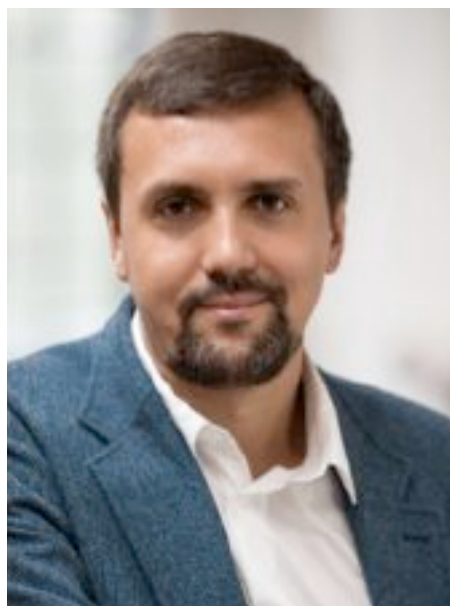# Moscow's Smart History by Andrey Belozerov

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Many smart cities and cities that wish to be smart are discussing the prospect of a bottom-up approach to city management. Moscow's experience clearly shows that this approach only works when the government has created an efficient digital environment both for internal managerial processes and for the citizens.

Moscow's path to being a smart city started in 2011, when the new mayor Sergey Sobyanin took office and the overall city development strategy underwent a number of major changes. One of the key initiatives was aimed at automation of all city functions. To implement this initiative, Moscow Government centralized the tech development within one department, and so the Department of IT was created. Since 2011, it was proven that such centralization leads to reducing costs thanks to economy of scale. It also made it possible to implement unified citywide standards for information systems and data processing.

Since 2011 Moscow has come a long way: it became one of the Top7 Intelligent Communities of 2017, became a finalist of the Smart City Awards in 2015 and 2016, and is frequently mentioned as one of the leading cities in smart city reports by leading analysts.

Our strategy is citizen-centric: we view the city as a service platform that provides easy access to everything that the Muscovites need, and even predicts their needs. A comfortable physical environment – well-kept streets, safe roads, accessible public transport network, and easily reachable recreational areas – makes a city liveable and lovable. Easy access to public services in all spheres saves the citizens' time and makes them feel like they are not on their own with their day-to-day tasks. They also have the possibility to take part in the decision-making process and have an easy-to-use tool to report any problems they see, engaging in direct communication with the city authorities.

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ONLINE PUBLIC SERVICES

- 200+ services available online
- convenient app for everyday needs
- mos.ru – unified channel for all services
- 650m requests per year
- 127 multifunctional centres within easy reach in all districts

Moscow's citizens have a convenient system of e-services at their disposal; allowing for seamless switching between mobile, online and offline, it helps them pay for utility services, check their children's online diaries, get social assistance, make doctor's appointments, pay traffic fines and much more. Over 200 public services are currently available online. There is no need to remember lots of web addresses: all public services are available through a single online point of contact - mos.ru - and via a unified mobile app. After the initial order via internet or mobile channel, status notifications are sent in SMS and then, if a paper document is needed, it can be obtained in one of 127 multifunctional centres. The centers are conveniently located in all city districts; the average waiting time is less than 3 minutes thanks to online appointments and efficient resource management. Multifunctional centres provide the services offline; however, they also offer training to elderly citizens, so that they can learn how to use their devices, surf the internet, and access public services online.

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HEALTHCARE AND EDUCATION

IMIAS – integrated medical information analytical system: 9m connected patients, 22,000 connected physicians, 660 connected clinics and labs

- cloud-based electronic health records

- 85m online appointments per year

- 25m e-prescriptions per year

- 97% of prescriptions are digital

- maximum waiting time is 20 minutes

IMIAS – Integrated Medical Information and Analytical System of Moscow – aims to make free medical services accessible, high quality and convenient. For patients it means fewer queues and easier appointment booking. For the health specialists, IMIAS means more time spent on communication with the patient and analysis of symptoms, as there is less paperwork to do and all the required information is readily available in patients' electronic medical records.

IMIAS covers all the outpatient facilities of the city. Medical institutions use IMIAS to manage patient flows, human and other resources, and the Moscow Department of Healthcare uses collected data for efficient decision making and governance.

- Moscow Online School: 980,000+ connected pupils, 65,000 connected teachers, 773 connected schools

- 800,000 units of online educational content

- online school diary and registry

- Wi-Fi in each classroom

- 15% growth of academic performance

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While some countries introduce regulations prohibiting use of mobile devices in school, Moscow is aiming to make the modern technology serve the educational needs. Today every school in Moscow has high-speed wireless network that enables "Moscow online school" platform to function. This centralized platform solves three main tasks: 1) organization and control of the educational process from teacher level to the level of Moscow Government; 2) equipping schools with up-to-date laptops, interactive whiteboards, and digital checkpoint systems; 3) provision of high-quality educational materials for all pupils.

Teachers, parents and pupils have access to online diaries and online class register. It is a unified system with separate interfaces for each group, so parents can not only check marks but also communicate with teachers online.

Lesson scenarios have substituted lesson plans. The teachers can use them as they are or introduce improvements, and the pupils can follow the scenario on their tablets during the lesson. The scenarios interface looks different for pupils and teachers: teachers have some additional tips, and pupils have tasks to perform and tests to complete.

CITIZEN ENGAGEMENT

- Active Citizen: 1.9m users, 1709 initiatives already implemented
- Our City: 1m users, 2m problems successfully resolved
- crowd.mos.ru: 15 projects implemented, 140,000 users, 2,700 ideas selected for further elaboration

People in Moscow have the right to speak and they know they will be heard. The digital platforms Active Citizen, Our City, and crowd.mos.ru together form an easily accessible channel for communication with the city authorities without any middlemen.

Users of Active Citizen vote on public transport route improvements, speed limit restrictions, street renaming, educational programs, and make other decisions that matter to them. Our City is a platform to report problems, like slow garbage removal, potholes, or a broken swing at the playground. It saves expenses for inspectors and makes it possible to resolve the problems more swiftly. Crowdsourcing platform crowd.mos.ru is used for generation and discussion of new ideas on city improvement.

The highly developed infrastructure and e-readiness play a major part in the success of these platforms: 77% of Moscow citizens use smartphones, 99% of the territory is covered with high-speed 4G and broadband networks, and an average Moscow citizen spends 1% of income on broadband, so everyone is online and ready to resolve the problems and take part in city management.

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TRANSPORT

- Intellectual Transport System: 1,900 cameras, 3,600 speed sensors, depersonalized geo data from mobile operators and 2,500 smart traffic lights

- Optimization of the public transport system: 350 000+ Moscow drivers have switched to public transport thanks to introduction of convenient routes and Troika unified payment card

The Intelligent Transport System of Moscow is aimed at traffic modelling and regulation. Thanks to the system, transportation systems are more safe and predictable for the citizens, and city authorities are able to manage them more efficiently. Regulation of traffic makes it possible to create convenient conditions for all drivers. City residents can see information on traffic situation on large screens installed along the roads. This information system helps drivers make reasonable decisions and choose appropriate route options.

The public transport routes are optimized based on data obtained by using GPS and GLONASS sensors that tracks their efficiency and speed. Apps for public transport users and car owners help them plan their routes more efficiently.

ENVIRONMENT FOR BUSINESSES AND TECHNOLOGY STARTUPS

- 90% of public services for companies are available online

- 12 business accelerators, 15 business incubators, 31 technology parks

- 70,000 technology companies

Businesses – from individual entrepreneurs to big companies – benefit from online public service systems just like the citizens. Today it is possible to register a legal entity online, obtain necessary permits, licences and accreditations, and get legal advice and support online. The government procurement system is open for all suppliers who wish to register on the city supplier portal.

Moscow is a fast developing technology hub, and the city authorities are determined to promote this development. Innovative companies can get grants and subsidies; they also profit from special conditions provided by research and technology parks. There are many initiatives aimed at lowering administrative barriers and promoting business in the capital of Russia, such as portals that provide essential information for start-ups and the development of small and medium-sized business and business incubators that help technology startups to grow. Moscow Innovation agency is a one-stop shop service for innovation enterprises, promotion and provision of information about opportunities for innovation activity in the city.

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STRONG AND RESILIENT INFRASTRUCTURE TO HANDLE EXISTING TASKS AND MEET NEW CHALLENGES

The infrastructure of a smart city shall be capable of handling the existing tasks and, most significantly, be ahead of time and ready for future challenges.

- Broadband connection is available in 99% of the territory

- Low tariffs: an average Moscow citizen spends less than 1% of monthly income on broadband

- 99% of the area is covered by 4G at 7 Mbps

- Free city Wi-Fi: Moscow is ranked 2nd among the largest megalopolises with regards to Wi-Fi coverage in public areas*

The ICT infrastructure of Moscow is a highly developed one thanks to positive competition among mobile and broadband providers. The tariffs are low if compared with other major cities: broadband tariffs in Moscow are 10 times lower than in New York, and an average citizen spends less than 1% of monthly income on broadband services.

Moscow public Wi-Fi system is a joint project of the Moscow Government and private investors. The Wi-Fi system on the Moscow metro has no counterparts in the world: some cities have Wi-Fi access at the stations, but only Moscow provides access in the cars in the tunnels. There is also the public Wi-Fi network in the city centre with seamless handover. This system is being developed not just for the citizens' convenience; it is also used for data transfer by the city systems, being one of the backbone networks for existing and future IoT implementations.

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DISRUPTIVE TECHNOLOGY FOR SMART MOSCOW – WHAT'S NEXT?

Blockchain: Moscow has become the first city to introduce blockchain in e-voting. Now users can monitor polls in real time and verify the authenticity of results. Every vote in Active Citizen becomes a publicly viewable transparent smart contract. Once the vote is placed, it will be listed in a public ledger consisting of all votes taken place across a peer-to-peer network. For now this is a pilot project.

Pre-delivery of public services: Today we provide over 200 services online. Pre-delivery will be the next step, meaning that a citizen doesn't need to apply for a service, as the state acts proactively. E.g., when a child turns 7 years old, his/her parents are automatically informed by the state authorities on 3 possible school options located in their neighbourhood. Another example is when citizens get reminders to change passports when they turn 20 or 45 years old. We are using big data to make this level of service possible.

AI and machine learning: we are currently uploading over 6000 computer tomography (CT) and X-ray images in our Artificial Intelligence systems teaching the machine to diagnose lung cancer and further diseases with the aim to support clinical decision-making. Our target is 97% success rate (this is actually a technological limit at the moment). We also use the data of Unified Medical and Analytical System to build decision-supporting system for the doctors and predictive analytics of illness frequency.

5G: Moscow government is currently in negotiations with private telecom operators regarding implementation of next generation 5G wireless networks. We are expecting to reach agreements with operators by the end of 2017. The installation of 5G stations in Moscow is planned for 2019-2020, so Moscow will become first world capital to switch to 5G.

VR and AR for education: we completed a pilot project and aim to replicate it in all Moscow schools. In the virtual labs pupils can carry out experiments that would not be possible in real life: use Geiger counters to measure uranium radioactivity or observe a cross-section of operating combustion engine. Biology lessons also become much more interesting in virtual reality, where pupils can study body systems and viruses via 3D models.

Video analytics: Moscow CCTV system, which features over 160,000 cameras throughout the city, uses advanced video analytics. Motion analysis makes the work with video archives much faster, and face recognition makes the city safer, allowing for fast search of missing persons and alleged criminals.

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BIO

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Andrey is a lifelong technology executive with deep expertise in delivering innovations in both governmental and commercial sectors. He joined Moscow Department of IT in 2011 and is now responsible for developing and implementing smart solutions for the city. Public city Wi-Fi, citizen engagement platform, system of online public services, and mobile apps for the Moscow residents are only a few among successful projects implemented in Moscow under his guidance. Before this role Andrey was in charge of Electronic Government initiative of the Russian Government.

Andrey is a frequent speaker at international conferences and forums, such as Smart City Expo World Congress (Barcelona), Arab Future Cities Summit (Dubai), ICF Summit (New-York), CeBIT Global Conference (Hannover), Mobile World Congress (Barcelona). In 2017 Andrey moderated Russia Singapore Business Forum at Open Innovations Forum (Moscow).

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MOSCOW SMART CITY LAB

Smart City Lab was created in 2016 to coordinate the processes aimed at smart city development and increase their efficiency, and today we are working on piloting new technologies in Moscow and integrating world best practices.