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Public transport

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Leibniz Association

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Contents

The key characteristics of public transport are long-term planning, general accessibility and concentrated demand. While its flexibility is limited, it can handle heavy traffic flows efficiently. Services need to be expanded in response to changing levels of demand.

1 Basic characteristics

The term *public transport* describes a transport system, which makes mobility available to the public under fixed conditions. The system can be used by everyone on payment of the fare. The most frequently used and best-known examples are scheduled services by bus, tram or railway. Taxi services are also covered by the legal definition of public transport, but offer transport tailored to individual travellers' needs.

This article focuses on public passenger transport. The term *public transport* is also commonly used in this sense (for goods traffic, cf. ▷ *Logistics*).

Forms of public transport can be distinguished according to the technology used, method of operation or market served (cf. Fig. 1). However, three aspects common to all forms deserve mention:

Fixed terms and conditions: The pattern of services is planned for an extended period in advance by the provider, based on experience, commercial objectives and other factors, and is advertised to the users of the service (e.g. by the service timetable). These services must run irrespective of the actual demand (i.e. there is an obligation to operate). This means that the services available are adapted to daily variations to only a limited extent. The transport services are provided by a company with technically qualified personnel. From a legal perspective, the passengers enter into a service contract with the provider in order to use the service.

Open to the general public: To use public transport, passengers merely have to go to an access point and pay the fare due for the desired service. They then have the legal right to use the transport service (there is an obligation to carry). This easy-access availability – no driving licence or membership of a specific group is required – is key to the social and political significance of public transport systems: they are accessible to those groups within the population who would otherwise lack any means of motorised mobility. Accessibility also means that people who do not know each other travel together, and that the mix of passengers can be controlled to only a limited extent.

Another basic principle is the **concentration of demand** for transport, both from a spatial perspective (i.e. on specific routes), from a temporal perspective, and according to the transport mode. The effect of this varies according to the type of service. Railway services, in particular, have high capacity by virtue of their ability to form trains.

2 Historical development

Services offered by public transport systems, as so defined, can be traced back to the medieval period in the form of stage coaches and ferries. Scheduled transport systems as we know them today only began to take shape during the age of industrialisation (horse-drawn bus routes and trams, initially in large cities, and passenger trains). This was driven by a combination of improved technology (tracked-wheels, motorisation) and growing demand (cf. Dienel/Schmucki 1997; ▷ *Mobility*). In the period up to about 1930, public transport became the dominant form of transport, even though the share of non-motorised transport for short trips should not be

underestimated. With the increasing availability of ▷ *Motorised individual transport* (MIT) after 1950, the significance of public transport gradually declined. This trend was borne out by the market share of public transport (as measured by the share of public transport in total traffic volume or, to a greater extent, in system capacity). This was frequently coupled with a lack of interest among transport policy makers (▷ *Guiding principles for urban development*; ▷ *Guiding principles for spatial development*; ▷ *Transport policy*). During the oil supply and environmental crises of the 1970s, a gradual shift in perception occurred, and investment in public transport systems increased, at first primarily in metropolitan areas. At the local level this generally led to a clear rise in demand, but at the national level some slight increases in the market share of public transport have become noticeable only recently (cf. *infas* [Institute for Applied Social Sciences]/ *DLR* [German Aerospace Center] 2010).

3 Role in the transport system

These characteristics reveal the strengths and weaknesses of public transport systems and, accordingly, the places where they can be usefully deployed (cf. Heinze/Kill 1991). Public transport is particularly efficient in situations where large traffic volumes must be managed in a spatially and/or temporally concentrated and circumscribed space. This means that a public transport service can be provided in a far more space-saving, environmentally-benign and city-friendly way than individual motorised transport (▷ *Sustainability*; ▷ *Urbanity*). Another benefit is the higher safety levels achieved by more strictly regulated public transport systems, which are operated with technically trained personnel, as users are not burdened with having to drive themselves.

In spatial terms, the effect of public transport is significantly more differentiated than that of motorised individual transport, because the developmental impact of providing local public transport infrastructure is largely concentrated along the (main) routes. This is illustrated by the numerous settlements established in the late 19th and early 20th centuries and the increased land values in areas close to railway stations with good public transport connections (▷ *Land market/ land policy*).

These benefits are particularly apparent in metropolitan areas, along the main axes of regional and long-distance transport systems, and in ecologically sensitive fields. These areas have the highest service standards and greatest frequency of use. Conversely, low traffic volumes which are temporally and spatially dispersed, such as are typical of both ▷ *Rural areas* and suburbs, are problematic for public transport due to the characteristics of such systems (▷ *Urban traffic*; ▷ *Transport in rural areas*; cf. Heinze/Kirchhoff/Köhler 1999; *BMVBS* [Federal Ministry of Transport, Construction and Urban Development]/*BBSR* [Federal Institute for Research on Building, Urban Affairs and Spatial Development] 2009). Motorised individual transport, on the other hand, has the benefit of considerable temporal and spatial flexibility. Public transport systems tend to become unattractive if users have to transport luggage or other people for short distances at the access and exit points, or if changes of vehicle are needed to access their destination. In addition, passengers' limited ability to influence their own travel environment and the loss of privacy is often perceived as a disadvantage by those used to cars (cf. Schiefelbusch 2008: 59 et seq.).

4 Available services and subsystems

The public transport system comprises several subsystems, which are planned and operated by diverse stakeholders and are governed by different formal requirements. Figure 1 shows the essential distinguishing characteristics and the relevant systems in each case. (In Germany) the Carriage of Passengers Act *(Personenbeförderungsgesetz, PBefG)*, provides the essential legal basis for defininig some types of service, but these are only elements within a wider spectrum of public transport modes. Essential differences exist, e.g. with regard to markets served and in the technical means of operation:

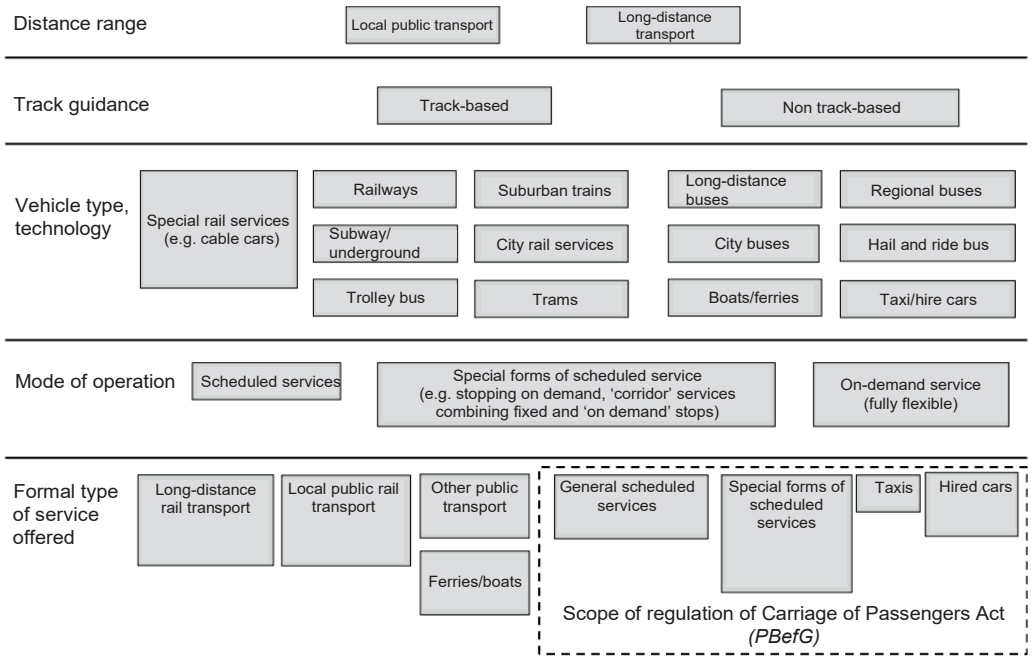
a) There is a formal distinction between

- local public transport (up to 50 km/per hour over average travel distance): acknowledged as part of the ▷ *Provision of public services*, planned by the relevant public administrative bodies
- long-distance transport – assumed under German law to be operated independently by the providers at their own financial risk, and significantly less regulated

b) Distinctions in technology exist (cf. Vuchic 2007) between

- track-based systems (▷ *Railway transport*), which require their own ▷ *Infrastructure* and are, accordingly, capital intensive and appropriate for large volumes of passengers
- other scheduled services without their own infrastructure and with correspondingly lower capital costs, but with consequences for quality and capacity
- flexible operating modes for lesser volumes in a restricted area

Figure 1: Principal types of public transport services and systems



Source: the author

In practice it is often difficult to distinguish between these types, and mixed types may increase the complexity, e.g. dual-mode city trams which use both tram and railway tracks.

5 Providers and market structure

Public transport in western societies is rarely shaped by the free interplay of supply and demand. Since the beginning of regulation, legal frameworks have been designed to prevent ruinous competition and to develop a coordinated, comprehensive range of services. At the same time, the providers were expected to be financially self-reliant in their operations, albeit only within their allocated technical and spatial remits (see Fig. 1; Dienel/Schmucki 1997). The public authorities awarded the necessary licences, but were not responsible for planning the services. This approach is still largely recognisable today.

The past 20 years (with railway reform, regionalisation and market liberalisation) have brought home the (late) realisation that most public transport services cannot be operated on a break-even basis. To ensure the efficient and transparent allocation of grants, additional elements were added to the structures mentioned, which now comprise two or three levels:

- a public administrative entity, which defines the scope of services in its local public transport plan and invites tenders for services that require grants (▷ *Spatially-relevant sectoral planning*),

- a management level, often acting as a transport association, providing for the day-to-day coordination of providers (depending on the deferal state in question),
- the transport companies which provide the services in accordance with the requirements set.

This model is based on examples in other countries and EU requirement. A special feature of the German model, however, is the continued parallel co-existence of services offered by independent operators. Distinguishing these two forms of provider is often difficult, and characterised by conflicts of interest.

6 Current issues

Over the past 20 years, changing values (▷ *Lifestyles*) and ▷ *Reurbanisation* have led to some revitalisation of public transport systems. In future, however, these systems must cope with multiple challenges if they are to survive in the market (cf. also Ilgmann/Polatschek 2013).

▷ *Demographic change* alters the distribution and structure of the population. This results in demands for new standards, while in areas experiencing depopulation, a substantial decline in demand is to be expected (cf. Kindl/Reuter/Schmidtmann et al. 2012; Schiefelbusch 2014).

While rail transport is already predominatly electrified, public transport systems still need to expand electro-mobility (generated as far as possible from renewable energy sources) (▷ *Renewable energies*). Compared with the motor industry, the steps taken to date are not sufficient; there is a risk that public transport systems will lose their advantage of being perceived as environmentally-friendly.

The present complex financing system will face substantial changes in the times ahead. Neither the volume of funding nor the future distribution of those funds is secured, either for investment or for operating costs. At the same time, there is a growing need to upgrade the infrastructure.

Due to its system characteristics, public transport always requires a compromise to be struck between the desires of its users and the pattern of service specified in the service schedule, as determined by the available financial means and by corporate policies. Hence, it is important to ask how these compromises can be made more acceptable to achieve more environment friendly mobility.

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