# « Transport in Moscow » by Maksim Liksutov

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**Maksim Liksutov** is the deputy mayor for transport in Moscow. Moscow addressed its road and public transit congestion problems and developed one of the world's smartest and most-used public transportation systems. Here's how.

**Smart transport is foundational** to any smart city; it is a system that wields a vast array of information and communication technologies to improve efficiency, convenience, and safety across a variety of vehicles and infrastructure assets. But it is a daunting undertaking for cities looking to digitize, with hundreds and thousands of citizens taking daily rides that must run smoothly, cleanly, and on time.

**Maksim Liksutov:** Until 2010, the traffic situation in Moscow was close to critical: the road network had reached maximum capacity, and Moscow had one of the worst road traffic situations in the world. Thus, in 2011 the Government of Moscow and leading Russian and international experts developed the State Program of Moscow Transport Development to 2020. The plan centers on an analysis of large amounts of commuting data to reduce the load on the roads through a strategic approach to upgrades and new construction, as well as the launch of an intelligent transport system (ITS).

The ITS, which controls more than 2,000 video surveillance cameras, 3,700 road detectors, and 6,000 traffic lights, allows us to provide real-time response to traffic situations throughout the city rather than waiting for Muscovites to call emergency responders, law enforcement, or others to resolve issues. The mayor of Moscow was personally involved in developing and implementing the traffic-improvement measures that resulted in a significant reduction in congestion. Despite that, the number of registered private cars in Moscow increased by more than one million since 2010. In fact, according to the TomTom ranking,[1] Moscow was the most congested out of nearly 400 cities in 2010; by 2016, we had moved down to 13th. The traffic speed in Moscow increased by more than 13 percent—from 45 km/h in 2010 to 51 km/h in 2016. Such congestion reduction is among the best in the world.

We still experience congestion during peak traffic hours, but the improvement has been substantial thanks to the ITS, major changes in parking policies, and significant investments in public transportation, such as metro and buses. In 2017, Moscow won the TomTom award for parking, ranking first globally in quality of parking planning.

**McKinsey:** What steps is Moscow taking to increase use of the public transport system?
**Maksim Liksutov:** It is difficult for public transport to compete with the comfort of the car, so we set out to ensure public transport is safe, modern, reliable, accessible, and accommodates the needs of each passenger.

First of all, we have been upgrading our vehicle fleet. Since 2010, we have purchased more than 8,000 new ground transportation vehicles and 1,600 new metro train cars, all manufactured domestically. By the end of 2017, the share of new train cars being used on the metro will reach 37 percent, and ground transportation vehicles will be at 90 percent. Today, the average age of urban buses is less than five years, and 98 percent of our ground transportation vehicles are accessible to disabled passengers. The Moscow metro offers a

special assistance service, and there are also "social taxis" to help the elderly and the disabled navigate the city.

Second, we have implemented several modern services found in the best transportation systems in the world, including electronic ticketing systems, a city bicycle system, bus lanes, and a regulated taxi industry. Today, more than 85 percent of trips on public transport are paid for with Troika transport cards, which were introduced in 2013 and enable seamless transfers between all types of surface transport. In 2017, Muscovites made 2.3 million city bicycle trips, twice as many as in 2015. Bus lanes ensure that public transport vehicles are given priority in traffic, which has improved the regularity of bus service in central Moscow; annual full-fare trips on surface transit increased from 586 million in 2010 to one billion in 2017. And thanks to high competition and legalization of the market, Moscow's 47,000 legal taxis have seen a 16-fold increase in ridership since 2010.

third, we have been focused on using data to improve the passenger experience and inform our public transport investments. In addition to helping streamline private car usage and traffic conditions, we use the ITS to collect an extensive data set on bus passenger boarding and alighting, frequency and speed, and load on roads and hubs. Mobile data and tracking systems give us an accurate picture of each bus's movement. This informed our launch of a new bus route network called Magistral, which has given the more than 900,000 people working downtown access to an efficient alternative to metro travel that would require line changes.

Fourth, we sought to improve connectivity between city districts and relieve the load on metro and train stations by building the Moscow Central Ring, which encircles the city center and connects all of our metro rail lines. Within one year of operation, passenger traffic on this circular railway reached 400,000 trips per day.

Finally, we recently introduced a smart closed-circuit television (CCTV) system to ensure passenger safety. The CCTV automatically records and detects potentially dangerous situations, from unusual crowds to lost or abandoned items, and can even recognize faces. We anticipate that the new security system will provide a tenfold improvement in emergency response times for Moscow metro employees.

As a result of these efforts, Muscovites are making the public system their main mode of transport; the number of full-fare trips taken annually increased from 1.9 billion in 2010 to 2.8 billion in 2017. And today, intervals between trains during peak hours on the busiest lines are at 90 seconds, which keeps the system running smoothly. This indicator is a record among the world's major underground systems.[2] Indeed, according to a 2016 study by Community of Metros (CoMET), an independent international association, Moscow has one of the world's top three metro systems for passenger satisfaction with real-time information.

**McKinsey:** How do you collect passengers' feedback on their experiences of using transport, and how do you use this feedback to help make decisions? **Maksim Liksutov:** No initiative is implemented without considering the views of Muscovites. Moscow has two service centers that receive questions, suggestions, requests, and appeals from more than 5,000 people every week through telephone, internet, or personal contact. We also process all inquiries and suggestions submitted through social media networks.

Our latest tools for interaction with citizens are city transportation network mobile applications, which Muscovites have downloaded 3.5 million times. The apps can be used to plan a trip using public transportation, pay for parking, and find the nearest bike rental station. The "Moscow Assistant" app even allows residents to register parking violations. About 200,000 residents use the app, and more than 230,000 fines were created in 2017.

At the same time, we are constantly improving our data handling with the goal of anticipating the wishes of Muscovites. We use the same advanced analytics and data processing methods as mobile operators and leading internet services. But unlike these groups, we work with a large volume of diverse data that come from metro and bus trips, photo and video recordings of violations, vehicle tracking, tracking of mobile applications, and Wi-Fi use. With this data in hand, we process feedback from passengers and provide relevant and up-to-date information on city events. We can also change the route network, for example, if we see there is a new hub of activity in the city that needs public transport service. We have just started to develop the mechanism, and much remains to be done in this regard.

**McKinsey:** What are the main problems that arise in the process of smart-city management and use of big data? **Maksim Liksutov:** Data protection is a primary concern in the management of any smart city. The introduction of smart technologies involves many risks, and we want to provide the most reliable protection available. This month, the Moscow Center for Traffic Management set up a new protective barrier for the virtual infrastructure of the ITS, including a set of advanced software protection measures that ensure full security. Now our ITS is defended by modern, cyber software and endpoint protection. The solution minimizes the risk of malicious software penetrating the city's databases and protects against leaks of confidential information and personal data.

**McKinsey:** What is your vision of Moscow in 2025? How does it fit into the global landscape of smart transport technology? **Maksim Liksutov:** To start, we are committed to continuing to increase the convenience of ticketing and payment methods for public transport, exploring methods such as wearable ticketing technology.In the realm of personalized travel, we recently began testing a new method of pushing information to metro passengers. Given the data obtained from Troika cards, we can recommend to each individual passenger the most convenient ways to use the city's public transport system (custom-made transport). We hope that in future, personalized information provision will become a convenient tool for managing passenger traffic, and the opportunities of big data will contribute to comfort and safety of Muscovites.

We understand that public transport plays an important role in reducing air pollution and creating a healthy city. As such, in the coming years Moscow intends to become the world leader in the development of electric public transport. With the city's buses carrying millions of people a day, procurement of an ecofriendly and comfortable fleet is a top priority. We will phase in electric buses over the next few years, and in 2021, Moscow will stop purchasing diesel buses, opting instead for an entirely electric fleet.

And of course, we will continue to create a more convenient route network that stays ahead of Muscovites' needs by providing buses and adding routes and stops based on what users say and technologies reveal are most needed.

**McKinsey:** What advice do you have for other city leaders? **Maksim Liksutov:** I am not in a position to give it; every city, especially a megacity, is unique. Since we started reforming our

transport system later than most world capitals, Moscow has had the opportunity to learn from and apply the experience of cities such as Beijing, London, Singapore, and Tokyo. We are working to implement the best solutions available across the world—and I know other city leaders are working to learn from one another and do the same for their home town.