

**URBAN
MOBILITY
INNOVATION
INDEX** CITIES PROFILES
2018



INTRODUCTION

UMii aims to provide insights into the way cities foster innovation for urban mobility around the world.

The index is based on 9 composite indicators covering 3 dimensions: Readiness, Deployment and Liveability. The UMii framework enables inter-city comparison and conversation, rather than scoring and ranking cities competitively.

Data is collected from cities worldwide and then analysed to produce reports.

The first report was launched in November 2017, featuring 30 innovation profiles of cities: Abu Dhabi, Abuja, Amman, Amsterdam, Barcelona, Casablanca, Chicago, Delhi, Dubai, Geneva, Helsinki, Istanbul, Johannesburg, Kuala Lumpur, Lisbon, London, Los Angeles, Manchester, Mexico City, Milan, Montréal, Munich, Nairobi, New York, São Paulo, Singapore, Sydney, Vienna and Warsaw.

Every year, 5 cities are invited to join the UMii Network until 2020, when another full report will be published with updated innovation profiles.

This publication presents 5 new innovation profiles in 2018 of the following cities:

- Cape Town
- Budapest
- Montevideo
- Oslo
- Vancouver

Beyond the index itself, UMii is about knowledge transfer and exchange of “next and best” practices between cities on innovation. Cities contributing to UMii are invited to take part in UMii Forums. 6 of those meetings have already taken place in Singapore, Dubai, Montréal, Moscow, Los Angeles and Barcelona, where cities representatives presented their approach of innovation to improve mobility services, as part of the goal to create more liveable cities.

UMii Framework

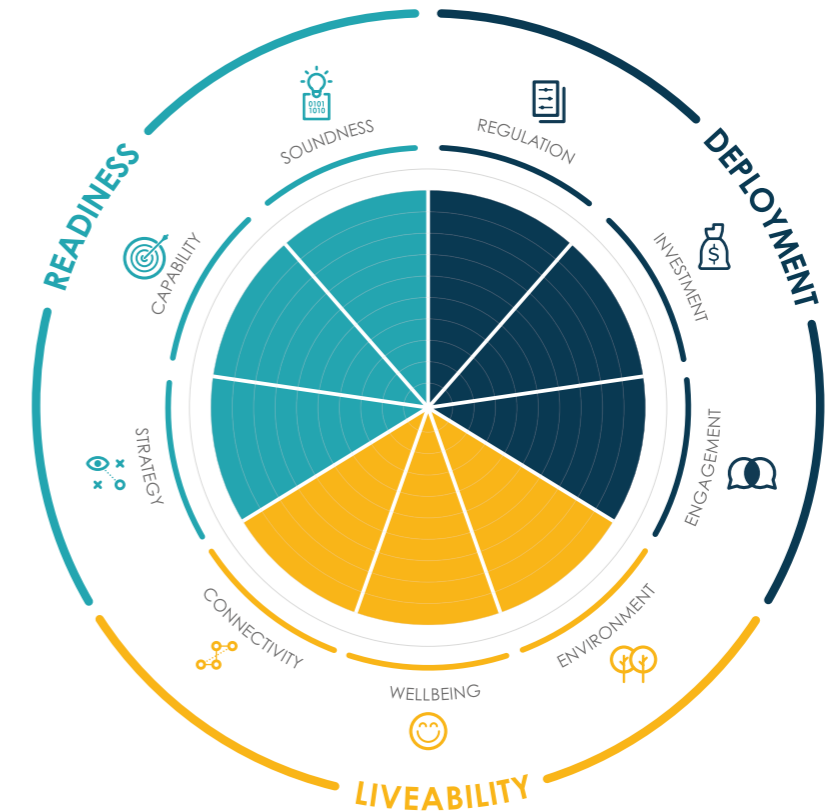
DIMENSIONS AND LEVERS

The UMii framework looks at challenges and opportunities across three dimensions, which capture elements of the different innovation stages: readiness, deployment and liveability.

Housed within the UMii dimensions are nine innovation levers: a combination of policy features, which can be acted upon at a city level to drive urban mobility innovation:

- Strategy
- Capability
- Soundness
- Regulation
- Investment
- Engagement
- Connectivity
- Wellbeing
- Environment

Each lever then expands into multiple qualitative and quantitative indicators, which measure how well cities are performing in specific domains.



Readiness

Does the city have a grounded view of how to approach innovation and the capability to deploy it?



STRATEGY

Strategy investigates how city stakeholders look at innovation in urban mobility, uncovering the underlying drivers for the strategy, the process through which they will achieve a common vision, and who takes ownership of the strategy.

Strategy also explores the foundations of the plan, assessing how well informed the process is and whether the strategy is translated into specific SMART¹ actions.

This lever combines a set of indicators, which assess the following features:

- Is the innovation strategy readily available and was there a process of engaging stakeholders?
- How comprehensive is the strategy?
- Is there a feasible plan for how to execute and monitor the strategy?

CAPABILITY

Capability looks at how the city builds internal capacity to support innovation, and leverages the skills and capabilities of external stakeholders.

To assess how open the city is to experimentation, capability investigates the maturity of the open innovation ecosystem by looking at whether the city has created a real-life environment where innovation could take place, and how close it is to becoming a living lab.

This lever combines a set of indicators, which assess the following features:

- Is there internal capacity to support innovation?
- Are the city's skills and capabilities leveraged to drive innovation?

SOUNDNESS

Soundness focuses on data as a catalyst for innovation, exploring how the city is harnessing data to inform its strategy, as well as how it is encouraging the use of data, both internally and externally, to support the development of new and improved mobility solutions in the city.

Soundness explores the maturity of the processes adopted to collect mobility related data and data beyond traditional transport information (investigating the intersection of the transport sector with non-traditional areas that might have an impact on mobility) as well as how open and useable the data collected is.

This lever combines a set of indicators, which assess the following features:

- How mature is the data collection?
- Is data accessible?
- Is data usable?

[1] Specific, Measurable, Attainable, Relevant, Time-bound.



Deployment

How effectively does the city enable innovation to be deployed?



REGULATION

Regulation investigates how the city is looking at barriers that prevent innovation from being introduced in the city, and the extent to which it uses the powers available to address these failures.

Regulation also looks at how changes in the regulatory environment have impacted the creation of new business models.

This lever combines a set of indicators, which assess the following features:

- Are there market barriers to innovations?
- Is there an emergence of new business models?



ENGAGEMENT

Engagement explores how the city engages and interacts with its users (citizens, commuters, tourists and businesses) and how the city acts upon users' insights to inform decision-making, improve local services and drive local innovation.

Engagement also looks at how data regarding user experience of mobility services in the city is collected, how it is used to understand the needs and preferences of city users, and how it informs decision-making processes, improves local services and overall, drives local innovation.

This lever combines a set of indicators, which assess the following features:

- What are the city's user engagement practices?
- How does the city collect data?
- What is the city's communication and information provision?



INVESTMENT

Investment focuses on how risk-averse the city is and the level of financial resources they have committed to supporting R&D projects in urban mobility.

Investment also assesses the type of incentives on offer, which encourage third-party innovation and how the city leverages investment to multiply the funds available.

This lever combines a set of indicators, which assess the following features:

- What is the city's own investment?
- How well does the city attract investment?



Liveability

How well is the city performing when it comes to quality of life?



CONNECTIVITY

Connectivity investigates how integrated the transport system is, at both a physical and digital level.

Connectivity assesses the quality of a typical journey through the transport system – based on how barrier free and easy the system is to navigate.

This lever combines a set of indicators, which assess the following features:

- How seamless a user's journey is
- The usability of the city's transport systems



WELLBEING

Wellbeing explores how the city is performing in terms of access to healthy and sustainable mobility options by understanding the spectrum of options available to users and their travel habits.

Wellbeing also looks at road safety, accessibility and equity of the transport system as a proxy for happiness.

This lever combines a set of indicators, which assess the following features:

- Quality of life
- Fairness
- Sustainable and healthy mobility



ENVIRONMENT

Environment looks at two key environmental pressures to assess the performance of the city and its progress regarding energy consumption and air pollution as markers for environmental sustainability.

This lever combines a set of indicators, which assess the following features:

- What is the city's air quality?
- What is the city's level of energy consumption?

City profiles

This section is a collection of snapshots into the innovation ecosystem of the 5 UMii cities. Although not exhaustive, they uncover key insights captured during the research process highlighting for each city “top indicators”, next steps and guidance, incoming/live projects and innovative solutions.

It is important to note that while UMii adopts a fairly sophisticated non-linear flow of input, process, output, outcome and impact components covering 52 different qualitative and quantitative indicators, the framework still has its limitations when considering the complexity of the innovation ecosystem and all the different domains it aims to assess. It should also be kept in perspective that the assessment of the different levers is subject to the best available evidence at the time of the report.



- CAPE TOWN
- OSLO
- MONTEVIDEO
- VANCOUVER
- BUDAPEST

Cape Town

POPULATION

4.0 MILLION

GDP PER CAPITA \$

19,210

CARS/1,000 CITIZENS

NOT AVAILABLE

STRATEGY OWNER

CITY OF CAPE TOWN +
TRANSPORT AND URBAN
DEVELOPMENT AUTHORITY (TDA)

PUBLIC TRANSPORT

TRANSIT RIDERSHIP (MIL)
NOT AVAILABLE



CITY HIGHLIGHTS

BACKGROUND

Cape Town is a city that has multiple modes of transport with overlapping public and privately run services (and operators). Like every city, it has various challenges associated with transport. The City of Cape Town, along with the newly formed Transport and Urban Development Authority (TDA), are responsible for identifying and addressing these challenges. The TDA is the first dedicated transport authority set up in South Africa with a key objective to make it easy for commuters to benefit from transport services in the city. The TDA is also responsible for an index, supported by city data, against which the city's service delivery can be measured.

This data is used to develop potential projects and solutions that can cover many of the city's services, such as water and sanitation, energy and housing, parks and recreation, transport, safety and more.

The City Council evaluates and selects projects to progress against the following criteria:

- Potential impact on the city's service delivery and/or socio-economic impact
- Technical merit and novelty of the proposed solution
- Time and resources required to implement the idea

NEXT STEPS AND GUIDANCE

Investment – Currently support for third-party innovation in the city is limited to the organization of several dedicated events, including the 'Open Data Tourism'

hackathon. By 2040, the city aims to remove the barriers to entry for entrepreneurs to stimulate R&D by developing new mechanisms including a new financial and social partnership model (social impact bonds) to promote public/private partnerships.

The city could further build on this ambition by developing other open calls for innovation, challenge/outcomes based procurement processes or by promoting collaborative Research and Development (R&D) initiatives in which the council (or TDA) would be a key partner.

Environmental – Efforts to increase ownership or use of low emission vehicles in the city have been limited to the improvements of fuel standards rather than the adoption of core propulsion systems such as those for with electric vehicles. A significant mode shift to electric vehicles (both privately owned and shared) could help improve local air quality and the health of citizens.

Regulation – Although the TDA publish legislation and by-laws that affect transport, they could take on a further role to develop processes to identify barriers specific to mobility innovation. This process could also help to influence relevant decision-makers to overcome such barriers.

UPCOMING / LIVE PROJECTS

TRANSPORT PROJECT OFFICE

TPO is a progressive 6-month pilot and platform between 'Accelerate Cape Town' and 'Future Cape Town'. It aims to co-ordinate corporate leadership and action in relation to the transport challenges and opportunities in Cape Town using innovation as a tool and by tackling regulation that stifles innovation. The aim of the program and TPO is to:

- Address traffic congestion and find solutions to the problem in an effort to enhance business productivity
- Encourage behavioral change amongst commuters
- Foster a spirit of collaboration amongst corporate Cape Town, encouraging them to consider innovative and alternative transport solutions to ease congestion
- Forming part of steering committees in projects such as the metropolis at Cape Town International Airport and the Air Access project

TPO brings the private sector in Cape Town together to solve the challenges the city is facing. Cape Town is rated as the most congested city in South Africa. TPO also brings the private sector closer to the development of transport policy which impacts their operations.

INNOVATIVE SOLUTIONS

OPEN INNOVATION PLATFORM

Cape Town has an "Open Innovation Platform" to provide citizens with a space to suggest and submit that could help the council enhance their services to all the residents of Cape Town.

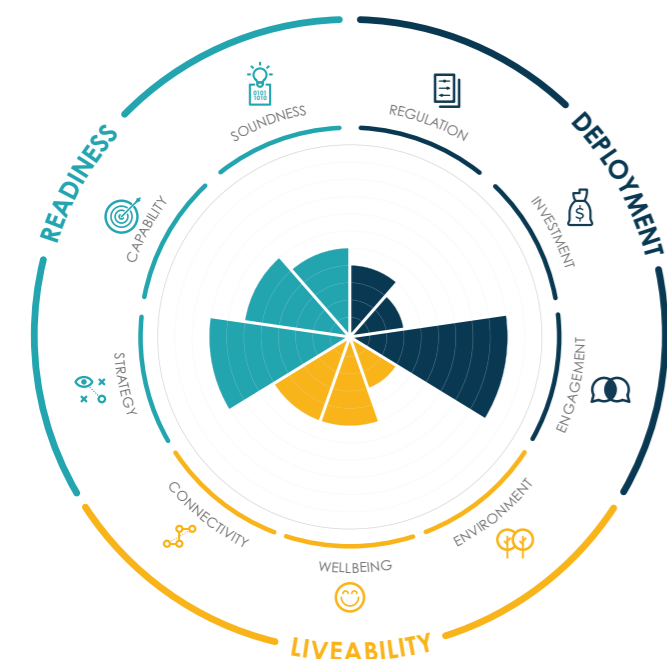
Anyone can submit ideas, from residents, innovators and researchers to suppliers, partners and more. Solutions can cover any of the city's services, from transport, energy and housing, to parks and recreation, safety and more.

TRANSPORT FOR CAPE TOWN (TCT) APP

The TCT app was developed by the TDA in partnership with 'WhereIsMyTransport' to provide citizens with an integrated journey planner and place to manage their mobility services. The app combines mobility options when creating journey plans, including walking, buses, trains, cycling or even Uber. The total estimated cost of any journey is given, allowing those using public transport to make informed decisions about how to travel. Users also have immediate access to notifications about bus and train delays, service interruptions, accidents, roadworks, road closures, or any other transport-related issue that may have an impact on their journey.

Within the app, commuters can engage directly with transport providers and the city, giving feedback and making their voices heard as the Authority gathers data on riders and their needs.

The journey planning service is powered by 'WhereIsMyTransport's real-time data platform which means the city could, for the first time, offer this integrated service.



TOP INDICATORS

Strategy – Cape Town has a suite of published strategies and plans to guide the city's development, several of which have been developed by the City Council. Together, these documents explore mobility, planning and other urban systems. The strategies set clear objectives, actions and goals along with the means to monitor and evaluate delivery of interventions.

Engagement – The City of Cape Town has launched the 'Open Innovation Platform', a place for anyone in the city to submit ideas that will help the council enhance their services to all the residents of Cape Town. This, combined with data sets from the MyCiti smart ticketing system, provides the city with valuable quantitative data on citizens which is evaluated by a dedicated insights program.

Oslo

POPULATION

1.4 MILLION

GDP PER CAPITA \$

56,520

CARS/1,000 CITIZENS

450

STRATEGY OWNER

OSLO KOMMUNE
RUTER, PUBLIC TRANSPORT
AUTHORITY

PUBLIC TRANSPORT

TRANSIT RIDERSHIP (MIL)
300.7



CITY HIGHLIGHTS

BACKGROUND

The city of Oslo (Oslo Kommune) is the highest decision-making body in Oslo. It is divided into five Standing Committees, one being 'Transport and Environmental Affairs'. Their strategic efforts to foster innovation in urban mobility is supported by Ruter, the public transport authority for Oslo. However, one of the things that makes Oslo unique is the limited hierarchy it has and the informal nature of collaboration which stimulates creativity.

Tackling climate change and enhancing environmental conditions in Oslo underlies many of the strategic decisions around transport and mobility. The city has ambitious targets to cut emissions by 50% by 2020 (compared to 1990) and to be carbon neutral by 2050.

Environment – Oslo's embrace and support for electric vehicles (EVs) is world leading. A strong uptake of EVs is vital for the city to achieve the environmental goals outlined in the Climate Adaption and Energy Strategies published by Oslo Kommune. The success of the program is partly due to the local and national incentives.

Oslo Kommune kick-started the program by deploying a radically improved EV infrastructure that includes over 2,000 charging points throughout the city and is replacing its 1000+ car fleet with EVs.

Connectivity – The RuterBillet app is a new digital ticketing system used in Oslo. Users can purchase the tickets they require through the app (which remembers previous purchases). While many cities have a smart ticketing system, they often have to be validated prior to

or whilst boarding the service. In Oslo, the tickets do not have to be validated, it is a free flow system based on trust. This significantly improves the efficiency of the on/off boarding for buses and trams in particular.

NEXT STEPS AND GUIDANCE

Strategy – Although there are several published strategies by Oslo Kommune to guide sustainable development, there is no dedicated strategy to focus on urban mobility and innovation in the city. Ruter has developed its own strategic plan based on a selection of UN Sustainable Development Goals, which serves as points of reference for all their strategy and business development.

Soundness – Although Ruter provides an API to access real-time data on departure information, travel planning and deviation information, there is no integrated open data platform at the city level to provide open access to the various data sets held by the city council to the community.

UPCOMING / LIVE PROJECTS

PREPARING FOR FUTURE MOBILITY SERVICES

Ruter has contracted the consulting firm COWI to develop a model for driverless transport. The aim is to develop a model that helps Ruter and other city stakeholders understand the implications of new forms of mobility and trends brought about by the introduction of driverless vehicles.

The project will identify opportunities, risks and implications for urban and transport planning in Oslo that may arise from these new mobility trends. Various future scenarios will be examined, answering questions such as:

- What is the impact of driverless vehicles that are integrated into the public fleet on the people's mobility behavior?
- What happens if everyone owns their own autonomous car so that conventional vehicles are steadily being replaced?
- What kind of autonomous sharing concepts should be implemented?

FREE FLOW SMART TICKETING

The next step for smart ticketing in Oslo is the deployment of a ticketing app which responds to the geographical location of the commuter, charging them

automatically when they board and alight a train, tram, bus or ferry. A bill will be automatically issued at the end of the month.

The system is currently undergoing trials on 60 buses fitted with 800 beacons, which report the precise position of passengers. Ruter is cooperating with data authorities to secure approval for its passenger positioning system in order to overcome concerns with personal freedom laws.

INNOVATIVE SOLUTIONS

TRAFFIC AGENT'S APP

The app is created to enable primary school children (43,000) to map their route to school and register positive and negative spots along the way and report hazards. It is primarily about traffic, but also captures travel habits and behaviors. The Agency of Urban Environment, Norwegian Centre for Transport Research and Oslo City Teaching Agency collaborated to create the app, an excellent example of organizations breaking down silos to develop a solution. More than 43,000 school children can identify and report hazardous places on the route to and from school, with the help from a mobile phone.

EV PROCUREMENT FRAMEWORK

Oslo city council created an EV procurement framework to guide its transformation of all municipal vehicles into a fleet of zero-emission electric cars within five years (from 2010). The framework agreement covers:

- Governance measures between city council and the EV supplier/operator, including the services the supplier/operator should provide
- Access to the relevant data to monitor the status of vehicles, monthly costs, types of cars in use etc.
- Conditions for subsidies for charging points and installing charging points, to which cooperatives, residential development and commercial companies are eligible to apply.
- Procurement of vehicles; to ensure that Oslo has access to the most suitable electric cars, and to enable free choice between different car models.

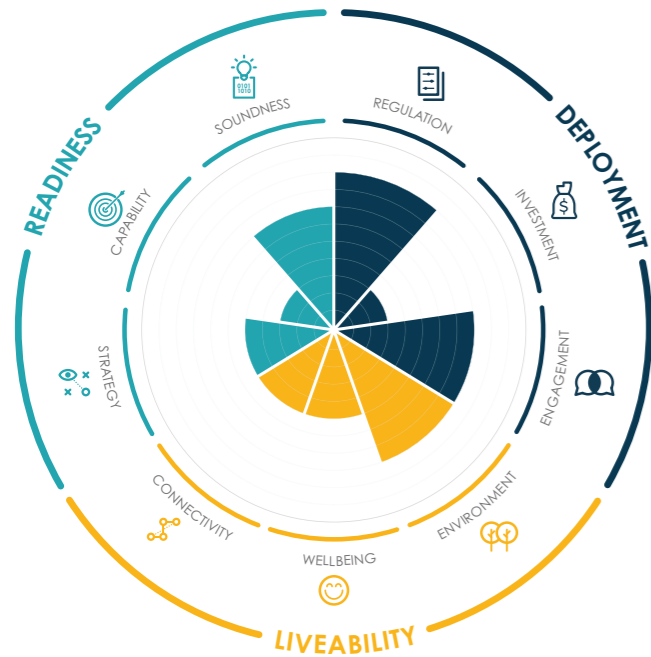
TOP INDICATORS

Investment – To support third-party developers and entrepreneurs, Oslo Startup Lab was created to foster R&D for ideas whilst supporting their commercial model. The Lab often involves business experts to collaborate with participants through events and competitions. One competition was about developing innovative solutions to tackle air pollution associated with transport. Ideas were then evaluated on their impact on the environment, combined with market potential. The winner was featured at a Smart City expo and received further support. Examples of technologies supported by the accelerator include sensors, IoT devices, big data, advanced analytics, machine learning, artificial intelligence, blockchain, beacons, and virtual/augmented reality. The Lab is expanding with the new 'Mobility La' which will support start-ups that develop environmentally-friendly transport solutions.

Montevideo



POPULATION 1.8 MILLION	STRATEGY OWNER MUNICIPALITY OF MONTEVIDEO
GDP PER CAPITA \$ 29,890	
CARS/1,000 CITIZENS 191.5	PUBLIC TRANSPORT TRANSIT RIDERSHIP (MIL) NOT AVAILABLE



CITY HIGHLIGHTS

BACKGROUND

Montevideo is the capital of Uruguay and the economic and political center of the country. 50% of national GDP is generated in the city which has a population of 1.38 million (2017). In several rankings, Montevideo has often been recognized as having the best quality of life in Latin America. The city has a thriving tech center and entrepreneurial culture. It also boasts several strong universities with active programs to support technology entrepreneurship helping the city to become the largest per capita software exporter in Latin America.

At the city level, the Municipality of Montevideo developed the Urban Mobility Plan (2010) which aims to redesign and modernize urban transport in the city. Under this plan, the Metropolitan Transport System (STM) was created, with the goal of integrating the different components of the public transportation system together. One of the first improvements from STM was to include GPS devices on buses and allow passengers to pay for tickets using smart cards (STM card), which have been now extended to the metropolitan area services.

TOP INDICATORS

Soundness – Montevideo Municipality has actively tried to encourage data usage internally and externally through start-ups and third party developers. The Bicitón Montevideo Hackathon in 2017/18 is a good example of this support.

The challenge focused on how technology can promote the use of bicycles in the city. Teams from different disciplines worked with open data to create solutions that can improve cycling movements in Montevideo. A panel awarded a prize of US \$ 5,000 to the winning team

and another US \$ 5,000 to incubate the product, with support and guidance.

Internally, STM have recognized the use of data collected from the smart ticketing system. An “Origin Destination” matrix has been developed to extract insights from the data on how people move about the city using smart algorithms and data analysis.

Engagement – The Municipality has developed an innovative way to promote and create a culture of direct citizen participation through digital media. ‘Montevideo

Decides’ is a digital platform that citizens can use to develop or suggest an innovative solution. Anything with over 500 votes is followed through by the city. All stakeholders can participate in debates, present initiatives that aim to improve the quality of life, as well as participate in surveys and the creation of strategic documents. To reflect stakeholders’ experience in this field, different membership levels for users of the platform were allocated which provided a deeper layer of data and insight.

Regulation – The Urban Mobility Plan has a dedicated section to focus on regulation, management and monitoring. It outlines the process used by the Municipality to identify and work to develop/evolve regulations to support the initiatives in the plan. This is done through the Transdisciplinary Commission, created to be in charge of the revision and drafting of policy/regulation to support innovative infrastructure and traffic management interventions.

NEXT STEPS AND GUIDANCE

Capability – Montevideo is fairly open to innovation; several mechanisms of support are available for innovators to test and demonstrate their solutions. However, Montevideo could go a step further by opening up a physical location in the city where innovators could experiment new solutions in a real-world context. Creating mechanisms to secure the support of citizens in a co-creation approach could also prove extremely valuable for the development solutions

Capacity – Montevideo Municipality could consider developing a specific role or department with the specific remit of fostering innovation to increase the capability of the organization. This role/department could also be responsible for driving the strategy.

Investment – There does not appear to be a dedicated fund or specific budget allocated to mobility innovation activities (both CAPEX and R&D). This does not allow any room for failure when developing or testing innovation, which means that innovation can be limited.

UPCOMING / LIVE PROJECTS

IOT AND BIG DATA PLATFORM

The City of Montevideo has been collaborating with various partners to implement a smart city ‘IoT and Big Data Platform’ for the City. The long-term objective is to increase the efficiency of the city’s most important

services, including public transport, waste management and environmental management through actions based on data collection and analysis. This will be achieved through an extensive network of IoT sensors which will be brought together with other existing data sources.

FUNDS FOR URBAN MOBILITY

The city received a \$80 million loan from the Inter-American Development Bank (IDB) to support the Urban Mobility Plan and a public transport system in the eastern section of Montevideo as an alternative to individual transport. The Montevideo Urban Transportation Program II will finance the second stage of the Urban Mobility Plan, which the Municipality of Montevideo is presently carrying out with IDB support in the city’s northern and western sections.

INTRODUCING ELECTRIC VEHICLES

The city council, supported by the National Agency for Energy will introduce the first 50 electric taxis in the city with a view to progressively replacing fossil fuels in public transport. To support the uptake of electric taxis, operators will not be paying fees in the first two years. In the next months, the City will start a series of pilots with e-buses on different lines.

INNOVATIVE SOLUTIONS

INCENTIVIZING BIKE USAGE

Pedaleapp, was the winner of the 2017 Bicitón mobility hackathon. This application is a collaborative platform designed to stimulate mobility by bike, through a system of rewards.

FEASIBILITY STUDY TO DEVELOP A PUBLIC TRANSPORT AUTHORITY

Montevideo, Canelones, San José and the Ministry of Transport are working together to define the creation of a Public Transport Authority to coordinate public transport infrastructures and services at the metropolitan level.

MOBILITY MANAGEMENT CENTRE

Run by the City council, the “Mobility Management Centre” implements the Intelligent Transport Systems (ITS) that manage and control traffic and transport in Montevideo. The Centre acts as a collection point for accurate and real-time data on the flow and status of traffic in the city. The City is working on incorporating data from Public Transport infrastructures, services and demand.

Vancouver

POPULATION

2.65 MILLION

GDP PER CAPITA \$

63,698

CARS/1,000 CITIZENS

617.9

STRATEGY OWNER

METRO VANCOUVER REGION
CITY OF VANCOUVER
TRANSLINK

PUBLIC TRANSPORT

TRANSIT RIDERSHIP (MIL)
437.4



CITY HIGHLIGHTS

BACKGROUND

The City of Vancouver has a hierarchy of transportation modes, with walking as the top priority, followed by cycling, transit, shared vehicles, and finally the private car. Many of the decisions made by the council are influenced by this hierarchy, which aims to make Vancouver one of the world's greenest cities. This is reflected in the city's vision:

- **Economy:** "We envision a city that enhances its natural environment, ensuring a healthy future for its people and the planet".
- **Environment:** "We envision a smart and efficient transportation system that supports a thriving economy while increasing affordability".
- **People:** "We envision healthy citizens in a safe, accessible, and vibrant city".

several innovative mechanisms and approaches to engage with citizens and stakeholders. 'Talk Vancouver' is a two-way digital platform that makes it easier for the council to share plans, hear ideas or discuss citizen needs. A particular advantage of this tool is the ability to hear from a newly captured audience of a younger generation, with varying backgrounds and incomes.

All the information collected thanks to the engagement with citizens and stakeholders is used by the city council to inform decision making, improve local services and overall drive local innovation.

Wellbeing and Health – The city council has taken a very proactive approach to shared mobility services. They have actively helped develop the regulation and the commercial models to support a shared-economy, working close with the providers and regulators.

Vancouver's public bike share system – Mobi by Shaw Go – was launched in the summer of 2016. This is just one of a broad range of alternative mobility solutions to conventional public transportation that is available to citizens. In the city of Vancouver, one in three adults are members of a car-share service. There are over 3,100 dedicated car-sharing vehicles.

Services to help vulnerable citizens use the network are also supported in Vancouver. New signs and signals are being tested that emit a high-intensity light to let road users know that someone with mobility challenges is crossing. Public transit system in Vancouver is "100% universally accessible".

NEXT STEPS AND GUIDANCE

Regulation – whilst there has been encouraging signs of the city council removing legislative barriers to innovation (this was done to support car-sharing recently) the city could look to formalise the processes to identify and act on regulatory barriers or bottlenecks to mobility innovation.

Soundness – Although several open data platforms have been developed in the city (VanMap, Open Data Catalogue) the city council could envisage to develop a more sophisticated platform that can provide access to real-time data and APIs to the developers community to create even more innovative applications, tools and services.

UPCOMING / LIVE PROJECTS

SMART CITY CHALLENGE

The cities of Vancouver and Surrey has been shortlisted for a chance to win \$50 million dollars for their joint submission to 'Infrastructure Canada' for the 'Smart Cities Challenge'. The submission aims to deliver a model to position Canadian cities as leaders in autonomous vehicles and smart mobility. The project will develop two collision-free corridors that will be equipped with smart mobility solutions related to:

- Autonomous shuttles
- Smart mobility infrastructure
- Advanced data and analytics
- Enhanced user experience

The proposal was shaped by the impressive 'Smarter Together' campaign which asked the community for the most pressing city challenges and innovative ideas

to help address them. The program was extremely successful with over 58,000 social media conversations, 2,200 survey responses, an idea session with 250 graduates and tech professional and an advisory panel with 13 influential leaders in the region.

TRANSLINK TOMORROW

TransLink is the regional transportation authority and the operator of the public transit system serving the 23 local governments in Metro Vancouver (including the City of Vancouver). TransLink Tomorrow is a commitment to continuously explore, test, and implement innovative ways to improve mobility in the Metropolitan area of Vancouver. They have several active pilots and demonstrator projects which include:

- **Artificial Intelligence Bus Prediction Pilot:** to test the effectiveness of machine learning to improve bus arrival and departure predictions.
- **Electric Battery Buses:** the 2.5-year project will put electric battery buses on route 100. At each end of the route the buses will get a full charge in approximately four to seven minutes.
- **On-Demand Micro Transit:** to test a concept for on-demand shuttle services using TransLink's existing community shuttle bus vehicles. This pilot runs on municipality of Bowen Island.

INNOVATIVE SOLUTIONS

VANQUISH COLLISIONS HACKATHON

In September 2018, the City of Vancouver held the first 'VANquish Collisions Hackathon' focused on using data and technology to shape creative solutions that can help achieve the cities goals of zero traffic related fatalities and serious injuries.

The Hackathon brought together strategists, technologists, and designers for a three-day event to battle it out for one of the three prizes on offer (First place: \$5,000 Second place: \$2,000 Third place: \$500).

THE COWLINES APP

This app is one example of the new types of multi-modal journey planners available in the metropolitan area of Vancouver, developed by a local startups. It is designed to enable a modal shift, from private vehicles to shared mobility by offering users various journey options with a variety of modes. It also allows people to track CO2 emissions so they can choose the most environmentally friendly transportation options.

TOP INDICATORS

Strategy – There are several strategic documents published by the city council that recognize innovation in urban mobility as a means to solve some of the most pressing challenges associated with transport in the city. These strategies go beyond expanding infrastructure and instead look for smarter solutions.

Transportation 2040 is Vancouver's long-term strategy that will help guide transportation decisions and public investments for the years ahead. At the Regional level, there is a Transportation Strategy and Mayors' Council 10-Year Vision for Transit & Transportation providing a framework for regional transportation including targets to reduce VKT by 33% and to have 50% of all trips by walking, cycling, and transit.

Engagement – Vancouver city council has developed

Budapest

POPULATION

2.8 MILLION

GDP PER CAPITA \$

39,390

CARS/1,000 CITIZENS

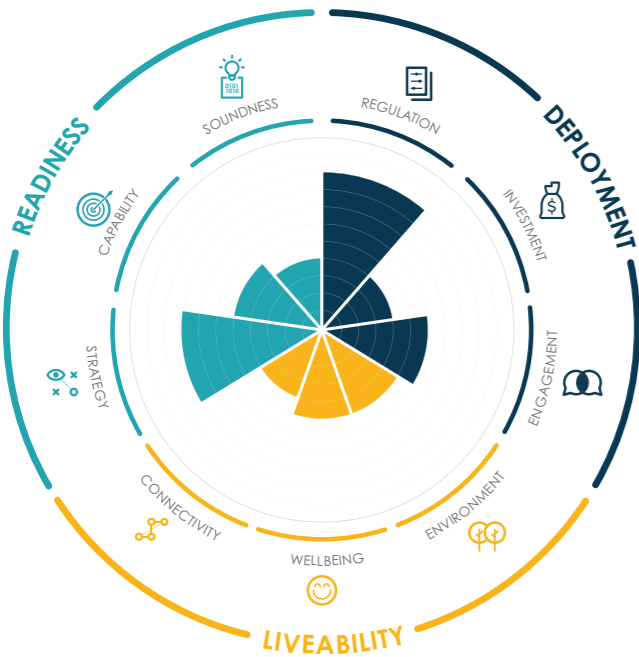
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STRATEGY OWNER

BUDAPEST MUNICIPALITY
BKK CENTRE FOR BUDAPEST
TRANSPORT

PUBLIC TRANSPORT

TRANSIT RIDERSHIP (MIL)
1,393.5



CITY HIGHLIGHTS

BACKGROUND

Operation of the city's infrastructure, public services and their modernization is one of the major priorities of Budapest's Municipality. These investments are significant not only for the population, but they also affect the changes of potential development plans, and are important elements of the city's competitiveness to help to reduce difference and fragmentation between regions.

The city has outlined the following key targets to develop transport operations across the city:

- Climate and environmental protection program
- Intelligent, cooperative transport program
- Renewal of public administration infrastructure and operations

TOP INDICATORS

Strategy – Between the Municipality of Budapest, Budapest Transport Company (BKV), the Centre for Budapest transport (BKK) and other city stakeholders, there are a number of strategic documents that frame the approach of innovation to improve urban mobility

- Budapest 2020 Integrated Urban Development Strategy
- Budapest Mobility Plan – 2014 - 2030 (BMT) – Municipality
- Digital Startup Strategy of Hungary – National level, 2016
- The Smart City Vision of Budapest – Municipality of Budapest, 2017

“The objective of Budapest is to achieve a stable and

renowned position in Europe and the world by combining local assets with novel, creative, and established global solutions. Strategy is focused around 1) Environment 2) Competitiveness 3) Quality of Life”.

Investment – The Budapest Enterprise Agency provides preferential loans for Budapest-based micro businesses employing less than 10 people. It is possible to apply for this loan to develop the company or to finance costs incurred in contracts concluded previously. The Agency provides professional assistance and mentoring in creating business plans for applicants.

Engagement – The Municipality recognizes the importance of user engagement, reflected by the Mobility Plan published in 2014. The engagement process followed a plan that defined the tools,

scheduling, and tasks of maintaining contact with the affected stakeholders groups. During the course of the consultation, the city's residents played an important role. The opinions of social and civil organisations, transport service providers, research and education institutions and official bodies were also of prominent significance. Consultation material was distributed to more than 200 institutions and organisations. A website was prepared to receive directly comments submitted by the Public.

Environment – GreenGo is one of the biggest car-share companies in Budapest and started using 45 electric cars. Due to an increase of demand, the number of cars has now reached 168. The goal is to expand the fleet between 300-500 cars and to cover an area of 80-90 square km in Budapest, compared to 60 square km currently.

NEXT STEPS AND GUIDANCE

Capability – In Budapest, there is currently no dedicated department or role to foster innovation in urban mobility or drive the strategy. However, the Municipality has announced the establishment of the Smart City Centre under the Smart City Framework Strategy.

Soundness – There are several ways transport and mobility data is collected in Budapest, including real-time location of public transport vehicles (all vehicles are equipped with GPS system), real-time availability of bike-sharing bicycles at docking stations and freight traffic volumes. To build on these data sets, the collection of pedestrian flows and/or human mobility and behavioural data for transport insights should be considered. Transport data that intersects with non-conventional areas (that might have an impact in mobility e.g. weather and environment) could also enhance Budapest's capability.

Connectivity – Although there is a certain level of integration between transport services in Budapest, the city could improve connectivity by implementing a smart, integrated ticketing system for users to pay for services. Additionally, the city can develop a pilot or strategy for Mobility as a Service (MaaS) to explore innovative ways providing seamless transport.

Other measures to improve connectivity include: intermodal transport facilities to allow ease of interchange across different modes (e.g. transportation of bikes in public transport, bike storage in key hubs,

park & ride systems), improved wayfinding and tools that facilitate mode combination pre-trip.

UPCOMING / LIVE PROJECTS

SMART CITY CENTRE

The Smart City Centre in Budapest is currently being developed under the Smart City Framework Strategy. The Centre, launched by the European Union, will help cities in Eastern Central Europe to meet the European Union's climate objectives, and to facilitate the transition to smarter and more sustainable urban infrastructure and transport by facilitating capacity building in the region.

The overall goals are to strengthen the research and innovation capabilities of Budapest and to become an incubator of smart city concepts and solutions in the region.

Known as Smartpolis, the Centre has been involved in research projects in collaboration with the Research Centre for Autonomous Road Vehicles (from 2017). Smartpolis led the Smart City Working Sub-group. Another research project, 'FedKom' (from 2016) looked at the development of eCall on-board device and communication system that can be retrofitted to motor vehicles. The aim of the European eCall system is to reduce the number of accidents with fatalities and serious injuries.

INNOVATIVE SOLUTIONS

REAL-TIME PUBLIC TRANSPORT

INFORMATION & PREDICTIVE MANAGEMENT

The system called FUTÁR was launched in the autumn of 2014. It is a real-time passenger information platform and a centralized, digitalized, GPS tracking-based traffic management tool. FUTÁR allows the continuous tracking of the traffic, immediate response to disorders, and to give priority to public transport vehicles at junctions with traffic lights.

The system is also a traffic management tool, providing real-time information for route selection, influencing traffic with billboards with changeable displays, parking management, coordinated and demand-driven traffic control. The extensive use of databases and consistent administration will contribute to a predictable and effective road transport organisation.



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