans with a lid or waste bags.
- The inner surface of the vehicle should be cleaned using a cloth dampened with water and detergent.

When each route between first stop and last stop is completed, frequently touched surfaces (door handles, armrests, handles, window operating switches, seat belt buckles) should be firstly wiped with a cloth dampened with water and detergent and later they should be disinfected with 1:100 bleach solution or at least 70% of alcohol. The disinfectants licensed by the Ministry of Health may be used. Doors and windows should be kept open while cleaning the vehicle. Cleaning should be done when there is no passenger and after disinfection, it should wait one minute and then ventilate.

Throughout the pandemic, the Ministry of Transport and Infrastructure and local administrations took financial measures including both health and hygiene and sectoral supports in the context of COVID-19 measures in the framework of their service areas. The obligation to wear masks in public transport vehicles was imposed pursuant to the decision announced by the Presidency on 03.04.2020 in the context of COVID-19 measures in Turkey. Trips are made through only electronic fare collection system by imposing the HES code obligation in public transport vehicles in many MMs.

In addition to the Instruction prepared by the Ministry of Health, a series of measure was also taken for passenger transport companies in the context of pandemic measures. Based on the Circular published by the Ministry of Interior on 23 March 2020, passengers are transported at rate of 50% of the passenger transport capacity in all public transport vehicles operating in-city or inter-city in districts and provinces. It is inspected that passengers are seated in vehicle in a way to prevent contact with

each other. Moreover, the companies were instructed that they should not carry the passengers aged 65 and over on their vehicles.

Specific comparisons between Turkey and selected EU Member States were presented in the following sections.

5.1. Italy

Central government in Italy is responsible for:

- National transport systems and infrastructures, including road, railway, water, air transport;
- National airports and air transport systems,
- Traffic planning,
- Roads and national transport and
- Traffic regulation.

These are the concurrent competencies:

- Civil ports and airports;
- Large-scale transport and navigation networks and
- Communication.

Regional authorities are responsible for:

- Regional public transport,
- Maritime transport,
- Ports and other infrastructure for maritime transport,
- Internal navigation,
- Regional railway,
- Inter-regional roads (with Joint Conference) and
- Public works for regional interests (highways, hydraulic works etc.).

Provincial authorities are responsible for:

- Provincial transport,
- Construction and maintenance of provincial roads,
- Provincial roads and public transport and
- Driving courses.

Metropolitan cities are responsible for:

- Transport mobility which provides the coherence and consistency of municipal urban planning at metropolitan level.

Municipal authorities are responsible for:

- Local public transport,
- Urban transport,
- Municipal regional planning,
- Construction and maintenance of local roads,
- Urban traffic control,
- Aqueducts and Highways.

Inter-regional unscheduled bus services were rationalised due to the restrictions on mobility in Italy due to the COVID-19 pandemic by 13 March 2020. This measure consists of the changes and discount made in the non-scheduled services authorized by the Ministry of Transport and Infrastructure. Services were provided at minimum level. As of 13 March 2020, railway passenger transport was also rescheduled in order to protect passengers and railway employees by reducing the traffic. For each route, connection was guaranteed with at least one other scheduled train.

Milan introduced bicycle and pedestrian priority on the streets by closing the streets with 35 km/h speed limit to automobiles and increasing the road network boundaries with 30 km/h.

5.2. France

Local public transport is carried out at local level. While regional administrations are responsible for the transport outside of urban areas (inter-city buses, regional trains, school buses for high schools), every municipality is responsible for delivering all features of public transport within its boundaries and creates their local public transport system.

The Transport Regulation delegates certain transport functions and responsibilities to the Transport Authority which is automatically the Municipality. However, inter-administration cooperation is commonly implemented by three regulatory frameworks (EPCIs) which give place to this type of cooperation according to the size of the Municipality. Where transport responsibilities are delegated to this type of EPCIs, these EPCIs become Transport Authorities vested with regulation and operation responsibilities in their regions.

As services can be delivered through in-house execution, concessions may be provided by competitive bidding as well and private operators may play an important role. However, re-municipalisation trends have been recently observed in France due to cost, quality concerns and labour disputes. Certain municipalities realised that delivery of the service through in-house execution might be more cost-effective instead of negotiating with private companies for service delivery.

In Turkey, public transport services vary because the authorities delegated to provincial and district municipalities with the Law No. 5393 on Municipality are different from the authorities delegated to MMs subject to the Law No. 5216 on Metropolitan Municipalities. In metropolitan areas, this responsibility is vested in the MMs leaving out MDMs. A re-municipalisation process similar to process in France is not experienced in Turkey. However, some Municipalities combine public and private transport organisations. For example, Ankara Metropolitan Municipality has developed a single card which can be used in both public and private public transport organisations.

Municipal councils may deliver local public transport services through in-house execution or may decide to transfer this service to private companies regarding public transport service delivery. Moreover, in Turkey, municipal councils are authorised to privatise local public transport services.

The COVID-19 pandemic had huge impact on the public transport. Many countries advised that public transport should be used only when it is necessary; number of passengers significantly decreased and services were reduced. The provision of reasonable service to paying passengers caused big financial losses. According to the data published by Transit, France experienced the biggest decrease in the use of public transport, e.g. by 92% in Lyon and 85% in Nice.

There are no restrictions on travel within France. In the context of the present COVID-19 crisis, some traffic bans were partly removed for the vehicles above 7.5 tonnes. Removal of this ban was limited to

certain categories of goods and certain days. Transport for supplying food products (human, animals), hygiene products and pharmacies along with garden products was permitted for certain days and hours.

The curfew is imposed between 18:00 and 06:00 every night in France was firstly updated such as to be between 23:00 and 06:00 and removed on 20 June 2021. Face masks are obligatory in closed and public areas. Moreover, wearing masks was made obligatory for everybody older than 11 years old in all public areas, public transport vehicles, crowded areas, taxis, restaurants, cafes, bars (it is obligatory for personnel and customers when they are moving), schools (it is obligatory for teachers). An exception is envisaged for people with disabilities provided that a medical certificate is presented.

5.3. Germany

Central Government of Germany is responsible for:

- Legislation on digital infrastructure

Specific legislation on the following

- Air transport
- Federal roads and highway
- Federal railway
- Waterway
- Logistics
- Maritime policy
- Big infrastructure projects
- Planning momentum
- Traffic safety
- Air quality observance
- Market analysis for long-distance bus transport

Authorities at regional level are as follows:

- Regional roads
- Regional, local and other railway which do not belong to the federal state
- Public transport at regional level
- Administrative joint responsibility for federal roads
- The Federal Government executes, through commissions, the planning and approval procedures for the construction or renewal of federal roads and highways.

Authorities at local level are as follows:

- Local roads
- Create and maintain public transport at local level
- Urban traffic management

Germany took the lockdown measures under the COVID-19 response on 22 March 2020, which affected the mobility of people and goods on the road and accordingly the exposure to road accidents. According to preliminary data, traffic volume decreased approximately by 11% in 2020 compared to the average of 2017 and 2019 while the deaths in road accidents decreased approximately by 12%.

Road traffic data for 2020 were obtained from approximately 1600 permanent count stations on Federal Highways of Germany (highways and national roads).

Based on such data, motor road traffic on Federal Highways decreased as of March 2020 compared to average monthly traffic in 2019.

Heavy motor vehicles (in other words, buses, trucks and semi-trailer trucks with the maximum permissible total weight of more than 3.5 tonnes) were lightly affected and showed a moderate decrease in the traffic in April and May. However, this does not apply to buses. In October 2020, bus traffic decreased much more than all other motor vehicles which had relatively a low rate.

There were sharp decreases in the traffic for light motor vehicles (in other words, passenger cars, small trucks the maximum permissible total weight of 3.5 tonnes or less and motorcycles) from March to May with the biggest decrease in April. The impact was felt more strongly on highways than national roads. The highway traffic of light motor vehicles decreased by approximately 60% in April 2020.

The measures taken regarding travel by public transport are as follows:

- According to IFSG, those who use public transport vehicles, should wear a FFP2 medical face mask or a similar standard mask,
- If passenger cars are used for passenger transport, the driver should wear a medical-grade face mask,
- Physical distance requirements are valid unless restricted by spatial conditions. Those who suffer from respiratory illnesses should not enter into the facility; this shall not apply to rescue services,
- Operators of public transport vehicles and facilities remind passengers through written or verbal notices or images that they should comply with the requirements, and through verbal warning in individual situations where they refuse to comply with ,
- The personnel also have the right to refuse to serve those who refuse to comply with the requirements; taxi drivers and people who own similar means of transport are obliged to refuse to serve such a person. It is obligatory to collect the contact information for the transport by bus; this shall not apply to school buses.

5.4. Spain

Central government in Spain is responsible for:

Government Officials

- Exclusive general competence (legislative and executive functions) for the construction and management of transport and transport infrastructures among public interests,
- National legislation, policy formulation, the responsibility for planning and coordination,
- Crisis coordination and management,
- Policy formulation and management of inter-regional road and railway transport,
- Formulation and implementation of policy of air and maritime transport concerning general interests and engaging in commercial activities,
- Implementation of Plan Estratégico de Infraestructuras y Transportes (PEIT, Strategic Infrastructures and Transport Plan) and sectoral plans and programs as well as ensuring the coordination of regional actions,
- Monitoring the implementation of PEIT, revision and adaptation (Ministry of Public Works and Transport, General Directorate of Regional Planning and Coordination).

Authorities at ministry level:

- Infrastructure of road, air and maritime transport.
- Control, management and administrative regulation of transport services,
- Access to housing, buildings, city planning, land and architecture,
- Regulatory organisation of post and telegraph,
- Services related to astronomy, geodesy, geophysics and cartography,

There are units in central services and other environmental services to implement this. Moreover, there are different affiliated assets:

- Autonomous Bodies, Agencies, Public Organisations, Public Business Organisations, State Associations and Public Foundations.

Authorities at regional level (Autonomous Communities; AC) are responsible for the following:

- Exclusive general competence (legislative and executive functions) for the construction and management of autonomous vehicle transport system and transport infrastructures for regional interests,
- Implementation and management of national policy,
- Management, planning, coordination and monitoring of public transport activities and services at regional level,
- Limited roads and infrastructure with AC region,
- Limited railways and infrastructure with AC region
- Airports and ports and infrastructures which are not engaged in commercial activities,
- Implement actions/objectives of PEIT in AC regions,
- Participation in the management of governmental transport infrastructures in AC,
 - This implies the ACs participate in port council and they assign the director of port in ports.
 - When it comes to airports, the model is revised to increase the participation of ACs.
- Intercity and inter-metropolitan transport (in local administrations and generally in coordination with financial cooperation of the State).

The curfew is imposed between 23:00 and 06:00 in Spain, except for Canary Islands. Autonomous regions have the right to start curfew earlier or later.

Face masks are obligatory in public areas, indoors and outdoors. Moreover, wearing face masks is obligatory in all public transport vehicles and in private cars unless all passengers live in the same house together. There are exceptions for children under the age of six and people with disabilities or respiratory illnesses.

It was made obligatory to wear masks for people older than six years old in public transport vehicles, in the areas where safety distance of at least 1.5 metres among people cannot be guaranteed, public streets, public airports and any closed area open to public use. Moreover, public transport services were reduced by 50% of the normal capacity. Cleaning activities were enhanced in transport vehicles.

Spain implements EU “traffic lights” approach which is jointly adopted for travel restrictions.

The measures on mobility limited freedom of movement of individuals except for essential activities such as grocery shopping, going to pharmacy and commuting. Mobility between provinces was limited to work.

The critical objective of the Ministry of Transport was to ensure transport of goods within national borders and guarantee the supply. Corridors were created to allow entry and exit of raw materials or end products into facilities where food is produced including farms, markets, fodder plants and slaughterhouses.

5.5. Poland

In the past, Poland used to be served by the public transport services provided by big enterprises of the state as many non-market economies in Middle and Eastern Europe. However, this dramatically changed in the beginning of the 1990s with the beginning of the transition and the adoption of privatisation programs. Larger public economic enterprises were divided and were transformed into public or private enterprises. During transformation process, the share of railway transport on division sharply reduced and the increasing demand for road transport services and the increasing in private traffic led to significant bottlenecks in infrastructure.

The situation in Poland changed dramatically after the transition in the beginning of 1990s. Large public economic enterprises were divided and were transformed into public or private enterprises. In Poland, the share of railway transport in modal division substantially decreased as in Middle and Eastern European countries. While the share of railway in freight transport decreased to just fewer than 27% from over 50% between 1995 and 2005, the share of railway in passenger transport decreased to 8% from 15% between 1995 and 2005. At the same time, the share of road transport substantially decreased, which compensates for the decrease in railway transport.

The central government in Poland is responsible for:

- Highways and national roads,
- Road transport,
- Railway,
- Air transport,
- Maritime transport and inland sea transport.

The National Road Safety Council is responsible for:

- Recommending improving road safety,
- Implementation of road safety improvement action programs,
- Starting research,
- Presenting opinion on legal regulations on road safety,
- International cooperation,
- Social organisations and cooperation with NGOs,
- Conducting impact analyses.

The General Directorate of National Roads and Highways (Generalna Dyrekcja Dróg Krajowych i Autostrad - GDDKiA) is responsible for:

- Management of national roads and traffic,
- Implementation of government budget,
- Implementation of national transport policy regarding road system,
- Data collection and reporting,
- Inspection of road infrastructure preparation,
- Granting single pass permit limited to time and route for private cars,

- International cooperation,
- Collaborating with local administration units regarding expansion and maintenance of road infrastructure,
- Coordination of toll road construction and/or operation.

Regions are responsible for:

- Regional roads,
- Regional public transport (including railway transport and purchase of railway vehicles),
- Regional branches of General Directorate of National Roads and Highways (Generalna Dyrekcja Dróg Krajowych i Autostrad - GDDKiA),
- Recording driving test officials of the state,
- Establishment and audit of regional traffic centres (Wojewódzkie Ośrodki Ruchu Drogowego), including audit of state driving tests,

District authorities are responsible for:

- Powiat - level roads – construction and maintenance
- Public transport in Powiat;
- Recording enterprises operation driving school (ośrodki szkolenia kierowców),
- Recording the enterprises operating vehicle inspection stations (stacje kontroli pojazdów) and audit of vehicle inspection stations,
- Licensing for road transport operations.

Local administrations are responsible for:

- Local roads, streets, bridges, squares,
- Traffic organisation,
- Local public transport,
- Granting licences of taxis,
- Granting permission for road transport within municipality,
- Review of drivers in terms of local topography where municipal council introduces such a procedure (this only applies to municipalities with more than 100,000 residents).
- Local branches of General Directorate of National Roads and Highways (Generalna Dyrekcja Dróg Krajowych i Autostrad - GDDKiA), fulfilling national objectives and affiliated to regional branches.

In December 2020, 20 millions of passengers (12% less than the previous month) were transported by public transport in Poland. Compared to the previous month, there were significant decreases in all public transport vehicles except for air transport.

In Poland, the government took the following measures for transport in the context of COVID-19:

- It is obligatory to maintain a distance of least 1.5 metres between pedestrians.

The following persons are exempt from the restrictions:

- Parents with children who need care (younger than 13),
- Persons who live in one household or run a household together,
- People with disabilities, persons incapable of moving on their own, persons with a special educational needs statement and their caregivers.

It is obligatory to wear a mask in the following places:

- Streets, roads and town squares, cemeteries, promenades, boulevards, car park areas, forest car parks,
- Busses, trams and trains,
- Stores, shopping malls, banks, markets and post offices,
- Cinemas and theatres,
- Physician's offices, in outpatient clinics and hospitals, in massage parlours and tattoo studios
- Churches, at schools and universities,
- Government offices (when going there to take care of certain matters) and other civic centres.

The number of passengers is limited in public transport vehicles:

- By 50% of the seating capacity or,
- By 30% of combined capacity for seated and standing passengers, by leaving at least 50% of the seats unoccupied.

These limits shall not apply to the vehicles aimed at carrying passengers with disabilities.

6. Recommendations

Several recommendations were presented as follows on the health of users and employees in public transport specific to COVID-19 for the cases which may arise later and the standards planned to be developed. These may be classified later such as to be drivers/operators and users/passengers or inside of the vehicle and outside of the vehicle. The studies are conducted considering the EN 13816 which can be regarded as the most important document for service quality and the European Union bases on for the standards. The following recommendations may be primarily given, related to measures for enterprises and measures for general passenger and user health as well as measures for inside of the vehicle and outside of the vehicle during the pandemic.

Measures for the vehicles:

1. Particularly during COVID-19 process, air conditioners in the vehicles should be used carefully as they may cause the spread and it should be required to use natural ventilation or use air conditioners hygienically.
2. Environmental impact should be reduced through controls by taking required measures for emission and noise in the vehicles.
3. Driver's seat and steering wheels in vehicles should be required to be ergonomic such as to comfort the driver.

Measures for operations:

1. Adequate number of public transport vehicle and capacity should be provided to prevent crowds.
2. The vehicles should be required to be disinfected daily and it should pay attention to hygiene conditions.
3. In order to reduce interaction while getting on and out of the vehicle, it should get on through the front door and get off through the mid or back door.
4. It should organise campaigns on the safety of public transport and its positive impact on health for the passengers leaving public transport during the COVID-19 pandemic.
5. Clauses relating to passenger and driver health should be included in the requirements of outsourced (tendered) operation rights of public transport.
6. The adequate distance between passengers, between passengers and driver should be preserved inside the vehicle and at stops primarily after the pandemic and in the future if possible.
7. Regular health checks should be conducted of primarily drivers and ticket sellers, if any, and transport personnel.
8. Required markings to maintain physical distance should be made in both vehicles and stops.
9. Both driver and passengers should be required to wear masks. Drivers should be also provided with personal protection equipment and face shields.
10. Measures such as body temperature measurement etc. should be made obligatory both for drivers and other transport employees.
11. Periodical cleaning and disinfection should be done at stops and terminals.
12. In stops and terminals where more than one vehicle park at the same time, crowds should be prevented and interaction should be reduced by ensuring the vehicles park at marked areas.

Measures which may be improved with technology:

1. Compliance of public transport vehicles with the rules should be inspected and its efficiency should be enhanced by using effectively the intelligent transport systems, cameras and passenger notification systems.
2. Smart payment systems should be extended and contactless payments systems should be highlighted to decrease the interaction with money.
3. Cohesion between public transport and pedestrian & bicycle traffic should be increased, and regulations should avoid increasing private vehicle traffic.
4. By using passenger notification systems effectively, the public transport should be made more attractive and waste of time should be prevented for passengers and people in waiting areas.

Measures for drivers:

1. Passenger and vehicle safety should be enhanced by providing drivers trainings on safer driving techniques.
2. It should particularly pay attention for slippery grounds in vehicles and stops in terms of the safety of drivers and passengers.
3. Drivers should be trained according to seasonal conditions (snow, rain, frost, extreme heat etc.) and should be required to take necessary measures.
4. It should provide drivers with places where they can meet their needs such as toilet, food etc. during their travel at last stops of the lines.
5. Personal health of drivers, both physically and mentally, should be followed regularly.

It was observed in the reviews that the measures taken after the pandemic in EU member states were less restrictive and could transform the large-scale urban form.

Cities discussed and sought solutions, for the post-pandemic period such matters as formation of improved roads, planning of road networks and regions with lower traffic flow.

It is regarded highly important that the above-mentioned measures are absolutely implemented and followed regularly in order to continue using public transport healthfully and provide a safe environment for transport.

7. Conclusion and Evaluation

Particularly the situation emerging with the COVID-19 pandemic shows that a regulation directly titled as public transport or public health does not exist in most of the countries including EU countries and Turkey. However, measures are taken by relying on the legislation which regulates various matters relating to the health of passengers and employees. This topic is discussed together with climate, environment, health, social arrangements and road safety; various practices were introduced by individual countries and even by cities.

Public transport stakeholders responded to this pandemic or crisis with the sense of responsibility toward their employees and sense of responsibility toward the communities they serve even though they have not experienced a similar situation before and have no experience to deal with such a situation. Many scientific studies and empirical analysis showed that public transport was far less risky than public places and private meetings; however, they could not overcome the perception that it is the source of spread. Many articles based on scientific findings and practical experience showed that appropriate measures were taken to reduce the risks to a manageable and acceptable level for users in public transport vehicles.

The COVID-19 pandemic showed that the measures to protect public health in public transport should be presented as a body of rules. By turning the crisis into an opportunity and looking at the upside of present practices, studies should be conducted to establish several definitive standards in our country. In this study, current regulations for this purpose in various countries and in our country were reviewed and would serve to develop standards.

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