

THE VALUE OF DATA FOR THE PUBLIC TRANSPORT SECTOR

SUMMARY

This Action Points paper highlights the necessity of the sector, particularly for Public Transport Operators (PTO) and Public Transport Authorities (PTA) to develop a data strategy, based on the cost and value, focusing on the strategic benefits of data.

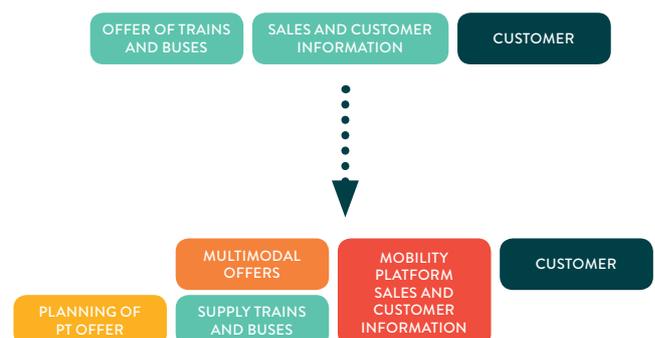
There are many ways to develop and monetise data-based applications whether by enhancing cost-efficiency or by developing new services. To do so, data is a key component and should be generated around the customer journey and smart asset maintenance, enabling incumbents in the mobility sector to be their own mobility disruptors. It is crucial that mobility stakeholders are not only able to compete against potential new market entrants, but also need a suitable environment to develop new business models and services.

UITP suggests a differentiated view on data governance and related regulations, as public transport is becoming a data-enabled or data-driven business and has to answer different local conditions. It does not aim to present a generally applicable solution nor to contradict previous UITP positions.

THE ROLE OF DATA IN PUBLIC TRANSPORT

The need and drive to change and innovate can be hard for incumbents in any specific market, the public transport sector is by no means an exception¹. New players have modified the prevailing modes of value creation and disrupted what was considered the traditional business model. As power tends to concentrate towards those who own information, creating room for new players to enter the mobility market. These new entrants increasingly try to become intermediators between original market players and their customers. A similar outcome happened in the hotel business, and could be replicated in the mobility sector, where the direct relationship to the customer may be lost to commercial and non-transport related platforms.

The changing value chain of the urban transport offer²



¹ UITP (2017) Digitalisation in Public Transport, Report.

² Based on Rogers D (2016) The digital transformation playbook, Columbia University Press: New York.

UITP sees benefits for society and local economic opportunities that lie within open data policies implemented by governments concerning the use of public data. Indeed most public transport providers have some relationship with government agencies, from licensing to direct public operation. These links are clear indicators of the enabling role that the public transport sector plays in the development of cities and economies³. This position towards the opening of data has been led by some mobility stakeholders, particularly PTAs and entities benefiting from the establishment of new services based on open data platforms.

However for mobility operators, it needs to be noted that while there is competition with private-car based transport, there is also increasing competition in the digital market with new stakeholders. Opening all data may lead to strategic and commercial competitive disadvantages. Notwithstanding the confidential nature of proprietary data and safeguards for intellectual property rights, the sharing of certain types of data between entities operating in the same industry can help foster trust between mobility actors. With thorough risk assessments and under specific local context, the sharing of data and cooperation can stimulate innovation and drive faster growth.

The main question highlights how to align the different priorities concerning the use of data for the mobility ecosystem and towards the operator of the mass transport system.

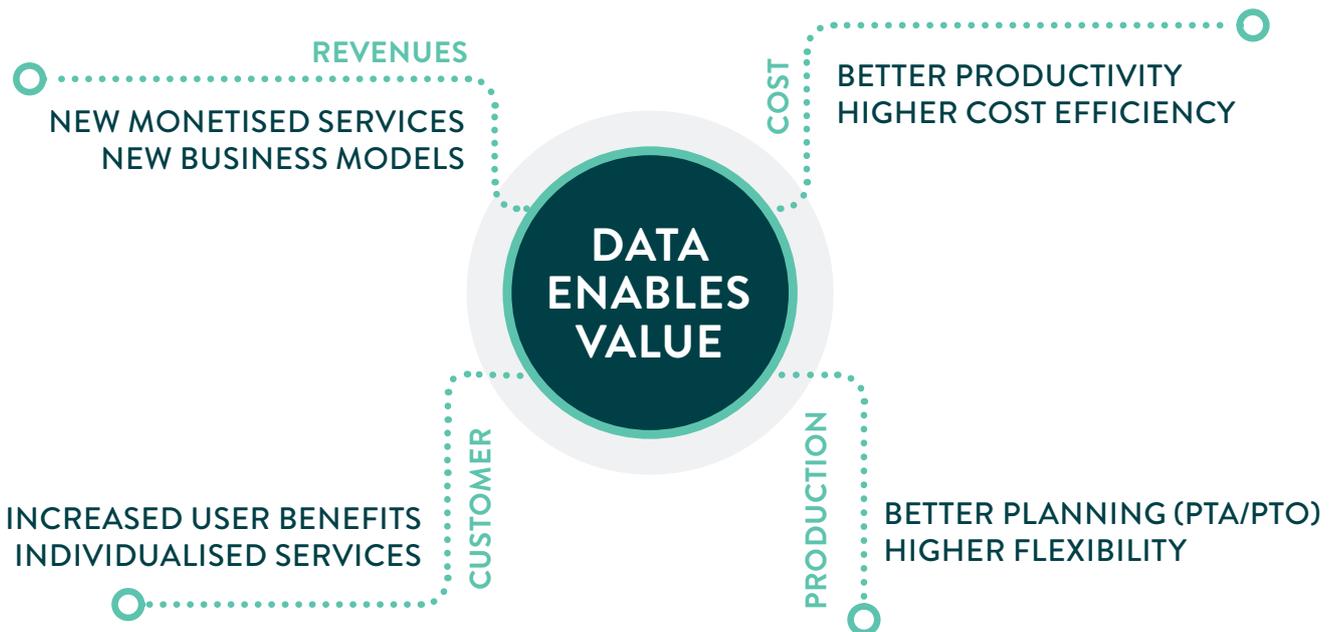
BECOMING A DATA-ENABLED COMPANY

To strive in this new environment, public transport companies need to evolve into **data-enabled businesses**. Among the key features, we should underline:

- Awareness and know-how to harness value from data
- Develop data strategies and a clear vision on collecting, storing, analysing and using data
- Awareness of privacy and data stewardship, cybersecurity and faster competitors
- Understanding of the value of data and the potential risk of publishing them openly
- Recognition when data should be opened or closed, shared or sold, depending on the potential benefits
- Open up internal data silos and improve data analytics

Advanced business analytics support efficient decision-making by turning the relevant data into valuable insights to improve business performance.

Different aspects where data enables value in urban transport



³ UITP (2018) Public transport and business: Empowering our cities, Policy Brief.

FIGURING DATA OUT

WHY DATA?

From its raw form, data needs to be shaped, processed and interpreted to become information which may either provide added-value or be used in the decision-making process. The ecosystem interlinking businesses, data and people has provided fertile grounds for emerging technologies to thrive⁴, these are particularly due to:

- Increasing interconnection/connectivity of people and objects through the internet of things, smart cities and deep penetration of smartphones into society
- Allowing great levels of data to be created, stored, exchanged and analysed almost in real time and at diminishing marginal costs
- Allowing complex analysis of data to guide decision-making processes

While there is much optimism about data as a new resource, the use of data in public transport is not new. Historically, PTOs and PTAs have based their policies on data, drawing conclusions from traditional qualitative and quantitative methods.

DIFFERENT TYPES OF DATA IN PUBLIC TRANSPORT	
TYPOLOGY	DESCRIPTION
Customer Data	All data on the customer itself, as well as passenger preferences and their use of the system Examples: Personal data, travel behaviour data, customer journey data and CRM data
Operational Data	Data produced by operators' assets for the delivery of public transport services Examples: Operations monitoring and control, disruption management, ticket sales, journey reliability and real-time information, management information, staff information, security data, predictive maintenance of infrastructure, asset and fleet

Mobility Data	Data which provides information of urban mobility patterns Examples: Network description, timetable information, car traffic and other mobility modes data, parking data and accessibility data
Exogenous Data	Data from third parties which can have an impact on mobility Examples: weather, disruptions or scheduling (big events, schools, etc)

Public transport companies require knowledge about their mobility market in their region, travel patterns and mobility demand. Information must also be gathered on the status of their vehicles, infrastructure and how external factors such as the weather, events or construction sites can affect mobility. With such knowledge they can strive to be more cost-efficient and flexible through predictive maintenance, while improving the adjustment of production to demand. This also provides opportunities to introduce new services like on-demand shuttles, developing possibilities to individualise transport.

THE COST OF DATA

All activities surrounding the use of data, including its collection, extraction, analysis, storage and deletion, incur expenses to operators and authorities. Among them, we should highlight the initial sunk costs, required upfront for the installation of infrastructure and systems able to perform such tasks, and variable costs, which will include operations and maintenance activities. Whilst keeping in mind, potential upgrades and future investments maintaining with the technological innovations and evolving needs for all categories.

Ensuring that activities related to data ensure the highest quality of data, operators require:

- Investing in networks, such as devices, sensors, geolocation and telecommunication
- Strengthen and expand operators' capabilities in:
 - **Human resources:** training and hiring staff
 - **Procurement:** purchasing data services to phone, banking and internet operators

4 UITP (2017) Autonomous vehicles: A potential game changer for urban mobility, Policy Brief.

- **Budgeting:** including in the annual budgets specific amounts for data management
- **Monitoring and maintenance:** both for infrastructures and super-structures
- **Licensing:** according to types of data and softwares
- **Privacy:** data protection and stewardship for both customer and operational data
- **Risks:** identification, assessment and management of risks

CAPTURING THE VALUE OF DATA

We can identify various features that increase the value, especially from owners of particularly scarce data, from the aggregation of different types of data or to the providers of data analytics. Such value can occur through various series of channels⁵:

1. Commoditisation of value by either selling or producing a service
2. Indirect value by enriching the type of service or through the development of additional services (such as apps, information, journey planners) to enhance the customer experience
3. Value accruing to companies which engage in social or market making platforms (for example, Customer Relationship Management) enhancing network effects, linking with customers and generating data
4. Avoided costs enabled by cost-efficiency or improved production processes

To analyse data value, determining the relative importance of data to a company's balance sheet, its ability to effectively compete, lifetime customer value and its operational capabilities are good elements to start with. This can be achieved not only by placing a monetary value on specific operations and divisions of a PTO, but by economically forecasting how that value will evolve in time. This value should be significant enough to include company's data value in corporate accounting. Failure to accurately quantify the enterprise value of data may undervalue the importance of cybersecurity investments, for instance, as well as the financial provisions typically applied to cyber insurance policies or privacy risk.

Different regulatory regimes, as well as different approaches from PTOs and PTAs, exist on the appropriate and acceptable use of data. Emerging frameworks, such as the newly enforced General Data Protection Regulation (GDPR) which seeks to protect all EU residents from privacy and data breaches in an increasingly data-enabled world.

There is a broad range of types of data, with varying degrees of granularity and potential commercial value, for instance with respect to passengers:

- A simple origin-destination request gives valuable information, allowing for tailor-made services related to each journey
- Using GPS location can allow for even more precise and personalised services, this process uses passengers' fluxes
- Using personalised data per passenger may yield higher rewards, at a much more significant impact in terms of privacy – which may include recorded behaviour and personal preferences

Enhanced use of data could be used to improve mobility and comfort for passengers, to increase efficiency and predictive maintenance of assets⁶, to improve management (staff planning, absenteeism, fraud, invoicing, collections, purchasing), and it could bring new revenue sources. New functions and technologies, such as artificial intelligence (AI), are gradually entering the transport supply chain, spearheaded by real-time operation and supervision, intelligent ticketing systems and customer analytics. These types of technology trends, while still in their infancy, are leaning towards testing and considered to be deployed particularly by operators and industrial partners⁷.

HOW DO WE TRANSLATE THE VALUE OF DATA TO THE MOBILITY SECTOR?

The routing, timetable or the status in real time of transport companies is a dependable service to customers. For public transport companies it is very valuable to build a large customer base and to collect data from its app users – deepening their knowledge on needs and requests. This value can be increased, when shared with third parties, while the PTO or PTA can still earn their share of benefits, such as public transport driven interoperable platform.

Creating a connection with the customer, getting their feedback and starting a dialogue with them should be the next step. Customers are good quality scouts and sensors for infrastructure that need to be cleaned or fixed. Companies could also harness that knowledge to develop and introduce new services from the data gathered, whether qualitative or quantitative. A further level would be to open up to commercial cooperation, with third-party stakeholders. Public transport companies often have a quite valuable user-base and mobile advertisement or the combination of travel destinations with local-based

5 McKinsey Global Institute (December 2016) The age of analytics: competing in a data-driven world

6 UITP (forthcoming) Digitalisation and asset maintenance, Report.

7 UITP (forthcoming) Artificial intelligence in mass public transport, Report.

services can bring additional business opportunities. As PTOs are often publicly owned, the trust of citizens and customers is of high value. Although it has to be carefully assessed which amount of data collection and usage of personal data should be made, and how it is stored and protected.

Finally, a data-enabled company would also ensure that the production side benefits from data collection and analysis. It should ensure that all data is available to decision makers on all levels in the company, fostering data-based decisions, backed with evidence. Using data can help to improve and align customer needs with improved planning and proactive management of transport networks and modes.

NUDGING DEMAND

The usage of personal data can only be possible with the customer acceptance via 'opt-ins'. This permission could allow passengers to be influenced or nudged for the delivery of special services or options.

Operator companies can send push alerts and alternative routes for disturbances on favourite connections. They can market extra services and try to upsell on individual usage.



CONTROLLING THE DATA CAN BE TRICKY

The access, stewardship and control of data is crucial. It is no longer the single ride, defined by the entry into the system of a passenger, that characterises the customer relationship, but all data obtained from the total customer journey accounted through all contact points of the mobility provider. Equally, one should not forget the amount of information produced by transport assets throughout the production process and other services or activities provided from the passenger journey – these can include fare transactions or WiFi access within stations amongst others.

SKETCHING A PUBLIC TRANSPORT DATA GOVERNANCE FRAMEWORK

DIFFERENTIATED VIEW OF DATA USAGES

A general tendency has been observed in the opening of information and datasets related to activities of public services, well beyond the transport sector. Those services may be partially or fully financed by taxpayers, those companies nonetheless operate in competitive markets and therefore need their most sensitive data to be kept confidential. It is important to understand, that some new market entrants may wish to benefit from the value of the data, without providing the public service. The use and boundaries of data for PTOs and PTAs remains a contentious issue, where all benefits and losses must be weighted with relation to different stakeholders.

DIFFERENT STAKEHOLDERS IN PUBLIC TRANSPORT AND GENERAL INTEREST IN DATA

STAKEHOLDER	INTEREST
Customers	Benefit from a rich and complete network of mobility options with an easy interface
Transport operators	Provide mobility service in the most cost-effective and efficient way
Information/platform providers	Provide resources and expertise in the management of data

Infrastructure owners and operators	Provision of car/vehicles sales and maintain control of data (including automotive and vehicle owners)
Transport authorities	Creation of a suitable and economic sustainable mobility network
Governments	Benefit from opened data to foster economic development with the development of apps from third parties

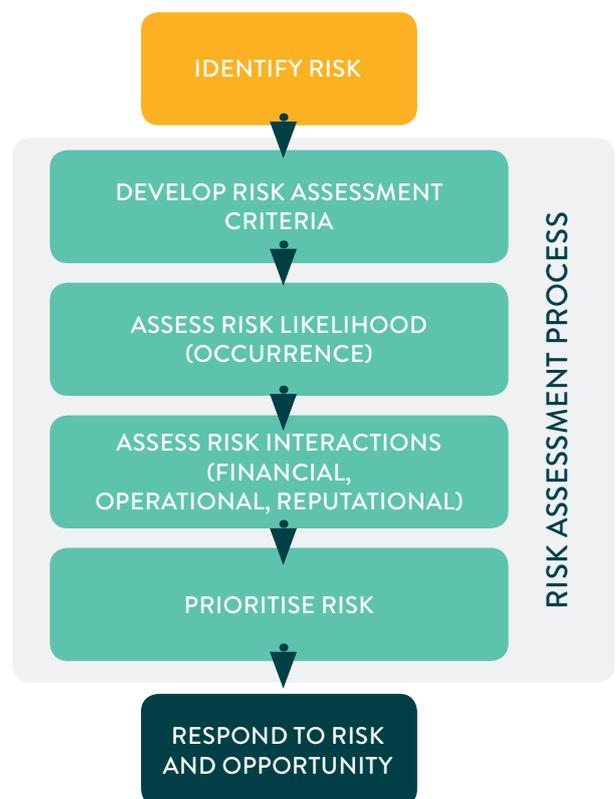
When a framework for open data is established through laws or regulations, it is essential that three crucial considerations are taken into account:

- **The importance of a fair and level-playing field** among institutions having an interest in capitalising on data. In some cases, it may be argued that opening all data could cause strategic and commercial competitive disadvantages.
- **The cost of producing and disseminating data** for operators. The cost of dissemination should, at least, be covered by those who are heavily dependent.
- **The imperious necessity to preserve proprietary and commercial data.** Industrial know-how and expertise, as well as commercial data, constitutes the foundation of business-models, and should be treated as confidential. In a framework where this sort of data is considered to be public, the risk of judicial attacks between transport or digital companies is significant – with high implications to PTOs resources.

The legal framework must be fair and balanced, as ultimately PTOs are enterprises in a competitive market. They can be encouraged to exchange data, making public transport more accessible, customer-friendly and more attractive as part of their own business strategy. PTOs, ideally with PTAs, should define locally a **data-sharing strategy** based on the principles of reciprocity and co-development/partnerships, notably for the development of common platforms, interfaces, standards, etc.

Within this data-enabled business strategy, it is advisable that public transport companies define and be allowed to define for themselves:

- **Which types of data are strategic assets in the relationship to the customers, for the market and for efficient production:** This data should only be opened in strategic partnerships on a voluntary basis, after a thorough data risk assessment. Typically, PTOs should consider surveying financial, commercial, reputational, regulatory, safety, security, environmental, employee, customer, and operational impacts in a scalable matrix. It is advisable to define impact using a combination of criteria looking at the financial, reputational or safety implication, amongst others.
- **Which types of data are costly to produce, store, maintain or are of high commercial value for other parties:** this part of the data should be sold or exchanged reciprocally. It is also crucial PTOs and PTAs survey under which license they are allowed to operate and select the type according to risk and opportunities decision.
- **Which types of data could improve customer experience or create efficiency gains:** if shared and not accounted within the company’s main priorities for innovations, this data could support the development of new services and take the risk of innovations through the use of emerging companies or crowdsourced initiatives.



Once a position about the business strategy concerning data is defined, the question of openness and availability, as well as free/payable data must be addressed – implying a crucial distinction between free data and open data. Respectively reciprocity has to be defined for each potential data user and the relevant dataset to be shared. Such stakeholders can be strategic partners, for instance municipalities or mobility providers in the region, commercial ventures such as touristic destinations, non-profit organisations or other public interest institutions like research labs or universities.

On the other hand, certain datasets ought to be considered as private and may only be stored and used under the restrictions of the privacy laws. Data that is considered as strategic, which means they are valuable for the business strategy and the market position of the company. Some of the data considered as commercial, means they could be bought from or sold to third parties or used for commercial services like direct marketing, advertisement or locally based services. Finally, openable data entails that data has more value when open and shared with other parties.

POSSIBLE CORPORATE GOVERNANCE OF DATA WITH RESPECT OF THE VALUE OF DATA			
DATA USERS CATEGORY OF DATA	STRATEGIC PARTNERS	COMMERCIAL VENTURES	PUBLIC INTEREST OR NON-PROFIT ORGANISATIONS
PRIVATE DATA	(If within strategy) Reciprocally exchanged under privacy restraints	(If within strategy) Reciprocally exchanged under privacy restraints	Not openable
STRATEGIC DATA	(If within strategy) Reciprocally shared	(If within strategy) Reciprocally exchanged	Not openable
COMMERCIAL DATA	Reciprocally shared, exchanged or sold	Reciprocally exchanged or sold	Not openable for commercial use
OPENABLE DATA	Shared	Shared	Open



When a framework is established through which PTOs can disseminate their data, an important question is the price that could or should be charged. The price must represent the value or, at the very least, the cost of producing and disseminating the data, depending on its license agreements. The company has to choose whether to open its data, either offered as open service solutions or sold. Only in cases where no commercial interests of third parties have been identified and datasets are available and openable, should data be given for free.

RECOMMENDATIONS

UITP recommends that the public transport sector fosters its process of digital transition with a clear strategy on data, mindful of its costs and benefits. Data has value, along with its own competitive market. Opening all data with no proper delimitations can cause strategic and commercial competitive disadvantages. On the other hand the sharing of data and cooperation can stimulate innovations.

Therefore UITP suggests a differentiated view on data and related regulations on data.

UITP recommends the following findings to the public transport sector:

- Data has and brings value. Customer data, operational data and the knowledge of the market are of strategic and commercial value.
- Data is as an asset and should be treated like such, one can generate revenue or save costs out of it and put it at risk.
- PTOs and PTAs should become a data-enabled business and have a clear strategy on data.
- The public transport sector should be the backbone and integrator of mobility. Integrating mobility services and keeping the customer relationship is a data business.
- Platform economics strengthens the need for the digital transformation of the sector.

- Data has a cost. The process of collection, storage, analytics, security and privacy and elimination needs permanent attention, budgeting expenses and investments.
- PTOs and PTAs are collecting a lot of data especially as issuer of apps, they can use it and control it within their privacy and contractual constraints.
- PTOs are enterprises in a competitive market, this should be reflected in its relevant data legislation.
- The public transport sector can and shall share data for innovation and good customer service within itself.
- Data is becoming more and more regulated. The regulation has to be differentiated by the type of data and by the strategic value of the data to the public transport sector.



This is an official Action Point of UITP, the International Association of Public Transport. UITP has over 1,500 member companies in 96 countries throughout the world and represents the interests of key players in this sector. Its membership includes transport authorities, operators, both private and public, in all modes of collective passenger transport, and the industry. UITP addresses the economic, technical, organisation and management aspects of passenger transport, as well as the development of policy for mobility and public transport worldwide.

This Action Points document was prepared by the Transport Economics Commission, supported by the IT&I Commission and the EU Committee. We would like to thank the Verband Deutscher Verkehrsunternehmen, CarPostal Suisse and Transportes Metropolitans de Barcelona for their leadership in the elaboration of this Action point. We would also thank the contribution of all UITP members involved in its elaboration and production.



SEPTEMBER | 2018



Rue Sainte-Marie 6, B-1080 Brussels, Belgium | Tel +32 (0)2 673 61 00 | Fax +32 (0)2 660 10 72 | info@uitp.org | www.uitp.org