

OPPORTUNITIES AND STRATEGIES FOR
MAINSTREAMING OPEN DATA
IN TRANSPORT PROJECTS IN ST. PETERSBURG



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Executive Summary

The World Bank conducted this study of the potential for Open Transport Data in St. Petersburg as part of the preparations for the National Urban Transport Improvement Project in Russia. It is principally intended for use by the St. Petersburg transportation authorities, the Federal Ministry of Transport and the Project Implementation Unit in considering and implementing open data as part of the new systems being developed as part of the Project.

There are already good examples of transport information systems in St. Petersburg. Most of this information is not currently available for external use, but in the cases where it has been made available - for instance by the Agency "Organizer of Transportation" for real-time bus information - this has been welcomed and well-used by citizens and authorities, despite some current limitations.

Within the St. Petersburg component of National Urban Transport Improvement Project there are plans for more transport information systems, including parking information, traffic management and passenger information systems.

The conclusion of this report is that the social, economic and environmental benefits of the St. Petersburg project would be enhanced by the greater availability and use by travelers and others of the information collected by these planned systems. Making the information available as Open Transport Data and allowing it to be used for development of innovative third-party applications would be a relatively easy and cost-effective way of leveraging the planned investment to ensure that the information reached the largest number of travelers. Doing so would maximize the desired behavioral changes that drive the benefits and improve the overall return on investment.

It is a highly opportune time to consider this as it will be much easier and more secure to implement Open Data in an integrated way with the development of the new information systems themselves.

A policy of Open Transport Data would also be consistent with St. Petersburg's existing policies and program for Open Data as a whole as well as with the Federal Government's Open Government policies and program.

The report identifies a number of potential concerns about Open Transport Data including the need to ensure that the public get reliable and up to date information about the transport system, and the report suggests how these risks could be managed or mitigated in ways which protect and strengthen the overall transportation strategy for St. Petersburg and the reputation and operations of the Committee and subordinate bodies.

The report makes six strategic recommendations for the consideration of the St. Petersburg authorities:

- Develop a coherent Open Transport Data strategic framework and plan for St. Petersburg.
- Make Open Transport Data an integral part of St. Petersburg's Urban Transport Improvement project.
- Engage with developers and potential business data users to understand their needs and priorities.
- Build capacity among decision-makers and engineers, and consider how to generate innovative solutions to the specific issues of St. Petersburg.
- Use Open Transport Data to accelerate progress towards an Intelligent Transportation System in St. Petersburg.
- Work with the Federal Ministry of Transport and with other leading cities in the Russian Federation on common policies and standards for Open Transport Data in Russia.

The report also makes five recommendations for the consideration of the Ministry of Transport of the Russian Federation:

- Promote the use of Open Transport Data to improve passenger information, reduce time and costs of journeys, optimize the use of transport infrastructure and promote economic growth, job creation and innovation in transport applications and services.
- Set legal and technical policies and standards for the publication of Open Transport Data by the responsible municipalities and other public bodies in the Russian Federation.
- Set legal and technical policies for standards for the publication of Open Transport Data by relevant Federal bodies including Russian Railways.
- Include responsibilities for technical standards and for promoting best practice in transport information and Open Transport Data in the terms of reference of the Federal Center for Development of Urban Transport Systems to be established as part of the Urban Transport project funded by the World Bank.
- Support the release of Open Transport Data by St. Petersburg as a pilot of the use of Open Transport Data in support of Federal Transport policy.

The World Bank is well positioned to assist the Transport authorities of St. Petersburg and the Federal Ministry of Transport in taking forward the recommendations of this report.

Introduction and Context

Urban transport in Russia and St. Petersburg

Urban transport is a matter of growing concern not only in great metropolises but also in many medium-sized cities of Russia. Traffic congestion has consistently worsened in many cities, making the commute longer and business costly¹. Congestion is symptomatic of the rapid increase of car ownership and use, lack of maintenance of the legacy public transport system², which has lost and is losing its competitiveness over private cars, and inefficient traffic management. Under these circumstances, mobility options for the low-income population, which primarily rely on public transport for access to jobs and services are limited, and road traffic fatalities that are among the highest in Europe. Environmental sustainability is compromised by air pollution from the increasing private vehicle fleet and the old public transport vehicles.

The main contributing factors are:

- **Lack of a coherent legal basis:** In Russian laws, responsibilities for urban transport management are split among various authorities: public transport management to municipalities, traffic rules and parking enforcement to road police, and some traffic management functions to regions.
- **Challenges in financing urban transport systems:** Allocation of financial resources is often inadequate, unpredictable and not strategically planned. As a result, transport infrastructure and vehicles are not adequately maintained or renewed. Investments in innovative technologies for efficient and safe traffic management have been limited.
- **Weak physical and operational integration of public transport services:** Metro systems are often run not in coordination with other modes. Artificial segregation of bus services prevails in most cities between Municipal Unitary Enterprises, and private operators, with little coordination with the social services, increasing overall cost of transport and undermining user convenience.
- **Automobile oriented policies and investments:** Most municipalities respond to growing congestion problems by expanding the road network capacity, which quickly gets congested. The concept of transportation demand management (TDM) has not been fully embraced by Russian laws and policy-makers.

These trends would disproportionately affect low-income populations in Russian cities, who continue relying greatly on public transport systems. While private car ownership has grown considerably in the last decade even among the lower and middle classes, car use is still selective and hence public and non-motorized transport continue to be the main travel modes among the bottom 40 percent. Similarly, while public transport in Russian cities is subsidized,

¹ Peak hour speeds of ground public transport in most cities do not exceed 8-9 km/hour (World Bank TP-41, 2013)

² Average age of municipal bus fleet in 15 medium-to-large cities is 12 years (World Bank TP-41, 2013)

transport expenses for the lowest income quintile range may still be as high as 15-20 percent for the lowest-income segments, evidencing the high financial burden of public transport. Without improvements the least disadvantaged groups in Russian cities will find it increasingly difficult to access jobs and services at high costs to their overall welfare.

The key objectives of the Russian Federation Transport Strategy until 2030 are to strengthen the innovative, social and environmental dimensions of the transport development, in support of the main development objective to be a fully advanced economy. One of the pillars of such development is to provide accessible and safe transport services, while reducing the negative impact of transport through technological and behavioral improvements.

The National Urban Transport Improvement Project

The National Urban Transport Improvement Project³ aims to enhance urban mobility and accessibility for citizens in the pilot cities and beyond, particularly disadvantaged groups. Safer and more reliable mobility and improved accessibility for those groups would improve their access to jobs and services. Additionally, investments aim to improve utilization of existing infrastructure and quality of the services, rather than building a new system. The project would create a framework, under which successes from pilot cities would be scaled up for broader benefits in other Russian cities, further supporting the twin goals at the national scale.

In St. Petersburg the pilot project aims to reduce traffic congestion and air pollution in the historic center of the city through: (i) development of a comprehensive parking management scheme for the historic city center, comprising on-street parking charges, time-limits and other restrictions, real-time parking availability information, and technology-assisted enforcement, and (ii) development of traffic management and passenger information systems that will give priorities to public transport vehicles and improve convenience and reliability of public transport services. The parking charges and restrictions would make the use of private cars more costly and less attractive (“push”); parking enforcement, traffic management and passenger information systems would reduce unlawful use of bus-dedicated lanes and improve public transport service quality, enhancing the attractiveness of public transport (“pull”). It includes the creation of a center for road traffic organization and development of a traffic data portal (including data on passengers and non-motorized transport).

At a Federal level the project also includes the creation of a Federal Center for Development of Urban Transport Systems. This will function as the creator, synthesizer, and distributor of knowledge. Its role will involve development of a nation-wide urban transport database, including establishment of standards, performance monitoring and benchmarking among Russian cities as well as with international peers; development of toolkits synthesizing international and Russian good practices on the sustainable development of urban transport

³ This is a brief and informal description of the project objectives and components that are relevant to transport data in St. Petersburg. The project as a whole has a wider geographic and functional scope. The detailed project documents should be regarded as the comprehensive and authoritative description of the project.

systems; training programs for transport policy planners and practitioners; research of national importance; and knowledge facilitation among regions and municipalities on the sustainable development of urban transport systems.

This Study

The St. Petersburg transport authorities, the Federal Ministry of Transport and the World Bank agreed on the need for a short study to assess the potential for using the investment in new information systems already envisaged within the St. Petersburg project as a basis for making more transport data available to a wider set of users in the form of “Open Transport Data”, and how this would contribute to an increased return on investment in terms of the social, economic and environmental benefits targeted by the project.

Therefore, in May 2014, the World Bank sponsored a technical visit of three open transport data experts and several project and regional staff to St. Petersburg and Moscow, Russia. The purpose of this mission was to help decision-makers in Russia understand the potential and the implications of making more transport data available and to prepare recommendations on how this might be done within the context of the National Urban Transport Improvement Project.

Although the Bank has a methodology for identifying key actions for clients that decide to proceed with an open data program⁴, the technical visit did not have the time or the resources to conduct a full formal Assessment. It was however able to use the established Assessment framework to benchmark St. Petersburg’s current level of achievement against global best practice.

In addition, in the timescale of a necessarily brief technical visit, it was not possible to meet representatives of all the responsible Committees and their subordinate bodies, or to meet other key stakeholders. In addition the emphasis of the visit was on obtaining the views and professional judgment of the officials concerned, and there was only limited scope for direct inspection of the data currently held or the plans for new information systems. ***Therefore this report is not itself based on a systematic and comprehensive survey of all the transport data in St. Petersburg or all the legal and technical policies that currently apply.*** Instead, we recommend actions for consideration by the Committee of Transportation, the Committee of Transport Infrastructure Development and other responsible bodies, including a more systematic and comprehensive analysis based on our suggested approach and strategic direction.

⁴ The Open Data Readiness Assessment (<http://data.worldbank.org/about/open-government-data-toolkit/readiness-assessment-tool>)

A Brief Primer on Open Transport Data

Open Data

“A piece of data is open if anyone is free to use, reuse, and redistribute it — subject only, at most, to the requirement to attribute and/or share-alike.”⁵

Open data allows governments to use their existing datasets as a platform on which business and others can develop services and applications which deliver additional benefits to the public and to other businesses. Governments collect or generate a lot of data for their own purposes or from their own operations. However, the fact that governments have used the data for the purpose for which it was collected does not prevent the government allowing, if it chooses, that data being used for other purposes - by others or, indeed, by other parts of the government itself. By releasing data in accessible formats and without restrictions, governments enable businesses and citizens to innovate and serve the public in different ways. This concept of open data has gained traction among public agencies and governments around the world in the past decade. For most governments the policy objectives have been a mixture of four distinct drivers: economic growth, business innovation and the creation of companies and jobs; closer citizen engagement in improving public services, particularly by giving citizens information on standards of provision and service performance which equips them to be more engaged “consumers” of public services; increased transparency and accountability; and improvement in the efficiency and operations of public services themselves.⁶

Open Transport Data

The transportation industry has been a prime opportunity for open data because it is becoming data-rich and because use of that data allows travelers and businesses to optimize each of their journeys - and to do so day by day in response to changing conditions. Because of increasing use of modern technology, transportation has become a data-rich industry. In the course of operating road infrastructure and public transport services, transportation operators generate data about the system, such as congestion and crash information for automobiles, system schedule and vehicle locations for public transport and a variety of infrastructure and safety data for non-motorized modes. This information is essential for the effective management of the transportation systems by the relevant authorities.

However there is also a strong desire by travelers and by businesses to optimize their journeys to save themselves time and money. This creates a demand for information and applications that use it. Application developers and service providers can serve this demand by taking

⁵ Open Definition: <http://opendefinition.org/>

⁶ Adapted from Stott, Andrew. “Open Data for Economic Growth.” May 2014. White paper prepared for the World Bank.

authoritative, reliable, open transport data from transportation authorities and deliver it in a wide range of innovative ways to suit the different needs of individual travelers - without the transportation authorities themselves having to make additional investment. Examples in Russia already include Yandex.Maps, Yandex.Navigator and 2GIS. In addition, providing data that enables citizens and business to optimize their behavior usually leads to benefits for the transportation authorities themselves, through for instance congestion avoidance and faster location of legal parking, optimization of public transport usage and greater transport user satisfaction.

There are hundreds of examples where third-party developers have used transportation data to create apps and services for travelers⁷, a trend that continues to create more demand for both public transport and other transportation-related data. Beyond smartphone apps, traveler services may come in the form of private infrastructure (like information kiosks), civic research and new citizen participation methods. The reliance on public innovation for services built on publicly-generated data represents one of the most important benefits of open data in transportation.

Of the different types of transportation data available, the tangible outcomes for open data in public transportation have been the most publicized and well-documented over the past few years. These include myriad applications for websites, smartphones, SMS-phones and other devices to provide journey-planning and real-time arrival information to travelers, making public transport more accessible to them. A great resource with many examples of apps created using open public transport data is available at City-Go-Round (<http://city-go-round.org/>).

For bicyclists and pedestrians, relevant data are typically less universally structured. Examples of localized data that have been released in various cities include pedestrian-related crash locations, sidewalk quality, bicycle infrastructure maps and accessible facility outages.

International examples of Open Transport Data relevant to the St. Petersburg project

The St. Petersburg components of the National Urban Transport Improvement Project are focused specifically on three main information systems - parking information, traffic management information and public transport passenger information. This section gives some examples of where other cities have made some of the data from these systems available as Open Transport Data.

⁷ Transportation Apps using Open Data <http://www.citygoround.org/apps/>

Parking Management

SFPark utilized new parking technology and opened the resulting data as part of the project's initial roll-out. The most comprehensive study of parking and technology in the United States is from San Francisco. A pilot project called SFPark was implemented in 2012 to test congestion-based pricing strategies for on-street parking. Prices were set highest for dense, popular destinations but were less expensive on neighboring blocks where prices where parking occupancy was lower. The technology in this project was secondary to the pricing program, but was nonetheless an important component of the pilot. To achieve the public goals of improved parking occupancy and lower search times, researchers found that price transparency and information availability were critical⁸. The system was designed with open data in mind such that all information was released when the project launched even though the agency had its own app developed. San Francisco has a generally positive attitude towards progressive technology issues; parking data was a new kind of data that neither the city nor the public had previously worked with, but it was easily folded into the open data initiative because it was incorporated into the design of the project (open-by-default). In addition to SFPark, Los Angeles is now experimenting with a similar system called LA Express Park and is expected to release results of the project in the coming year.

Streetline is a company whose API is currently the most widely discussed parking data API for parking inventories, regulations and real-time occupancy and pricing information. Using common standards (even if they are de facto) is advantageous to both data suppliers and users. Streetline is a technology provider working with public agencies to manage on- and off-street parking. By managing the parking supply and using sensors to identify real-time occupancy, Streetline technology provides similar services to several other smart-parking technologies. The difference, however, is that Streetline publishes the inventory and regulations for parking spaces of its clients in a documented API. The real-time occupancy and pricing information is also available, but it is protected through registration and authorization at the company's discretion. This is less of an example of open-data (although it is far more accessible, it is not necessarily free); it is more of an example of the use of APIs that allow developers to scale their efforts so that an app using data from one city is compatible with data from other cities.

Traffic Management System

Traffic management centers accomplish their task of congestion management and safety by alerting travelers with as much information as possible, creating a favorable environment for open data policies. Traffic management centers have expanded in use among US metro areas since the mid 1990's due in large part to legislation that supported the

⁸ Gregory Pierce & Donald Shoup. "Getting the Prices Right: An Evaluation of Pricing Parking by Demand in San Francisco." 2013. Journal of the American Planning Association Vol.79 Iss. 1 pp 67-81. DOI:10.1080/01944363.2013.787307

use of real-time traffic management. These often act as centralized aggregators for traffic condition data using inductive loops or radar detection, and CCTV cameras for crash-prone locations. Many TMCs also have traveler information components like variable message signs and, more recently, traveler information apps. A study of the Georgia NaviGator system, a traffic management center and traveler information system for metro-Atlanta, found that open data was embedded in many of the original elements of the system but never called “open data.”⁹ Congestion management is accomplished, in part, by ensuring that as many drivers as possible know about congested routes, crashes and planned construction. To that end, agencies sought ways to get information out to news outlets, commercial web applications and eventually their own traveler information apps. Since the motivation for their data systems was always to maximize dissemination, the agency found the transition towards an open data policy to be an easy organizational change.

Passenger Information System

The fast pace of public-service innovation in Boston is a key case-study in the power of open data and its ability to be a platform for other services. The city of Boston famously released its public transport vehicle location dataset in 2009 and documented a breakneck pace of innovation. This process led to apps that serve more customers than the local transit agency could do on its own with its limited internal expertise in app development. In the initial developer’s conference, they had released bus location data for five routes and by the end of the day had a map with all the data shown. Within a few weeks a number of desktop widgets had been created to deliver bus arrival information and a local coffee shop had produced its own LED sign with countdown information for bus arrivals. The first iPhone and Android apps appeared within two months along with an SMS-based service and a free automated phone-line.¹⁰ The agency itself never saw direct revenue, but was able to be the basis for many customer services without any additional expense.

Revealing expected wait times has a tangible improvement on customer satisfaction. Passenger information systems are usually the easiest case for open data since the information generated is intended for maximum public consumption. Information like stop location and routes schedules are easily converted into journey-planning applications while real-time vehicle locations can be used for arrival predictions for travelers waiting for a bus. This data also has a tangible benefit for travelers who were shown to have noticeable improvements in perceptions of transit service when they had real-time arrival information. Even though the transit service

⁹ Watkins, K., Wong, J., Roell, M. & Anders, J. “Technology Scan of Future Traveler Information Systems and Applications in Georgia.” October 2013. Georgia Department of Transportation. <http://www.dot.ga.gov/doingbusiness/research/Documents/11-25.pdf>

¹⁰ Chris Dempsey, Massachusetts Department of Transportation. <https://www.youtube.com/watch?v=I-UAjyy45k>

itself did not change, the perception improved which led to better customer satisfaction with the agency.¹¹

World Bank and Open Transport Data

The World Bank is both an active participant in open data for its own work¹² and an advocate and advisor on the adoption of open data policies by its clients. The World Bank has now been helping its clients on a number of urban projects that have used open data techniques as part of an integrated solution to meet transport sector objectives. In Mexico City, for example, the World Bank helped its client to improve public transport access through a pioneering process to generate open data about various companies' public transport operations. The resulting product was the first comprehensive public transport map for the city, a feat that has resulted in journey-planning and other traveler support applications.¹³ In Manila and Cebu, Philippines, the World Bank is helping its client improve public transport efficiency, congestion management and improving transportation planning and management. In Brazil, the World Bank helped its client set up an Transport Data and Urban Mobility Lab and to address poor bus performance and high tariffs that had caused protests.

The World Bank's approach is to see Open Transport Data not as an end in itself but as a potential means, to be deployed where appropriate, of leveraging existing and planned systems investments in order to increase, protect or sustain social, economic and environmental benefits in transport projects. As a result of its close involvement with its clients in practical projects involving Open Data around the world, the World Bank has amassed an unrivalled amount of global knowledge about best practices for implementation.

¹¹ Watkins, Kari Edison, et al. "Where Is My Bus? Impact of mobile real-time information on the perceived and actual wait time of transit riders." *Transportation Research Part A: Policy and Practice* 45.8 (2011): 839-848.

¹² April 10, 2012 "World Bank Announces Open Access Policy for Research and Knowledge, Launches Open Knowledge Repository" (<http://go.worldbank.org/VOS0JQ0VK0>)

¹³ "Mehndiratta, Shomik. March 21, 2014. "Use, transparency and reuse – how the transport sector in Mexico is being transformed by open data." *World Bank Blogs - Transport for Development*. (<http://blogs.worldbank.org/transport/use-transparency-and-reuse-how-transport-sector-mexico-being-transformed-open-data>)

Transport data in St. Petersburg

Note: *This report is based on the division of responsibilities as of 31 May 2014. We understand that some changes are under consideration for 2015 onwards. Recommendations directed to particular agencies in the 31 May 2014 structure should be read, where necessary, as relating to their successor body or bodies.*

Overview of municipal structure in St. Petersburg transport sector

The overall governance structure in Saint Petersburg includes committees that are largely responsible for guidance and policy setting, and state-owned agencies (subordinate organizations) that act as implementation organizations. Subordinated organizations carry out the specific tasks and guidance given to them by the committees they serve. Ultimately, these committees report to two Vice Governors and Governor of St. Petersburg. Responsibility for transportation in St. Petersburg is divided by mode and function. The Committees of Transportation and Transportation Infrastructure Development are responsible for policies related to the bulk of transportation activities. These committees set policies related to long term transportation and infrastructure planning as well as operating existing facilities and services (like public transport, parking and traffic signals).

Committee of Transportation (CT)¹⁴ is responsible for urban passenger transport including public transport: buses, electrical transport, subway (“Metropolitan”) and water buses. It also coordinates the ticketing system and fare cards and is responsible for city taxi (licensing) and transport safety.

There are 5 subordinate organizations of CT: *Organizer of Transportation, Metropolitan, Agency of External Transport, Passenger Auto Trans (Buses), GorElectroTrans (Electrical transport)*. Most of data is owned by subordinated organizations as implementation organizations. Also some of them have their own information system for internal use or for public.

- *Agency “Organizer of Transportation”*¹⁵ is one of the important parts of transport infrastructure in St. Petersburg. It controls the work of carriers, organizes ticketing and fare cards systems, is responsible for improvement of service and handles feedback from citizens. This organization developed and now supports one of the main sources of transport data in St. Petersburg - Portal of public transport¹⁶ to external users. It also publishes weekly statistics¹⁷ about accidents with public transport (by carriers), delays in the start/end work of vehicles, sanitary conditions, treatment of citizens (including passenger service, safety, conditions, delays, etc). However none of this data is yet published as open data and archives are limited to one week timeframe.

¹⁴ Available at http://gov.spb.ru/gov/otrasl/c_transport/ (Website of Committee)

¹⁵ Available at <http://www.orgp.spb.ru/> (Organizer of Transport)

¹⁶ Available at <http://transport.orgp.spb.ru> (Transport Portal main page)

¹⁷ Available at <http://www.orgp.spb.ru/transp.html> (Treatment of citizens)

- *Agency “Metropolitan”* organizes the work of the subway system: it supports stations, vestibules, trains, ticket sales and everything else related to the subway. Metropolitan is a “secure infrastructure object”, a term from the Soviet past, when it was also intended to be used as air-raid shelter; partly as a result of the previous national security role, there are still some legal issues remaining today that impede opening up data about the metro stations, real time timetables, delays and other information important to the public. Opening up data would be in line with Metropolitan’s increasingly customer friendly services, including online fare card refill system and better accessibility for people with disabilities.
- *Agency of external transport*¹⁸ is responsible for shipping, air transportation and railway transportation objects and warehouse infrastructure (but for trains, stations and timetable of railways the responsible federal agency is Russian Railways). Data owned by this organization could be useful for interagency cooperation and solutions. The agency also monitors truck traffic and organizes evacuation of trucks.
- *Passenger Auto Trans* is a government operator of public buses on the routes that may not be profitable but are socially important.
- *GorElectroTrans* is responsible for all electrical transport (trams and trolleybuses).

The Committee of Transport Infrastructure Development (CTID)¹⁹ is responsible for roads of regional significance, service infrastructure, metro development, pedestrian areas, street road network, parking, airports, bridges, toll roads, road development and infrastructure. It likewise has several subordinate organizations: *Mostotrest* (responsible for support of bridges, overpasses, tunnels, etc.), *Center of Parking*, *Center of Transport Planning*²⁰, *Directorate for Transport Construction*, and the *Directorate of Traffic Management*.

- *Center of Parking*²¹ is responsible for: establishment and operation of intercepting parking, establishment and operation of social parking, the provision of parking spaces in parking lots, removal and storage of detained vehicles. The Parking Management System to be developed as part of the Urban Transport Project will be a key source of useful and authoritative data about parking. In addition the information about detained vehicles and commercial parking could be interesting for data users and should be published.
- *Directorate of Traffic Management*²² is engaged in the design, construction, reconstruction, and maintenance of technical equipment - road signs, traffic lights, road markings, and the development of automated systems of traffic management. They have a dispatch service for accepting applications for non-performing traffic lights and this information can be really helpful for drivers. At the moment this information is closed.

¹⁸ Available at <http://etaspb.ru>

¹⁹ Available at http://gov.spb.ru/gov/otrasl/tr_infr_kom/ (web site of Committee)

²⁰ Available at <http://ctpspb.ru/>

²¹ Available at <http://www.gcag-test.ru>

²² Available at <http://www.gudodd.ru/>

There is a possibility to share information from traffic intensity on some crossroads which can help private companies that provide traffic information (such as Yandex, Google) to make information about congestion more precise. Information about different types of signs could help data users to make more useful mobile applications for drivers, such as ParkMe²³ web applications - the largest parking data base in the world which collect data from 1800 cities in 32 countries. In addition, this body will be responsible for the new Traffic Management System to be developed as part of the Urban Transport project, and we recommend that the key data from that system be published online as Open Transport Data.

- *Committee of Improvement of Public spaces*²⁴ is also responsible for parts of transportation infrastructure maintenance, cleaning and operation of roads, pedestrian areas, public transport stops, freight (including parking), traffic restrictions. Also this committee has an internal information system for monitoring of road cleaning vehicles.
- *State Administrative and Technical Inspection*²⁵ - is a separate department reporting to the Governor. Also this organization has very high level of openness because its main function is informing citizens about traffic restrictions, road renovation and repair works. Any citizen or company can track and get information about licenses and documents related to any traffic restrictions in machine-readable formats. The agency's website offers information about traffic restriction orders with a geo-information layer.

St. Petersburg's **Informatization and Communication Committee** is also relevant to this study because it sets policy related to data and information aggregation among the city's various state-run agencies, as well as manages open data initiatives for the city.

Local supply of transport data - assessment and opportunities

Open data for government sectors has been incorporated into Russian legislation, but the transport sector is lacking in progress. Open data has been part of official national initiatives since May 2012 when Presidential Directive No 601 mandated that government become more transparent by implementing, among other things, open data in its activities. In 2013 the President signed changes in laws about information and transparency of government which define "open government data"²⁶. The Russian Government also issued guidelines and

²³ Available at <http://www.parkme.com/the-data>

²⁴ Available at <http://gov.spb.ru/gov/otrasl/blago/> (web site of committee)

²⁵ Available at <http://www.gati-online.ru/>

²⁶ Federal Law of the Russian Federation dated June 7, 2013 N 112-FZ
<http://www.rg.ru/2013/06/11/informatsia-dok.html>

technical requirements for publication of open data by state bodies and local municipal governments²⁷.

Since the initial directive, an internal assessment²⁸ on the effectiveness of implementing this directive shows that some agencies have been more successful in implementing the major benchmarks related to open data than others. It suggests success in achieving partial progress with many agencies, but it also identifies key barriers. While only six of the 78 federal executive agencies have met all high-level criteria in opening data (such as open data sections of websites, use of feedback links, regular updates and presence of good data structures), 59 have taken at least some steps towards opening data. The same report identifies an insufficient understanding of the term 'open data' as well as a critical shortage in information availability related to transport routes and transport infrastructure.

Existing data portals at the national level and in St. Petersburg represent commendable efforts to establish open data products, but many key transportation datasets and APIs are missing. The Russian Federation's open data initiative is embodied in the National Russian Open Data Portal²⁹. This hub includes data across all government sectors. However it lacks the vast majority of transportation-related datasets in Russia because this data is not the operational responsibility of the Ministry of Transport. Instead it is the responsibility of municipalities or of state-owned transport operators such as Russian Railways.

The open data hub for St. Petersburg³⁰ includes similar efforts to present data across many sectors but lacks in transportation resources. Some of the key agencies are represented with some data, but the most critical datasets and APIs are missing such as public transport and roadway infrastructure data. With regards to public transport, however, a separate website exists through the Committee of Transportation that provides a map of real-time public transport information³¹. This portal contains information about movement of buses, trams and trolleybuses using a GLONASS/GPS system; routes and locations of stops; forecasts of vehicle arrival on a stop; information about each vehicle (i.e., accessibility). This information can be retrieved through an API. Currently the API is only available to users who have submitted a written request for access to be submitted and whose use has been considered and approved: best international practice would be to allow access to the API without registration, at least for moderate levels of usage. Nevertheless the existence of this data in one location using APIs is a promising and commendable technical development and it has demonstrated that there need be no major barriers in implementing Open Data principles for transport data in St. Petersburg.

²⁷ Guidelines and technical requirements for publication of open data

[http://ar.gov.ru/files/page/353_metodicheskie_rekomendacii_\(versiya_2.3\).pdf-d](http://ar.gov.ru/files/page/353_metodicheskie_rekomendacii_(versiya_2.3).pdf-d)

²⁸ Implementing Russian Open Data Concept: Public and Local Government Bodies Progress Report 2013 http://opengovdata.ru/wp-content/uploads/2013/10/Open-Data-Report_Russia-2013.pdf

²⁹ Available at <http://data.gov.ru/>

³⁰ Available at <http://data.gov.spb.ru/>

³¹ Available at <http://transport.orgp.spb.ru/>

With the help of the existing Urban Transport Improvement Project plans for St. Petersburg are starting to address information needs in the three priority areas of parking management, traffic information and passenger information, but the focus so far has been on the collection of data rather than its dissemination.

- **Parking Management** - There is no current parking management scheme in St. Petersburg but the urban transport project seeks to implement one with capabilities to generate and report data about parking inventory and usage. The relevant data would be parking locations (on and off-street), occupancy, regulations and real-time pricing. One of the most important elements of parking management is to disseminate information to drivers so they can quickly and efficiently find the most appropriate available parking space to minimize cruising (a major contributor to urban traffic congestion). According to a recent survey in Los Angeles, “76 percent of drivers would choose to park in a less-expensive space a little farther from their destinations, but those drivers must know about the dynamic-pricing plan to take advantage of it.”³²
- **Traffic Management** - The Directorate of Traffic Management (GUDOD) is actively deploying a project to add video sensing upstream of key traffic signals to help identify congestion and to share information about the traffic at some intersections. This could be an excellent source of information to others on traffic congestion, especially if coupled with software that analyzes images for movement. If the agency had a full network of validated traffic monitoring data available as real-time open data, it could have a very significant impact.
- **Public Transport Management** - The Organizer for Transport manages schedule data and provides it to the public in a visual³³ and machine-readable format. The machine-readable API³⁴, however, is challenging to access and could be made more visible to users. Consideration should be given to additional publishing the schedule data as a GTFS feed: while the raw data already published may be richer in detail than the GTFS format allows, GTFS is the de facto global standard for publishing data about transit routes, schedules and fares and so there are toolkits readily available for developers to use it - indeed if information was available in GTFS format then some existing applications from elsewhere could be quickly adapted to serve St. Petersburg and its citizens.

St. Petersburg transport agencies are starting to consider information needs of travelers and what improvements in public transport information services are required. The

³² Chieppo, Charles. "Playing the Slots: Technology's Growing Role in Bringing Efficiency to Parking." May 23, 2014. Governing: The States and Localities. (<http://www.governing.com/blogs/bfc/col-los-angeles-san-francisco-technology-variable-rate-parking.html>)

³³ Available at <http://transport.orgp.spb.ru/>

³⁴ Available at <http://transport.orgp.spb.ru/Portal/transport/internalapi/gtfs>

Directorate for Transport Development has issued terms of reference for research on the opportunities for better public transport information services for the citizens of St. Petersburg and Leningrad Oblast to promote the use of public transport, receive feedback, provide timely updates to citizens, gather data about popular routes and problems with public transport, increase tourism, and others. The idea is to create and implement a strategy for a coordinated system of public information services to make the transport services easier to use. ITMO is doing the research to demonstrate the need for such strategy and essentially create a roadmap for the development of information services. The roadmap will include the big picture as well as instruments, activities and KPIs.

Local demand for transport data

There is a strong demand for better and more integrated transport information from transport users in St. Petersburg and Leningrad Oblast. We are grateful for access to research conducted in July 2014 by ITMO University in the framework of project "Development of the concept of social information transport services implementation for the residents of St. Petersburg and Leningrad region".

The research found that transport is important to the economic performance of St. Petersburg: more than 50% of passengers are people in the age groups 25-44 years, which means active working population. Up to 42% of the employed population use interregional routes 5 times a week. Pensioners and housewives use the services less frequently - 53% of the passengers in age group "55 and older" only use the interregional transport 1-2 times a month or less.

The majority of respondents use more than one mode of transport when traveling. These findings underscore the importance of information systems for inter-regional and intermodal routes development. Nearly half of the respondents (47%) used 3-4 routes to get to the right place. The average time spent by passengers on a trip is 99 minutes (almost 1 hour 40 minutes), with 23% spending over 2 hours. This shows the potential economic benefit if information could be used to allow people to choose quicker routes or avoid disruption.

Existing transport information services are popular and demanded among the passengers of St. Petersburg and Leningrad region. According to survey data, 71% of passengers use information services, providing them with information about the schedule of traffic, routes, costs, etc. More than half of passengers use Internet services to get necessary information, 15% use the service Yandex Maps, and 17% turn to the bulletin board, 5% use mobile applications, and others use services like tutu.ru (Railway schedule) and Russian-bus (buses' schedule). Yandex services and mobile applications are more popular among young passengers. Only about 14% of all passengers get their information from paper schedules or by asking friends and acquaintances.

However, there is no unified system of information services in St. Petersburg. According to the survey, the passengers feel a real need for improvements in information services, including the following:

- up-to-date information about traffic jams, disruption and detour options;
- a unified system which reports information for all types of transport together.
- information on bus arrival times stop by stop.
- getting schedules via SMS for free.
- online ticket purchase.
- interactive maps and information signs
- improvement to existing information services.

Third-party companies and application developers want to create projects that provide citizen and commercial services using open data. There is steady growth in the use of open data by independent application developers around the world. The fact that governments publish and maintain open datasets using common standards allows independent developers and private companies to build innovative projects running on open data. As innovation expands in civic services such as journey planners, the market grows and generates demand for more civic-oriented apps that those developers and companies will meet.

Efforts should be made to engage businesses to learn their priorities for what data they need and to encourage them to develop applications - bearing in mind that the applications may not only benefit them but may also contribute to the same strategic objectives of the Urban Transportation project. For example businesses may be interested in supplying parking and congestion data to their customers because of the impact on their business (if customers cannot park they will not shop) - but it would also contribute to St. Petersburg transport priorities and help stimulate the city's retail sector. To take another example, data on road safety could be used to influence customers' buying habits and promoting sales of, for instance, safety seats and other devices - again contributing both to the businesses' self-interest but also to the wider objectives. Once the business community is involved, and they understand the potential benefits of open transport data to their business objectives, there is likely to be more momentum of demand and greater clarity of priorities for the availability of data.

It is also important to measure the demand and priorities for data not only by the number of downloads from official sources but also through unofficial access through, for instance, "scraping" websites or using URLs intended for humans as "informal application program interfaces".

To start this discussion the World Bank and its partners held an initial developer conference in St. Petersburg to ask a cross-section of data users responded to questions about what data they would want and how they would want information provided. The following themes were evident in discussion:

- Users want access to detailed data, not just summarized statistics.
- Real-time information has some of the most potential for being incorporated into customer tools.
- Users specifically highlighted a number of kinds of data: parking locations and real-time availability, public transport service locations and real-time locations, information about

informal transit, existing and planned infrastructure for bicycle facilities, fare card usage information and traffic data.

It is also possible that transport data could be used by other government agencies. Making the data available as open data would allow other government agencies to use this data (for instance for zoning and planning decisions) without placing additional burdens on the transport agencies themselves.

Data users want the St. Petersburg transport agencies to support a productive open data ecosystem through effective communication about data status, a commitment to maintaining data feeds and an open and positive relationship with developers. One consistent piece of feedback during the workshop was that developers think it is important to have a relationship with the agencies that provide data. This includes the provision of documentation and on-line metadata (include about when the data was last refreshed) as well as outreach agency staff who can respond to users with guidance and who can respond and take action on feedback about data errors. Even further, data users want the authorities to publicize the availability of data and help promote the services that use it. One positive example cited was the recent initiative at the municipal level where the administration of St. Petersburg organized a competition called "OpenPiterMobile"³⁵ in 2014 to promote use of its Open Data Portal.

Potential barriers and perceived risks of Open Transport Data

The technical visit enabled some discussion with officials about the potential barriers to the publication of Open Transport Data and the perceived risks.

Legislation. While there is a Federal Law covering Open Data it was not clear the extent to which this applied to transport data and whether it conflicted with security, privacy or other legislation which limited the disclosure of information to the public. Clearly this is an essential consideration to resolve, and we have suggested that the Ministry of Transport should work with the Department of Open Government to give clear guidance to St. Petersburg and other municipalities on the issue.

Allowing others to distribute data could mean that the public gets unreliable or out-of-date information for which the transportation authorities are blamed. This is a common and understandable concern of transportation authorities, in particular in relation to Open Data, because useful transport information not only needs to be accurate but also up-to-date. However in reality application developers share the same objectives as the transportation authorities - no-one will want to use an application which gives unreliable or out of date information, and in a competitive applications there is a "survival of the fittest" in which those applications that meet customer needs and display data correctly will thrive and those which do

³⁵ Available at <http://openpitermobile.ru/>

not will not. Experience shows that transportation authorities have been able to manage this risk by stimulating a wide range of competing applications and then working with their developers to ensure, for instance, that there is good documentation for developers on how to interpret and present the data and that applications refresh their data from the authoritative systems of the transportation authorities sufficiently often. At the same time it is also common to require that applications do not claim official endorsement and sometimes to require that the time the data was last updated is made clear to its users.

Opening up data could mean foregoing potential income. Selling data may be permitted by law and the prospect of additional income to supplement budgets can be enticing to a public body. However transportation information systems are not established with the intent of generating income but rather managing transportation resources and so allowing the citizens, business and visitors to St. Petersburg to make their journeys efficiency, effectively and safely. Any limits on the use or distribution of the data that runs these public services detracts from the overall goal of serving the traveling public who may end up with less information about their travel options, including alerts for drivers approaching crashes, information for transit riders whose typical commute train is delayed, and guidance systems that quickly tell drivers where to find parking to reduce urban congestion. The cost of not providing information to the widest possible public audience is not easily quantified, but the evidence of the large number of third-party applications in cities which already make data available - including the evidence from St. Petersburg itself where there are said to be 30 third-party applications using the API of the Agency “Organizer of Transportation” - shows that very significant numbers of travelers would be disadvantaged if access to information was limited to those who could pay. Economic analysis and evidence in other sectors also suggests that the usage and overall public value of information is maximized if it is Open³⁶.

It is hard to qualify the benefits of Open Data. It is true that there are competing estimates of the value of Open Data at a global level. However all studies indicate that the lowest estimates of benefits far exceed the costs, and most governments and public bodies have been able to justify the adoption of Open Data policies on the basis of deliberately cautious estimates of benefits. In transport not only is there a rich stock of estimates of benefits, but there is also now a growing body of international evidence of benefits delivered as a result of Open Data in other major world cities.

Security and the protection of operational systems is paramount. Security related to data is a concern because of potential threats to public infrastructure and assets. One agency official with a background in technology said that his main concern about creating live-data feeds is that when data can be sent out, it leaves the agency more vulnerable to a cyber-attack coming in

³⁶ See for instance <http://ec.europa.eu/digital-agenda/en/news/review-recent-studies-psi-reuse-and-related-market-developments> and <http://ec.europa.eu/digital-agenda/en/news/economic-analysis-psi-impacts>

through the same connection. It appears, however, that best practices using separate web-systems to deliver data to the public (through firewalls, staging servers, “demilitarized zones” and the like) can be used to manage and mitigate these risks. With regards to physical attacks on infrastructure, open data typically contains information that is publicly accessible in more than one way using commercially available products (such as station locations and freeway routes) - indeed in many cases the information is already available to the public through official websites.

A further aspect of security is the risk that knowledge of information might be used to compromise national security or public safety. This is an important consideration in the release of any official data. So, as part of a security-mitigation task, agencies should thoroughly review the information being made available and selectively remove those attributes that may contain sensitive information, taking specialist security advice from the relevant authorities as necessary. It may also be necessary to provide for the “switch off” of certain information systems at times of high threat or after an incident - although often it is at times of disruption when it is most important to get accurate, official, information to travelers as quickly and widely as possible to manage the incident and contain its impact.

Overall Assessment of Transport Data in St. Petersburg

Although the Bank has a methodology for identifying key actions for clients that decide to proceed with an open data program³⁷, the technical visit did not have the time or the resources to conduct a full formal Assessment. It was however able to use the established Assessment framework to benchmark St. Petersburg’s current level of achievement against global best practice.

The results of this assessment are shown in the following table:

³⁷ The Open Data Readiness Assessment (<http://data.worldbank.org/about/open-government-data-toolkit/readiness-assessment-tool>)

St. Petersburg Transport Data evaluated on World Bank Open Data Readiness Assessment Criteria

Dimension	Importance	Findings for Transport Data in St. Petersburg	Rating ³⁸
1. SENIOR LEADERSHIP	Open Data Programs require the implementation of change. Focused, strong, sustained, political/senior leadership is therefore critical to helping overcome resistance and to achieving the desired objectives and benefits of an Open Data Program.	St. Petersburg already has an Open Data program with the strong backing of the Vice Governor. However the Committee of Transportation and the Committee of Transport Infrastructure Development have yet to make a positive and public commitment to the use of their data outside their own subordinate bodies or to agree a strategy for doing so.	YELLOW
2. POLICY/ LEGAL FRAMEWORK	The long-term success and sustainability of an Open Data Program is greatly impacted by the policy and legal framework that exists. Open Data requires that a range of policy and legal issues be addressed – for example, with respect to the licensing of data reuse.	The Agency “Organizer of Transportation” already provides data feeds through an API, showing that an Open Transport Data policy is possible within its statutes. However other subordinate bodies do not currently have policies to publish much of their data and it was suggested that there might be legal restrictions in some cases. There were some proposals that data should be charged for, even if that reduced overall usage and benefits.	YELLOW
3. INSTITUTIONAL STRUCTURES, RESPONSIBILITIES AND CAPABILITIES	Middle management level skills and leadership are important to success: creating an Open Data Program requires agencies to manage their data assets with a transparent, organized process for data gathering, security, quality control and release.	The subordinate bodies visited showed strong technical and operational management skills, but most saw the use of data, and so the design of systems to manage it, as primarily for the internal operations of the body.	YELLOW
4. DATA MANAGEMENT POLICES AND PROCEDURES	Good existing information management practices within government can make it much easier to find data and associated metadata and documentation, identify business ownership, assess what needs to be done to release it as Open Data and put processes in place that make the release of data a sustainable process.	The subordinate bodies visited showed a good awareness of the data they held, and had a clear vision of the new systems which would be developed with the funding from the Urban Transport Project.	GREEN

³⁸ Green means there is clear evidence of readiness. Yellow means that evidence of readiness is less clear

Dimension	Importance	Findings for Transport Data in St. Petersburg	Rating ³⁸
5. DEMAND FOR OPEN DATA	The value of data is in its use. A strong demand-side “pull” of data is important not only in creating and maintaining pressure on government to release data but also in ensuring that the wider Open Data Ecosystem develops and that Open Data is turned into economically or socially valuable services for citizens.	There was strong evidence of demand for Open Transport Data from the innovator and developer community. The data already released by the Agency “Organizer of Transportation” is reported to have 30 applications already. It was clear that data from the new systems being implemented with funding from the Urban Transport project would be equally in demand. There is also an “application culture” among mobile users, especially the young, which would drive demand.	GREEN
6. CIVIC ENGAGEMENT AND CAPABILITIES FOR OPEN DATA	The effective use of Open Data requires capability in the private and civic sectors to build applications and to provide supporting services for them.	St. Petersburg has a strong developer and application services community which would be quickly able to innovate new applications from the data to be generated by the new systems funded by the Urban Transport project. In addition developers from other cities within the Russian Federation could be attracted by the opportunities offered if St. Petersburg were to lead the way with Open Transport Data in Russia.	GREEN
7. FUNDING AN OPEN DATA PROGRAM	Funding with respect to both the “supply side” and “demand side” of Open Data is vital to ensure that the objectives of an Open Data Program are met.	The extra cost of APIs to publish data from the new systems online should not be material if they are designed from the beginning and could be covered within the existing World Bank project budget envelope with careful and prudent financial management. There was clear evidence of the availability of finance for application development, including a venture capital.	GREEN
8. NATIONAL TECHNOLOGY AND SKILLS INFRASTRUCTURE	Open Data Programs normally rely for their success at least in part on the national technology infrastructure, in terms of technology and communications .	St. Petersburg has excellent broadband and mobile data services with high levels of take-up including ownership of smartphones. If compelling applications were available using Open Transport Data then St. Petersburg’s infrastructure would allow it to be used widely and quickly.	GREEN

Potential contribution of Open Transport Data to St. Petersburg's Transport Objectives

The St. Petersburg component of the National Urban Transport Improvement Project involves the design and implementation of three key information systems - for parking management, traffic management and public transport information. Based on experience in other cities, the publication of data, particularly real-time data, from these systems could contribute to the achievement of project objectives and wider social, economic and environmental improvement in St. Petersburg through the following broad mechanisms.

In each case some of the achievement of objectives depends on changes in traveler behavior which can be influenced by information about the service they plan to use and about alternatives.

Parking Management

- Information on parking location and availability will enable drivers to find parking locations more directly, reducing congestion and emissions from vehicles driving round looking for parking spaces. Drivers will also make time savings which have a value.
- Information on parking location and availability will enable drivers to make a better informed modal choice, and with better knowledge of costs and limited space available, chose to make some journeys by public transport. This also reduces congestion and emissions through the elimination of these vehicular journeys.

Traffic Management

- Information on current traffic conditions will enable drivers to re-plan their journeys to avoid congestion and delays. This will further reduce congestion and the associated emissions. Drivers will also make time savings which have a value.
- Information on current traffic conditions, particularly congestion, will enable drivers to make a better informed modal choice. With better knowledge of current congestion they will have a higher propensity to choose public transport modes. This will not only save them transport costs but will also benefit the city through reducing congestion and emissions through the elimination of these vehicular journeys.

Public Transport Information

- Information on public transport services, both schedules and real time running, is already widely sought by passengers in order to plan and conduct their journeys to minimize their costs and time. These savings are also economically beneficial to St. Petersburg, and since transport costs are a relatively high proportion of income of the poorer members of society a reduction in transport costs also has strongly positive social benefits.

- Better information about disruptions to current services will allow passengers to replan their journeys and take alternative routes. Not only will this save them time but it will also help allow the original services to recover more quickly and at lower cost.
- Better information about services will enable car drivers to make a better informed modal choice, and to discover how to use public transport for journeys that they would otherwise have made by car. This will give social, economic and environmental benefits in the reduction of congestion.

In all three of these areas the benefits are largely linearly scalable³⁹, because they are the result of independent decisions by individual travelers. Therefore the more travelers that have the necessary information, the greater the benefits that will result.

Releasing information as Open Data has been shown to greatly increase the use of and economic return from that data. The POPSIS study⁴⁰ for the European Commission showed that in seven case studies the amount of usage of data had risen by a factor between 10 and 100 when it was made open. Moreover releasing such information as Open Data often leads to a wide, competitive and innovative market in applications to supply the information to end users. There are already reported to be 30 applications for bus passengers in St. Petersburg using the limited data feed already available⁴¹, which demonstrates that St. Petersburg's application developers could rise to the challenge. The availability of a wide range of applications suited to different individual needs will ensure that more travelers find a suitable application, and so have easy access to the information they need at the point they take their journey decision. This, as discussed above, leads to more travelers using information to take decisions about their journey and so increases the overall social, economic and environment benefits.

In other cities the alternative strategy of supplying information solely through applications developed by the transport authorities themselves has not been successful. The costs of developing and promoting applications which are appealing to a wide range of travelers can be prohibitive, and drain funds from other priorities within the transport authority itself. In addition experience has shown that different travelers have different needs and it is hard to justify a single authority developing a range of overlapping applications that compete with one another. Indeed the direction of travel is the opposite: transport authorities are positioning themselves as suppliers of data and not as application developers: for instance with 500 third-party applications available Transport for London has abandoned development of its own applications.

³⁹ In extreme cases - for instance so much modal shift from private cars to public transport that congestion ceases to be a problem - the marginal benefits of further travellers using information would of course diminish. But even in such cases the benefits gained could only be sustained if information was widely available.

⁴⁰ <http://ec.europa.eu/digital-agenda/en/news/economic-analysis-psi-impacts>

⁴¹ Similar experience has been reported elsewhere. For instance there are at least 68 third-party applications for the New York City metro and 20 third-party applications for the Barcelona bus system. For London, covering metro, buses, trams, roads and cycle hire there were reported to be 500 applications by mid-2013.

In addition the survey of public transport passengers has highlighted the high proportion of complex journeys using multiple transport providers and so the demand for applications which bring information about all providers together in an integrated way. No single St. Petersburg operator is well positioned to be able to develop such applications. However if each operator releases their data as open data then it will be easier for others to build applications which enable integrated journey planning across different public transport services and modes.

A further consideration is that Open Data on current traffic conditions will also be available to other road users including municipal and private bus companies. As a result they will be able to take decisions to minimize disruption to their services and provide better information to their customers. In addition to the financial benefits to these other road users this will also help reduce congestion further, with social, economic and environmental benefits.

This study has not sought to quantify the level of these benefits; that would be for further work within the project. However the examination of the benefit mechanisms suggests that appropriate Open Transport Data could contribute to, and enhance, the types of benefits already sought by the St. Petersburg component of the National Urban Transport Improvement Project. Since the additional costs of developing open data feeds from systems that are to be implemented anyway is relatively low - especially if incorporated into the design from the start - it seems likely that the increased use of the information would give substantially greater benefits than the marginal cost of implementation within the existing project.

In addition, the National Urban Transport Improvement Project is designed to pilot solutions that could be applied in other cities in the Russian Federation. If Open Transport Data was part of the St. Petersburg solution and if local ICT and other businesses built applications to exploit it (as we believe they can and will), then the rollout of the approach to other cities will create a significant business opportunity for St. Petersburg-based companies, bringing further income and jobs to the city. It will of course give a position of national and international prominence to the St. Petersburg and its transport authorities as well.

Recommendations

Recommendations for St. Petersburg

On the basis of this short technical visit and the examples that we saw in the transport bodies which we were able to meet, we make the following recommendations for consideration by the Transport authorities of St. Petersburg:

(1) Develop a coherent Open Transport Data strategic framework and plan for St. Petersburg. To realize its vision for Urban Transport St. Petersburg needs a single coherent strategic framework and plan for transport information across all modes. This needs to be designed to support and help achieve the specific social and economic objectives of St. Petersburg's transport system. It should reflect the demands and priorities for data from the citizens and businesses of St. Petersburg reported above and informed by further research and piloting as necessary. In this context the terms of reference recently issued by the Directorate for Transport Development for research on the opportunities for better public transport information services for the citizens of St. Petersburg and Leningrad Oblast are a very important contribution, and this work and its follow-up should be a key part of the development of the Open Transport Data framework. While most of the data is generated and managed by the various subordinate bodies responsible for the operation of the various modes and the different assets, it is essential that there is clear instruction to them on the overall policy of Open Data, the standards which should be applied, their specific responsibilities for implementation, and KPIs for each agency to ensure steady progress towards the city's objectives. The strategy should also include any necessary capability-building programs. (Action: Committee of Transportation, the Directorate for Transport Development and Committee of Transport Infrastructure Development, in conjunction with the St. Petersburg Informatization and Communication Committee to ensure that it is consistent with St. Petersburg's broader Open Data policies)

(2) Make Open Transport Data an integral part of St. Petersburg's Urban Transport Improvement project. While the strategic framework should not only apply to the data from the new systems developed within the World Bank-financed project, the project gives good opportunities to pilot the approach and to help deliver the benefits that the project has been set up to achieve. The return on the proposed investment in information systems can be enhanced by making their data more widely available and so more likely to positively influence modal choice and traveler behavior on a larger number of journeys: Open Data can be a key mechanism for ensuring that road and public transport users have the information they need to use the transport system efficiently and effectively, and so minimize the time and cost of their journeys. By releasing appropriate, relevant and non-sensitive transport information as Open Data, and by encouraging and assisting third-party developers to use it to get information to transport users in innovative ways, the St. Petersburg transport authorities can reach a larger audience and leverage their investment in information systems. In addition incorporating Open Data principles into the design of the systems at an early stage (often called "Open By Design") will make it easier to ensure that the data which will be open and the data which will be

protected are identified and separated within the system design and that robust architectures are implemented which allow the data which will be open to be accessible to external users without putting at risk internal data or systems. In addition, like all requirements, designing open data into the system from the start minimizes the costs of development and rework and increases the robustness and security of the system as a whole. (Action: Center of Parking (parking management system), the Directorate of Traffic Management (traffic management system) and the Agency “Organizer of Transportation” (passenger information system)).

(3) Engage with developers and potential business data users to understand their needs and priorities and to help ensure they deliver the maximum social and economic benefit to St. Petersburg.

It is important that transport agencies understand not only their own needs and uses of data but also how that data could be used by others to enhance the return on investment for St. Petersburg. In New York City, “following a series of cooperative meetings with software developers to learn how they would support transit riders and how the agency would benefit from better avenues of traveler information, the agency transformed into one of the most open sources of transit data in the industry.”⁴² The transport agencies should proactively contact businesses using or considering using their data and provide them reasonable help and support within their available resources. Engagement with actual and potential data users can also be promoted through the use of developer events, competitions and prizes. These can generate innovative solutions to transport-related business problems and to the same strategic challenges which are driving the St. Petersburg components of the National Urban Transport Improvement Project. In addition they enable potential developers and businesses who could use data to meet agency staff and to build business relationships which can continue throughout the project. (Action: Committee of Transportation and Committee of Transport Infrastructure Development, in conjunction with the St. Petersburg Informatization and Communication Committee which already has established some initial relationships with developers and Open Data users).

(4) Build capacity among decision-makers and engineers and consider how to generate innovative solutions to the specific issues of St. Petersburg.

Examples and experience from peer cities tend to be one of the most effective methods in building the capacity among senior officials and engineers to use new technology concepts. This means looking not only at other major cities within the Russian Federation but also at other peers of St. Petersburg globally. For instance examples of an integrated system of all kinds of transport in Washington D.C.⁴³, MTA in New York City⁴⁴, London⁴⁵, San Francisco⁴⁶ where developers have access to open data could be helpful for future planning of transport IT-infrastructure in St. Petersburg and in other major cities in Russia. This does not mean blindly copying other models or imposing

⁴² Wong, J; Reed, L; Watkins, K; Hammond, R. “Open Transit Data: State of the Practice and Experience from Participating Agencies in the United States.” Paper presented at 92nd Annual Meeting of the Transportation Research Board. Washington, DC. January 2013.

⁴³ Available at http://www.wmata.com/rider_tools/developer_resources.cfm (Developer resources)

⁴⁴ Available at <http://web.mta.info/developers/> (Developer resources)

⁴⁵ Available at <https://www.tfl.gov.uk/info-for/open-data-users/> (for Open Data users)

⁴⁶ Available at <https://www.sfmta.com>

solutions which are inappropriate for St. Petersburg. Instead, finding a range of respected cities with a successful track record of open data to convey their own experiences will be useful in helping St. Petersburg's decision-makers and engineers to consider innovative ways in which it could use Open Data to address issues which are most important to it and to enhance further the investment which is being made through the National Urban Transport Improvement Project. (Action: Committee on Transportation and Committee of Transport Infrastructure Development).

(5) Use Open Data to accelerate progress towards an Intelligent Transportation System in St. Petersburg. The St. Petersburg Urban Transport strategy should embrace Open Data to lower barriers to the deployment of Intelligent Transportation Systems (ITS). When implemented, ITS will contribute to the creation of a transport network that is safe, clean, efficient, and comfortable for travelers. The benefits of ITS at the National level can be maximized if individual municipalities, starting with St. Petersburg, can ensure that relevant multi-modal transport data becomes available to the Public and shareable with multiple Transportation Agencies across the Russian Federation. Availability of multi-modal data sets at the municipal level will not only encourage local agencies to collaborate more with each other towards the goal of implementing a harmonized ITS program for Russia but also open up opportunities for private sector and application developers to synthesize innovative transportation solutions. (Action: Committee on Transportation and Committee of Transport Infrastructure Development).

(6) Work with the Federal Ministry of Transport and with other leading cities in the Russian Federation on common policies and standards for Open Transport Data and for Intelligent Transport Systems in Russia. If St. Petersburg is an early strategic mover on Open Transport Data in Russia then its experience and knowledge should be leveraged by the Federal Ministry of Transport to set common policies and standards for Open Data in the Transport sector across the Russian Federation. Encouraging and supporting other cities to adopt the same standards as St. Petersburg will also mean that application developers in St. Petersburg will have a larger potential market, with the possibility of St. Petersburg becoming a center of excellence and business innovation in Transport Data in Russia. (Action: Committee on Transportation and Committee of Transport Infrastructure Development).

Recommendations for the Federal Ministry of Transport

The report also makes five recommendations for the consideration of the Ministry of Transport of the Russian Federation

(1) **Promote the use of Open Transport Data** to improve passenger information, reduce time and costs of journeys, optimize the use of transport infrastructure and promote economic growth, job creation and innovation in transport applications and services. The analysis in this report suggests that the Russian Federation could benefit significantly from the use of Open Transport Data to enhance social, economic and environment benefits in line with its Transport Strategy to 2030. However if this is to be achieved, it will require leadership and direction from the Federal Ministry of Transport. (Action: Ministry of Transport).

(2) **Set legal and technical policies and standards for the publication of Open Transport Data by municipalities.** While the vast majority of transport data in the Russian Federation is managed by the responsible municipalities and other public bodies in the Russian Federation, and not by the Federal Ministry of Transport itself, the Ministry should take the leadership role in setting policies on which data should be published online as Open Transport Data and in setting common standards across Russia. The adoption of common policies and standards is important to the development of the application eco-system and to allowing innovators and entrepreneurs to build applications that will work in many different cities as the data becomes available. The Department of Open Government and the Ministry of Economic Development have already developed cross-sector standards for Open Data in the Russian Federation, but there is a need for further standards specific to transport data (both fixed and real-time). (Action: Ministry of Transport, in conjunction with the Department of Open Government and the Ministry of Economic Development as necessary).

(3) **Set legal and technical policies for standards for the publication of Open Transport Data by relevant Federal bodies including Russian Railways.** It will be important to include railways and other Federally-run modes of transport in the Open Transport Data program. The Ministry of Transport should lead the development of applicable policies and standards for these modes too. (Action: Ministry of Transport, in conjunction with Russian Railways and other Federal transport operators, and with the Department of Open Government and the Ministry of Economic Development as necessary).

(4) **Include responsibilities for technical standards and for promoting best practice in transport information and Open Transport Data in the terms of reference of the Federal Center for Development of Urban Transport Systems** to be established as part of the Urban Transport project funded by the World Bank. The creation of the new Center provides a unique opportunity for it to take technical and professional leadership in Open Transport Data in the Russian Federation. This should be set as an early priority. (Action: Ministry of Transport).

(5) **Support the release of Open Transport Data by St. Petersburg within the National Urban Transport Improvement Project as a pilot of the use of Open Transport Data in**

support of Federal Transport policy. The St. Petersburg pilot gives an ideal opportunity not just to deliver benefits to the citizens and visitors to St. Petersburg itself but also to serve as an exemplar for the wider use of data in the transport sector in Russia. The Ministry of Transport (through the Federal Center for Development of Urban Transport Systems once established) should work closely with St. Petersburg to ensure the success of the pilot and the capture of practical experience prior to wider adoption of Open Transport Data in the Russian Federation. (Action: Ministry of Transport, and then the Federal Center for Development of Urban Transport Systems once established).